he had a pain and some swelling in the joints of the big toe of the left foot. While not severe, these symptoms were present during the whole course of the eye affection.

CONJUNCTIVITIS.

The existence of conjunctivitis due to an endogenous infection of gonorrheal toxins is certainly rare, and is questioned in many quarters. Before the era of close bacteriologic study it is quite possible that cases of this kind may have escaped observation, since it would be only natural to refer any conjunctival inflammation with a mucopurulent or purulent discharge to an external infection. The case here reported might easily have been classed as an ordinary gonorrheal infection of the conjunctiva had I not followed my invariable custom of examining all conjunctival discharges as to their bacteriologic character.

*Patient.*—R. C., white, aged 25, came to me on May 22, 1905, with a double mucopurulent conjunctivitis.

*Examination.*—There was but slight swelling of the lids. The cornea was clear and the iris and other internal structures normal. He first noticed a discharge from his eyes two days ago. As he confessed to having a slight gonorrhea (a second attack), an external infection was considered almost certain. Nevertheless a smear of the discharge was taken. He was given a cleansing wash, to be used three times a day. An examination of the slide by Dr. Le Merle at the Lionel laboratory at the Emergency Hospital failed to reveal any organisms of any kind. The specimen was pure mucopus.

*Course of the Disease.*—May 24: There was quite considerable thickening of the conjunctiva of the lids. The eyeball itself was not entirely free from infection, and there were a few fine ecchymoses of the conjunctiva near the cornea in both eyes. The discharge was about the same—not creamy, but stringy and in rolls. On May 28 another careful examination of the discharge was made, with the same result as before—no organisms of any kind whatever were found. By May 30 the discharge was much less, and the infection of the ball quite gone.

*Remarks.*—By June 1 the eyes were practically free from discharge, though there yet remained some thickening of the conjunctiva of the lids, particularly the lower retrotarsal folds. An inquiry into his history revealed the fact that when he had his first attack of gonorrhea, two years ago, about three weeks after the beginning and when it was in the stage of decline, he was seized with rheumatism in the left foot which laid him up for three weeks. During his present attack he has had pain and tenderness of the patellar ligaments of the left knee—not severe, but sufficient to keep him reminded that he has a knee joint.

I am aware, of course, that it may be charged that there is little evidence, beyond that of coincidence, that the conjunctival inflammation was due to an endogenous affection. An external affection, however, I think, can be positively excluded, and we should at least learn from this the importance of a bacteriologic examination in every case of purulent conjunctivitis occurring in gonorrheic patients. If no gonococci are found, the prognosis is quite different from that when their presence is demonstrated.

External inflammations of the eye in gonorrheic infection have been observed and commented on by both ophthalmic and genitourinary authors. They have generally been described as of a mild type.

Taylor, who is one of the few who mention it at all, in his "Text-Book on Genitourinary Diseases," 1904, has characterized it as "scrovascular conjunctivitis." Others evidently regard it as a form of scleroconjunctival affection. No author I have been able to consult has mentioned the pronounced mucopurulent form here described. While it is quite true that most of the complications of general gonorrheal infection show themselves under the form of the so-called rheumatic inflammation, that is a plastic form affecting the fibrous structures, there are certain instances in which it assumes the purulent form, as in cases of endocarditis that have been reported. A more careful examination and observation of cases of purulent conjunctivitis in gonorrheic subjects would throw much needed light on this subject, which has an important pathologic, as well as a highly practical interest.

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## THE MEDICAL FEATURES OF THE PAPYRUS EBERS.*

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This is an age of inquiry in researches and excavation, with a constant craving for some new development to assist us in our studies.

The last hundred years is the Niobe of civilization, not only in inventions and productions, but in the remarkable revelations which have materially assisted us in the wonderful development in science. However, whatever we have done to advance the history of civilization was not done by an easy task.

When we look through the magnificent works of discoverers and pioneers, the fruit of hardship, trial and labor, we can not fail to be infected with some of the enthusiasm which animated those who were endowed with superior intelligence and the gift of knowledge to bring forth hidden treasures from the inmost bosom of the earth, and to transmit them to future generations. Of one of these it may well be said: "From the Orient to the Occident," great be thy name (George Ebers).

The Anglo-Saxon nations, though renowned for deep thinking, and philosophizing in every branch of science and art, can not boast of a scholarship in bringing forth the first literature of the science of medicine. A third of a century has elapsed since George Ebers revealed the pages on medicine which were written some seven thousand years ago, and which were concealed for nearly four thousand years between the legs of a mummy. With the assistance of the learned Ludwig Stern and other Egyptologists, Ebers published the fact that Hippocrates of Cos, who for twenty-three hundred years has been known to the world as the "Father of Medicine," and as an original observer, no longer possesses this distinction. It has been wrested from the ancient Greek by the discovery of this papyrus of a date so remote as almost to place Hippocrates within the ranks of modern physicians.

However great the appreciation we may manifest, it is but strictest justice to do homage to the zeal, the remarkable ability and indefatigable activity of this German scholar, whose name is attached to that elaborate work, the "Papyrus Ebers."

The revelation of this important document merits assuredly all praise. In the Ebers Papyrus we have a monument of ancient culture before us, whose medical and historical value is inestimable, as may be seen from the description of its contents.

In this complication we have the most important medical treasure of the Egyptians before us, in a more complete form than any other known work. We learn much, too, of the anatomic, physiologic, pathologic and pathologico-anatomic conception of that time. Further-

* Delivered before the Thirtieth Annual Session of the American Academy of Medicine at Chicago, 1905.

more, it gives us information concerning the methods of the examination of a patient and diagnosis of the Egyptian physicians, of methods of teaching and learning, as well as of the medical standing at that time.

DISCOVERY OF THE PAPYRUS.

No better history can be attempted than the one given by the illustrious Ebers[1] himself, which possesses all the characteristics of a romance.

In the winter of 1872-73, George Ebers and his friend, Ludwig Stern, of the University of Leipsic spent several months at Thebes in quest of rare documents. For some time the two scientists made their dwelling place in one of the tombs of Abd-el-Gurnah, and associated daily with the Arabs of Luxor. A wealthy citizen of that place showed Ebers the antiquities which he, little by little, had obtained from a fellah, on the other side of the Nile. One day he exhibited one of those texts that are known under the name of "shai-en-sensen," and a wooden Osiris statuette in which a papyrus was well concealed. As an Arab did not trust himself to unfold the perishable manuscript, Ebers bore in mind the "shai-en-sensen," and let its high-priced possessor know that similar texts known had been found, and that he could not consider its purchase without seeing the contents of this papyrus, but that if he had anything really valuable or rare to offer him, he would not hesitate to pay him well for it. The next day the Arab sent for Ebers and took from a tin case a well-preserved papyrus roll. According to the statement of the Egyptian possessor, the papyrus was found in a tomb in the so-called Il Assiût part of the necropolis of Thebes, between the legs of a mummy. Since the finder of the latter was dead, it was impossible to refer to the exact tomb that formerly contained the treasure.

The costly manuscript was unfolded and on close inspection Ebers made the startling discovery that it was a document of great value and in an unusual condition of preservation. Ebers says he can with difficulty describe the impression that the precious, delightfully written and undamaged memorial made on him. The first lines on which his eyes fell belonged to a fragment of a calendar that he had known for a long time. This little document, so very important to the Egyptian chronology, was years ago shown to the renowned Egyptologists, Dümchen, Naville, Brugsch, Eisenlohr, and in 1870 to Ebers himself, in a copy belonging to a Mr. Smith, an American inhabitant of Luxor, who maintained that he was the possessor of an extensive medical papyrus. Because of an affection of the eyes contracted while copying inscriptions, Ebers could not study the Smith copies; hence Professor Eisenlohr of Heidelberg succeeded in obtaining a drawing (by means of tracing) of the fragment of calendar which was then regularly advertised in a periodical devoted to the Egyptian language and archæology, but without success.

Outside of the already-mentioned fragment of calendar, not a line of the papyrus was known. Mr. Smith claimed to have possessed a roll from which he had copied the fragment of the calendar, while, in reality, he possessed only a copy, which was the product of his own handwriting.

Thus Ebers knew the true possessor of the precious memorial, and he resolved from the first to obtain it. The required price was high, but not higher than that paid for less handsome papyri. The same winter an Englishman of the British Museum was traveling through Egypt, and being aware of the treasure at Thebes, intended to purchase the same from Mr. Smith, whom he believed the true possessor. Ebers longed to possess the document himself, but had not the means to meet the demands of the owner, who was not altogether aware of its full value. However, receiving the financial assistance, graciously advanced to him by Max Günther, privy councilor of commerce at Leipsic, then visiting the Egyptian monuments, Ebers purchased the treasured papyrus.

With the newly acquired treasure on board, they sailed for Cairo, where they had an opportunity to glance over the contents of the fragile roll. His friend, Professor Stern, remained behind. Ebers traveled homeward, and ended the work which he later showed and explained to His Majesty, the lamented King John of Saxony, a man of letters in the broadest sense of the term. It was finally turned over to the University of Leipsic for safe-keeping.

In order better to preserve the valuable antiquity, and so that it may be shown to the many visitors, it has been cut into twenty-nine pieces of different sizes. Each piece lies under a glass, so as to avoid pasting. Those written on both sides are placed between two glasses.

DESCRIPTION OF THE PAPYRUS.

When Ebers came into possession of the papyrus, it consisted of a single, tightly rolled piece of the finest yellow-brown papyrus. The width of the document was 30 centimeters, and the length of the written part 20.23 meters. No other papyrus known to Egyptologists is better preserved.

The text of this perfect ancient record is divided into columns, each of which is numbered. The column numbers are placed over the first line in the middle of each column, which contains either twenty-one or twenty-two lines. With the exception of columns three to twenty-one, which are considerably smaller, the columns are 22 centimeters in width, and run from 1 to 98, and in the back from 99 to 110. Singularly, the numbers 28 and 29 are missing, although the text continues uninterruptedly. The omission is explained on the ground that the Egyptians considered 110 to be a perfect number, and by this means the writer was enabled to complete his book with the required number of pages.

Dr. von Oefele believes the writer was a very fine caligraphist, but evidently a very ordinary and careless subject, and therefore carelessly skipped from number 27 to 30.

There is no lack of figures in the text, and only a few that are repeated time and again, and they are written in red to denote the quantity of the medicament to be used, while the prescriptions are in black. Another particular feature of the pagination is that up to column sixty the same hand paged the papyrus, while another scribe continued in the pagination in a different manner, although the text shows that it was wholly written by one person only. The second pagination may be the work of the physician who added his (ℸ) signature after many a prescription, or the purist, who wisely added his signature in paler ink, when that of the physician was omitted.

*Script.*—The script in which the Ebers Papyrus is written is extraordinarily regular, partly in black and partly in red ink. This form of writing is known as the hieratic, and is one of the three forms used by ancient Egyptians. The others are the hieroglyphic and the demotic. The hieratic is the cursive form of Egyptian writing, and is used chiefly on sacred and medical papyri and on wooden coffins. How early the hieratic came into

1. Papyrus Ebers, vol. i, Leipzig, 1875.

use is unknown, but fragments of papyri in script with those characters have been traced to the I. dynasty. The characters are usually written from right to left. The invention of this script was attributed to Thoth (the Greek Hermes), and was in constant use up to about 100 B. C.

About 300 A. D. all knowledge of the meaning of the characters had died out, and it was not until the discovery in 1799 of the Rosetta Stone (by Boussard, a French artillery officer) that any real progress was made in their decipherment.

Rubic or red occurs in almost every heading throughout the papyrus. Also in the statement of the disorder for which a medical prescription is to follow. Those headings, or rubrics, as they are called, show the use of red colors for such purposes in the most remote antiquity. Dr. Christen,[2] in a chemical analysis of this red coloring, found it to contain red lead.

*Synonyms.*—In the Ebers papyrus there exist a great many synonyms which are so much like the Semitic vernacular, both in expressions and pronunciations, that one is almost led to believe that the ancient Egyptian belongs to the group of Semitic tongues. The language of the papyrus with all its richness of primitive forms possesses such organic arrangements that a single word can be easily recognized, for if a branch of the same is lacking, it may be readily supplied by one from another dialect. Sometimes an abstract conception or a mental function is combined with different things or actions, perceptible through the senses; ordinarily, therefore, things are easily explained; substances of either material or spiritual character are represented according to their characteristics. Each noun contains one of those characteristics; therefore, there exist as many nouns for the same thing as there are characteristics in it. One of the characteristics of the Egyptian, as well as of the Semitic tongues, is that they had different ways to arrive at the expression of the conception, which, however, were not identical in meaning. It is difficult, therefore, to differentiate the co-existing synonyms. Philologists regard the various shades in order to explain the origin of a conception from different sides.

*Age of the Papyrus.*—The exact date of the writing of this papyrus has not yet been established. Carious opinions exist. The calendar which is on the outside of the papyrus refers to the eighteenth dynasty, in the sixteenth century B. C., and bears the following inscription: "In the ninth year of His Majesty the King of Upper and Lower Egypt, Amonophis I, the Everlasting." Before the last epithet is the framed name of the king.

*The Date of Transcription.*—According to Lenormant,[3] a royal library was established at Thebes 1670 B. C. (near the place where the Ebers Papyrus was found), under the direction of Amen-em-an, who took great pride in transcribing fragile papyri, which was at that time falling into decay. Therefore, it is possible that the Ebers Papyrus was either compiled, revised or rewritten in 1552 B. C., or 118 years after the establishment of the library. There is still another important supposition concerning the Ebers Papyrus. According to the discoverer's opinion, it is identical with the hermetic books Περὶ φαρμα'κων which are quoted by Clemens Alexandrinus.[4]

The latter is said to be the greatest of all works deposited in the tomb of Osymandias at Thebes, which, according to Diodorus Siculus, contained 20,000 volumes. Among these were the forty-two hermetic books described by Clemens Alexandrinus, six of which were medical works, on the structure of the body, on diseases, on instruments, on medicine, on the eyes, and on women.

*Hermetic,* which means compiled, or inspired by Thoth, was any work which was written by a priest according to the inspiration of the god, which would correspond excellently to the Ebers Papyrus. However, Lüring[5] believes that the Ebers Papyrus is much older than the book, and argues that there are certain remarkable differential points between them. Whatever may be the truth, the value of the Ebers Papyrus is the same, be it the hermetic work or a compilation from writings of prominent physicians of the earliest ages.

That the writer of the Ebers Papyrus wrote in 1552 B.C. can be proved in three ways, as Ebers[6] shows, namely, first, by the peculiar shape of the letters in which the manuscript is written; second, by the names of kings occurring in the papyrus; and third, by the calendar which we find at the back of the first column of the roll.

The name of the king in whose reign the Ebers Papyrus was transcribed, compiled or written was Amenophis I of the eighteenth dynasty.

von Oefele[7] calls attention to the fact that the language from columns 103 to 110, which are written on the back of the papyrus, is different from that of the rest of the roll, although the handwriting is the same and shows that there existed different dialects in the land of the Pharaohs, the same as exist to-day in many countries. Dr. von Oefele further states that while the style of writing in the Ebers Papyrus does not go back beyond 1600 B. C., yet the text, in other words, the idioms of the language, belong to a much older period, and that the oldest portions of the Ebers Papyrus very likely reach back into the time of the first Egyptian dynasties.

Lepsius[8] and Meyer[9] believe that it was not only written, but also compiled under the government of an unknown Hyksos king. It is thus generally accepted that the Ebers Papyrus is a copy. Moreover, the many corrections made by strange hands and the many critical, marginal notes found throughout the papyrus show that the document was worked on.

## CONTENTS OF THE PAPYRUS.

A large proportion of the diseases known to modern medical science are carefully classified and their symptoms minutely described.

Mention is found of the following diseases, with their treatment:

*Diseases of the Abdomen.*—Abdominal tumors and swellings, obstructions of the abdomen, swellings in the inguinal region, affections of the stomach, esophagus, pylorus and small intestine, obstruction of these organs, inflammations, diseases of the liver, affections of the intestines, intestinal worms, belching, cramps, jaundice, and chlorosis—Ægyptiaca.

*Diseases of the Bladder and Urinary Organs.*—Obstruction of the urinary passages, cystitis, retention of urine, polyuria, hematuria, diabetes mellitus, blood in the urine, hypertrophy of the prostate, stricture, dysuria, and strangury in children.

*Diseases of the Rectum and Anus.*—Tumors, inflammatory abscesses, prolapsus, affections of the vessels, inflammations, obstructions, diarrhea, dysentery, constipation, and pain.

*Diseases of the Chest and Respiratory Organs.*—Diseases of

2. Ebers: "Die Maasse u. d. Kap. ü. Augenh., p. 71.
3. Manuel d'Histoire Ancienne, vol. i, p. 425.
4. Strom. vol. vi, p. 785, Section 634, ed. Potter.
5. Die ü. d. med. Kennt., etc., p. 13.
6. Pap. Eb., Leipzig, 1875.
7. Prag. Med. Woch., 1905, No. 11, p. 143.
8. Ægypt., Zeit., 1875, p. 145.
9. Gesch. d. Alt. I, section 402.

the bronchi, affections of the lungs, asthma, phthisis, general diseases of the chest, and sequels to diseases of the stomach.

*Diseases of the Heart.*—Fatty degeneration, dilatation, carditis, angina pectoris, hypertrophy, thrombosis, and anasarca.

*Diseases of the Eyes.*—Conjunctivitis, iritis, blear eyes, hyperemia, granulations, albugo leucoma, vascular cicatrix of the cornea, corneal opacity, staphyloma of the cornea, inflammation, myiodeopsia, hypopyon, stenosis, contractions, strabismus, xanthelasma, fatty degeneration, abscesses, chemosis, suppuration, amaurosis, amblyopia, cataract, paralysis, blepharitis, injury, calcification of the Meibomian glands, distichiasis, and trichiasis.

*Diseases of the Ears.*—Impaired hearing, inflammation, viscous humor, suppuration, fetid pus, and foreign bodies.

*Diseases of the Nose.*—Tumors, coryza, influenza, and mucus.

*Diseases of the Head and Neck.*—Tumors, migrain, neuralgia, shooting pains, and vertigo.

*Diseases of the Scalp.*—Tumors, alopecia, superfluous hair, and eruptions. There are also prescriptions to prevent hair from turning gray, to produce its growth on bald heads, to promote the growth, to make it grow on cicatrices, to depilate the scalp, to prevent white hairs from coming in the eyebrows, and to dye the hair.

*Facial Diseases.*—Sunburn, freckles, wrinkles, discoloration, roughness, and blotches.

*Diseases of the Tongue and of the Teeth.*—The ailments of the tongue are not specified, but for the teeth there are prescriptions to strengthen them, to make them grow, to heal ulcers of the gums, swelling of the gums, and bloody congestions of the teeth.

*Diseases of the Skin.*—Pains, pustules, prurigo, swellings, tumors with fetid suppuration, lesions, fistulas, leprosy, eczema, scabies, rashes, itching, burning, cankers, boils, carbuncles, and furuncles.

*Diseases of the Blood, Arteries, Veins and Nerves.—Distoma hematobium*, extravasations, congestion, coagulation, numbness of the vessels, loss of suppleness, and weakness of the nerves.

*Sores and Wounds.*—Blows that have cut the flesh, blood in the opening of the wound, gangrene, eschar formation, pus, contusions, cuts, pricks, bites of man or beast, thorns, splinters, etc., and their treatment.

*Burns.*—Sores which result from burns, poisonous burns, spots or white cicatrices which such sores leave, and alteration of the hair on the burnt surfaces.

*Diseases of the Limbs.*—Trembling, pain, swellings, stiffness, bent limbs, itching, tumors, lesions, *Filaria medinensis*, tired limbs, perspiration of the feet, sore toes, corns, bunions, callosities of all sorts, and falling nails.

*Diseases of the Female Genitals.*—Tumors and abscesses in the vagina, inflammation of the vagina, twinges in the vagina, chafing due to inflammation in the vagina, ulceration of the womb, pain in the labia, abscesses of the labia, menstrual disturbances, *fluor albus*, affections of the mammary glands, etc., and their treatment.

*Maternity.*—Methods to induce abortion, to prevent abortion, to replace a prolapsed uterus, to deliver a woman, to perform version during delivery, to deliver the placenta, to restore the vagina to its normal condition, to prevent retention of urine, and to stop hemorrhage.

*Hygiene.*—Deodorizations, fumigations of dwellings, perfumes for women to render odor of the house, clothing and breath agreeable, to destroy insects, reptiles, plant lice, to prevent wasps and mosquitoes from stinging, to prevent mice and rats from gnawing things, to prevent birds from eating crops, to prevent rodents from devouring corn in the granary, and to destroy lizards and scorpions.

Not only diseases producing suffering to mankind claimed the physician's care in those days, but he had also to consider the toilet. Seventy-four prescriptions pertain alone to hair washes, dyes, oils and depilatories. After duly reflecting on important anamnestic facts, on the subjective disturbances or disorders, and the objective or demonstrable changes, the physician prescribed the treatment, and a remedy which was either aimed at the principal subjective disturbance of the patient, or at the most striking objective manifested symptom, and often symptoms of the disease were regarded as the disease itself. It is not improbable that in difficult cases consultations were held.

In this papyrus are mentioned over 700 different substances from the animal, vegetable and mineral kingdoms which act as stimulants, sedatives, motor excitants, motor depressants, narcotics, hypnotics, analgesics, anodynes, antispasmodics, mydriatics, myotics, expectorants, tonics, dentifrices, sialogogues, antisialics, refrigerants, emetics, anti-emetics, carminatives, cathartics, purgatives, astringents, cholagogues, anthelmintics, restoratives, hematics, alteratives, antipyretics, antiphlogistics, antiperiodics, diuretics, diluents, diaphoretics, sudorifics, anhidrotics, emmenagogues, oxytocics, ecbolics, galactagogues, irritants, escharotics, caustics, styptics, hemostatics, emollients, demulcents, protectives, antizymotics, disinfectants, deodorants, parasiticides, antidotes and antagonists.

Medicines are directed to be administered internally in the form of decoctions, infusions, injections, pills, tablets, troches, capsules, powders, potions and inhalations; and externally, as lotions, ointments, plasters, etc. They are to be eaten, drunk, masticated or swallowed, to be taken often, once only—often for many days—and the time is occasionally designated—to be taken mornings, evenings or at bedtime. Formulas to disguise bad-tasting medicaments are also given.

The Ebers Papyrus contains numerous other subjects pertaining to the practice of medicine, which the reader will find in the text.

### TRANSCRIPTION FROM HIERATIC TO HIEROGLYPHIC.

In 1874, two years after the discovery of the papyrus, at the Orientalists' Congress, held in London, a method of transcribing hieratic texts into hieroglyphics was devised. Ebers, in working on the papyrus, has followed this method in general, still he transcribed a few signs, especially those which seem to indicate vowels, independently of the London method. The latter, accepted in the main by all orientalists, has been modified in its details by all Egyptologists, so that in every work on this papyrus we meet with various interpretations of the written characters.

In 1875 Professor Ebers, with the financial support of the Royal Saxonian Ministry of Education, had reproduced *fac simile* photo-lithographic plates in size, dimension and color, in two magnificent volumes, in large royal folio, illustrated after the hieratic text.

Volume I contains an introduction written by Ebers himself, a general index of the titles of all the subjects, with explanatory notes and plates I-LXIX. Volume II contains an hieroglyphic and Latin glossary of all Egyptian words alphabetically arranged, with reference to the columns and lines where they are found, and plates LXX-CX. Much credit is due both George Ebers and his traveling companion and assistant, Ludwig Stern, librarian of the vice-royal collection of manuscripts in Egypt, for the reproduction and the translation from a language of which so little is known. The study of Egyptian literature, as a whole, is hardly more than three-quarters of a century old, and too much praise can not be given Prof. Ludwig Stern for his labor and the pains taken in the compilation of the special glossary annexed to this beautiful work, which will ever remain an honored testimonial and a monument to both immortal names.

### OTHER PAPYRI AND MEDICAL ANTIQUITIES.

There are now in existence seven papyri on the subject of medicine, those at Berlin (large and small), Lon-

don, Leyden, Turin, Bulak and Leipsic, the last being the Ebers Papyrus, which, because of its rich contents, the distinctness of its script and its completeness is foremost in importance.

In order to fill the vacuum between Ebers Papyrus and the writings of Hippocrates, we must not overlook the inscription on one of the "Mastabas," or tombs of Egyptian grandees, which surround the pyramids of Sakkarch, that of Sekhet-enankh, chief physician of the Pharaoh Sahura of the fifth dynasty, 3533 B. C. It describes how he healed the king's nostrils, for which his majesty wishes him "a long life in holiness"; and the compilation of medical works assigned by tradition to one of the most ancient kings, Teta, the successor of Menes of the first dynasty. Manetho,[10] the Egyptian priest and historian, tells us that this king wrote treatises on anatomy and surgery and performed surgical operations with flint flakes. About 3300 B. C., during the reign of Cheops, the builder of the great pyramid, a medical papyrus containing anatomy was found by a priest in a temple. We also know that the Egyptians

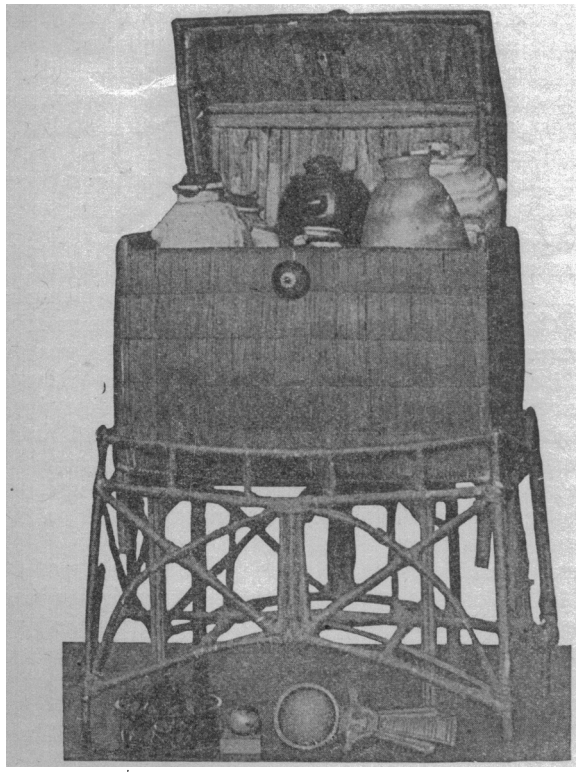

Fig. 1.—A domestic medicine chest of an Egyptian queen.

practiced embalming for over 5000 years B. C., and their process surely necessitated a knowledge of anatomy. There can be no doubt, therefore, that this ancient people knew the structure of the body, and without that knowledge they could not have understood even the symptoms of the different maladies enumerated in the Ebers papyrus.

Pliny (XIX, 5) tells us that the Egyptians examined the bodies after death, to ascertain the nature of the diseases of which they died. There may have been a prejudice against it, perhaps, just the same as there is to-day, but the Egyptians did not shrink from human dissection, consequently the study of anatomy was a matter of course. However, they may not have attained the degree that we might expect in comparison with their other medical knowledge.

10. Ap. eund, p. 54 c.

Another relic of Egyptian medicine is the domestic medicine chest (Fig. 1) of the wife of the Pharaoh Mentu'hotep of the eleventh dynasty, 2500 B. C. It contains six cases, one of alabaster and five of serpentine, with dried remnants of drugs, two spoons, a piece of linen cloth and some roots, enclosed in a basket of strawwork. It was found in the queen's tomb (Fig. 2).

Beginning with the earliest chronology on the existence of Moses, or his five books in the Bible, and considering the doubtful authority and the most accepted authority, namely, Josephus, who believed that Moses wrote Exodus about 1985 B. C., and Bunsen, who stated that Moses died 1523 B. C., we observe a difference of 462 years in the dates assigned to the life of Moses, hence between the two authorities we naturally come to the conclusion that the five books of Moses must have been written between 1985 B. C., and 1523 B. C. Hence, as between the oldest and the latest parts of the Ebers

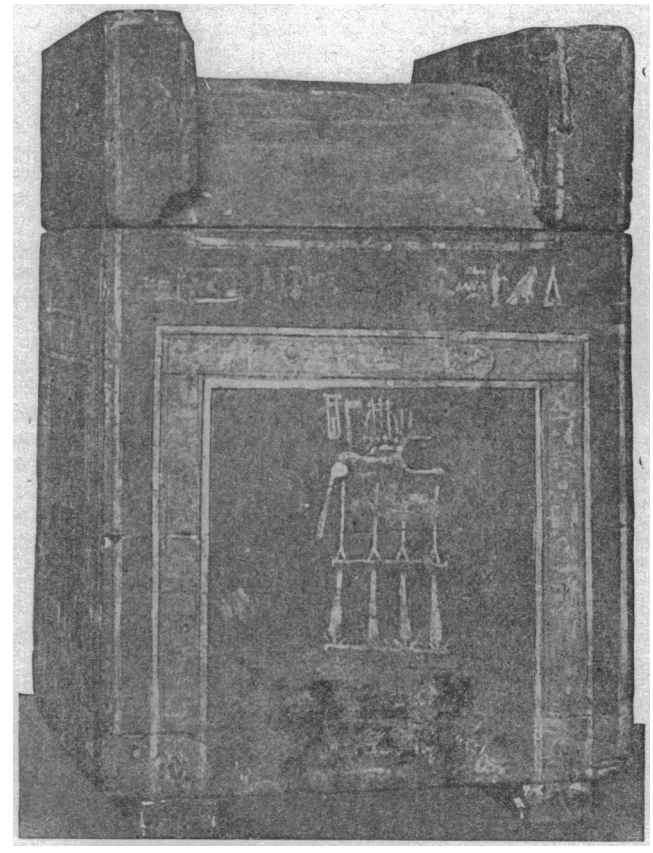

Fig. 2.—Stone case in which medicine chest was found in queen's tomb.

Papyrus lies a vast space of time, over 3,000 years, the whole dating from various epochs between 4688 B. C. and 1552 B. C., it appears reasonable to conclude that Moses knew Egyptian medicine. Medical literature was considered sacred, and therefore was carefully guarded from the profane eyes of the laity, and was only open to members of the priest class and their matriculants.

### EGYPTIAN AND MOSAIC MEDICINE.

Moses, in whatever period he existed, was known to have resided at the court of Pharaoh, and to have received his collegiate education among the wise men of Egypt, and in the same school in which the Ebers Papyrus was written. The immortal Ebers, in his "Aegypton und die Bücher Moses," Berlin, 1868, has already shown the existing similarity of the Bible and Egyptian writings.

Biblical botany no doubt originated with the Egyptians and found its way into the Mosaic writings. The same source led to the knowledge of the plant world and the most remarkable phenomena of plant life.

We find the Bible not poor in the designation of different plants and their various parts. In the very beginning (Gen. i, 11) we read: "And God said: Let the earth bring forth grass, the herb yielding seed and the fruit tree yielding fruit after his kind," etc.

*Biblical Medicine.*—Moses, who evidently borrowed from the writings and teachings of the Egyptians, gives us in his "five books" information of their anatomic knowledge. In the narrative of the twin birth of Esau and Jacob it is related that the latter grasped the former's heel (Genesis xxv, 26); and in the description of Jacob wrestling with the angel it is remarked that the angel touched Jacob's hollow of the thigh, and put it out of joint (Genesis xxxii, 25); and in the same chapter, verse 32, the "sinew that shrank" is spoken of.

In Exodus (xxviii, xxix) the heart, brow, shoulder, breast, lobe of the ear, hand, finger and thumb are mentioned. In Exodus (xxix, 17) dissection is mentioned, "and thou shalt cut the ram into sections"; some of the visceral portions are also mentioned, such as inwards, caul, liver, fat kidneys; skin also occurs. In Deuteronomy (xxxii, 10) the apple of the eye is mentioned, the lids (Ps. xi, 4), and eyes (Exodus xxi, 24); bones (Gen. ii, 23), and sinews (Gen. xxx, 32); teeth (Gen. xlix, 12); palate, temple (Cant. ii, 3; vi, 7). In Job (xvi, 13) we read of pouring out his "gall" on the ground.

The Bible tells us of physicians (Gen. l, 2): "And Joseph commanded his servants, the physicians, to embalm his father." Isaiah (iii, 7) mentions particularly a healer: "I will not be a healer." We also find that the Jewish prophets, as well as the Egyptian prophets, practiced the art of healing. This may be seen from the narration of a man of God who restored the paralyzed hand of King Jeroboam (I Kings, xiii, 4-6). Elijah brought to life a child, apparently dead (I Kings xvii, 17-22); and his disciple, Elisha (II Kings iv, 18-20, 34-35) performed similar miraculous cures. Isaiah (II Kings xx, 7) cured King Hezekiah of an inflammation by applying a plaster made of figs.

The Bible likewise mentions surgeons and surgery of wounds and injuries in different parts of the body, caused by various weapons—sword, arrow, hammer, etc. (II Sam. ii, 23; iii, 27; iv, 6; xviii, 14; xx, 10; Num. xxv, 8; Judges iii, 21; v, 24; I Kings, xxii, 34; II Chron. xxxv, 23; and many other places). Inflammation and abscesses (Deut. xxviii, 25, 27) are also mentioned. Wounds were treated by the application of wine or oil, bandages or sutures (Isa. i, 6; Jer. viii, 22; xlvi, ii; li, 8; Deut. xxviii, 27). Gangrene and putrid discharges (Ps. xxxviii, 6; Prov. xii, 4; xiv, 30; II Macc. ix, 9) are spoken of.

It is also evident that Moses acquired a knowledge of chemistry from the Egyptians. As Boerhaave aptly remarks, the fact that Moses knew how to reduce gold to powder so as to render it miscible with water, and by this means potable, shows he had acquired a knowledge of chemistry only to be attained by the highest masters of science and art.

The fact that apothecaries (*Rakha*) are mentioned in the books of Moses (Exodus xxx, 25-35, "after the art of the apothecary"; Exodus xxxvii, 29, "according to the work of an apothecary"; Ecclesiastes x, 1, "the ointment of the apothecary;" II Chronicles xvi, 14, "prepared by the apothecaries' art"), and the compounded prescriptions in the Ebers Papyrus, furnish us evidence that a distinct class of apothecaries existed among the ancient Egyptians, who were cultivated pharmacists.

Certainly more competency was required of the ancient pharmacists than of those of our day, for the former had to make their own pills, extracts, infusions, etc., as we can find no proof that there existed manufacturing chemists. Their prescriptions were composed of many ingredients and many remedies. Of the 108 columns in the Ebers Papyrus, seven were devoted to tænia alone.

There can hardly be a doubt that the Ebers Papyrus existed prior to the exodus of the Israelites, and that the Biblical medicine embodied in the so-called Torna shebacsab (written law) had its origin in the valley of the Nile.

*Post-Biblical Medicine.*—Beginning with the post-Biblical history of medicine, we have the script, which was discovered 623 B. C., but which may have been handed down by oral tradition for many centuries before, and which is called Torha shebalpæ, or oral law. In this work is found a book on medicine (saphar raphout), containing classifications of plants, trees, etc., and their habitations.

We also know that another Egyptian monarch, Nakhepsus of Sais, in the seventh century B. C., wrote on medicine. It is said that he was the first to observe the wonderful virtues of green jasper, which when engraved with a dragon with rays, and hung around the neck, was considered a cure for digestive disturbances.

The employment of numerous drugs in Egypt has been mentioned by both sacred and profane writers; and the medicinal properties of many herbs which grow in the deserts, particularly between the Nile and the Red Sea, are still known to Arabs, though their application has been but imperfectly recorded and preserved.

Homer[11] speaks of the great number of medicinal plants and herbs produced in Egypt, some of which grew naturally, while others were cultivated.

The fame of the Egyptian physicians was spread throughout the ancient world. Homer described them as the "sons of Pæon, skillful above all men." In the third book of Herodotus is the following passage: "Cyrus sent to Amasis (500 B. C.) and bade him for an oculist—the best in the whole land of Egypt." Darius also sent hither for a body physician, and in the time of Tiberius and Nero, Egyptian physicians regularly came to Rome, usually to heal skin diseases. The science of medicine among this ancient people was in the hands of specialists, who were called *Snu.* Homer, and later Herodotus (ii, 37) tell us that there was a specialist for each single disease, and what records we now possess of the Egyptians after thousands of years of continued destruction corroborate the statement of the latter when he says that Egypt swarmed with physicians. They concealed their medical knowledge under the most mysterious formulas, and therefore used a writing or language not understood by the laity. The Latin prescriptions of our modern physicians appear to be an echo of the secret doings of our ancient colleagues.

The subdivision of the medical profession which prevailed among the Egyptians must have had a tendency, in some respects, to advance medical knowledge by specializing it. If we review the contents of the Papyrus, we can not but admit that the Egyptian physicians were well advanced in ophthalmology. The collection of Hippocrates, edited 4,000 years later, did not contain more

11. Odyss., vol. iv, pp. 228-230.

eye diseases, but they were more clearly and more agreeably described. The number of diseases mentiond in the Ebers Papyrus, as well as the profusion of medicines prescribed, is a source of wonder to modern physicians. The ancient Egyptians must have been experienced diagnosticians. All physicians, however, were required by law to employ the prescribed remedies, and in no case to resort to others unless, as Aristotle (iii, 10) states, the regularly authorized prescriptions proved unavailing. Any transgression of this rule of practice, if followed by the death of the patient, was a capital offense. This may have been but a nominal law, or one, as Finlayson says,[12] "held in reserve to check abuses, for the complicated formulas and large choice of alternate remedies indicated in the Ebers Papyrus would seem to show that no great weight was attached to strict adherence to special methods, deviation from which was fatal."

Up to a recent period our knowledge of Egyptian medicine was gathered solely from scattered passages from great writers. Praxagoras (though from Cos, the town where Hippocrates was born, and where the temple of Esculapius was built, lived in Egypt), of whom Galen speaks as the greatest symptomologist and diagnostician, and quotes his treatment for acute diseases, and especially gymnastics, was the teacher of Herophilus (400 B. C.), the first anatomist who made postmortems on cadavers. The former went to Egypt for his medical learning, and established a school for Greek physicians; the latter went for the same purpose and founded a system of pathology.

We have a continuous history of Egypt to the extent of about 5,000 years B. C., and a prehistoric account of 2,000 and a continuous culture known to us to cover about 2,000 years more, hence our continuous knowledge probably extends back to about 9000 B. C.

The Ebers Papyrus, therefore, opens a new era for the history of medicine and pharmacology. The work discloses an astonishing knowledge of a great variety of remedies, and shows that four or five thousand years before Christ there were learned men in Egypt who could make intelligent observations of disease, combine complicated prescriptions and use them with judgment. It is hardly possible to exaggerate the literary, scientific and historical importance of this wonderful papyrus, the most complete compendium of Egyptian medical science that is left to us, and we must acknowledge the fact that the copy of the Ebers Papyrus is the genesis of medicine.

## TRANSLATION.

My sole purpose in translating the "Papyrus Ebers" into the English language is identical with that of the illustrious Ebers himself, namely, to bring out the origin and to cultivate the prehistoric knowledge of medicine, and to show that there existed in ancient Egypt nearly 7,000 years ago a civilization in which medical knowledge was in a high state of cultivation and in which the foundation of our present system of medicine was established. A careful study of this papyrus will convince the student that the medicine of to-day is essentially the medicine of the ancient Egyptians. Certainly it was in a crude state and on the same footing as our wearing apparel, both in custom and in fashion. Man has always covered his nakedness from the day that Adam ate of the apple. Garments have developed from the leaf covering to our present style of dress. In our latest advancement of civilization we have doffed the turban and donned the hat; we have cast aside the chiton and have clad ourselves in the frock; we have dispensed with the kilt and adopted trousers; we have thrust aside the sandal and have replaced it with the shoe. A similar evolution has taken place in medicine. New garbs adorn anatomy, physiology, pathology, botany, chemistry and materia medica in general, but the fundamental principles of curing disease still remain the same. Even the various methods in the practice of medicine have not changed. From all historical accounts and from the contents and language of this papyrus, we have evidence that the ancient Egyptians had three different classes of physicians—the regulars, the priest physicians and the conjurers, just the same as we have to-day. Our advancement consists merely in a greater variety. We have regulars, irregulars, faith healers and many others, too numerous to mention.

In my translation I have added commentary notes, the aim of which is to establish the fact that medicine up to, and from, the time of Hippocrates until the present day has been built on the foundation of that of the ancient Egyptians.

It was with great hesitancy that I entered on this very difficult task, by reason of a real distrust of my own ability. My knowledge of Egyptology is but superficial, and yet I have been greatly encouraged by medical men in various parts of the world, to whom I had communicated my intention. On their advice, therefore, I venture to offer this work, not only to fill a hiatus in our medical history, but to bring forth for the first time in the English language the ancient treasure of medical knowledge, namely, "Papyrus Ebers," translated from the original, utilizing the labors of Ebers, Stern, Brugsch, Chasbas, Dümchen, Ermann, Lüring, Lieblein, Joachim, von Oefele, Hirschberg, Scheuthauer, Schäfer, Proksch, Lange, Piehl and many other renowned Egyptologists.

The assistance of the above-named scientists, whose labors cover a period of over thirty years, and their criticisms of one another have enabled me to produce probably the best translation in a modern tongue. I have borrowed from these eminent minds not as a plagiarist, but as a kleptomaniac, who steals for the benefit of others. In no place have I failed to acknowledge the theft by a footnote; therefore, I can only appeal for mercy to those who are always ready to engineer some method of criticism, be it just or unjust. I have spared no pains to render the translation as accurate as possible. In a work involving such an infinity of details and interpretations, doubtful to even more scholarly Egyptologists, it would be unreasonable to expect that no errors or misinterpretations would occur.

While the outline of my work is as crude as that of a pioneer, I trust it will serve the labors of others who are more accomplished.

I now come to that which is to me the most painful part of my duty; that is, to inform you that the immortal Ebers had worked on a translation for a period of twenty-five years. His death, however, unhappily cut short his labors. On opening his last will and testament it was found that in case of death the manuscript was to be burned; accordingly, his will was carried out.

In conclusion, gentlemen, allow me to acknowledge my sincere gratitude to Baron von Oefele, the greatest living medical Egyptologist and ancient medical historian, for his consent to review and to correct my translation of the "Papyrus Ebers" before its publication. I also wish to express my thanks to my daughter, Edith.

12. British Med. Jour., April 8, 1893.

who for seven long years has labored by my side, inspired not merely by the devotion of filial love, but also by the same interest and purpose as that of her father, namely, to cultivate medical history and to elevate the standing of the humane and noble profession of medicine.

70 Bellevue Place.

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# THE WATER SUPPLY IN SHIPS FROM ITS BEGINNING TO THE PRESENT TIME.*

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(*Concluded from page 1852.*)

## CHANGES IN OUR PRESENT METHOD OF STORING AND DISTRIBUTING WATER, RECENTLY PROPOSED.

Certain well-marked sanitary defects inherent in our present methods of storing and distributing water on shipboard must have been noticed by every thoughtful naval surgeon, no matter how brief his experience at sea. These defects concern the water tanks, the pipe connections and the scuttlebutt. To begin with, one fundamental difficulty about the water tanks, located as they are, near the bottom of the ship, is, that it is at times almost impossible for a man in the hold to distinguish the one containing merely feed or other utility water from the one containing distilled water for drinking. Since much might depend on this under certain circumstances, measures should be taken to prevent such a mistake from occurring. A radical remedy has recently been suggested by Couteaud and Girard,[12] who recommended the establishment of two separate holds, one in the forward part, the other in the after part of the ship; one for utility water, the other for distilled water. Again, the danger of drinking water becoming mixed with utility water on board ship is not alone dependent on a mistake in the tanks; it may likewise be traced to faulty pipe connections, as was shown in a recent experience of mine in this instance, the drinking water, as well as the salt water, were circulating in one system of pipes, separated from one another only by certain cut-out valves. The consequence was that neither sweet water nor salt water could be drawn without taking part of the other into the bargain. Since the quantity of salt water thus added to the sweet water in both kitchen and pantry was very large; and since, moreover, the salt water, in this instance, was in fact undiluted sewage drawn from the harbor of one of our navy yards, it could not help being quickly discovered and remedied. One such experience ought to suffice to show the great necessity for the widest possible separation of both tank and pipes carrying utility water from those carrying distilled water. Each should circulate in its own separate system of pipes and be independent of cut-out valves.

Dr. Le Méhauté, in the article referred to above, has placed the whole subject in an entirely new light before the naval medical profession. He has clearly pointed out present defects and suggested means to remove them. The objects to be aimed at are: (1) The protection of the water from impurities that may originate in the present reservoirs and pipes themselves; (2) its protection from the impurities liable to get into it from the outside; (3) the providing of a method for the disinfection of tanks and pipes.

The measures which Le Méhauté suggests to meet these various demands are as follows: (1) Simplify the pipe system and remove all unnecessary parts of it; (2) hermetically seal the entire system and make the water circulate in a closed system of vessels; (3) protect the metallic sides of the system against attacks by water; (4) provide a method to disinfect the system which shall be simple, efficacious and always at hand; (5) adopt steam under pressure as a means for disinfecting the pipes.

It certainly would seem obvious that by reducing the length of the distributing pipes and by removing all unnecessary parts of the system the danger from inside impurities can be materially decreased. Since, perhaps, the greatest danger from impurities lies outside the system, the hermetic sealing of the entire system, from the tanks to the fountains, would almost suggest itself. The dangers lurking around the water tanks from outside contaminations must have suggested themselves to every inspecting officer who has seen them and appreciated them but once. The changes recommended by Le Méhauté as regards the construction of these tanks, in view of these dangers, would seem to be most opportune and very much to the point. They are: (1) Place the manholes on the side instead of at the top of the tanks; (2) provide every tank with a metallic aspirating tube permanently fixed to one of its sides and closed outside by a screw plug; (3) ventilate the tanks through an L shaped pipe, provided at the lower outside end with a tampon of absorbent cotton to filter the air; (4) keep the upper surface free, closed and unencumbered; (5) slightly incline the bottom surface to allow of the accumulation of any deposit of possible iron rust and provide a purging spigot at the most dependent part of the bottom of the tank for an easy removal of the solid impurities collected there. Another suggestion deserving attention in this connection is the one made by Couteaud and Girard.[13] These authors would reduce the large number of small tanks, at present in use, into a small number—say three or four—of large reservoirs or cisterns, containing up to 14 or 15 tons of water each and place them between the two protective decks. They are also in favor of placing the manhole on the side instead of on top.

These suggestions are sound, and every naval sanitarian will endorse them without much hesitation. The hermetic sealing of the pipe system would naturally make disinfection sometime a necessity and hence provision must be made for it. Since it would involve a great deal of difficulty to take the system apart for such a purpose, the method of steam disinfection suggested is the one practically applicable method. For the purpose of disinfecting the tanks, the soldering lamp is no doubt the best means. Whether it is that the pipes are choked up mechanically with iron rust or coal dust, or, whether infected water has passed through them, the method of steam disinfection is equally applicable.

Thus, it will be seen, that hygiene has become exacting. It cannot rest content with half-way measures because these do not meet her ends. It is due to half-way measures that some much useless time and money-wasting experimenting has been done in the past, as we have seen, without producing the desired results. It is also evident that the hermetic sealing of the whole water circulating system and the modifications in the construction of the tanks, as recommended by Le Méhauté, must insure a faultless product inside of them.

* Read in the Section on Hygiene and Sanitary Science of the American Medical Association, at the Fifty-sixth Annual Session, July, 1905.

12. L'Hygiene dans la Marine de Guerre, Paris, 1905.

* Read in the Section on Hygiene and Sanitary Science of the