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"THE ANTIQUITY OF OPHTHALMOLOGY"*

BY

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GLASGOW

PRIOR to the Greek period Egyptian medicine was regarded very highly; and was considered as the commencement of practical and clinical medicine. In fact one of the Greek writers commends specially the wisdom of the Egyptians, and the Odyssey contained the statement that the physicians of Egypt were skilled beyond

* Opening paper read at the Summer Series in the Department of Ophthalmology, University of Glasgow, April 5, 1944.

all others. These views were held, off and on, during succeeding ages until, in 1849 when Sir Henry Layard (1817-1894) discovered the great library of 30,000 clay tablets gathered by King Ashurbanipal of Assyria (668-626 B.C.) during excavation of the mound Kouyunjik opposite Mosul, the site of Nineveh.

They were all in the Sumerian language, and of these the medical tablets numbered 800, while others contained the laws and regulations suggesting the famous code of King Hammurabi of Babylon, who reigned 1791-1749 B.C., which was discovered at Dusa by De Morgan (1839-1917) in 1901 A.D.

The stir and commotion caused by their discovery and translation lead the historians to place the reign of Hammurabi as far back as possible and to advance the early Egyptian dynasties later in order to obtain the time of the centuries necessary for such a development of civilisation, as is shown in the code.

It may be mentioned that the turmoil was not caused by the medical discoveries; but by the question whether the tablets did or did not confirm in certain respects the early books of the Bible.

But since then an enormous amount of work has been undertaken in the different fields of geology, archaeology, anthropology, palaeography, and philology; and the discoveries of the different medical papyri of Egypt and their translations have aided in altering the balance; and together have put the earliest known medical lore of the world in the country of the Pharaohs.

If we take these in turn it is only requisite to give a brief synopsis of the recent work on geology, and archaeology as it affects Europe, Egypt and Mesopotamia.

Into the pre-glacial period it is not necessary to enter, except to say that the Nile gulf of the Pliocene period is thought to have been due to a crack in the chalk strata or layer over Egypt, deposited by the sea once covering it, like the chalk cliffs of S.E. England. The Nile gulf was followed by a series of long lakes, which later became the Nile stream fed by the tropical rain belt farther south, nearer the Equator, and by the mountains of Abyssinia.

In the Ice age there were four extensive glaciations of Europe of which the second "the Mindel," was the most severe. It covered Europe almost to the Mediterranean, Great Britain to within a short distance of the south coast, Mesopotamia and much of Asia around the various mountains; but Egypt was left clear as well as a strip along the north shore of the Mediterranean. In this second glaciation the Nile rose 90 to 100 ft. above modern flood level, and new gravels were deposited along the edges of the new banks.

In the third glaciation the Nile rose only 30 ft., while in the fourth, the "Wurm," glaciation it fell 60 ft. below modern flood

level. At the rate of deposit of alluvium of 4.08 inches of a rise in a century, since measurements were made in the 13th century B.C. this would give 15,000 to 18,000 years for the glaciations. At one time it was thought that the north pole had moved to the Equator four times and back again, but that theory has been abandoned.

For each of these glaciations the discovery of eoliths, and rough pottery and evidence of hunting animals has shown that on each of the beaches of the variation in the Nile height, there has been man there and that he has adjusted himself to the circumstances, and thus it has been definitely proved that man has been present in the Nile valley since the beginning of the Pleistocene period, *i.e.*, since the onset of the Post Tertiary. The Cambridge Ancient History, Vol. I, p. III, as if grudgingly, says it is only recently realised that in the Nile valley we have a small continuous series of deposits outside the glaciated area.

On the other hand Mesopotamia has been completely covered twice or thrice during the glaciation periods with ice; and on its recession the Euphrates had to make a new channel each time through the gravel and rocks left by the glaciers.

The ancient language of the Egyptians was known up to the time of the Greek Ptolemies, but had fallen gradually out of use with the introduction of Greek, followed by Latin, and finally by Arabic the language of the Mohammedan conqueror. The Hieroglyphs on all the monuments and temples, remained a closed book therefore until last century, when M. Boussard, one of Napoleon's officers at the time of his conquest of Egypt, found the large stone of basalt at Rosetta, bearing three inscriptions, the Hieroglyphs above, with the Demotic, a written cursive form of the Hieroglyphs in the centre, and Greek below. The stone was brought to London, and tracing facsimiles of the inscriptions were sent to all scholars. Thomas Young of the undulatory theory of light; and colour vision, found a good many; but a Frenchman, Champollion (1790 to 1832), deciphered both completely. He had seen that modern Coptic (Egyptian Christians) was a descendant of the ancient language.

The Medical Papyri

The medical papyri have been divided into two groups, those with less, and those with much magic, but it is unnecessary to touch upon the latter. (1) Of the former, Ebers' Papyrus is the largest, and may be looked upon, and has been claimed, as the oldest book in existence, any earlier papyri being so short as not to be classed as books.

It is then a roll of 68 feet in length, and twelve inches broad. It is in almost perfect condition, and contains 110 pages of about

20 lines in each, giving 2,289 lines divided into 877 sections with the text in black, and the headings of the chapters, the names of the diseases, the directions for treatment, and often the weights and doses, all written in bright red, these being the rubrics, from which they get that name. It is preserved in the University of Leipzig, and exact copies in two volumes with all the plates printed in colour, were sent to every University by Ebers in 1876. The eye portion occupies a little over 9 pages, from Plate 55, 20 to Plate 64, 13, but we will return to it later. In 1889 Ebers published a book with the measures and doses and a translation of the eye section.

The Papyrus was offered to Georg Ebers (1837-1898) in 1872 by a native, who said that it had been found between the legs of a mummy in 1866, but the man who discovered it was dead by this time. Ebers had to get another German to pay the price as it was too much for him. He thought it was one of the lost sacred or Hermetic books of the priests of the God Thoth, the special deity of medicine.

The Papyrus contains portions on the alimentary system, minor medicine, disease of women, skin, eye, ear, nose and throat, nervous system, worms, including the hook-worm, arm and heart and hair. There are a number of cases for diagnosis at the end, including surgical treatment, the knife for some, and the cautery for haemorrhage. On the back of the papyrus was a most important calendar of Egyptian chronology. Ebers stated that the papyrus had been written between 1553 and 1550 B.C. and this has been confirmed; and that it was transcribed during the reign of Amen-Hotep I of the Eighteenth Dynasty, who lived two hundred years before Tut-Ankh-Amen. It is written in several different archaic dialects, and collected from forty different sources, and for these and other reasons it is believed that this papyrus has been copied from far older works. Breasted suggested that Edwin Smith's papyrus had come from the same place as the Ebers had been found and that the black script in it came from the Old Kingdom 3188-2248 B.C. and the rubrics from the Middle Kingdom 1990-1777 B.C. and the magical comments from the priests of the New Kingdom 1573-1314 B.C. and the same might be said of the Ebers.

The script is Hieratic, a cursive form of the Hieroglyphs, which are too complicated for writing and were only suited for chiselling on stone. Later on the general public used the Demotic, which was simpler still. In both cases the Egyptologists seemed to have transcribed the Hieratic and the Demotic back into Hieroglyphs for translation. These two run from right to left while the hieroglyphs go either way but are placed from left to right like modern European printing. See pages 26 and 27, Dr. Finlayson.*

*Ancient Egyptian Medicine. A bibliographical demonstration by Jas. Finlayson, M.D. *Brit. Med. J.*, Vol. I, pp. 748, 1014, 1061, 1893.

(2) Hearst Papyrus was discovered in 1899 and is now in the University of California, and contains about half of the Ebers, and has been assigned to the time of Tuthmosis III, XVIIIth Dynasty, but later than the Ebers.

(3) The Edwin Smith Papyrus was found at Thebes in 1862. It is now held by the Historical Society of New York. It is a roll 15 feet long, 22 columns or pages of 48 sections, nearly 500 lines. It is devoted to surgery with civil and war injuries, and fractures, commencing with the head and reaching to the chest. There is given examination, semeiology, diagnosis, prognosis, treatment and glosses on the archaic terms for all cases. Garrison states that the sword gashes and the fatal comminuted sword fractures correspond with actual findings in Nubian Mummies by Elliot Smith. The frontal sinus is described as the region between the eyebrows. The late Professor Breasted (1865-1935) published in 1930 the XXII plates in full with a transliteration of each into Hieroglyphs on the opposite side; with a text translation and commentary in English, in a separate volume.

The papyrus is a copy made in the XVIth century B.C., he held, when the surgical treatise was a thousand years old or more, from which this had been transcribed. This was shown by the commentary on archaic terms in the original treatise, incorporated in it centuries after the meaning had become obscure, and the commentary is written in red in the copy. The glosses are in the language of the Middle Kingdom, thus placing the black type to the time of the Old Kingdom. This gloss has given now for the first time the meaning of many of the archaic words to Egyptologists of to-day. Breasted (p. 10, original treatise) said the black has "Moor him (the patient) at his mooring stakes." The commentator knows this curious idiom to be unintelligible and appends the explanation in red "It means 'Put him on his accustomed diet and do not administer to him any medicine'."

In a total of 69 such brief discussions there is thus formed an early Egyptian dictionary of archaic medical terms.

The original author had to describe brain injuries, so he likens the convolutions to the corrugations on metallic slag; a segment of the skull to a turtle's shell; and a puncture of it to a hole in the side of a jar. He also notes carefully the side of the brain injured. The tenth case is of a wound through the eyebrow to the bone, with the direction to stitch the wound, this being the first case on record for stitching a wound, i.e., probably 4,500 to 5,000 years ago.

The beginning and the end of the papyrus are absent. On the back are five columns of incantations, as if the scribe had been set to write them and had forgotten to finish the surgery.

(4) Chester-Beatty Papyrus No. 6, is preserved in the British

Museum, and dates from the XIXth century B.C. It has 48 sections: and contains a series of remedies and prescriptions for diseases of the anus and rectum; and it might be termed an early treatise on proctology.

(5) The Berlin Medical Papyrus is preserved in the Berlin Museum, and dates from the XIXth Dynasty. It is similar to the Ebers and Hearst Papyri, and contains 204 sections translated by Brugsch.

(6) Kahun Papyrus. Gardiner found it at Lahun in the Faiyum, Lower Egypt, in 1899. XIIth and XIIIth Dynasties, 34 sections all on gynaecology, 2160-1788 B.C. Translated by F. L. Griffiths.

(7) Petrie Papyrus. Veterinary scripts. 2160-1788 B.C. Translated by F. L. Griffiths. XIIth and XIIIth Dynasties.

(8) The London Papyrus is mainly burns and translated by Walter Wrewzinski, 1910.

*The Paleopathology of Egypt was investigated in Nubia prior to submersion by the raising of the dam at Assuan by Fouquet, Elliot Smith, Wood Jones and M. A. Ruffer. They found arthritis common, that the teeth of early predynastic peoples were good, from the coarse husky food found in the intestines. Caries followed by abscess was occasionally found—mastoid, appendicitis, Pott's disease with psoas abscess were also rarities.

About 1000 B.C. gall stones were found in a youth's body. Syphilis, cancer and rickets were unknown.

These different Egyptian papyri give us then, from at least 3000 B.C. medicine, surgery, and gynaecology, proctology, veterinary medicine, diseases of the eye, the ear, nose and mouth, diseases of the skin and the chlorosis and different phases of hook-worm and other worm diseases and thus form an extensive if not quite a complete medical curriculum. Those papyri coming from the old kingdom are believed to have a considerable proportion due to Imhotep, the medical adviser, and ultimately Grand Vizier of King Zoser, a Pharaoh of the IIIrd Dynasty 2980-2903 B.C. Imhotep is supposed to have been the architect or to have obtained architects to make the Step Pyramid of King Zoser at Sakkarah. He became so famous for his medicine that he was worshipped as a demi-god for centuries and ultimately raised to full godhead as the deity of medicine. Three temples were erected in honour of Imhotep, the first at Memphis, which became a hospital and school of medicine containing a medical library of which the only book so far recovered is the Bestin Papyrus. Another was at Philae and now partially submerged as the result of raising the dam at Assuan, and the third a small one at Thebes.

The Hermetic Books of the ancient Egyptians were held by the

* The hieratic writing seems to run truly, while the Arabic causes errors to appear in subsequent copying; but the former holds still some unknown sounds.

priests and it is generally believed that medicine in the Old Kingdom was free from priestly influences and that it was the priests who introduced the magic and superstitious rites into the papyri, or added them on the back, as in the case of the Edwin Smith Papyrus.

The Hermetic Books numbered 42, the last six of which were medical. No. 37 was anatomy; 38, diseases; 39, surgery; 40, remedies; 41, diseases of the eye; 42, diseases of women.

Ebers believed that he had found the Book of Remedies No. 40.

It will be seen from this list that diseases of the eye is the only speciality among five general treatises, and is given such a prominent place because of the very large number of the cases requiring specialists to treat them. From remote antiquity, the Khamsin, a hot S.W. wind blows across Egypt for about 50 days, from mid March, and it is laden with sand. It caused an immense number of eye cases many of an obstinate and chronic nature, affecting also the nose and mouth. Hookworm disease was prevalent from drinking the Nile water, and may have had eye complication. Trachoma was also prevalent, and in the Ebers a number of preparations are given and epilation employed for trichiasis and entropion. Epilation forceps were found all over Egypt.

By our time trachoma had become such a plague, that in 1903, A. F. MacCallan was appointed to direct a travelling ophthalmic hospital, and by the time he left Egypt, 20 years later, there were 23 new units of 16 permanent eye hospitals, 5 travelling hospitals and 2 ophthalmic departments, attached to permanent general hospitals. By 1937 there were 111 ophthalmic units, including 36 ophthalmic clinics at primary government schools.

Herodotus, writing in the 5th century B.C. (484-408 B.C.) says that in Babylonia, patients were placed in public places so that passers-by could give advice as to what they or others had done successfully, because there were no regular physicians. That is the first stage of medical progress.*

He stated further that in Egypt, where medicine had begun with the 1st Dynasty of the Pharaohs, they had reached by his time, specialists for a number of diseases. He mentions also that the specialists of Egypt were so famous that Cyrus, the Great, of Persia, 560-592 B.C., sent to Egypt for a world renowned oculist. There were specialists for cataract operations.

Inscriptions demonstrate that even in the Old Kingdom 3500-2400 B.C. there were already numerous oculists. One of them is Iri shown in this picture, of which the inscription reads "The Oculist of the Court, Iri."†

* Reference is made in the "code" to bronze knives, showing that they were still in the bronze age. --

† XXV *Congrès Ophthalmo.*, Livret Guide, p. 35, 1937.

The eye figures prominently in Egyptian mythology. An amulet with the image of the perfect healthy eye, blackened with kohl, made in all materials—gold, silver, lapis-lazuli, granite, porcelain, wood, etc., has been used universally throughout the ages. It is worn as a protection against the evil eye, and also that the wearer may acquire perfect sight, vigour, security, and health. There is of course a legend connected with this.

This eye is called the eye "Oudjat," and it was made the badge of the Fifteenth International Ophthalmological Congress in Egypt in December, 1937.

(*Ibid.*, p. 36.) The king wearing the high feather crown offers a pair of healthy eyes in sacrifice to the God Horus, seated on his throne. This is symbolical of the sun and the moon, and the offering of the two perfect eyes signifies that the light of the God will be unconquered through eternity. Two sacred eyes were painted invariably on coffins.

It is possible that if not penicillin, yet the Egyptians used so many dungs that they might have employed other moulds and even penicillium glaucum in their treatment as it is used to-day with such brilliant results.

It must be remembered that we owe the alphabet, mathematics, astronomy, and the measurement of time, as well as medicine to the Egyptians.

In this paper it has been shown that ophthalmology was in existence in Egypt during the days of the Old Kingdom more than 3,000 years B.C., and also in Mesopotamia between 2000 and 1500 B.C., and was the first specialism to be set up, on account of the serious results of different eye diseases which were so frequent, that oculists were required to treat and to prevent them as now from the dire results of failure, and for which they gave in their day and generation of their best, as we give still to-day of our best to advance the art and science of Ophthalmology.

Note.—During the meeting, by the courtesy of W. R. Cunningham, Esq., M.A., LL.D., the librarian of the University of Glasgow, were shown the two volumes of Ebers Papyrus, the volume of the eye section, and the two volumes of the Edwin Smith Papyrus from the University Library. The Royal Faculty of Physicians and Surgeons of Glasgow loaned *The Proceedings of the Royal Society of Medicine*, volumes VII, XVII and XIX, and demonstrations of the late Dr. James Finlayson, of Glasgow, and other volumes from the Royal Society of Medicine, London, and the Royal Philosophical Society of Glasgow, Legacy of Egypt, and of Rome and other volumes.