ANIMAL PHARMACEUTICALS OF THE PAST AND PRESENT.*

BY CHARLES WHITEBREAD.[1]

The natural desire which we experience for self-preservation has led mankind, from the earliest ages, to distinguish carefully between those things which minister to health and the prolongation of life, and those which may impair the former and shorten the latter. They have specially directed their efforts to preventive measures, but perceiving that, notwithstanding all their care, they are sometimes taken by surprise and are not able to avoid the causes of injury or disease, they have, as a last resort, devoted their energies to the discovery of remedies and of methods of cure to be applied when precautions have failed.

Seeing that those who died had apparently committed some error which gave to their ailments a fatal character, and that those who survived had made use of certain things, not necessary or desirable in health, to which their recovery was attributable, man was led to avoid the mistakes which proved injurious and to adapt for himself and others the remedies which proved beneficial.[2]

In the progress of civilization various incidents have gradually unfolded the remedial powers of many natural substances. These were recorded and the authentic history of medicine and pharmacy dates its commencement from the period when such records were begun. The Chaldeans and Babylonians, we are told by Herodotus, carried their sick to the public roads and markets that travelers might converse with them, and communicate any remedies which had been used in similar cases. This custom is said to have continued during many ages in Assyria. It is also said that it prevailed among the ancient Lusitanians, or Portuguese. In this fashion the results of experience traveled only by oral tradition.

It was in the temple of Æsculapius in Greece that medical information was first recorded. Diseases and medicines were there registered on durable tablets of marble. The priests and priestesses, who were the guardians of the temple, prepared the remedies and directed their application, and thus commenced the professions of pharmacy and medicine.

With respect to the actual nature of the remedies used by the early Asclepiads it is useless to inquire except in a few instances. The lapse of ages, loss of records, change of language and ambiguity of description have rendered research unsatisfactory. Indeed we are in doubt concerning many of the medicines which even Hippocrates used.

It is shown by the earliest records that the ancients were in possession of many powerful remedies. Thus, Melampus of Argos, a Greek physician who is supposed to have lived about 1380 B.C., is said to have cured one of the Argonauts of sterility by administering for ten days, the rust of iron in wine. The same physician used hellebore as a purge on the daughters of King Praetus who were afflicted with melancholy. Opium, or a preparation of the poppy, was certainly known in the earliest ages.

There are records of ancient magic cures being effected by animal drugs. For instance, a memorial tablet found on the site of an Æsculapian temple records

* Section on Historical Pharmacy, A. PH. A., Toronto meeting, 1932.

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[2] Leclerc, "Histoire de la Medecine."

the following among other cures: "A blind soldier named Valerius Aper, having consulted the oracle, was directed to mix the blood of a white cock with honey, and make of it an ointment which he was to rub on the eyes for three days. He recovered his sight and went to thank the god before all the people."

The endeavor to find medicinal virtues in parts of animals dates back to time immemorial. Mythology furnishes legends of pharmaceutical interest concerning the fabulous animals, the phoenix, the unicorn and the dragon. According to Herodotus the phoenix was a bird about the size of an eagle. It was believed to

Living Creatures, &c. The Phyſitians Library. 69

Heart as any is, being beaten into Pouder and taken inwardly; alſo it reſiſts Peſtilence and Poiſon.

The Skull of a Man that was never buried, being beaten to Pouder, and given inwardly, the quantity of a dram at a time in Betony water, helps Palſies and Falling-ſickneſs.

That ſmall Triangular bone in the Skull of a Man, called *Os triquetrum*, ſo abſolutely cures the Falling-ſickneſs, that it will never come again, ſaith *Paracelſus*.

Thoſe ſmall bones which are found in the fore-feet of a Hare, being beaten into Pouder, and drank in Wine powerfully provoke Urine.

A Ring made of an Elk's Claw being worn helps the Cramp.

The Fat of a Man is exceeding good to anoint ſuch Limbs as fall away in the Fleſh.

Gooſe greaſe and Capons greaſe are both ſoftning, help gnawing Sores, ſtiffneſs of the Womb, and mitigate Pain.

I am of Opinion that the Suet of a Goat mixed with a little Saffron is as excellent an Ointment for the Gout, eſpecially the Gout in the Knees, as any is.

Bears greaſe ſtays the falling off of the Hair.

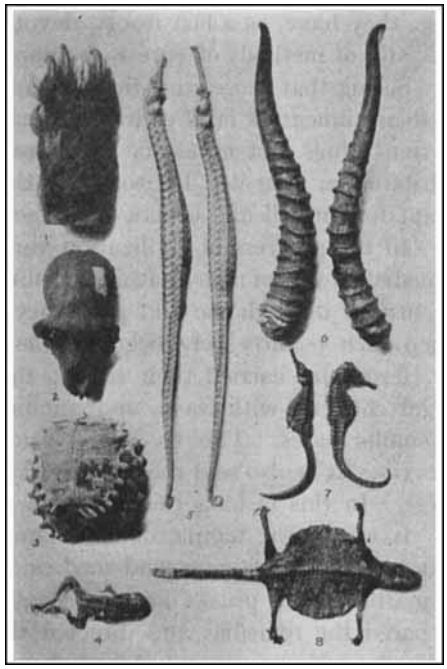
Fox greaſe helps Pains in the Ears.

Elks Claws or Hoofs are a ſoveraign Remedy for the Falling-ſickneſs, though it be but worn in a Ring, much more being taken inwardly: but ſaith *Mizaldus*, it muſt be the Hoof of the Right Foot behind.

Milk is an extream windy Meat; therefore I am of the Opinion of *Dioſcorides*, *viz.* That it is not profitable in Head-aches; yet this is for certain that it is an admirable Remedy for inward Ulcers in any part of the Body, or any Corroſions or Excoriations, Pains in the Reins and Bladder; but it is very bad in Diſeaſes of the Liver, Spleen, the Falling ſickneſs, Vertigo, or Dizzineſs in the Head, Fevers and Head-aches. Goats-milk is held to be better than Cows for Hectick Fevers, Pthilicks and Conſumptions, and ſo is Aſſes alſo.

Whey extenuateth and Cleanſeth both Choler and Melancholy: wonderfully helps Melancholy, and Madneſs coming of it: opens ſtopping of the Bowels; helps ſuch as have Dropſies, and are troubled with the ſtoppings of the Spleen, Rickets, and

This reproduction (reduced) of a page from Dr. Culpepper's London Dispensatory gives some idea of the forerunners of organotherapy as practiced in England in 1718. —*Courtesy of U. S. National Museum.*



Animal substances as kept in apothecary shops of the past: 1, Bear's claw; 2, charred monkey skull; 3, tortoise shells; 4, dried frog; 5, pipefish; 6, antelope horns; 7, seahorses; 8, lizzard.—*Courtesy of U. S. National Museum.*

be immortal and was worshipped by the Egyptians. It was adopted by the alchemists as their emblem, and was afterward a sign used by the pharmacists. Aristotle described the unicorn as an animal resembling the Indian wild ass, with a single long horn projecting from the center of its forehead. This horn was a medicine, and the unicorn was a frequent sign used by apothecaries. The dragon was associated with pharmacy by means of the "blood" which at one time was supposed to be yielded by it.

Among the animals mentioned in the *Papyrus Ebers* are the buffalo, stag, ox, pig, camel, ram, dog, crocodile, bat, goose, tortoise, beetles and flies. Among

the animal substances used as medicines were blood, human brains, urine, feces, genitals of cats, various animal oils, honey, milk, eggs and wax.

Hippocrates, "The Father of Medicine" (460–370 B.C.), who practiced about 800 years after the period of Æsculapius, the Greek "God of Medicine," mentioned nearly four hundred simples in his numerous writings. These included milks, wines, fruits and vegetables, as well as other substances, which would be classified with the foods of to-day. Among the animal drugs of the time of Hippocrates may be mentioned aparine (goose grease), cantharides, centipedes, crayfish, dog, excrement of the ass, goat, mule, goose and fox, frogs, honey, horns of the ox, goat and stag, ostrich, ox liver, gall and urine, red spider, serpent, sweat, torpedo fish, turtle, wax and worms.

Between Hippocrates and Galen, called "The Father of Pharmacy," an interval of some six hundred years elapsed. Galen was an enthusiastic admirer of Hippocrates, and used all the power of his genius and the influence of his name to maintain the practice of medicine on the foundation laid for it by Hippocrates in the study of the natural history of disease. Galen's writings and teachings had almost undisputed authority in medicine down to the 16th century. It has been estimated that Galen's materia medica consisted of 540 plants, 180 animal and 100 mineral substances. He was a prolific writer on pharmacy, and the preparation of medicines by physical means is still called galenical pharmacy.

It was in the 16th and 17th centuries that the introduction of animal remedies developed rapidly. From the number of animal substances made official in the London Pharmacopœias of 1618, 1650 and 1677, it would seem that the world was ransacked for animal medicines with which to alleviate human ills. Illustrations of apothecary shops of that time usually show a crocodile suspended from the ceiling, and different animal carcasses in other parts of the store. The animal pharmacy of this time, which was practiced in all countries, continued in some parts of the world on an extensive scale till about 50 years ago. It is not practicable to list many of these materia medica specimens, but striking examples of some of those retained in the collections of the United States National Museum and now on exhibition in the Division of Medicine will serve to illustrate this phase of the medicine and pharmacy of bygone days.

Antelope Horns.—The horns of the goat antelope, *Nemorhoedus crispus*. Used, in coarse powder or partially calcined, in cerebral affections and rheumatism, and especially in the various diseases accompanying pregnancy. The shavings, said to be a cooling medicine, were supposed to cure inflammation of the lungs and liver.

Bear's Gall.—The gall-bladder of a bear was valued as an alterative, anthelmintic and nerve stimulant, and was used especially in hepatic and other abdominal diseases.

Bear's Paw.—The skin of the foot, with the nails, of a species of bear. The bear's paw was considered a great delicacy, and was supposed to strengthen the constitution.

Bird's Nest.—The gelatinous nests of several species of the swallow, *Collalia esculenta* and others, were regarded as a valued and expensive article of food, and was accounted a tonic and invigorating remedy for the sick.

Caterpillar.—The dried larvæ was used in bronchial complaints and as a purgative and antispasmodic.

Centipede.—The head and feet being rejected, the rest of the dried animal was reduced to powder. It was given for demoniacal possession, malarial fevers, obstruction of the bowels, for worms and for snake bites.

Cicada Skins.—The exuviæ of a species of *Cicada*, or locust, was used for difficulties in

speech; for dimness of vision and cataract; for bringing out the eruption of smallpox, and for convulsions and other diseases of children.

Clam Shells.—The powdered shells were used for colds, chills and fevers, and as a cathartic.

Cockle Shells.—The powdered shells of a bivalve mollusk were given for chills, and for intestinal obstruction.

Coral.—In fine powder it was used to arrest hemorrhage from the nose and to remove nasal polypi. It was also applied to opacities of the cornea.

Cow Bezoar.—A concretion (biliary calculus) found in the gall-bladder of the cow was a remedy for chorea, smallpox, insanity, apoplexy and palsy. It was given to newborn infants as a charm and prophylactic.

Cuttlefish Bone.—The internal shell of a species of *Sepia*. Said to be styptic, alterative and anthelmintic. In powder it was used locally to arrest hemorrhage, and internally for cancer.

Deer's Horn.—Hartshorn was formerly an expensive medicine, and all sorts of therapeutic properties were attributed to it.

Dragon's Bones.—Fossil bones of the *Stegadon orientalis*, reduced to a fine powder. Used in ague, fevers, hemorrhages and fluxes.

Dragon's Teeth.—The fossil teeth of various animals were known by the name of dragon's teeth. They were supposed to act on the liver, and to be of service as cordial and sedative remedies.

Dried Frogs.—The common frog dried without removing the skin or viscera. Soups and gelatin prepared from these animals were thought to be especially strengthening for convalescents.

Dried Mussels.—The common salt water mussel dried. Claimed to be aphrodisiac; also a remedy for post-partum hemorrhage, for colic and intestinal obstruction.

Dried Toads.—Skinned, eviscerated and dried. They were said to be tonic and sudorific.

Dung Beetle.—Gathered on the fifth day of the fifth moon, the feet and elytra discarded, and the insect roasted or boiled. Used for chills and fever, convulsions and insanity.

Earthworms.—They were reduced to powder and used as an anthelmintic; for fever, jaundice, ulcerated throat, snake and insect bites.

Elephant's Hide.—A small piece of the skin of an elephant entered into the composition of certain plasters used for the cure of contusions.

Fossil Crab.—In powder it was applied to ulcers, wounds and snake bites; mixed with wine or oil it was given for chronic dysentery and pernicious fevers.

Fossil Shells.—Undetermined species of fossil shells belonging to the genera *Spirifer* and *Rynchonella*. Held in the hands of parturient women they were said to facilitate delivery. Powdered they were applied to opacities of the cornea and to the eruptions of scabies; internally they were given for diarrhoea and hemorroids.

Fowl's Gizzard.—The lining membrane from the gizzard of the common domestic fowl was prescribed in dyspepsia, diarrhoea and urinary disorders.

Goat's Blood.—The dried blood of the mountain goat. It was used as an application to bruises, and as a remedy for amenorrhoea and certain conditions following childbirth.

Haliotus Shells.—The shells of *Haliotus funebris*, a bivalve mollusk. The outer layers were removed and the pearly portion reduced to fine powder, which was applied to opacities of the cornea and to the films of pterygium. It was also a remedy for diseases of the liver.

Hedgehog Skin.—The skin of the head of the hedgehog. A decoction of the skin was used for pulmonary complaints; powdered and made into pills it was taken for the cure of skin diseases.

Human Feces.—Mixed with a large proportion of vegetable fibre, this was used as a remedy for hydrophobia, and as an antidote for certain poisons.

Human Hair.—Human hair was reduced to charcoal by burning in a closed vessel and was given as a remedy for hematemesis.

Human Placenta.—The dried human placenta was considered a tonic in consumption. Roasted, it was given, in the form of pills, to parturient women to facilitate the expulsion of the fetus.

Human Urine.—The urine of children, to which common salt or calcium sulphate had been added, evaporated to dryness. It was given in debility, and in renal, vesical and uterine complaints. It was also used as a lotion for sore eyes.

Inner Membrane of Eggshell.—The dried membrane lining the inner surface of fowl's eggs was used as a plaster to close small wounds.

Ivory.—Supposed to be taken from a living elephant. The powder was believed to be stomachic, vulnery and diuretic, and the jelly was a specific for rickets.

Larvæ of Flies.—The dried maggots of blue bottle and house flies. They were given as a remedy to cachectic and scrofulous children.

Maggots.—The dried larvæ of a species of *Eristalis*. Prescribed in the delirium of fevers and for dysentery.

Mole Cricket.—The anterior portion of the insect was used for polyuria and diarrhoea; the posterior portion for retention of urine and constipation. It was also used for difficult labor, hiccough and bad ulcers.

Monkey's Skull.—Animals, or parts of animals, were enclosed in coarse clay vessels and subjected to heat until thoroughly carbonized. Thus prepared they were kept in shops and sold for medicinal purposes.

Musk.—The sac, containing musk, taken from the abdomen of the musk deer, *Moschus moschiferus*, was believed to purify the air, cure melancholy and protect from the bites of serpents.

Ox Gall.—The dried gall-bladder of the ox, with its biliary contents, was said to be tonic, stomachic and laxative, and was used in the treatment of diseases of the digestive organs.

Oyster Shells.—The partially calcined shells of the oyster. They were said to be tranquilizing by nature, and in powder were used in malarial fever and various diseases accompanied by hypersecretion.

Pangolin Scales.—The scales from the body of *Manis javanica*, scaly ant eater. Formerly used in all sorts of diseases, especially of the skin.

Rhinocerus Horn.—Tonic, alterative and other properties were attributed to these horns. The decoction was taken in fever, smallpox, hemoptysis.

Scorpions.—Roasted and powdered this medicine was used for all forms of paralysis, for small-pox, scrofula, convulsions and abdominal tumors.

Sea Horses.—Used as a stimulant; also had the reputation of facilitating parturition; it was sufficient that the patient hold one in her hand.

Seed Pearls.—Powdered and given internally for diseases of the heart and liver; externally applied to ulcers and opacities of the cornea, to the auditory meatus for deafness, and to the pustules of smallpox.

Silk Cocoons.—They were burned, the ashes mixed with wine and taken internally in order to cause the bursting of abscesses.

Silkworms.—Washed in rice water, boiled in a decoction of ginger, and dried they were used for convulsions in children, for menorrhagia and as an aphrodisiac.

Silkworm Moths.—Roasted moths. This medicine was thought to be aphrodisiac and a remedy for impotence.

Snails.—The common garden snail collected in the 5th month. They were used for lameness, rectal prolapse, convulsions, retention of urine, etc.

Snake.—Believed to be a useful remedy for abdominal pains. From its habit of hiding in hedges and crevices it was supposed that, mixed with other drugs, it aids them in penetrating the most secret recesses of the body.

Sparrow Dung.—The excrement of the common house-sparrow, mixed with powdered peppercorns and made into a mass with alcohol, was applied to the skin to produce local anesthesia preliminary to the opening of abscesses or extraction of foreign bodies from wounds.

Spiders.—Used for fever sores, boils, and to neutralize the poison of snakes and venomous insects.

Tortoise Shell.—Jelly made from the plastron, or the powdered shell made into pills or mixed up in cakes, was reported to be tonic, cordial, astringent and useful in diseases of the kidneys. The ashes were given to parturient women and dusted upon wounds and ulcers.

The method of reasoning of the middle ages—pure deductive reasoning from accepted premises—formed the basis of the old systems of medication. From some general hypothesis, accepted without proof and believed to represent a truth

of universal application, deductions were made about all diseases and all remedies. For example—to cite only the selection of medicines by the doctrine of signatures—it was believed that the Creator in providing plants and other objects for the service of man had stamped on them, at least in many instances, an unmistakable sign of their special remedial value. Many of the animal remedies listed were probably chosen by some imaginary relation between the characteristics of the medicinal material and the symptoms of the disease. Thus, cicada skins might have been selected as a remedy for difficulties in speech because this insect had the power of producing such a shrill and prolonged sound, and parts of snakes were used for the reason that it was thought this reptile could "penetrate the most secret recesses of the body" as it did crevices and hedges, and thus carry the remedy mixed with it to the seat of the trouble.

Francis Bacon upset the deductive sort of reasoning completely as a method of arriving at the truth in the material world, and to-day observation of facts, explanation of relations between facts, establishment of rational general principles, and scientific interpretation form the basis of our reasoning in applying and extending knowledge in the sciences. Under Bacon's system animal remedies were put to the test, and health-restoring and life-saving specifics came into use.

The animal kingdom's contributions to materia medica now became important. Jenner's vaccination of James Phipps on May 14, 1796, with cowpox virus from the arm of Sarah Nelmes furnished an animal remedy with the power to prevent smallpox, one of the world's greatest scourges, which, it is estimated, in every twenty-five years deprived at least 15,000,000 human beings of life, and left millions disfigured, weakened, crippled and sightless. We have learned that only one agent can keep smallpox in check, and that is vaccination. We know, too, that this animal remedy has done its work so well that a dreadful scourge is almost forgotten.

Charles Edouard Brown-Sequard, at the age of seventy-two at a meeting of the Paris Societe de Biologie in 1889, described the now famous experiments he had performed upon himself by the subcutaneous injection of testicular extracts which resulted in increased physical strength, improved appetite, regulation of bowel function and increase of mental activity. His report stimulated research in internal secretions, and resulted in the development of organotherapy, and its firm establishment in the treatment of disease. Thyroid, pituitary and epinephrine are now included in our pharmacopœia, while ovary, corpus luteum, mammary and numerous other organotherapeutic products are used all over the world in fields in which they are practically alone.

Emil von Behring, working in Koch's Institute with Shibamiro Kitasato, demonstrated that the serum of animals immunized against attenuated diphtheria toxins could be used as a preventive or therapeutic inoculation against diphtheria in other animals, through a specific neutralization of the disease. After trying out the remedy in man, Behring began to produce it on a large scale in 1894, and it soon became recognized as the specific treatment for diphtheria.

No more striking example of North American research along this line can be given than the evolution of insulin by Banting and Best in 1922. This glycolytic extract with its power of increasing the metabolism of sugar is daily prolonging the activity and usefulness of persons afflicted with *diabetes mellitis*.

And now animal remedies have come into their own to such an extent that we cannot think of the most modern and successful of our medicinal agents without thinking of serums, vaccines and organotherapeutic products in general. In fact, there is perhaps no better way of demonstrating the upward progress of medicine and pharmacy than by comparing the make-shift animal remedies of the past with the scientifically proven ones of the present.

PIONEERS IN AMERICAN PHARMACY.*

Among the first of the pioneers in manufacturing pharmacy may be mentioned Dr. Edward R. Squibb. This talented physician-pharmacist in his attempt to reconcile discordant conditions in the ethics of medicine and those of pharmacy as applied to business in the early annals of American pharmaceutical evolution, met with disappointments and resistances from various interested parties. But in it all he established a reputation for unquestionable service.

His introduction to the pharmaceutical world was as Assistant Director of the Government Laboratory, New York City, 1855. When came the fire that destroyed his modest pharmaceutical establishment, scattered his moderate fortune and burned him so badly as to nearly destroy his life, undiscouraged by it all, on his recovery he turned his face to the future. With the help of admiring professional friends and the influence of a host of confiding pharmacists, he built for himself a new establishment, in the conduct of which he endeavored to unite and affiliate the scientific, professional and commercial, in medicine and pharmacy. He thus established his name imperishably in the annals of American pharmacy. For many years the house of Edward R. Squibb and Company has enjoyed the unqualified confidence of American physicians and apothecaries. To-day it is immeasurably greater than its founder could even have anticipated.

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As a co-laborer in America's early records, especially connected with the American materia medica, the founder of the William S. Merrell Chemical Company, rises to view. Well does this writer remember him. Modest and unassuming, cordial to every one, Mr. Merrell was most earnest in his efforts, the beginnings of which were in a circumscribed retail pharmacy that occupied a small corner room in the building where these lines are now being written.[1] Closely associated in companionship with William S. Merrell was Dr. T. L. A. Greve, his able clerk assistant, whom no incentive could lure from prescription life. To these two

* At the meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION, Put-in-Bay, 1899, a prominent member asked me to write an article on the subject embraced by this paper. I replied that in my opinion it was not yet time to make the record of the past. But while the subject was on my mind, on my return to Cincinnati, I wrote offhand the record as I knew it. That paper was resurrected by my son, John Thomas Lloyd, who gave it to Editor Eberle for publication if he desired. In reading it the date at which it was written must be kept in mind.

[1] His son George succeeded to the business, which in turn his children have inherited and furthered. Many honors have come to them. Charles Merrell, whom this writer takes pride in counting as one of his friends, is now the chief and very active guider of the firm of Wm. S. Merrell Company.—J. U. L., 1933.

pioneers, concerned in American plant pharmacy, we owe a debt of gratitude—William S. Merrell, the genial charming manufacturer, Dr. Greve, the exceptionally gifted scientist-apothecary.

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Co-laboring pioneers in the American field of plant pharmacy were the Tildens of New Lebanon, N. Y. (H. A. Tilden, founder), who conducted the first great eastern laboratory devoted mainly to medicinal plant preparations. In connection therewith was established perhaps the most extensive of all American medicinal-plant gardens. In the Tilden laboratory was first established and applied vacuum apparatus devoted to medicinal plant manipulations on a large scale. Working with the Tildens were the Shakers of Lebanon, N. Y. Hand in hand they worked, their efforts contributing to the opportunities and progress of the great Tilden establishment, described editorially by Prof. William Procter, Jr., in the *American Journal of Pharmacy* (1855), as a wonderful sphere of pharmaceutical activity.

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Contemporary with the Tildens we find Frederick Stearns of Detroit, one of the most enthusiastic contributors to botanical medicinal literature connected with early American pharmacy. His treatise on the *Medicinal Plants of Michigan* stands to-day as authority in the records of the AMERICAN PHARMACEUTICAL ASSOCIATION, to which organization his early contributions were voluminous and exceptionally useful. The establishment founded by him, Frederick Stearns & Company, covers one of the choice squares of Detroit, and stands as a tribute alike to the foresight of the founder and the energy of his successors.

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Well do I recall when, after the close of the Civil War, Colonel Eli Lilly came from Lexington, Ky., to the young and growing city of Indianapolis, to engage with Johnson in drug-mill pharmaceutical efforts, from which—after separation of the partners, grew the world-renowned establishment of Eli Lilly and Company. The founder of this establishment was not in affluent circumstances. He prepared with his own hands the preparations bearing his label, bottled and packed the compounds, marked and shipped them personally, content and happy in the opportunity of so doing. I believe that all will now agree that the name of this family stands second to none in pharmaceutical activity.[1] To me the friendship with the founder of this establishment is one of my cherished recollections.

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Next uprises the face of Mr. Parke, of Detroit, who established what was destined to become the world-renowned house of Parke, Davis & Company. To one of the first Cincinnati Expositions, he brought from Detroit, a modest assortment of pharmaceutical preparations, and himself attended to setting up and caring for the display. Soon thereafter came into the business, first as a traveling representative, next as a partner, George S. Davis, who united with the efforts of Mr. Parke his most remarkable business management. The most conspicuous and aggressive was he of all men to that date concerned in the manu-

[1] After the founder came his son, J. K. Lilly, under whose guidance the establishment advanced with marvelous strides, and now (1933) the grandsons of Eli Lilly are carrying forward this great institution.

facture of American pharmaceutical preparations. Indeed, in this writer's opinion, the systematic processes of George S. Davis instituted a new phase in the then developing pharmaceutical business processes of all American manufacturers. A phenomenal man was he, whose innovations in manufacturing pharmacy marked an epoch in American pharmacy that this writer believes should be, and will be, conceded by every one. The scholarly Professor Ryan and his corps of able co-laborers, on whose shoulders has fallen the responsibility of the great Parke, Davis establishment, surely recognize that this tribute is not overdrawn.

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Come now to view the faces of "Charlie and Louis" Dohme, of the well-known pharmaceutical establishment in Baltimore. No one could have foreseen when I first visited the retail apothecary shop of Sharp & Dohme, that within a very moderate period as history counts time, preparations bearing their label would be in every pharmacy in America. No fairer business men ever lived, no more charming companions, than "the Dohmes," which applies also to A. R. L. Dohme,[1] son of Charles, who now conducts the establishment, and is so fortunate in his exceptionally systematic scientific education.

In this connection one cannot neglect to mention the name of Charles Caspari, the energetic co-laborer with and advisor of the Dohmes, to whom the side of professional pharmacy, heired from his no less talented father, appealed, rather than did manufacturing expansion. Scientific was he to the extreme. His son, Charles Edward Caspari, now devotes his efforts to the interests of the well-known establishment of the Middle West, Mallinckrodt and Company of St. Louis, where to a high degree he maintains the reputation of his forebears.

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Possibly no manufacturing pharmacist of the early days in the Middle West was more endeared to his circle of physician friends than was Harlow M. Merrell, nephew of William S. Merrell, with whom he was first associated, being his successor in the Court and Plum Street business location in Cincinnati. Indifferent to the business phases that appealed to many others, Harlow did well his work as an apothecary, expanding therefrom into a specialty business, embracing the manufacture of preparations derived chiefly from America's medicinal plants. In my recollection no man concerned in pharmacy had a more delightful personality than the affable, cultured and unconventional Harlow M. Merrell, the early partner of the writer of these lines. The establishment, much expanded, still stands on the old corner which has been occupied as a pharmacy since 1845.

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Phenomenal was the record of the brothers, W. J. M. and O. F. Gordon, in Cincinnati. Coming from Baltimore in the early part of the nineteenth century, they established a small apothecary shop on the corner of Western Row (now Central Avenue) and Eighth Street. Expanding into a physicians' supply house but yet retaining an increasing prescription business, they ultimately became wholesale druggists as well as dispensing pharmacists. Situated near the old Eclectic Medical Institute, they naturally made a specialty of America's botanicals.

[1] In later years, I believe he has not been active except as an executive director.—J. U. L., 1933.

Neighbor to Procter & Gamble, who then ran their "sweet water" into the canal as a waste product, Gordon saw his opportunity, caught the "sweet water" daily in a box wagon and began the manufacture of glycerine. A large factory became necessary, but it was not until years later that Procter & Gamble and other Cincinnati soap manufacturers comprehended their opportunities in this direction. The Gordon brothers were not only active business men but were excellent citizens of decidedly attractive personality, as this writer who was then apprenticed to them can attest.

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No article concerning early American pharmaceutical activities on a large scale would be complete without the name of George J. Seabury, veteran maker of medicinal plasters, of the firm of Seabury and Johnson. Of all the membership of the AMERICAN PHARMACEUTICAL ASSOCIATION, Seabury was the most cosmopolitan "mixer." No meeting of the ASSOCIATION was considered complete without the presence of the versatile George Seabury. At these meetings he was always accompanied by his two daughters, whom every one admired from their very childhood. In many respects very like George S. Davis, Seabury possessed one decided advantage. Davis seldom took any personal part in pharmacists' gatherings, while Seabury was always in evidence, making many friends, as well as a few antagonists. He took an active part in New York City politics, was an expert fisherman, writing a series of verses on the Black Bass which were illustrated, privately printed and presented to his circle of friends.

Came finally the re-arrangement of the firm of Seabury and Johnson, the Johnson Brothers retiring from the business to found the firm of Johnson and Johnson, while the time-honored name of the old firm was retained by Mr. Seabury. Johnson and Johnson were not long in establishing their reputation as manufacturers of sanitary products, such as absorbent cotton and medicated plasters of the highest quality.[1]

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Before sugar-coated pills were made in America, at least before they were offered to the trade (so far as I am informed) there came from France a line of cumbersome sugar-coated products, labeled "Dragees." These were oval, nearly as large as the first joint of the little finger, sugar-coated, reminding me of the confection known as sugared almonds. They helped to make an opportunity in which Wm. R. Warner, an apothecary of Philadelphia took the initiative. Within a short time Warner's sugar-coated pills were a standard and soon found in every drug store in America. However, the monopoly did not long continue. Candy makers everywhere were expert sugar-coaters, their pharmacy needed little other apparatus. In this writer's opinion, Mr. Warner, by his energy at the very start, founded a national business that expanded far beyond his anticipations. Many

[1] F. B. Kilmer was an apothecary-apprentice, who passed successively from errand boy and clerk in a small pharmacy to the management of this, one of the greatest manufacturing, pharmaceutical establishments of America—probably the largest of its kind in the world. Kilmer soon became at home in every department of the huge establishment, from the chemical laboratory to the distribution of the products. He is generous, self-sacrificing, a delightful companion, a student of historical pharmacy—one whose friendship I greatly cherish.—J. U. L., 1933.

pleasant visits have I had with Mr. Warner at the meetings of the AMERICAN PHARMACEUTICAL ASSOCIATION.

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Almost simultaneously came the American Elixir crusade, the pioneer specimen being introduced under the label, "Sim's Cordial Elixir of Calisaya," 1839. This was an aromatized cordial, conspicuous for its lack of the bitterness of Calisaya. It opened the "elixir" door, special advantage of the opportunity being taken by the firm, John Wyeth & Co. of Philadelphia. The energetic manner in which their preparations were advertised and distributed, made "Wyeth's Elixirs" as well known as were the Fluidextracts of Burroughs Brothers and Thayer, the Pharmaceutical Preparations and Chemical Apparatus of Bullock & Crenshaw, Philadelphia, the Pressed Herbs of B. O. and G. C. Wilson of Boston, or the Resinoids and Concentrations of Keith.

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Among the wisest of pharmacists occurs the name of C. B. Allaire, of Peoria, Illinois. Wise, because when came the opportunity, before he was confronted with age or weighted with an overgrown business, Mr. Allaire sold his interest in the thriving establishment of Allaire, Woodward and Company, and retired to a life of serviceable ease in San Antonio, New Mexico. There his mental activity was stimulated by helpful literature and intelligently applied efforts in economic research and its practical application. The establishment he founded and so ably guided to success, at an early date made a specialty of botanic drugs, both pressed and powdered, maintaining a leadership therein, as well as in general pharmaceutical directions.

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The name of another man living to-day comes now to mind, Professor Edgar L. Patch, of Boston. A professional pharmacist was he, a teacher in the Boston College of Pharmacy. As a partner in the firm of prescription apothecaries, Canning and Patch, he has disproved the often-made assertion that a professional man is not a business man. The preparations of the expanding Patch establishment stand second to none, and the confidence of all who know him is extended to the founder.[1]

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This fragmentary record cannot be made complete—the subject is expanding hopelessly as these words are penned under recollection's touch. The aim is merely to present the names of a sufficient number of our American pharmaceutical manufacturing establishments to use as an object lesson—not to make a complete record either in number or detail of activities. Many essential features must be neglected in directions that will appeal to others. However, enough has been said for the purpose of this paper. Whoever studies it must be indeed a pronounced cynic or a pessimist if (accepting that one feature of importance is success in business) he asserts that pharmacy of the recent American past, as well as of the active present, offered no expansive business recognition to its devotees. Not only has the reverse proved true in the efforts of those mentioned but of numbers unmentioned.—JOHN URI LLOYD.

[1] Professor Edgar L. Patch passed away in 1924.