AN ANCIENT EGYPTIAN TREATISE ON TRAUMATOLOGY 2800 B.C.

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Among the hundred thousand labourers who, according to Herodotus, were engaged for thirty years on the construction of the Great Pyramid, cutting huge stones, transporting them over land and water, and lifting them to great heights, serious accidents must have occurred almost daily. Priests visited the victims as part of their duty, read sacred incantations and administered herbs, but in general left them to the care of the gods. One of the labourers, however, was specially interested: he watched them carefully, examined them repeatedly, and helped them so far as he could with his meagre knowledge. He was an illiterate farmer with no pretence to any of the forms of education that were accepted in his day. He was innocent of exalted priestly knowledge and had no inkling of the vast information acquired by the domineering scribes; but it was this very ignorance that saved his mind from the doctrines, dogmas, hymns and charms of the highly educated; and his virgin mind was thus given full scope to develop its powers. This natural development proved to be exactly along the lines now recognised by modern medicine. He examined patients, acquired a vast experience, and remembered his clinical observations. Without the aid of records or any method of statistical analysis he grouped cases into clinical entities, foretold prognosis, treated patients rationally, examined them again and again, and observed the development of their diseases until they died or recovered. This was quite different from the technique of Hippocratic medicine, or Greek natural philosophy, which consisted in building logically and by deduction a great superstructure of knowledge on the basis of flimsy evidence and unimportant observation. His work proved that the inductive method can develop naturally even in the untutored mind and that human culture need not have waited so long before adopting it as the correct technique of thinking.

It is true that this doctor of ancient Egypt did not create a school. His work was too advanced for the age in which it was produced. It could not have been considered high culture—such a distinction was reserved for metaphysics, the occult arts and magic, which did little to permit the growth of inductive reasoning. Yet his work must have been appreciated by his contemporaries who became aware of its importance and asked him to commit his experience to writing. I imagine him as a grey haired man, who had seen the Great Pyramid grow, had seen some patients die and others recover, and thereafter told his younger colleagues what would happen to their patients. Almost invariably it befell as he told, and they marvelled. They were filled with admiration and wrote down the sayings of their great Master. He dictated his treatise—the first medical treatise in history. It was sought eagerly and commentated carefully. About one thousand years later, during the 17th century B.C., one copy, which unfortunately was unfinished, appears to have been mistaken for part of the Book of the Dead and was buried in a grave where it remained for about thirty-five centuries. In 1862 it was bought by an American Egyptologist, Edwin Smith; and later it was studied by Professor Breasted, the celebrated Egyptologist.

The style is remarkable. There is a peculiar quality, common to all original thinking, in which first-hand knowledge seems to be expressed so naturally. It is concise, unpretentious, orderly and simple. To find the same style we must pass through the centuries to the pages of “*De Motu Cordis*.” Ambroise Paré described fracture of the spine with paraplegia in the same graphic and succinct manner as this Egyptian author (Brockbank and Griffiths 1948).*

* BROCKBANK, W., and GRIFFITHS, D. LL. (1948): *Journal of Bone and Joint Surgery*, **30-B**, 556.

His talent for classification and orderly exposition is obvious. He was the first to use terminology which would not be intelligible to laymen and which had to be explained.

The papyrus itself, which has come to be known as the Edwin Smith Papyrus, is a collection of clinical records (forty-eight in all). They are arranged in logical fashion, starting with injuries of the head, and then the face, temporal region, mandible, chin, cervical vertebrae, clavicle, humerus and sternum. In each group he begins with the simple, superficial and less dangerous injuries and then discusses deeper and more serious disorders. Reports of the eight cases of head injury began by describing wounds of the scalp. In a glossary, the word "examine" is explained as having some relation to counting the pulse, "to know the action of the heart from which vessels go to every limb, hands, and feet." The commentator adds: "a priest of Sekhmat or any other physician puts his hands or fingers upon head or hands and measures the heart . . ." This knowledge of the pulse, and its clinical use as a measure of the action of the heart, was not known to Hippocrates and became

FIG. 1

Facsimile of the original hieroglyphic text of Case 6

popular only through the work of the doctors of Alexandria. Case 3 is one of compound fracture of the vault of the skull and in it he advises digital examination of the wound. Case 4 is the first of the more serious cases where the examination discloses "something disturbing under the finger." In spite of bleeding from the nostrils and ears, and stiffness of the neck, the verdict is given as "an ailment with which I shall contend." Case 5 differs from this only in so far as there is depression of the fracture but the verdict is: "an ailment not to be treated."

In describing Case 6 it is recorded: "If thou examinest a man having a gaping wound in his head, penetrating to the bone, smashing his skull, and rending open the brain of his skull, thou shouldst palpate his wound. Shouldst thou 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; when it has happened there is no throbbing and fluttering under thy fingers until the brain

of his skull is rent open; he discharges blood from both nostrils; he suffers from stiffness of his neck; thou shouldst say: an ailment not to be treated. Thou shouldst anoint his wound with grease. Thou shalt not bind it, thou shalt not apply two strips upon it, until thou knowest that he reached a decisive point." Fig. 1 is a facsimile of the original hieroglyphic of this case. Here is mentioned for the first time in history the brain. The gyri are compared to molten copper. Pulsations are observed and their absence is recognised as a serious sign. The case is evidently one of compression of the brain after a fractured base of the skull. The glossary of this case explains that the membranes are ruptured and that "it breaks open his fluid in the interior of his skull." He does not say blood and this could mean only cerebro-spinal fluid.

Case 7 is probably one of meningitis and is a little puzzling. Case 8, on the contrary, is beautifully clear: "If thou examinest a man having smash of his skull under skin of his head, palpate his wound. Shouldst thou find that there is swelling protruding on the outside of that smash which is in his skull, his eye is askew because of it on the side of him having that injury which is in his skull, and he walks shuffling with his sole on the side of the injury—thou shouldst recognise him as one whom something has smitten from outside as one who does not release his shoulder fork and who does not fall with the finger nails in the middle of his palm. He suffers from stiffness of neck and bleeds from ears and nostrils. An ailment not to be treated. Sit him up till he regains colour and until he reaches a decisive point." A second examination records observations exactly as Case 6 as far as the words "an ailment not to be treated." This is a clear case of hemiplegia after head injury with conjugate deviation of the eyes. For once he changes the formula "thou shalt say concerning him" and writes: "thou shouldst recognise him as one whom something from outside has smitten." I believe this shows that he wanted to make a distinction between hemiplegia due to internal disease and that due to injury.

Let us compare the observations of this Egyptian doctor on head injuries with those made about 2500 years later by Hippocrates who is acknowledged as one of the world's greatest medical thinkers. Hippocrates first noted that the configuration of the skull and the arrangement of sutures differed in various parts and said: "the region which is thinnest and weakest is the forehead. There the skull has least flesh over it and most brain matter underneath." From this it was assumed, by logic and not from clinical observation, that "the bone is more likely to be contused, fractured, and depressed and these lesions are more dangerous, more difficult to treat and less likely to escape death than lesions in other regions; and when death occurs it occurs earlier, for the brain suffers more seeing that the bone is thinnest and brain matter thickest there." The theme was developed and lesions caused by different weapons in different regions of the skull were considered, many conclusions being derived from the not very significant fact that the skull was thinnest in the forehead. The rest followed. This was real Greek logic and quite foreign to our author. There is much sound observation in the Hippocratic thesis, and in his writings the operative procedure of trephining is well discussed. But one does not gain the impression of clear recognition of clinical details of individual cases, nor of the fundamental facts of head injuries. The characteristic features of fracture of the base, compression of the brain, meningitis, and conjugate deviation of the eyes, were never impressed upon him by direct observation; and the undue attention he paid to the fracture itself influenced surgical text-books until very recent times. It is the brain injury that matters—not the fractured skull, and this was the emphasis of our very ancient author. His observations lay much nearer to the truth than many of those of Greek medicine which captured imagination by their cleverness rather than their soundness.

The Egyptian papyrus, Case 20, a wound of the temporal region, mentions bleeding from the nostrils and both eyes and adds that the "patient wipes his eyes with the back of his hand like a child and knows not that he does so"—a beautiful description of cerebral

irritation. Fracture of the mandible with fever is pronounced an ailment not to be treated. The report of Case 25 is a gem: "If thou examinest a man having dislocation of his mandible and the mouth is open, thou shouldst put thy thumb upon the end of the rami of his mandible and your two claws (hands) under his chin and thus reduce his dislocation." There never was, and probably never will be, another method of reduction for this dislocation!

In the management of injuries of the spine, Case 31 is a typical record. It is entitled: "Instructions concerning a dislocation in a vertebra of his neck." "If thou examinest a man having a dislocation of a vertebra of his neck, shouldst thou find him unconscious of his two arms and his two legs on account of it, while his phallus is erected on account of it and urine drops from his member without his knowing it; his flesh has received wind; his two eyes are bloodshot; it is a dislocation of a vertebra of his neck extending to his back-bone which causes him to be unconscious of his two arms and two legs. If, however, the middle vertebra of his neck is dislocated, it is an emissio seminis which befalls his phallus (it remains stationary, when it cannot sink downwards, it cannot lift upwards). *Diagnosis*: Thou shouldst say concerning him: One having a dislocation in a vertebra of his neck, while he is unconscious of his two legs and his two arms, and his urine dribbles, an ailment not to be treated."

In the treatment of fractures of the clavicle it is recorded that the patient should be placed "prostrate on his back with something folded between his shoulder blades . . . with his two shoulders to stretch apart his collar bone until the break falls in its place. Place two splints of linen, one on the inside and the other on the underside of his arm." Has any material progress been made in the treatment of this injury in the fifty centuries that have since elapsed?

There seems little doubt that the author of this papyrus was skilled not only in clinical observation but also in anatomical dissection and post-mortem examination apart, I think, from embalming. How else would he have known of the meninges of the brain, and the likeness of the gyri of the brain to molten copper? How otherwise could he have referred to "canals leading from the heart to every member," and to the "two canals on each side of the throat leading into the lungs?" Would clinical observation alone have shown him that in fractures of the spine the crushing of one vertebra into another was "like the imprint of a foot in cultivated ground?"

His knowledge of physiology and pathology was of course limited but he knew that by feeling the pulse he could assess the action of the heart, and that injuries of the brain could cause paralysis of the opposite side of the trunk and limbs. He knew something of conjugate deviation of the eyes. He knew about inflammation and described the signs of redness, swelling and heat. He recognised the danger of fever in a compound fracture. He described a sprain as "a rending of two members though each is still in its place." He knew that compression of the brain was dangerous when pulsation of the brain ceased. And we should perhaps emphasize the eagerness with which in Case 8, an injury of the skull and brain, he claimed that symptoms were caused by "something from outside smiting him"—thus denying the supernatural and demoniacal influences of a fall which even to this day, more than five thousand years later, are held in certain parts of Egypt.

The author lived 2800 years before Christ; he saw the building of the Pyramids; he had powers of clinical observation even greater than those of Hippocrates; and he recorded methods of treatment which have not been excelled to-day. His work was indeed too advanced for the age in which he lived.