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MEDICINE AND SURGERY IN ANCIENT EGYPT

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I shall speak tonight about medicine and surgery in ancient Egypt, and as I myself am no medical man, I should like to plead at the very start for indulgence on the part of the members of the profession. As yet, anyone who wishes to speak about Egyptian medicine, must of necessity be at least *one part* layman. Either he is an Egyptologist like myself—in which case he is a layman in the field of medicine—or he is a medical man, and then he is a layman in the field of Egyptology.

I hope that in the near future it will be different, and that we shall have medico-historians, whose training in Egyptology will be such that they can read the Egyptian texts themselves and can form their own independent judgment of them. And I do hope that your famous Institute of the History of Medicine at the Johns Hopkins University will help us to reach this goal.

But since we are not yet so far advanced, there is no other way—the Egyptologist must be heard from first. He must, as far as he is able, supply the philologically accurate translation of the text. Then, when such a text is ready, the aid of the medico-historian may profitably be enlisted. And his knowledge of the subject will not only make possible a correct placing of the text in the general history of

medicine, but often will lead to a more accurate translation of medical terms, and hence to a better understanding of the text itself.

If I am going to talk on Medicine and Surgery in Ancient Egypt, I have also to emphasize at the very beginning that our knowledge of this special field of Egyptian civilization is a very limited one. The reason for this is not only that our sources are few, but that they are also to a very large extent accidental. This is in a certain sense true of Egyptian civilization in general, but especially so of all those parts of this civilization, the life of which did not reveal itself in stone and metal, as in Egyptian architecture and sculpture, but in writing on papyrus, the most perishable of all material, as Egyptian literature and all the different parts of Egyptian science. For while the amount of Egyptian buildings and statues gives us an approximately complete conception of the development of Egyptian sculpture and architecture—although even here some deplorable gaps exist—of the works of Egyptian literature, history as well as fairy tales, hymns and prayers as well as love-songs, and of the works of Egyptian science, mathematical as well as medical, we know only just so much as has been preserved in one or another unusually well-hidden spot—especially as a deposit in tombs that happened not to have been destroyed in the course of three or four milleniums.

Thus, of all *medical* Egyptian literature, we have only five larger and well-preserved texts—all of which would appear to have been written within a period of about 500 years. And although one of them can be proved, as we shall see later, to be the copy of a much older text, you can easily understand from the scarcity and casualness of this material that, at least today, we are entirely unable even to sketch a history of the development of Egyptian medicine. As a matter of fact, the most fundamental question as to such a development is still being discussed: Did Egyptian medicine gradually grow out of a primitive darkness of religious and magic beliefs, and struggle its way toward the light of scientific truth? Or is just the opposite true? Did a primitive, sound, and matter-of-fact medical science, based on observation and experience, and after a certain development even interested in theoretical questions, become in the course of time more and more entangled in the net of magical conceptions? In the following brief review of our present material I shall try to give an answer to these questions.

But before I report to you on the contents of those five larger medical texts before mentioned, I want to sum up briefly what we know of Egyptian medicine from casual allusions in the literature or art of Egypt, especially of the older periods of her history, of which almost no traces of medical papyri have been preserved.

Of the so-called 'Old Kingdom,' the first great period of Egyptian history that lasted during the dynasties 1-6 from about 3400 to about 2450 B. C. (*i.e.*, almost 1000 years), we possess not a single scrap of a medical text. But, fortunately, sources of a different nature come to our aid. I am not referring here to the assertions occasionally found in papyri of the later time, that a certain recipe was found "among old writings in a chest at the feet of the God Anubis in Letopolis at the time of King Usaphais" (1. Dyn.); or that it was found "in a dark night by the light of the moon, while everything else lay in deepest darkness, in the courtyard of the temple, and was brought to King Cheops." The placing of the date of a recipe back in the earliest times, in order to enhance its qualities, could have been invented, as evidently have been the circumstances under which it was supposed to have been found. But a text of the 5th dynasty, that is, of the very height of the Old Kingdom (about 2700 B. C.), contains the relation of an incident, which gives us a more certain starting-point. In an inscription of the tomb of the Vizier Weshptah, who was also chief architect under King Nefererkerê, the death of this nobleman is related. We are told that the King, accompanied by his court, had just been admiring a newly completed building of Weshptah, when the latter suddenly fell to the ground without hearing the words of praise. The unconscious man was carried to the palace, and now the inscription reads: "His majesty called the royal children, the confidants, the chanting priests and the chief physicians . . . his majesty had a chest brought in with papyrus rolls . . . and [the physicians] said to his majesty: 'he has lost consciousness'" . . . whereupon the heart of the king "became sadder than over anything else," and he gave the order to build a stately tomb for his Vizier. This mention of a chest of medical writings at the time of the 5th dynasty is supplemented by the tombstone of an Egyptian physician by the name of Iri, found a few years ago near the pyramids of Giza, which I will show later in one of the slides. Iri was court physician

toward the end of the 6th dynasty, about 2500–2400 B.C. His tombstone, it is true, does not contain any historical inscriptions, but it does contain the titles of this man which, for us, are very important. He was not only “Court physician” but also “Chief of court physicians” and “Senior of court physicians” (or something similar). These titles show that the royal court of the Old Kingdom possessed an entire college of physicians, who like all other official units were graduated as to rank. But the titles of Iri disclose much more. They show that he was “Court eye physician,” that he was “Body physician,” and that in the literal sense of the word, for he was specialist for abdominal diseases, above all for those so very common even in the Egypt of today—stomach and intestinal troubles. And besides, he bore the quaint title “Shepherd of the rectum,” in other words, he was evidently a specialist for rectal diseases, such as are often mentioned in the later medical papyri, and it evidently was his duty to care for the good digestion of the king.

Thus we see that, in the Old Kingdom, the Egyptian medical profession was classified not only as to rank, but also as to specialized fields, and if a single man like Iri combined in his person several specialties, this may have been a mark of decadence of the declining Old Kingdom. In its best days, about the time of Cheops and Chefren, it is likely that the college of court physicians consisted of a group of specialists, each of whom represented his own field, just as was the case, according to Herodotus, in the Egypt of the 5th century. “The medical profession [says Herodotus II, 84] is so divided that each physician can cure only one disease. Hence everything is full of physicians. There are special physicians for the eyes, for the head, for the teeth, for the stomach, and for internal diseases.” Besides the above-mentioned titles of specialists of the Old Kingdom, we also find “dentist” (tooth specialist) which occurs in a number of tomb inscriptions. And of the activities of these specialists we have a contemporaneous proof of a non-literary character. In the Old Kingdom cemetery, near the pyramids at Giza, a skull was found in which two teeth were artfully connected by gold thread. A loose tooth was supported in this way and held in place by its neighbor, a procedure clearly more useful than that contained in a recipe of two of the later medical papyri, which promises “to fasten a tooth, which

is about to fall out," by treating it with a salve of honey, the kernels of a dumpalm, and another plant ingredient. And in the same Giza cemetery the American Egyptologist Reisner unearthed a skull, the lower jaw of which disclosed two bored holes beneath the first molar—evidently an operation of one of those dentists, the purpose of which was to drain an abscess.

The numerous tomb reliefs of the Old Kingdom, in which like a picture-book the daily life of the Egyptians of that time is spread out before us, unfortunately, tell us very little about the activity of the physicians and surgeons. Several times, we find that the "physician of the Pharaoh" was obliged to inspect the slaughtering of the oxen that were to be used as offerings for the dead, and to examine their ritual cleanliness. In a single instance only, we have a surgical operation depicted in a tomb relief of the Old Kingdom. It represents a circumcision, performed on boys who had reached puberty—and here, strange to say, the operator is not designated as a physician or surgeon (the Egyptians had only one word for both of them like the German word "Arzt"), but as a special kind of priest.

About Egyptian medicine during the so-called Middle Kingdom (about 2200–1800 B. C.), we do not know very much more, although fragments at least of two medical papyri belonging to this period have been preserved. One of these deals with female diseases. It contains an enumeration of cases, each beginning with the superscription "Directions for . . .", and then comes a short characterization of the disease; for instance, "for a woman who has pain in the uterus while walking" or "for a woman who has pain in her feet and in her legs after walking" etc. Next comes an equally brief diagnosis "you shall say of it: she has this or that," in which all symptoms of diseases, even those of the legs, for instance, are connected with diseases of the uterus. A prognosis is lacking. In its place stands a therapeutic prescription, which begins with the words "you shall do for it," and which consists above all of fumigations and injections, but also of all sorts of potions, such as mixtures of cows' milk with various food essences. On one occasion it is prescribed that fat be used as food, and in the above-mentioned case of pain in the legs we find the matter-of-fact observation that the legs be rubbed down (?) with a certain substance, until they are well again.

The other papyrus of the Middle Kingdom (which is only a small fragment) contains the only known Egyptian text of a veterinary nature. It concerns itself, among other things, with eye diseases of bulls against which sprinkling with water is prescribed, massaging, and, strangely enough, even incisions in the snout and tail. It is of interest that in the two better preserved cases of this veterinary papyrus the otherwise current expressions "when you examine someone" or "when you find anyone who . . ." are replaced by a statement in the first person "when I see a bull, whose eyes . . . etc.," as though here a veterinary were giving his personal experiences.

The Middle Kingdom was followed by the invasion of the so-called "Hyksos," a people of still undetermined nationality, who entered the Nile Valley from the Northeast, subdued the Egyptians and ruled over them for more than a hundred years. From this period of political unrest and disturbances, it happens that the two largest and most beautifully written of all Egyptian papyri containing medical texts have come down to us.

The first one was bought by the German Egyptologist Ebers, after whom it was named, and is now preserved at the University Library in Leipzig, Germany.

The second one was bought in 1862 by an American, Edwin Smith, after whom it was named, when it was recently published by the American Egyptologist J. H. Breasted of the University of Chicago. It is now in possession of the Historical Society of New York. Since this papyrus "Edwin Smith" differs in content entirely from all the other medical papyri of the Hyksos and later periods, I shall presently treat of it separately.

The Papyrus Ebers contains a collection of no less than 877 recipes, which are recommended for a great number of diseases and ailments, *e.g.*, heart diseases, stomach disorders, headaches, eye diseases, toothache, bladder disorders, inflammations of the abdomen, diseases of the legs and feet, ear and nose troubles, female diseases, infections of the rectum, etc. etc., besides quite a number of diseases, the Egyptian designations of which have not yet been definitely determined. Some of the recipes, it is true, are recommended for what we today would not exactly count among diseases in the proper sense of the word,—*e.g.*, wrinkles in the face, falling out or becoming white of the hair, and

similar disagreeable happenings—and some others are even to be used against the stings of flies and fleas, against rats and mice, and even against snakes.

In most of the cases, the diseases are very briefly described, but in 47 of them longer diagnoses are found. Let me give you one example of these (Ebers 295): “When you see a man who has a tumor on his neck, and both muscles of his neck pain him, and his head pains, and his collar-bone is rigid and his neck stiff, so that he cannot look down on his body, because it is too hard for him—then say: ‘He has a tumor on his neck.’” This is the diagnosis. And then follows the method of procedure, common to all recipes, in this case the following: “See to it that he applies a salve, and that he anoints himself, so that he may be cured immediately.” In the therapeutics the anointing with fat and healing salves plays a great rôle, and also a great number of vegetable drugs, many of which have not been identified. But besides, we find many animal substances prescribed, and by preference very repulsive ones. Thus we have the blood of a lizard, teeth of pigs or moisture of their ears, and especially the excrements of grown people and children, of asses, antelopes, dogs, pigs, cats, and even of flies.

If we review the great number of recipes of this Papyrus Ebers, it seems as if two different principles, fundamentally opposed to one another, here were bound together by force: a common-sense empiric medicine, using especially fatty substances and various sorts of drugs, because experience had taught that these had been helpful in many cases—and an entirely opposite kind of medicine, based on the idea that the diseases were caused by demons and evil spirits, who had to be expelled by the disgusting odor of those unmentionable ingredients. The activity of the physicians working in accordance with this latter principle would be essentially on the same level with the prayers and sacrifices addressed to healing deities as we know them from some tablets of the New Kingdom, and of which I want to show you afterwards an interesting example. The question remains: Which of these two principles found in the Ebers Papyrus is the older one?

It is remarkable, that beside these recipes, with their more or less elaborate diagnoses, the Papyrus Ebers—and only this papyrus—contains, toward its end, two treatises of theoretical, if not scientific,

character. They are the treatises enumerating the so-called "vessels" of the human body, which, according to the Egyptian belief, bring air to the heart and to the other parts of the body, and some of which conduct blood, urine, sperm and spittle. Naïve as is this notion of "vessels," it none the less proves a certain reflection concerning the ultimate phenomena lying behind the external appearances of the human body—a reflection freed from the mere spur of empiric need, a reflection the source of which is to be sought in the search for truth. And for such beginnings of scientific inquiry it is of special interest that just those treatises concerning "vessels" have come down to us in two redactions which differ in regard to their number. We evidently have before us the traces of two different theories, of which one assumed forty-six of such vessels, and the other only twenty-two. In these treatises, the importance of the heart for the entire body and its relation to the pulse beat—the Egyptian text says, "the heart speaks in all limbs"—are correctly recognized.

On the other hand, even this Papyrus Ebers contains quite a number of recipes, in which witchcraft and magic are openly referred to. For example, a recipe against a burn, begins with the words: "Exorcise the burn for the first time: 'My son! Horus! [the physician speaks of himself as of the goddess Isis]. There is a fire in the desert! Is water near?'"—and now Horus is supposed to answer: "There is no water near—there is water in your mouth, there is a Nile between your legs. Come to me in order to extinguish the fire." And the recipe goes on: "Say this over the milk of a woman who has borne a boy, as well as over honey and the hair of a ram, and apply it to the burn."

For the taking off of any kind of medical bandage, the papyrus prescribes the recitation of the following formula: "It has been loosened, it has been loosened through Isis. Horus has been loosened through Isis from all evil that was done to him by his brother Seth when he killed his father Osiris. O Isis, great sorceress, loosen me, deliver me from all bad, evil, red things, from the injury of a god, the injury of a goddess, the evil male spirit, the evil female spirit, the dead man, the dead woman, who come against me—as you have been loosened, as you have been delivered from your son Horus. For I have entered the fire and I have escaped the water, etc." And when a

patient takes his medicine, he has, according to the same papyrus, to recite a formula which begins as follows: "Come, medicine, come what expels the things from this my heart, from these my limbs. The exorcisms are powerful in the medicine."

This inclination toward magic, often making use of allusions to mythological events in the life of the gods, is found very much more developed in the three other medical papyri which chronologically follow the Papyrus Ebers.

The first two of these papyri, the British medical papyrus and the so-called Hearst papyrus of the University of California, were both written also in the 16th century B.C., that is, not very much later than the Ebers, either toward the end of the Hyksos period or at the beginning of the so-called New Kingdom. The third one, the so-called London medical papyrus, dates from some 500 years later and belongs to the 11th century B.C., or at the very end of the New Kingdom. All three contain recipes only (no scientific treatises such as are found in the Papyrus Ebers), the London papyrus 63, the Berlin papyrus 204, and the Hearst papyrus 260 recipes. And while the Berlin papyrus has only two detailed diagnostical descriptions of a case, and the Hearst only one, the youngest of all, the London medical papyrus, contains just magic spells and recipes with only a brief description of the disease which was to be cured.

I think we cannot escape the impression that here a deterioration has taken place, that Egyptian medicine at an earlier time, the traces of which are still obvious in the Ebers Papyrus, had reached a certain height of knowledge, based on sober observation and experience, and that it, then, like all other parts of Egyptian civilization, had fallen a prey to religious superstitions, to witchcraft and magic.

The question is now: Is the same true of ancient Egyptian surgery? Or do we find here a different state of affairs?

In order to answer this question, I must give you a conception of the oldest one of our five Egyptian medical papyri, the before-mentioned Papyrus Edwin Smith in New York, which is the only surgical Egyptian papyrus that so far has come down to us.¹ As such, it does not contain a collection of recipes, but an enumeration of a

¹ For advice in medical matters I am greatly indebted to Dr. Elisabeth Landfried, Heidelberg.

number of surgical cases. Let me give you, at first, one example taken at random:

Case 14. "Instruction concerning a wound in his nostril. If you examine a man having a wound in his nostril, piercing through—should you find the two lips of that wound separated from each other, you should draw together for him that wound with stitching. You should say concerning him: 'He has a wound in his nostril, piercing through. An ailment which I will treat.' You should make for him two swabs of linen, and you should clean out every worm of blood, which has coagulated in the inside of his nostril. You should bind it with fresh flesh the first day. When its stitching loosens, you should take off for him the fresh flesh, and you should bind it with grease, honey and lint every day, until he recovers."

You see, we are here in an atmosphere entirely different from that of the other Egyptian medical texts. Nothing of witchcraft or of belief in demons, no evil-smelling fumigations—but, instead, a realistic description of a medical case, a detailed, matter-of-fact diagnosis which ends with a kind of prognostic judgment, and a detailed method of treatment to be used by the physician—or rather, surgeon.

The cases enumerated in this Edwin Smith Papyrus are all built up according to the same realistic matter-of-fact scheme. First comes a kind of superscription, which gives very briefly the name of the illness (in the case just mentioned): "Instructions concerning a wound in his nostril." Then follows a careful description of the case in hand, which always begins with the words "If you examine a man who . . . has this or that illness." Then there comes a diagnosis in the form of a clause, grammatically dependent on the main clause, which always describes the case in hand. This diagnosis always begins with the words "You should say" he suffers from this or that ailment. Here the same words recur in the main, which were used in the first description of the case, though now, to be sure, they are the responsible utterance of the attending physician. This diagnosis always ends with the words "an ailment which" . . . and then one of three possibilities follows. The physician must say: "an ailment which I am going to treat," or "an ailment which I shall combat," or "an ailment which cannot be treated." Thus, at the end of his detailed diagnosis, the physician must always give a kind of prognostic explanation. This

prognosis is either favorable, doubtful, or unfavorable. It is, finally, except in hopeless cases, followed by a method of treatment—we would call it the therapeutics—which begins with the words “You must do” this or that, *e.g.*, “you shall bandage him with fresh flesh . . .” Then the healing substances are given, of which I shall have more to say later.

But furthermore, the cases of the Smith Papyrus are, with one exception of which I shall speak later, not only systematically constructed, each within itself, but the arrangement of all of them in respect to each other is throughout a systematic one.

The text begins with a group of eight different injuries of the head or skull. These are followed by an injury of the forehead and the eyebrow, by four nose injuries, three injuries in the region of the cheek, five of the temple or temple-bone, an ear injury, a fracture and a dislocation of the lower jaw, an injury to the upper lip, the chin and the neck, five collar-bone injuries, dislocation and fracture of the collar-bone, three injuries to the upper arm, two wounds and a tumor of the chest, three injuries to chest and ribs, two cases of tumors on the chest, a shoulder injury, and finally an injury to the lower spinal column.

The fact that here the text comes to an end would in itself make it probable that only a fragment of the original text has come down to us. As you will see later on the slide, the scribe who copied the Edwin Smith Papyrus from an older text, actually has stopped in the middle of a line, nay, in the middle of a sentence. And thus, we have every reason to assume that the complete text had once included injuries of the stomach, the pelvis, the leg and foot, and perhaps also of the lower arm.

And even within these groups of cases a systematic arrangement is noticeable. Thus the first six injuries to the head are arranged in the following way: (1) A gash in the head extending to the bone. (2) A gaping wound of the head extending to the bone. (3) Gaping head-wounds extending to the bone with fissure of the cranium. (4) Gaping head-wounds extending to the bone with fracture of the skull. (5) Compound fracture of the skull. (6) Compound fracture of the skull with damaged cerebral membrane. You see, the author proceeds from simple head-wounds to more and more complicated fractures. Similar is the arrangement of the various injuries to the forehead and to the cervical vertebrae.

Perhaps it will interest you to get acquainted with the wording of a few more of these cases.

Case 10. "Instructions concerning a wound in the top of his eyebrow: If you examine a man having a wound in the top of his eyebrow, penetrating to the bone, you should palpate his wound and draw his gash together for him with stitching. You should say concerning him: 'He has a wound in his eyebrow. An ailment which I shall treat.' Now after you have stitched it, you should bind fresh flesh upon it the first day. If you find that the stitching of his wound is loose, you should draw it together for him with two strips [of plaster], and you should treat it with grease and honey every day until he recovers."

Case 15. "Instructions concerning a fissure in his cheekbone: If you examine a man having a fissure in his cheekbone, should you find there is a swelling, protruding and black and diseased tissue upon his cheek, you should say concerning him: 'He has a fissure in his cheekbone. An ailment which I shall treat.' You should bind it with ymrw [some kind of mineral substance] and treat it afterwards with grease and honey every day until he recovers."

Case 25. "Instructions concerning a dislocation of his mandible: If you examine a man having a dislocation of his mandible, should you find his mouth open, and his mouth cannot close for him, you should put your thumbs upon the ends of the two rami of the mandible in the inside of his mouth, and your two claws [meaning two groups of fingers] under his chin, and you should cause them to fall back so that they rest in their places. You should say concerning him: 'He has a dislocation of his mandible. An ailment which I shall treat.' You should bind it with ymrw and honey every day until he recovers."

Case 31. "Instructions concerning a dislocation of a vertebra of his neck: If you examine a man having a dislocation of a vertebra of his neck, should you find him unconscious of his arms and legs on account of it, while his phallus is erected on account of it and sperm drops from his member without his knowing it; his flesh has received wind; his eyes are bloodshot—then you should say concerning him: 'He has a dislocation of a vertebra of his neck, since he is unconscious of his legs and his arms, and his sperm dribbles. An ailment which cannot be treated.'"

These examples give you an approximate idea of the nature of the cases enumerated by this Egyptian surgeon.

The Edwin Smith Papyrus, or rather its considerably fuller original, was a medical textbook, which grouped a number of surgical cases according to systematic principles with a description, diagnosis, and, as far as seemed possible, a method of procedure.

On one occasion (in case 33) the cause of one of these injuries is picturesquely rendered. Here it is said of the fracture of the cervical vertebrae of a man: "His falling headlong has caused the compression of one into the other." We must think here, as well as in several other cases, of falls from scaffolding, which must have been very frequent among the masons working on the Egyptian monuments with their often very considerable height. On the other hand, there are cases where the injuries, such as some of the fleshwounds and skull fractures, may have been inflicted by weapons, mainly by spears, clubs and daggers.

The directions given for examining a patient limit themselves in the main to putting the hand on the wound and palpating it. But in six cases with gaping wounds the directions say that the edges of the wound are to be fastened together with *idr*. It is very probable that that what is meant here is—as I have assumed in my translation—a sewing together of the edges of the wound, a procedure which later in the 11th century B.C. we meet with as quite common among the embalmers of Egyptian mummies. Furthermore, the physician must make certain observations, such as whether his patient can move his head sideways or down, whether he can open his mouth, move his neck, lift his arm, whether he is shivering, whether he bleeds, (from nose and ears, for example) whether the wound is deep, whether he has fever, whether the ends of a broken bone "crepitate," whether the patient can hear, whether the bone beneath the flesh wound is uninjured, whether swellings arise over the wound, etc. And on one occasion (case 7), it is to be determined whether the pulse-beat is weak (the Egyptian says, whether "his heart is too tired to speak"). Five times it is definitely prescribed (19, 20, 22, 30, 48) that the physician demand certain motions from the patient, by saying, for instance, "Look at your shoulders," "Stretch out your legs and put them together again," or that the physician make the patient speak by asking him a question (20, 22).

Perhaps it may interest you to hear a few examples of the more detailed descriptions of diseases:

Case 6. "Instructions for a gaping wound in his head, penetrating to the bone, smashing his skull, and rending open the brain of his skull. If you examine a man, having a gaping wound in his head, penetrating to the bone, smashing the skull, and rending open the brain of his skull, you should palpate his wound. Should you find that smash which is in his skull like those corrugations which form in molten copper, and something therein throbbing and fluttering under thy fingers, like the weak place of an infant's crown before it becomes whole—and he discharges blood from both his nostrils, and he suffers with stiffness in his neck"—whereupon follows the diagnosis, ending in the words: "An ailment that cannot be treated." The convoluted surface of the brain cannot be better described than by this comparison with the convoluted surface of the impurities of copper, which float on the top of the melting pot, and which must be removed before the copper is poured into the form. And how concretely is the fontanel of the baby's head described, whose skull has "not yet become whole!" In fact, there is here a digression which interrupts the course of the examination "If this [the becoming whole of the skull] has happened, then it does not throb and flutter beneath your fingers, until the brain of his skull is exposed." We have here then, a learned observation which has nothing to do with the practical exigencies of the case, of a case which furthermore has an unfavorable prognosis! Of course it is just here that we see that even a case which does not lend itself to treatment did not necessarily appear entirely hopeless to the Egyptian physician. Toward the end we have the words "You should anoint that wound with grease. You should not bind it, you shall not apply two strips upon it—until you know that he has reached a decisive point" [*i.e.*, until it becomes clear whether he shall live or die]. Much hope that nature took care of itself could not have existed in this case, particularly in view of the tremendous danger of infection.

Case 8 treats of a skull fracture beneath the scalp. Here, too, the directions state that the bone be felt with the hand, and then continue to say "If you find a swelling over that fracture which is in his skull, and he squints [the meaning of this word is not quite certain] with the eye which is on the same side as that of his head injury, and he walks

with dragging foot on the same side as that of the head injury"—in other words, the picturesque description of partial paralysis, in which very strangely the paralytic phenomena of eye and foot are stated explicitly as being on the same side as that of the skull injury! There is hardly any other explanation possible than that the case which has come under the care of the physician who first wrote this description, was a case showing the so-called "contre coup." The diagnosis then says that the physician should judge the patient, "like one who has been injured by a body penetrating from the outside, like one who cannot loosen the head of the fork of his shoulder" (meaning most likely that he cannot stretch his upper arm in its shoulder socket and roll it outwards—a frequent symptom in sufferers from "Hemiplegia"), "and like one who does not fall down with the thumb in the middle of his hand" [whereby is probably meant the paralysis of the muscles which cause the opposition of the thumb]. Here also it is declared that the surgeon can do nothing, yet it is prescribed that the patient remain seated, until the outcome can be seen more clearly.

In therapeutics, the bandage is most commonly used. Of interest is the direction to be found in 22, which form 50 per cent of the cases, that the patient be bandaged with fresh flesh. The idea evidently was that this fresh flesh would stop the bleeding, just as today we treat haemophils with blood serum or even fresh meat. This flesh bandage is to be taken off after the first day, and then there follows in less serious cases a treatment with fat and honey and often with a third as yet undetermined ingredient of a vegetable character. This is evidently a salve applied with or without bandage, the constituents of which answer each its particular purpose. The fat remains moist and affords a protection against external agents. The honey, which takes the place of sugar in ancient Egypt even in other uses, draws off the water and acts as an antiseptic. Whether the plant ingredient served the function of contracting the wound, must as yet remain a conjecture. In ten cases we meet another mineral ingredient called "ymiru," which constitutes in itself a bandage, and is used instead of a bandage with fresh flesh; on one occasion, where the flesh bandage is prescribed, it is used as an ingredient of the salve containing honey. These are generally cases where today we would employ mercuric or zinc preparations.

Besides these often recurring prescriptions, which apply to many cases, there are also found a number of others for quite special cases. Several times it is prescribed that the patient be treated in a sitting posture, for instance, in cases of skull fracture, a fracture of the upper jaw, a temple fracture, a fracture of a cervical vertebra, but also in the case of an injured and swollen cheek. In the last case the words are added "until the swelling has gone down." In particularly difficult cases, in which the healing process covers a long time, the exertion of sitting is to be lessened for the patient. "Make for him two supports of bricks"—evidently on which to put his arms—is the direction we find in two cases of severe skull fractures (4 and 7, 3), and both times with the words added "until he reaches a decisive stage." On one occasion, in the case of a severe head injury (7, 1), where the patient has a weak pulse and cannot open his mouth because of pain, it is prescribed "You are to make something warm for him, until he recovers and can open his mouth."

In the case of two nose fractures the directions are as follows: "You shall clear out for him [the bleeding nose] with two swabs of linen . . . afterward you shall take two plugs of linen, saturated with grease, and put [them] into his nostrils." Thus we see that tampons were employed, only they were soaked in fat instead of iodine, as with us. In both cases, a bandage of two plugs of linen is prescribed, by means of which the broken bones of the nose are to be brought into the correct position for healing. Plugs of linen were also to be employed for an injury of the ear cartilage (23), and for a collar-bone dislocation (34). Three times it is demanded that the patient be treated in a reclining posture. First, in treating a collar-bone injury (35). After the diagnosis, we read "Put him on his back with something convex between his shoulder blades.² You are to spread out his shoulder-blades in order to stretch his collar-bone, until that fracture falls back into its right place." (Or, as we would say—until the broken parts are in place.) Then the directions continue: "Make two cloth bandages and place the one on the inside of his upper arm, and the other on the lower part of his upper arm, and bandage with ymiru" [the above-mentioned mineral substance]. "Then," that is, evidently after the

² What is meant here, is evidently some soft support on which the shoulder can rest and allow the chest to expand.

fracture thus treated has begun to heal, the honey salve is to supply the last aid. Exactly the same treatment is described for a fractured upper arm (36). The third case, in which the patient is to lie on his back is case 48, the fracture of a pectoral vertebra without dislocation. The directions for treatment begin with the words: "You are to lay him on his back and you are to prepare for him" . . . but what is to be prepared we are not told. In the middle of the sentence, the scribe to whom we owe our text has interrupted his copying. It seems that he had intended to continue with it, for he has left an empty space, sufficient for about four more columns, and after this gap he has begun to copy a series of quite different texts. But he never fulfilled his intention, and we shall probably never know what was to be prepared for the reclining patient with his non-dislocated pectoral vertebra.

One remarkable thing you will have noticed, *i.e.*, that no surgical operation has as yet been mentioned. And in fact these ancient Egyptian surgeons do not seem to have employed the knife at all! But we *do* have one case in the Edwin Smith Papyrus, in which the surgeon operates, though not with a knife. It is the first (39) of three cases, which describe, not injuries and fractures proper, but infected wounds and tumors. We have here an abscess-like tumor, filled with pus—the Egyptian calls it "tumors with prominent head" on the breast of the patient. Here our physician says toward the end of his diagnosis: "an ailment which I shall treat with a fire-drill." And the author of the text goes on: "You should burn for him over his breast *i.e.*, over those tumours which are on his breast" and he adds: "You should treat him with wound treatment and should not hinder that [the wound] opens of itself . . . [for] every wound that arises in his breast dries up as soon as it opens for itself."

The latter is a learned observation of the experienced practitioner. The prescription here is, as we see, the burning out of the tumor, as is still done today under certain conditions for carbuncles, although with an instrument rather different from the primitive Egyptian fire drill!

If now we take this text of the Edwin Smith Papyrus and compare it with what I have mentioned in the first part of my lecture, we cannot but feel most strongly a striking difference between its tenor and that of all other hitherto known Egyptian medical texts. The comparatively few longer diagnostical descriptions in the oldest one of them,

the Papyrus Ebers, and those theoretical treatises concerning the vessels of the same text are the only things that are comparable at all. Besides, we have the impression that from an atmosphere of mythological and magical kind we have suddenly changed over to the brisk and rather cold air of sober scientific work, which is very closely related to our own.

To be sure, there is one thing to be admitted; the Edwin Smith Papyrus contains almost exclusively surgical cases—injuries and wounds, fractures and dislocations—in other words, ills, the causes and symptoms of which were easily accessible to sober observation. I said “almost exclusively.” The only exceptions are three cases, which deal with tumors and abscesses on the chest—but here the entire tenor is not different from that of the cases dealing with fractures and injuries, and it seems that the Egyptian physician connected these tumors with external injuries of some kind and therefore classified them with his surgical cases.

The four other papyri, on the other hand, contain recipes for non-surgical disorders, the causes and symptoms of which were of a hidden nature, and which, on this account, lent themselves more easily to magic treatment.

The question, therefore, might be raised, whether a collection of purely surgical cases, even in the time of the New Kingdom, would not look very much more sober than the texts which we happen to have, dealing as they do with non-surgical ills.

The answer to this question we should have had to put aside, until a surgical text of the New Kingdom was found—were not a very strange and most surprising fact coming to our assistance. Among those 48 cases of the Edwin Smith Papyrus, with their matter-of-fact descriptions and diagnoses and their sober prescriptions for treatment, we find one text that differs completely from all the rest. It is case 9, and I must give you a full translation of it.

Case 9. “Instructions concerning a wound in his forehead, smashing the shell of his skull. (You see, it deals with a complicated skull-fracture.) “If you examine a man having a wound in his forehead, smashing the shell of his head” . . . (so far for the examination; and now please note: there follows no diagnosis, no prognostic indication, neither of which is missing in any of the other cases, but immediately

the prescription for treatment!) "you should prepare for him the egg of an ostrich, triturated with grease and placed in the mouth of his wound. Afterward, you shall prepare for him the egg of an ostrich, triturated and made into poultices for drying up that wound. You should apply to it for him a covering for the physician's use. You should uncover it the third day, and find it knitting together the shell, the color being like the egg of an ostrich." And then follows a passage still more surprising: "That which is to be said as a charm over this recipe: 'Repelled is the enemy that is in the wound! Cast out is the evil, that is in the blood, . . . this temple does not fall down, there is no enemy of the vessel therein. I am under the protection of Isis; my rescue is the son of Osiris.' Afterward, thou shouldst cool it for him with a compress of figs, grease and honey, cooked, cooled and given to him."

How has it come about, that this text, which except for its superscription and its very short analysis brings us back to the world of magic of the later medical papyrus? How is it possible that this text has strayed into these very different surroundings? A compound fracture of the skull is not any more difficult to treat or more dangerous than many other cases of our text. But one thing we do notice. It is true that the terms of the superscriptions completely agree, but when we come to the short analysis, we are struck by something peculiar. Instead of the words used in the superscription, which speak of the fracture of his "skull," we find here the words "the fracture of his head"—that is to say, the old word for "skull" is here replaced by the word for head. And of this word, we know that it was not received into good Egyptian speech earlier than the time between the Old and Middle Kingdoms. Just as the common Latin word *testa* (French *tête*) did not replace the old Latin word *caput* until very late. And in the directions for treatment our attention is drawn to the short catchword-like terms "rubbed with fat, applied to the opening of his wounds," and then "cooked, cooled, given to him," which are exactly the same as the corresponding expressions of the later recipes. So much is clear: its language proves that the text of this 9th case belongs, except for its superscription, to a later time than the remaining text.

The bulk of the text, as can be proved by a great number of glossaries,

explaining obsolete words that occur in some of the cases, must go back to a very ancient date, perhaps even to the time of the 3rd dynasty, which preceded that of the pyramid-builders of Giza, *i.e.*, about 3000 B.C.

The text of case 9, therefore, which for linguistic reasons must be of a very much later date, perhaps not much older than the time at which our Papyrus Smith was copied from an older original, gives us a definite answer to our question, no matter how it may have found its way into the surrounding text. It shows that in Egyptian surgery exactly the same thing has happened as in Egyptian medicine. At a certain time, the development of surgical knowledge and practice, which was based on sober and matter-of-fact observation and experience and had reached a remarkably high level, seems to have been stopped, and magical notions seem to have crept in that were apt eventually to destroy what had been built up during the course of about two milleniums. This is corroborated, perhaps, by the fact that the Egyptian physician, who once owned the roll which now we call the Edwin Smith Papyrus, and who had it deposited in his tomb, did not care—much to our regret—to have the whole ancient surgical text copied. Instead, he had his scribe copy a number of quite different texts that were more to his liking and better fitted to the general taste of his time. These were magic spells chanted to “drive away the wind of a pestilential year” or “to drive away demons of sickness” or against the ill which a swallowed fly might cause in a man’s body, together with accurate directions for chanting them. They contain a recipe for female diseases, recipes for “changing” the wrinkled skin, for beautifying the face, and for healing a disease of the rectum. In addition there is also a detailed recipe which is supposed to have the power of changing an old man into a youth by means of a salve, the mixture of which is carefully described, and of which it is claimed that it “has been found effective many times.”

It is possible, and perhaps probable, that it was just in the so-called “second intermediate period,” the time after the Middle Kingdom, lasting from about 1800 to 1600 B.C., during which we have to assume that this change of views and methods in Egyptian medicine and surgery took place.

The proud structure of the Egyptian state had fallen down for the

second time. The whole country was filled with unrest and uncertainty. Strangers had invaded the Nile Valley and held sway over Egypt, and the whole nation was suffering under this foreign government.

It was the time when the Egyptians definitely lost confidence in their own strength and in their own achievements, and looked out for help from a quarter that seemed to be far above all human merits and accomplishments. It was the time when the Egyptians became a pious people and thrust all their griefs and sorrows into the hands of the gods, who had forsaken them, because in the preceding times they had not served them as conscientiously as they should have done.

Sickness and disease were sent by the gods and demons—and through the help of gods and demons they had to be cured.

And when, finally, after two centuries of national distress and weakness, the kings of the New Kingdom, for the third time in Egyptian history, succeeded in building up a strong and independent state, the power of the gods and their priests had already become too great to allow a revival of the old sober, scientific achievements.

Religious, magical, mythological conceptions increased in power within all phases of Egyptian life, and it is a characteristic symptom of the whole development, that the end of this last period of Egyptian civilization (about 1100 (B.C.) is marked by the fact that a high priest of the state god Amon of Thebes pushed aside the last one of the so-called Ramessids and made himself king of Egypt.

Thus, we notice during the longer first part of Egyptian history, in medicine and surgery just as in other phases of civilization, a gradual development that reaches a remarkable climax, probably toward the height of the Middle Kingdom, about 2000 B.C., while in the second, shorter, part of Egyptian history, beginning about the time of the Hyksos invasion, a rapid decline is noticeable.

Whether this final decline led back to a primitive stage, out of which that first development had itself originally grown—that is another question. But the beginnings of this first development go back into prehistoric times, and the veil that hides them from our view probably will never be lifted. We must restrict ourselves to raising the question, without—as it is so often the case with scientific problems—being able to answer it.