

PHARMACY AND MEDICINE IN ANCIENT EGYPT.*

BY L. E. WARREN.

The civilization of ancient Egypt had its beginnings in an indeterminately remote past. There is evidence that the Nile Valley was inhabited by man in paleolithic times. Northeastern Africa was once a wooded, well-watered country inhabited by numerous hunters and myriads of game animals. The desiccation of the country drove the hunters and the animals alike into the river valley. These hunters have left vast quantities of crude flint implements in the desert bordering the Nile, but they were not the ancestors of the ancient Egyptians. It is believed that the Egyptians originally came from south central Asia and that they migrated across the Isthmus of Suez into the Nile valley, but their exact origin is unknown.

From 15,000 to 25,000 years ago southern and western Europe was peopled by an intelligent white race which modern archeologists have called the "Cro-Magnon." This race is believed to have migrated into Europe from Asia at the close of the 4th glaciation and to have driven out or extirpated the Neanderthal race which had occupied Europe for many thousands of years. Various subdivisions of the Cro-Magnon race in order of time were the Aurignacians, Solutreans and Magdalenians. The Magdalenians were great hunters.¹ They bridled the horse, hunted the mammoth and woolly rhinoceros, made excellent line drawings on horn, ivory and stone and executed wonderful polychrome paintings of the bison, mammoth, stag and other contemporaneous animals on the walls of their caverns. The Magdalenians were followed by, or were merged into the Azilians, although there is evidence that they still survive in a few districts in southern France. Anthropologists have never been able to bridge the gap between Magdalenian man and the ancient Egyptians. We know that the microlithic flints which appeared in late Magdalenian times in Europe are similar to those used as arrow points in pre-dynastic Egypt,² and that there is other evidence to indicate that the Magdalenians were nearer to the ancient Egyptians in culture than, perhaps, any other race of prehistoric man. Petrie² places the Magdalenian flints of Egypt as from 6000 to 9000 B.C.

In order to understand the progress that the Egyptians had made in pharmacy and medicine, it is necessary to know something of the history of this wonderful people and to survey their knowledge of such of the arts and sciences as they had acquired. Ancient Egypt (as now) consisted of a strip of land bordering the Nile from 1 to 20 miles wide and about 750 miles long. It was primarily an agricultural country and then (as now) it depended upon the annual inundation of the river and upon seasonal irrigation for its crops.

The development of Egypt is divided into four principal periods, namely: The Pre-Dynastic, the Old Kingdom, the Middle Kingdom and the Empire. The last three are included in the more or less artificial classification known as "Dynasties" or families of kings. The Pre-Dynastic period was preceded by long ages of archaic civilization, during which the tribes gradually coalesced into two kingdoms, an upper and lower Egypt (the two lands).

We know almost nothing of archaic Egyptian medicine. Some of the corpses of that age have been preserved by desiccation in the hot sands. From these we know that circumcision was practiced.³ Some of the archaic skeletons show satisfactory healing of bones that had been broken, indicating that some form of surgery was practiced in that far remote time. The men had high, rounded foreheads³ and wore pointed beards. The women had long, wavy, dark brown hair in which they wore combs of carved ivory. They tattooed their bodies with zigzag designs⁴ and painted the face and eyebrows with green paint which they made by grinding malachite on palettes of slate. This is believed to be the earliest known use of cosmetics. The people made finely-shaped pottery ornamented with curious designs and crude drawings.

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¹ Garrison, "An Introduction to the History of Medicine," 3rd Edition (1922), 47.

² Petrie, "A History of Egypt," Vol. 1.

³ G. Elliot Smith, *Brit. Med. J.*, I (1908), 732; "The Ancient Egyptians and the Origin of Civilization," 1923.

⁴ Dr. G. Elliot Smith questions whether tattooing was practiced in this age.

PRE-DYNASTIC AGE.

Historians fix the beginning of the Pre-Dynastic age as 4241 years B.C., the date of the establishment of the calendar of 365 days. This calendar contained twelve months of thirty days each with five feast days at the close of the year. It has been in continuous use for over 6000 years and has come down to us intact except for some minor disfigurements and corrections in Roman times. Comparatively little is known of the Pre-Dynastic period.¹ It undoubtedly had a written language but its writings have been lost. Presumably it had temples but they have disappeared. It has left a few surviving monuments, some statuettes and several crude paintings on the walls of its tombs. The art of mummification was unknown. The contents of the graves show that the people of that age knew the art of pottery making, used stone and copper implements, were religious and believed in the resurrection of the body and probably in the immortality of the soul.

The earliest known evidence of pharmaceutical art is found in the ointment jars from the pre-dynastic graves, but we know almost nothing of the drugs or medicines of that age. However, it is inconceivable that a race which had advanced so far from barbarism as to have established a working calendar with less than six hours of annual error, had not collected some knowledge concerning the medicinal uses of plants and minerals about them.

DYNASTIC AGE.

The Dynastic Age began with the accession of Menes, the first king of United Egypt, about 3400 B.C. (Breasted) or 4777 B.C. (Petrie).² Manetho, Egyptian priest and historian, relates that King Athothis (Teta) the successor of Menes, wrote treatises on anatomy and surgery and that he performed surgical operations by means of flint flakes. Doubtless these operations were of a minor nature, such as lancing felons, opening abscesses and the like. Manetho's story, however, indicates that considerable surgical knowledge must have been accumulated during the preceding ages.

Some of the earliest known medical works date from Zoser's reign in the third dynasty, 2980 B.C. According to Breasted,³ Zoser's chief counselor was Imhotep, a celebrated architect and physician. This great seer collected much current knowledge of magic and medicine into Proverbs which were still quoted centuries later. Breasted states that "two thousand five hundred years after his death he had become a god of medicine, in whom the Greeks, who called him Imouthes, recognized their own Asklepios." We know him as Aesculapius. According to Manetho this great physician was a king, Tosorthros, the second in the Third Dynasty.

THE OLD KINGDOM.

With the advent of the Fourth Dynasty the history of Egypt begins to emerge from the mists of myth and tradition into the light of more certain knowledge. This was the beginning of the Old Kingdom. This period lasted for nearly a thousand years and was in some respects more brilliant than any succeeding age. Our knowledge of the Old Kingdom comes principally from its tombs and monuments as most of its papyri have long since crumbled to dust.

The Egyptian was a firm believer in the resurrection of the physical body, and it is to the powerful influence of this concept on his mind that our knowledge of his daily life is largely due. The Egyptian spent much of his time and substance in preparing a tomb for his existence in the

¹ When Herodotus visited Egypt twenty-four centuries ago, he was shown a row of 341 wooden statues which the Egyptian priests claimed were representations of the succession of priests who had ruled the religious affairs of Egypt since records had been kept. Herodotus does not give the names of this priestly succession, but he calculates that if the word of the priests be true, historical Egypt must have extended back at least 11,300 years before his visit. Whether or not the story of Herodotus be accepted, we know from other evidence that the Archaic and Pre-Dynastic periods of Egypt are very, very old.

² There is a great difference between the ages ascribed to the Egyptian Dynasties by the two principal schools of Egyptology. The British school, as represented by Sir W. M. Flinders Petrie, places the beginning of the Dynastic age as about 4777 B.C. The Berlin school, whose most illustrious follower in this country is Dr. J. H. Breasted, dates this event at about 3400 B.C. Unless otherwise stated the dates in this paper follow the more conservative school.

³ History of Egypt from the earliest times to the Persian Conquest; 1928 printing.

hereafter. He provided food, drink, raiment, medicines, cosmetics, weapons, boats, chariots, jewels and other articles of personal adornment; he ornamented his sepulcher with inscriptions, paintings, statues and rock carvings in great variety, depicting the daily life of his times. These mortuary offerings were designed for the entertainment of the departed in the future life. The pictures include hunting, planting and sowing, winnowing grain, tending flocks and herds, collecting tribute, dancing, making military campaigns, building boats, smelting ore (by the use of the furnace and blow pipe), weighing gold and malachite, etc. An example of the towering insistence of this belief in resurrection is recorded by Dr. G. Elliot Smith.¹ He states that when he unwrapped the mummy of King Siptah of the Nineteenth Dynasty he found a set of splints applied to the right forearm. The limb had been broken by grave plunderers long after the king's death and had been set by priests of the Twenty-first Dynasty, who had re-wrapped the body in preparation for the resurrection.

Medicine in Egypt originated with the priesthood and remained in its hands. According to Clement of Alexandria, only the less important classes of priests became physicians, but this is not in accord with other evidence for we know that some of the court physicians were very highly honored and respected by their Pharaohs. The temples were the hospitals and some of the rooms were reserved for laboratories, where the incense and the drugs were prepared. These are the earliest known pharmacies.

The priest-physicians began very early to keep the records of their cases on papyri in the temples so that in the course of time a great deal of information concerning the diagnosis of disease was collected. Disease was believed to be due to the displeasure of the gods or to hostile spirits. The physician depended fully as much upon magic for curing his patient as upon the effects of the drugs prescribed. The administration of a dose of medicine was always preceded by reciting an incantation, or prayer to the gods. This magic formula was to be repeated not only by the physician who prescribed the remedy but by the patient. The physician was forbidden to change the treatment from that prescribed in the "writings" or sacred medical works of the time. (According to some writers, he was permitted to change or modify the treatment after the fourth day.) This prescription resulted in almost complete stagnation of medical progress from the time of the Old Kingdom on. Searching for truth by the experimental method was never encouraged by the Egyptian priesthood. In later times the physicians were all specialists. Herodotus relates that:

Each physician is a physician of one disease and of no more; and the whole country is full of physicians for some profess themselves to be physicians of the eyes, others of the head, others of the teeth, others of the affections of the stomach, and others of the more obscure ailments.

THE PAPYRUS EBERS.

Although several medical papyri are known we are more greatly indebted to the Ebers papyrus for our knowledge of Egyptian pharmacy and medicine than to any other single source. This important document was purchased by Georg Ebers, a German Egyptologist, in 1872 from an Arab at Luxor, who claimed that it had been found 14 years previously between the knees of a mummy in a Theban cemetery. The finder having died, the identity of the mummy could not be determined. The Ebers papyrus dates from 1552 B.C. It is written in the hieratic



Small gold cap jar, from tomb of Khasekhemhin, for cosmetics; alabaster unguent jar V-VII Dynasty; vase from Denderah for oils or salves used in ceremonies for the dead; small cosmetic jar, same source as preceding.

¹ G. Elliot Smith, *Brit. Med. J.*, I (1908), 732; "The Ancient Egyptians and the Origin of Civilization," 1923.

(priestly) script of the day on the finest quality of yellow-brown papyrus. The document is about 30 centimeters wide and the written portion 20.23 meters in length. The entire text was written by the same calligrapher but a part of the pagination, the corrections and the marginal notes, are in different hands.

Ebers¹ believed that this papyrus was one of the forty-two lost sacred books of Thoth (Hermetic Books) which were described by Clement of Alexandria as epitomizing the wisdom of the Egyptians. Eight² of these books were supposed to have been on medical subjects. Ebers' assumption is now known to be incorrect. Certain portions of the text of the Papyrus contain idiomatic expressions not belonging to the age in which the manuscript was prepared. This is believed to indicate that the text is of far greater age than the time of this copy. It is probable that most of the text belongs to the Twelfth or Thirteenth Dynasties but that certain parts go back as far as the First Dynasty. The text and most of the prescriptions are written in black except that the headings, rubrics and quantities are in red.³ The Ebers Papyrus is an encyclopedia of the medical knowledge of the time. It describes most of the diseases of modern times with sufficient accuracy for recognition by modern diagnosticians, and many ailments that cannot be identified. It also prescribes the incantations and remedies to be employed in the treatment of the disease. The Papyrus contains 811 prescriptions and more than 700 drugs are mentioned. However, some of the drugs are disguised under fanciful names and many cannot now be identified.

The list of substances used as Egyptian drugs which follows has been compiled from various sources but chiefly from the Papyrus Ebers. Only those substances are included the names of which are translatable.

Absinthe	Cypress Wood	Juniper Berries	Saffron (Blood of Thoth)
Acacia	Date Blossoms	Lead	Sea Salt
Alabaster (ground)	Dates	Lettuce	Sebestens
Aloes	Elderberries	Lotus Flowers	Sodium Bicarbonate
Anise	Endive seed	Magnesia	Sodium Carbonate
Balsam	Excrements of the Gods, man and numerous animals.	Malachite	Sodium Chloride
Beans	Fat of various animals	Mastic	Squill (Eye of Typhoon)
Beer (bitter and sweet)	Fennel	Myrrh	Styrax
Beer Froth	Fenugreek	Nasturtium	Sulphur
Bees Wax	Figs	Oil of Cedarwood	Sycamore Wood
Belladonna	Flaxseed	Onion	Turpentine
Blood of various animals	Frankincense	Onion Sap	Verdigris
Calamus	Garlic	Opium	Vermilion
Calcium Carbonate	Gentian	Oxgall	Vervain (Tears of Isis)
Caraway	Goose Grease	Palm fibers	Vinegar
Cassia	Grapes	Peppermint	Watermelon
Castor Oil	Hartshorn	Pomegranate Bark	Wheat
Copper Shavings	Haematite	Poppy Heads	Wine (from fermented barley)
Coriander	Henbane	Poppy Seed	Wormwood (Absinthe)
Crocus	Honey	Potassium Nitrate	Yeast
Cucumber	Iron	Resins (of various kinds)	
Cumin	Ivy (Plant of Osiris)		
Cypress Berries			

At least 18 of the drugs employed in the Ebers Papyrus are described in the U. S. P. X. These are acacia, aloe, belladonna, hyoscyamus, flaxseed, myrrh, opium, caraway, gentian, senna, peppermint, castor oil, honey, pomegranate, colchicum, squill, sulphur, sodium chloride and sodium bicarbonate. Iron and copper compounds were also prescribed.

The following prescription was probably effective even if not an example of elegant pharmacy:

¹ *An Egyptian Princess*. Preface to 4th German edition.

² Some writers state that there were but six books devoted to medicine.

³ The red ink of this Papyrus has been found to contain red lead.

Remedy to stop the crying of a child.
 Pods-of-the-Poppy-plant (Opium)
 Fly-dirt-which-is-on-the-wall
 Make into one, strain and take for four days.
 It acts at once!

It is often stated that constipation is essentially a modern complaint—a result of the use of too concentrated food and to other errors in diet. No one who studies the Ebers Papyrus can believe that constipation is a recently acquired evil. On page after page of this work there is formula after formula for the treatment of this aggravating condition. Castor oil enters into most of the formulas. In one it is the only constituent. It is claimed for one of these formulas that it is not only a purgative but that it drives out all the diseases in the body. This wonderful panacea consisted of half an onion mixed in beer froth. This is described as a “delightful remedy against death.”

One of the remedies for indigestion is as follows:

A Hog's Tooth
 Crush to powder, put inside four sugar-cakes, and eat for four days.

In modern times we use extracts from the lining of the hog's stomach or from his pancreas in the hope of correcting imperfect digestion.

Seventy-four prescriptions in the Papyrus are for hair washes, hair dyes, hair oils and depilatories. A face cream of the day consisted of bullock's bile and ostrich egg beaten up with fresh milk.

The first prescription for a hair grower of which we have record was made for Queen Ses, the mother of King Teta (3400 B.C.). It consisted of

Toes-of-a-Dog
 Refuse of Dates
 Hoof-of-an-Ass

This hoary old formula of 5 milleniums was about as rational and probably just as efficacious as some of the concoctions which were advertised as hair restorers only two decades ago in the United States.

Another for the growth of the hair on a head which is becoming bald.

Fat-of-the-Lion
 Fat-of-the-Hippopotamus
 Fat-of-the-Crocodile
 Fat-of-the-Cat
 Fat-of-the-Serpent
 Fat-of-the-Egyptian-Goat

“Make into one and rub the head of the Bald One therewith.”

Dawson,¹ believes that the magician who wrote this prescription was fully aware of the fact that the patient probably could not obtain all of these fats on the spur of the moment but would be obliged to purchase them from his healer. He would receive them each in its respective gallipot properly labeled but the commentator ventures the opinion that each and all would contain nothing but goose grease. Apparently substitution is not a modern misdemeanor.

Throughout the Papyrus Ebers the directions for diagnosing disease are curious and quaint. Two examples with treatment are given:

“When Thou Examinest a Person Who is Suffering in His Abdomen and findest something in his backbone like the trouble in the knife-grinder's disease, then thou sayest: ‘This is the uxedu that has spread to his back. He is ill. I will make him the Back-remedy.’ It goes into him as if it had hopped in. Make for him a pot-yeast and then make him the following remedy:

¹ Physician and Leech, page 66, 1929.

Spring Plant	1
Peppermint	1
Resin-of-Acanthus	1
Mason's Clay	1

"Crush, cook in Yeast-of-*n*Seet-Beer, and smear on for four days in order to heal him at once."

When Thou Examinest The Obstruction in His Abdomen and thou findest that he is not in a condition to leap the Nile, his stomach is swollen and his chest asthmatic, then say thou to him: 'It is the Blood that has got itself fixed and does not circulate.' Do thou cause an emptying by means of a medicinal remedy. Make him therefore:

Wormwood	$\frac{1}{8}$
Elderberries	$\frac{1}{18}$
Asbesten	$\frac{1}{8}$
Sasa-chips	$\frac{1}{8}$

"Cook in Beer-that-has-been-brewed-from-many-ingredients, strain into one, thoroughly, and let the Patient drink."

From this diagnosis it is clear that the Egyptians recognized the circulation of the blood. A remedy for stye was as follows:

Red-lead	1
Powdered-wood-from-Arabia	1
Iron-from-Apollonopolis-parva	1
Calamine	1
Egg-of-an-Ostrich	1
Saltpetre-from-Upper-Egypt	1
Sulphur	1
Honey	1

Make into one and apply it to the Eyes.

To produce Milk in the breast of a woman about to suckle a child, Bones-of-the-Swordfish were warmed in Oil and her backbone smeared therewith. The same result could be brought about by mixing Fragrant Bread (which had been made from Soured Durra) with the Poppy-plant, and making her eat it while she sat cross-legged.

Testimonial writers were known in the Old Kingdom. Witness the testimonial following a prescription to drive away the turning-white of a burn:

"Durra-Bread-in-Oil-and-Salt.

Mix into one and apply as a plaster in order that he may become well at once.

It is quite true. I have seen it. It has often happened to me."

There are three diseases or conditions which are constantly being prescribed for in the Ebers Papyrus, the identities of which have never been satisfactorily explained. These are the "AAA disease," the "uxedu-disease," and the "Uha-disease." Various modern pathological states have been suggested for each of them, but the evidence at present indicates that they were different stages of *Chlorosis Aegyptica*, or the Egyptian hookworm disease. This was very common—about one of every four inhabitants being infected. That these diseases were considered as a scourge by the Egyptian doctors is shown by the scores of remedies that were suggested for their treatment.

The translation of the word *met* has given no end of worry to Egyptologists. Some think it was the nervous system; others the vasculatory system. Whatever it was the Egyptian doctor considered it of much importance for remedies to "stimulate and strengthen the *met*," remedies "to allow the *met* to take up the remedy," remedies for "the dried parts of the *met*," remedies "to refresh the *met* in every limb," etc. A poultice to "make the *met* supple" consisted of the following 36 ingredients:

Fruit-of-the Dompalm	Splinters - of - the-	Goose Oil	Refuse - of - the - Flax-
Beans	Sycamore	Hog's dung	plant
Amaa-grains	Splinters - of - the-	Elderberries	Mineral-Salt
Onions	uan-tree	Myrrh	Anab-plant
Splinters-of-the-Cedar-	Resin-of-Acanthus	Garlic	Red-lead
tree	Resin - of - the - Zizy-	Herbs-of-the-Field	Fresh-Lead-Earth
Splinters - of - the-	phus-Lotus	Thorns-of-the-Cyperus	Natron
Mulberry-tree	Resin-of-the-am-tree	Watermelon	Fat-of-the-Bullock
Splinters - of - the-	Resin-of-the-Sycamore	Barley-plant	Sasa-pieces
Willow-Tree	Red-corn	Fennel	
Splinters - of - the-	Berries-of-the-am-tree	Abu - plant - from-	
Zizyphus-Lotus	White Oil	the-Delta	

Possibly this polypharmic conglomeration had some advantages over our modern Warburg's tincture. At any rate, it is 4000 years older and it contains twice as many ingredients.

Self-medication was common in the later Egyptian ages, if we are to believe Herodotus. He says:

For three successive days in each month they purge, hunting after health with emetics and clysters, and they think that all the diseases which exist are produced in men by the food on which they live; for the Egyptians are from other causes also the most healthy of all men next after the Libyans.

So far as the records indicate the Egyptian priests made no pharmacologic tests with drugs upon animals. However, Plutarch relates¹ that Cleopatra experimented with various poisons and venomous serpents on condemned criminals and on animals in order to learn what form of suicide was least painless. He states:

Cleopatra was busied in making a collection of all varieties of poisonous drugs, and, in order to see which of them were the least painful in the operation, she had them tried upon prisoners condemned to die. But, finding that the quick poisons always worked with sharp pains, and that the less painful were slow, she next tried venomous animals, and watched with her own eyes whilst they were applied, one creature to the body of another. This was her daily practice, and she pretty well satisfied herself that nothing was comparable to the bite of the asp, which, without convulsion or groaning, brought a heavy drowsiness and lethargy, with a gentle sweat on the face, the senses being stupefied by degrees; the patient, in appearance, being sensible of no pain, but rather troubled to be disturbed or awakened, like those that are in a profound natural sleep.

SURGERY.

The Egyptians made no great progress in surgery. Their knowledge of anatomy was superficial as they were forbidden to dissect bodies, and their knowledge of physiology was equally weak. The earliest surgical operations of which we have records were described by W. Max Müller in the Smithsonian reports of 1904.² The records consist of engravings on the door posts of a tomb at Memphis, and date from about 2500 B.C. They depict the incision of a carbuncle; operations on the hand, knee and foot and also circumcision. The surgeon is operating with a flint knife. The attitudes of some of the patients as well as their conversation show that they are undergoing great pain. This would indicate that drugs for producing local anesthesia were unknown in the Old Kingdom. The patients circumcised were not infants or boys of seven or eight, but young men. From this evidence it is believed that circumcision of the men (at least in the earlier ages) was not performed by the Egyptians until shortly before marriage.

In later times circumcision was practiced on younger persons. Chabas³ has described another wall carving from the temple of Khons in Thebes of about 1200 B.C. which depicts a

¹ Plutarch, "Life of Antony."

² "Egyptological Researches: Results of a Journey in 1904," page 60.

³ *Revue Archeologique*, 3 (1861), 298.

surgeon performing circumcision (with a flint knife) on boys of six to eight years of age. A woman, probably a priestess, holds the boy's hands while another woman, presumably the mother, is sitting near. The children are believed to be the sons of Rameses II.

Comrie has described¹ what are probably the oldest known surgical instruments, except for the flint knife. They consist of 3 saber-shaped copper knives with hooked or incurvated handles. They were found in a tomb near Thebes and date from about 1500 B.C.

Dr. G. Elliot Smith² has described two sets of splints which he found wrapped around broken limbs in a cemetery of the Fifth Dynasty (2730-2625 B.C.). The first consisted of four pieces of wood, each wrapped in linen and bound around the thigh of a girl of about fourteen years of age. The femur was badly broken and the patient must have died from hemorrhage, for there was no evidence of healing of the bone. From their mode of application Dr. Smith concludes that these splints must have been quite useless as a support to the broken bone or as a restraint on the tendency of the thigh muscles to shorten the limb. Their only use must have been to fix the knee joint and insure some degree of rest to the damaged member. The examination of a series of healed fractures of the femur obtained from other tombs shows that there is considerable shortening, displacement of the fragments and an excessive development of callus. In the other instance of the use of splints the fracture was a compound one of the forearm. Three pieces of bark probably from the acacia had been separately wrapped in linen and placed around the limb. The bark did not form a complete tube around the limb but at the gap the space had been filled with coarse grass, probably to act as an absorbent of blood. Bandages and limb had then been wrapped with linen. No healing had taken place and the patient probably had died from hemorrhage, since fragments of blood-stained vegetable fibres (probably from the date palm) which had evidently been used to stop the bleeding, were still adhering to the bones.

The walls of the great ruined temple at Kom Ombo (Ptolemaic period) show a table of surgical instruments representing the clinic of Imhotep, the god of Medicine. It is a surprising revelation that many of the instruments are identical with those in use at the present day.

Although in the whole course of Egyptian medical history no records have been found to indicate that the abdomen was ever opened during life by the Egyptian surgeons for the cure of disease, it is quite possible that with this array of surgical instruments major operations may have been attempted. Neither do we find any evidence of skull trephining such as was practiced by the prehistoric inhabitants of Bolivia, Mexico and Peru,³ or by some tribes of savages in modern times. There is some evidence that the Egyptian surgeons operated for stone in the bladder.

THE EDWIN SMITH SURGICAL PAPYRUS.

The Edwin Smith Surgical Papyrus, recently translated by Dr. James H. Breasted, is the oldest known medical work. It is now owned by the New York Historical Society. The original manuscript was produced about 3000 to 2500 B.C. It is not a mere collection of prescriptions but a handbook of practical treatment applied to wounds. It deals, therefore, not with remedies but with cases. The wounds are in various parts of the body, starting at the top of the head and proceeding downward as far as the thorax. The text comes to an end at this point. This indicates that this papyrus is probably a copy of a part of a surgical work which treated wounds for the whole of the body. At present it contains 48 cases which are presented in a systematic fashion: title, examination, diagnosis, verdict, treatment. The treatment is appropriate and rational. In this respect it differs greatly from most of the other medical papyri which treat disease.

Three forms of verdict are found: (1) "It is an ailment which I will treat;" (2) "It is an ailment I will contend with," that is, a curable malady; (3) "An untreatable ailment," that is, an incurable malady. Thirteen of the 48 cases are designated as beyond hope. The author had observed that wounds of the right side of the head caused paralysis of the left side of the body but he appears to have made no further application of this important physiological phenomenon.

DENTISTRY.

It is an astonishing fact that the Egyptians made no progress in dentistry. However,

¹ *Arch. f. Gesch. de Med. Leipz.*, 3 (1909), 269.

² *Brit. Med. J.*, I (1908), 732.

³ *Bur. Am. Ethnology*, 16th Ann. Rep., 1894-1895.

according to the Edwin Smith Surgical Papyrus there were court dentists in the Old Kingdom. In the Archaic and Pre-Dynastic ages when the diet contained much uncooked grains and other coarse vegetable material, dental caries was rare. In later times after the wealthier classes had adopted luxurious habits, dental disease became more common.

The Hearst Expedition examined more than 500 skeletons of aristocrats of the time of the pyramid builders and found that tartar formation and alveolar abscesses were as common then as in Europe to-day.

Dr. Elliot Smith says:¹

There is in no case the slightest suggestion that any operative measures were adopted in order to cope with dental trouble, and in spite of frequent statements to the contrary, tooth-stopping was never practiced in ancient Egypt. Even the mummy of Amenophis III, often called The Magnificent, who reigned at a time when Egyptian power and luxury had attained their fullest expression, revealed no trace of any attempt to deal with the extreme condition of caries and alveolar inflammation found in his jaws.

The Egyptians worked in gold, silver, electrum and cement and made wonderfully beautiful and permanent inlays of quartz and lapis lazuli. They might readily have made copper tools for cleansing cavities with abrasives, and could have easily filled such cavities with hammered gold or cement. According to Kilmer² hyoscyamus was steeped in oil and used as a toothache cure.

DISTILLATION.

The Egyptians knew something about distillation. Cleopatra (not the notorious queen) wrote on distillation and gold making as well as on weights and measures at a very early date. The Egyptians knew of the poisonous properties of hydrocyanic acid. They referred to it as "the penalty of the peach,"³ and it is probable that they knew how to concentrate it by distillation.

The water-bath, so common in every pharmaceutical laboratory, was invented by a celebrated Jewess named Mary who lived in Egypt. She was an eminent alchemist. Ebers asserts⁴ that strychnine was known in the time of Rameses II. I have been unable to verify this from historical sources. It is certain, however, that the Egyptian priests knew a great deal about many poisons.

Bullock's blood, drawn fresh from the animal and swallowed, was considered as a deadly poison by the Egyptians. Herodotus relates that when the Egyptian king Psammenitus (Psamtik) was captured by Cambysses he was treated with cruelty at first, but afterward the Persian king was moved to pity the unfortunate captive and treated him kindly. Later Psammenitus was convicted of stirring his former subjects to rebel. Cambysses then condemned him to drink a quantity of bullock's blood. To quote Herodotus: "Such was the end of Psammenitus."

EMBALMING.

The art of embalming developed as a result of the belief in the physical resurrection of the body. The early inhabitants of the Nile Valley doubtless observed that the corpses of their dead were frequently preserved by simple desiccation in the hot sands. They observed, too, that certain chemical substances such as niter, salt, spices and wine had preservative properties and they began to use these substances in preserving dead bodies. It is probable that embalming in a crude form began about the time of the First Dynasty. By the Twenty-first Dynasty (1090 B.C.) it had reached a state of perfection that was never afterward surpassed and the results are the wonder of the twentieth century morticians. Herodotus tells us that in his day (shortly after the Persian Conquest) there were three forms of embalming. The most complex and expensive is quoted from his description:

¹ Introduction to The Papyrus Ebers, translation by Dr. Cyril P. Bryan.

² *Am. J. Pharm.*, 102 (1930), 700.

³ *Ibid.*, 102 (1930), 299.

⁴ "Uarda, a Romance of Ancient Egypt."

First with a crooked iron tool they draw out the brain through the nostrils, extracting it partly thus and partly by pouring in drugs; and after this with a sharp stone of Ethiopia¹ they make a cut along the side and take out the whole contents of the belly, and when they have cleared out the cavity and cleansed it with palmwine they cleanse it again with spices pounded up; then they fill the belly with pure myrrh pounded up and with cassia and other spices except frankincense, and sew it together again. Having so done they keep it for embalming covered up in natron for seventy days, but for a longer time than this it is not permitted to embalm it; and when the seventy days are past, they wash the corpse and roll its whole body up in fine linen cut into bands, smearing these beneath with gum, which the Egyptians use generally instead of glue. Then the kinsfolk receive it from them and have a wooden figure made in the shape of a man, and when they have had this made they enclose the corpse, and having shut it up within they store it then in a sepulchral chamber, setting it to stand upright against the wall. Thus they deal with the corpses which are prepared in the most costly way.

Herodotus does not mention the next stage of the process, that is that of desiccation. We know that the body was dried after being taken from the salt-bath and washed, but we do not know the details. Yeivin² believes that there is evidence that artificial heat was used. The embalmer of the Twenty-first Dynasty packed the body under the skin with mud and other padding material and moulded the tissues into the shape and plumpness which they possessed during life.

The obstetric chair was in use in Egypt as early as the Sixteenth Century B.C. according to Exodus.³

And the King of Egypt spoke to the Hebrew midwives. . . . ;

And he said, When ye do the office of a midwife to the Hebrew women, and see *them* upon the stools; if it *be* a son, then ye shall kill him; but if it *be* a daughter, then shall she live.

There is some evidence to indicate that there were apothecaries, as distinct from physicians, in the later Egyptian ages. For example, we read in Exodus⁴ that the Lord commanded Moses to take myrrh, sweet cinnamon, sweet calamus, cassia and olive oil, and to

"make it an oil of holy ointment compounded after the art of the apothecary;⁵ it shall be a holy anointing oil."

PALEO-PATHOLOGY OF THE ANCIENT EGYPTIANS.

From examinations of thousands of mummies and skeletons pathologists have learned much about the diseases which afflicted the old Nile-dwellers. Syphilis and rickets were unknown; cancer was extremely rare; rheumatoid arthritis and alveolar abscesses were common. Mastoid disease, adhesions from appendicitis, pleural adhesions, fusion of the atlas to the occiput from spondylitis deformans, cranial ulceration in women from carrying water jars, necrosis of the bones, tuberculosis of the bones, gall stones, stone in the bladder, arteriosclerosis, hookworm disease, infantile paralysis and leprosy have been found. The hair whitened with age and baldness was common. A statue of Queen Mertitefs of the Fourth Dynasty⁶ has large, staring eyes, which suggests possible exophthalmic goiter, although Petrie believes this to be one of the types of the inhabitants. The neck is probably enlarged but of this we cannot be sure.

ANCIENT APPRECIATION OF EGYPTIAN MEDICAL KNOWLEDGE.

Nearly all writers of the ancient world, both historical and poetic, acknowledge the su-

¹ In the process of embalming the flint knife was used for opening the abdomen long after metal tools came into use.

² *Annals of Archaeology and Anthropology*, 13 (1925), 15.

³ The book of Exodus, 2, 15-16.

⁴ Exodus, 30, 25.

⁵ Some scholars translate this word as "perfumer."

⁶ Figured by Petrie, "A History of Egypt," 1 (1899), 10.

premacry of Egypt in medical knowledge. In the *Odyssey* tribute is paid by Homer¹ to the magic virtues of Egyptian drugs and to the wondrous land which produces them:

But Jove-born Helen otherwise, meantime,
Employ'd into the wine of which they drank
A drug infused, antidote to the pains
Of grief and anger, a most potent charm
For ill of ev'ry name. Whoe'er his wine
So medicated drinks, he shall not pour
All day the tears down his wan cheek, although
His father and his mother both were dead,
Nor even though his brother or his son
Had fall'n in battle, and before his eyes,
Such drugs Jove's daughter own'd, with skill prepar'd
And of prime virtue, by the wife of Thone,
Ægyptian Polydamma, giv'n her,
For Ægypt teems with drugs, yielding no few
Which, mingled with the drink, are good, and many
Of baneful juice, and enemies to life.
There ev'ry man in skill medicinal
Excels, for they are sons of Pæon all.

About 590 B.C. the prophet Jeremiah wrote:

"Go up into Gilead and take balm, O virgin, the daughter of Egypt; in vain shalt thou use many medicines; for thou shalt not be cured."²

Herodotus states:

"Cyrus sent to Amasis (about 545 B.C.) and bade him for an oculist³—the best in the whole land of Egypt."

SUMMARY.

Medicine in ancient Egypt was in the hands of the priesthood. The priest-physicians acquired considerable skill in diagnosis, which is remarkable, considering their limited knowledge of anatomy and physiology. They depended more upon magic and prayer for the cure of disease than upon drugs, or at least they depended on magic and incantations to make their remedies efficacious. They used a very large number of substances as medicines, for the most part without skill or discrimination. Among these, however, were aloes, castor oil, henbane, opium and bark of pomegranate root, which were used for the same therapeutic purposes as in modern times. At least 18 of their drugs are described in the U. S. P. X. The Egyptians made progress in minor surgery and in the treatment of broken bones, but whether or not major operations were performed is not known. They knew nothing of dentistry. With the possible exceptions of hookworm disease and those conditions for which constipation is a symptom, it is probable that the magic and medication of the Egyptian physicians accomplished but little in the relief of human suffering.

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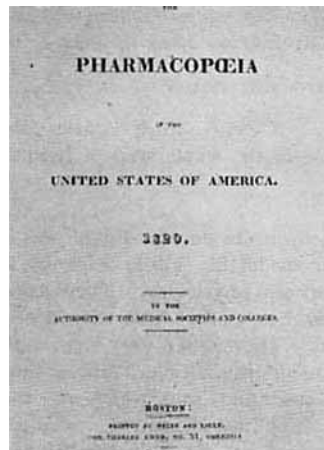
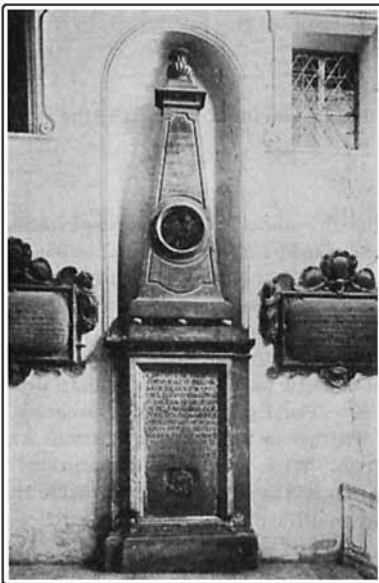
² Book of Jeremiah, 46, 11.

³ Dr. Georg Ebers in his fascinating novel "An Egyptian Princess," gives the name of Nebenchari to this priest-oculist. Kassandane, the wife, and later, widow of Cyrus, was afflicted with cataracts. Nebenchari removed them by cutting away the films and the patient was restored to sight. Also Petammon, using the technic described by Nebenchari, removed the cataracts from the eyes of the Egyptian king, Amasis.

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U. S. P. I.

Above.—Tomb of Paracelsus, at Salzburg. (See page 1355, December 1930 *JOURNAL*.)
 Right.—Laboratory of pharmacist d'Ailly, after a painting by Jelgershuis (1818). Here quinine was manufactured in 1825, after its discovery by Pelletier and Caventou. The former was one of the most brilliant workers in pharmacy. Right—above.—Reduced title page, U. S. Pharmacopœia I (1820). Reading text 3 $\frac{1}{2}$ x 6 inches. (Dr. Lyman Spalding.)

