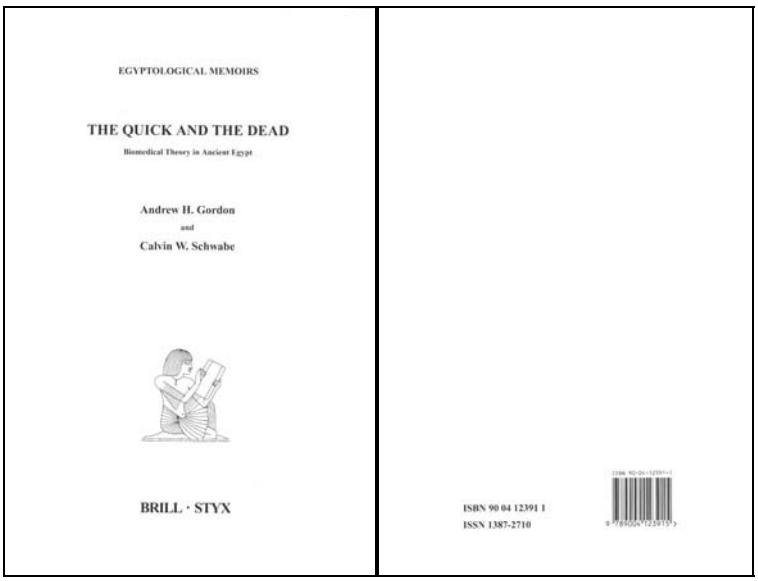
Gordon, A.H. & C.W. Schwabe. 2004. The Quick and the Dead: Biomedical Theory in Ancient Egypt. – Leiden, Brill (Egyptological Memoirs 4)

Book review by G. Metz



Ten years after the 7th International Congress of Egyptologists in Cambridge in 1995, one of the few papers presented and still burned into my memory was "'Live Flesh' and the 'Opening–of–the mouth': biomedical, ethnological and Egyptological aspects" by Andrew H. Gordon and Calvin W, Schwabe (1995: 68–69 & 1998: 461–469). This paper presented revolutionary ideas concerning the use of the detached bovine foreleg during ancient Egyptian funerary rituals. I was hardly the only one in the audience that day who had an epiphany of sorts, as when all the pieces of a puzzle come together. Ever since then, I have been awaiting a broader study by the authors and when presented with the opportunity to review their recent monograph 'The Quick and the Dead: Biomedical Theory in Ancient Egypt',[1] I was immediately intrigued.

In this book the authors use a multi–disciplinary approach to illuminate the origins of some of mankind's earliest theories concerning the magic of life and death in general and more specifically vertebrate physiology. The book presents revolutionary and innovative ideas indicating the source of various aspects of ancient Egyptian medicine and religion, namely in the observation of natural phenomena, especially within animal husbandry. The curiosity of the ancient Egyptians concerning nature and especially the animal world is viewed as the key element behind the development of ancient Egyptian society and religion. This inquisitiveness led also to the "emergence of a rudimentary scientific approach to understanding nature" (p. xv). The source material is studied using an unusual synthetic tertiary method combining Egyptological, biological and ethnographic perspectives – a task to which the authors are uniquely qualified.

The close connections perceived between mankind and the animals were central to the world view of the ancient Egyptians. According to the authors, the domestication and ritual sacrifice of cattle was the origin of an understanding of both animal anatomy and physiology. This knowledge (including both correct and incorrect conclusions) was in turn applied by analogy to mankind and the gods. Already during the Early Dynastic period, the Egyptians seem to have developed two physiological theories concerning life, death and rebirth based on these animal observations. The first theory was about life manifesting itself in movement as seen in the fasciolations of vivisected bovine forelegs and the second concerned the male's role in reproduction. Such an analogical approach to biomedical unknowns, *i.e.* the employment of animal models or comparative medicine, is still an important element in the advancement of human medicine today.

The first chapter lays the foundation for the rest of the book by discussing the differences in definition between science and magic, the development of early scientific theory and the origins of an experimental and comparative approach to understanding nature. The evolution of reason and science in Greece is outlined and the authors give evidence showing that a similar evolution of scientific thought was extant in Egypt thousands of years before, especially within the field of medicine. Traditional theories concerning the development of medical and anatomical knowledge from the treatment of battle wounds and from the practice of mummification are

[1] The fitting title of the book would seem to derive from the Athanasian Creed, via the tongue in cheek title of a western directed by Sam Raimi (1995).

discussed and dismissed. Instead, the authors propose observations of animal anatomy and veterinary medicine as the source of this knowledge. They base this on evidence from the multitude of hieroglyphic signs representing parts of the body, the Kahun Veterinary Papyrus etc. Earlier scholarly conclusions are shown to be biased due to the differences in mindset between ancient and modern man. For example, how the common (and incorrect) view today that sees veterinary medicine is an inferior derivation of human medicine has influenced our understanding of such practices in ancient Egypt. Furthermore, ritual slaughterers are often regarded as mere butchers and the sacrificial flesh is seen only as cuts of meat or food.

Modern scholars often misunderstand the fused character of ancient Egyptian society, where "such notions as metaphor, symbol, simile, analog and identity–same" (p. 23) were integrated. Likewise, institutions and activities such as religion, animal husbandry and healing were fused in ancient Egypt, although they are currently entirely distinct in the Western world. Another aspect of this fusion was the tendency to prefer multiple explanations of a phenomenon or event. This multiplicity of approaches was intended to complement and reinforce rather than contradict. This can be difficult to reconcile with a modern Western mindset which tends to dictate that there is only one correct explanation precluding all others.

Due to the 'Cattle Culture' nature of the Predynastic and Early Dynastic periods of Egyptian civilization it is problematic for modern scholars to decipher all the references to cattle in the source material. The ethnographic approach is used to complement the Egyptian sources by comparing them to what is known about present–day cattle–based pastoralists in the upper Nile region. Furthermore, the biomedical approach including experimental dissections of cattle is used to better understand parts of ancient rituals, the origins of various anatomical hieroglyphs etc.

The next chapter begins by discussing the preoccupation of the ancient Egyptians, and especially its priesthood, with the problems of life, death and rebirth. These preoccupations are most clearly viewed in the ancient funerary literature and rituals. The concept of the Ka as a vital force and manifestation of life is a central idea in these texts. Many of the statements made concerning revivification also make note of bulls. The bull was an animal often identified with the pharaoh due to its virility and strength. We are reminded that the bull was the main sacrificial animal throughout ancient Egyptian history and that the Egyptian word for bull was *k3*. Various common animal associations with life and death are also discussed, especially those of a bovine or herpetine nature, along with the possibility that animal behaviour may be the source of certain rituals.

Chapter three compares the cattle–culture of Predynastic and Early Dynastic Egypt with the cattle–centered pastoral societies still extant along the upper branches of the Nile and surrounding areas. These modern pastoral societies form what has been called the East African Cattle Complex in which the relationship between mankind and cattle is described as "a broad covenant and pattern of emulation" (p. 31). Cattle are economically viewed as wealth and are very important in rituals concerning birth, marriage, death etc., and are central to religious beliefs. Cattle–keeping has been shown to be closely connected to the emergence of both religion and agriculture, and the authors suggest a third close association with the evolution of rudimentary biomedical science.

Evidence of similar cattle–culture traits in Predynastic and Early Dynastic Egypt are investigated, for example the use of bovine statuettes and amulets, bucrania, and early iconography depicting the pharaoh as a bull. The plethora of historical sources from ancient Egypt are presented including bulls and cows as divinities, pharaoh as a bull versus his people as cattle, bovine sacrifice, temple herds etc. Cattle are also discussed from a more general perspective covering such subjects as the range of the now extinct wild bull, ancient bull hunting, the domestication of cattle and the concept of bovine milk as food for humans.

According to the authors, the Predynastic origin of this evolution of biomedical science is to be viewed in connection to hunting magic and the tribal chief's admiration and emulation of the powerful and libidinous characteristics of the wild bull as "great herd dominator and defender" (p. 54). The chiefs became so closely identified with the bovine species that they claimed descent from a cow. The bull and the cow were also assimilated into the firmament and into a cosmology where celestial bodies and deities were often portrayed in bovine form.

Chapter four deals with the history, development and medicinal implications of the comparative biomedical approach. Ancient Greek sources from the 6th and 5th centuries BC indicate that objects and phenomena were defined either as one of a pair of opposites or by assimilation to something else, especially in connection to animal dissection and comparative anatomy. Such reasoning led to the emergence of rational formulations of causal and explanatory hypotheses and even to confirmatory experimentation. The possibilities for a much earlier development of this kind of rational biomedical process in ancient Egypt are investigated in light of the dissections and vivisections of bulls which were important elements of many ancient Egyptian rituals. According to Gordon & Schwabe (p. 59), the Egyptians were not merely resorting to random trial and error or purely magical analogy, but had taken some consequential steps in the development of an orderly process of comparative inquiry, especially in relation to biomedical unknowns.

The following chapter deals with the concept of 'live flesh', the Ka and muscle physiology in connection to bull sacrifice and certain rituals. As early man would certainly have noticed that living animals move and dead ones do not, it is suggested that this motion was seen by the ancient Egyptian priests as a visible manifestation of life force or Ka. The tremors seen in the muscles of freshly killed animals may have been viewed by the ancients as a transferal or dissipation of this life force. Of particular interest are the initial stages of the bull sacrifice where one of the forelegs was amputated directly after the animal was killed or while the animal was still alive. Scenes showing this act indicate it was performed in haste and that the amputated foreleg was immediately carried off for use in various rituals. Anatomically, the foreleg is the only musculo–skeletal assemblage that can be quickly and cleanly removed with but a few cuts of a knife, especially if the animal is trussed on its back in the fashion generally portrayed in ancient Egyptian iconography. Furthermore, amputated limbs and excised muscles from living or freshly killed vertebrates can spontaneously contract or be stimulated to contract – fasciolations which gradually subside until rigor mortis sets in. Such contractions are more dramatic when the muscles are still connected to an articulated skeletal joint.

The freshly amputated foreleg (*ḫpš*) was a necessary part of the Opening of the Mouth ritual where it was used as a tool of revivification by the priest who held it to the mouth of the deceased. The adze (*msḫtyw*) was also used in this manner and the two tools were closely connected symbolically. For example, both were used to describe the 'imperishable stars' (Big Dipper or Great Bear, *Ursa Major*). The hieroglyph depicting an adze is used as a determinative in the word *stp* 'to cut up (an ox)' indicating, along with other evidence, that the actual tool was used in combination with a knife by the sacrificial butcher.

The authors postulate that the adze may also have been used to stimulate muscle fasciolations and the visible contraction of the foreleg during the ritual of the Opening of the Mouth and that these contractions were "dramatic demonstrations" (p. 79) of the transferal of the energy of life to the deceased. In order to test this theory, the authors performed experimental re–enactments in a humane manner and under controlled circumstances in a university laboratory. The experiments were performed at a constant temperature of 22° C and the timing was begun with the death of the bull. A foreleg was quickly amputated in order to observe stimulated and spontaneous fasciolations and contractions of whole muscles. Four different types of mechanical stimulation were used: 1) stabbing with the point of a knife, 2) striking with a simulated adze, 3) touching with a knife point and 4) prodding with a finger. The most dramatic contractions were induced by stimulating the biceps brachii, biceps brachialis and triceps brachialis muscles causing considerable flexions of the lower leg at the elbow joint. The greatest joint movements were induced by stabbing with a knife followed by striking with an adze. Following such stimulation, spontaneous fasciolations would often persist for three to four minutes. These stimulations were performed on the amputated forelimb every five minutes for the first hour and then every fifteen minutes. Fasciolations and contractions could still be induced up to two hours post–mortem, although the reaction decreased over time.

Although these phenomena were probably originally observed accidentally, the authors propose that they were incorporated into rituals concerning the transference of life energy and that the artificial stimulation of the musculature of a forelimb in order to demonstrate this affect was an often performed physiological 'experiment' from which the priests would have learned significant biological facts.

One example which may indicate that the ancient Egyptians applied this knowledge to human medicine and not just the ritual revivification of the dead is the usage of the ingredient 'live flesh' in many prescriptions. This term has often been translated as fresh or raw flesh, however the authors prefer to translate the hieroglyphs literally and see this in connection to the excision of muscles and forelegs from live bovine animals and the transference of life energy to the patient.

After this, the discussion of Ka continues and the authors propose that the biological observations from bull sacrifice and dissection are the origin of the word's definition as 'life force' or 'animating principle' and that it was not until later that the word became more abstract. The ancient Egyptian word for food and sustenance (*k3w*) and its key role in life is discussed, along with other similarly related words meaning 'vagina', 'pregnant woman' and 'construction'. The hieroglyphic sign used for all of the above is a connected pair of upraised arms, perhaps an early ritual imitation of a bull's horns, a theory for which evidence is presented.

The ancient Egyptian concept of Ka is compared to similar notions still found today among cattle–dependant pastoralists in the greater Nile basin. Several reports have been made of the cutting of flesh from live bovine animals for ritual consumption. Among the Nilotic Dinka, flesh is seen as divine energy and the tremors observed in sacrificial flesh is considered evidence of such and of life itself. The priests, who are called 'men of flesh', imbibe quivering raw flesh during sacrificial rituals in order to replenish their life force.

The medicino–historical development of knowledge concerning muscle physiology in the Greek world is outlined including important observations made by Praxagoras of Cos, Herophilus of Chalcedon and Galen. The first theory of muscle physiology is usually credited to Herophilus, however the authors show that similar conclusions were probably made much earlier by the ancient Egyptian priesthood, who then applied this knowledge to medical practice.

Chapter six deal with the anato–physiological source of life and the possible bovine origins of the Ankh and Djed hieroglyphs. The entire spinal column including the neck and tail vertebrae are mentioned in many ancient Egyptian texts as having properties important to procreation and revivification. Furthermore, semen was thought to originate from the interior of bones, and the marrow itself and spinal cord were seen as the source of life. Also, certain parts of the spine seem to have been especially important in this respect, especially the thoracic vertebrae.

The origins of many anatomical hieroglyphs related to the spine are discussed. Besides F41 and R11 (*ḏd*), other hieroglyphs are commonly used to determine such words. Examples are F38 & F39 in *psḏ* (back), V16 in *s3* (back – veterinary term) and F37 in *i3t* (spine). These hieroglyphs and others such as F40 in *3wt* (gifts), all represent the four thoracic vertebrae of an ungulate animal – most likely a bull. In this context, an unusual determinative for the word *psḏ* found in the Pyramid Texts (1547c) and in the Kahun Veterinary papyrus is of interest. Shaped like an inverted ankh, it has been identified as a thoracic vertebra from an ungulate animal shown from the front. The anatomical proximity of the thoracic vertebrae with the foreleg and the fact that they are exposed to view when the foreleg is removed may explain the emphasis placed on this part of the spine and why it was so endowed with the magic of life. A spell from the Coffin Texts is of particular interest in this context; it ensures the deceased's knowledge of "the secret path in which the vertex of Re and these four knots [vertebrae] which belong to the celestial kine [cattle] are hidden (?) because of them, I also know … what is loosed for it is the backbone, when Re speaks of it. See (?), you are lifted up alive" (CT 759).

Many sources including the Osiris myth and various funerary spells indicate that the ancient Egyptians feared dismemberment after death. Keeping the body intact, or reassembling it after death were seen as key elements of revivification. The spells concerning the reassembly of the body often use the sign S24, *ṯs* (knot), for the joining together of bones. This word can also be translated as 'vertebra' and the hieroglyphic sign may actually portray a bovine vertebra seen from above. Connections to the 'knotting of cords' and other uses of the word are outlined from this perspective. An interesting example is taken from the Coffin Texts (407 variant): "O you who knot (*ṯs*) your rope … O ferryman … O you seven knots (*ṯs.w*) of the celestial kine …" All mammals have seven cervical vertebrae and it is suggested that it is these that are implied. The same spell alludes again to the spine when it defines the mooring rope of the bark of Re as the "tail of the great wild bull" (CT 407 variant).

The origin and meaning of Ankh, the hieroglyphic sign for life S34 (*ʿnḫ*), is thoroughly discussed. Earlier suggestions as to what this enigmatic hieroglyph actually portrays include a sandal–strap, a mirror, a penis or penis–sheath and a magic knot similar to the *ṯyet* (V39). Although some of these associations may be correct, the authors suggest a complementary explanation that the Ankh sign is a representation of a thoracic vertebra from a bull shown from the front. This theory is supported by comparison to an actual thoracic vertebra and the appearance and symmetry of its parts.

Besides being intimately associated with life via a bovine connection, the spine is also associated in similar fashion with death via a herpetine connection. Both semen (*mtwt*) and poison (mtwt) were produced in the spine. Snakes were closely connected to death in ancient Egypt and these associations are concisely pursued. Not only do snakes resemble a "living spinal column" (p. 109) but they are associated with vertebrae in the funerary literature, especially to the seven cervical vertebrae possessed by all mammals: "The King is a serpent, the Bull of the Ennead, who swallowed seven uraei that they might become his seven neck vertebrae (*nḥbwt*)" (PT 511abc).

The deceased is also described in the funerary spells as either travelling through the spinal cord of a snake or that of a bull, a symbolic journey of rebirth. These complimentary paths of revivification are viewed by the authors as a symbolic retracing of the path of semen through the spine of a bull or the path of poison through that of a snake. These ideas are in turn compared to the placement of the uraeus on the brow of the king together with the tail of a bull worn at his back and also to statements in the Papyrus Jumilhac indicating that the semen from the bones of the male contributed to the white parts of a foetus whereas the menstrual blood of the female contributed the red parts.

Further comparisons are made to similar notions in other cultures, for example the Judaic tradition that Eve was created from a rib or thoracic vertebra. Also, present day Nilotic Dinka believe that semen originates in the brain and spine and the closely related Nuer use the word '*jok*' to mean both 'spirit' and 'back', especially in connection to the cervical vertebrae.

The following section deals in a similar way with the origin and meaning of the Djed sign (R11, 'stability'). Although previous studies have often suggested a non–anatomical source, such as a tree, a column or even the supports of the sky, the most common connection made in the funerary literature is to a backbone or spine, especially that of Osiris. The Djed sign is also used as a determinative during the Late Period in the word *psḏ* (back). The related hieroglyph F41 has previously been identified as a human or bovine sacrum, however this is incorrect as neither species has the transverse processes shown in the hieroglyph. The authors identify this sign instead as the four lumbar vertebrae as seen from the dorsal perspective. They in turn identify the Djed sign as the bull's sacrum plus the last three lumbar vertebrae. The similarity in form is striking as shown by images of

an actual combination of such bovine bones. Anatomically, these bones give stability to the lower back and pelvic area and in turn to the hind legs. Furthermore, the coccygeal (tail) vertebrae and the white retractor muscle of the bull's penis connect to the base of the sacrum. The sources indicate that the spine was thought to have two purposes: to support the body and be the source and channel of semen. It would seem that the Egyptian priesthood not only used the transference of Ka energy to revivify the dead, but also analogies founded in their knowledge of procreation and the elements causing foetal development.

The following chapter investigates the meaning of the Was sign (S40), its connections to the male reproductive system and its possible bovine anatomical origins. Ancient sources indicate that the Egyptians viewed the spine and penis as connected. Anatomically, this is not the case in man, however a bull's penis is connected via a white retractor muscle to the first coccygial vertebra, *i.e.* immediately behind the bones thought to be the Djed. The authors suggest that the Was sign, along with the closely related *ḏjˁm* sign (S41), may depict the dried penis of a bull, especially as the Ankh, Djed and Was signs were so often written together. The meaning of Was is usually translated as 'dominion', however the sources indicate that this power was sometimes of a sexual nature. The Was staff was used as a herding implement, for marking the cardinal points in the sky and for the ritual demarcation of boundaries, all uses found for similar staffs among some contemporary African pastoral groups today. This territorial form of dominion is also compared to animal behaviour, for example, the use of urine by the males of various species to set territorial boundaries and the male baboon's display of his penis during guard duty. The physical act of copulation is often used to exercise domination among many animals, especially herd animals with a dominant male. Phallic symbolism in Egypt is outlined, covering such areas as ithyphallic deities and the sexual acts employed in the battle between Horus and Seth. Penis analogs such as scepters, swords and horns are discussed along with semen analogs such as milk, saliva and incense.

Additional laboratory experiments were performed with dissected bull's penises. It was found that when the penis was removed at the root, the forked lower end of the staff could be reproduced by retaining the crura attaching the penis to either side of the ischial arch of the pelvis. The 'ears' of the staff could be produced by retaining some folds of epithelium or the distal end of the retractor muscle. When hung to dry suspended by a cord tied below its glans, it becomes a long, strong and flexible rod very similar in appearance to a Was staff, with an eared hook at the top and a fork at the bottom.

The Ankh–Djed–Was combination is seen as a symbol for the male reproductive system. The Ankh and Djed representing the spinal source and conduit of semen along with the Was, the organ of delivery. These creative properties along with the powers of life, stability and dominion, were then conferred upon the pharaoh as 'herd' leader. This kind of symbolism and the sources from which it derives indicate again that in connection with the emergence of science from magic, the ancient Egyptians came to rational conclusions based on observations from animal dissection and applied this knowledge to man.

Chapter eight broadens the discussion by illuminating the role of ancient Egyptian healers and their institutions. The titles of healers are outlined as well as the contexts in which they are found indicating that no major distinction was made between human and veterinary medicine before the Ptolemaic period. The institutions in which medical and other knowledge was retained and dispensed are also discussed, especially the role of the Per Ankh, the House of Life. This establishment dealt not only in the preservation of wisdom and the practice of medicine, but also in the health, maintenance and slaughter of sacred cattle. Comparisons to Greece are discussed and it is suggested that the scholarly institutions of Alexandria such as the Museum and Library may have been inspired by these more ancient establishments.

The final chapter and epilogue review the theories presented. In connection to the development of scientific thought in ancient Egypt, the authors conclude that the process was more important than the results, *i.e.* that although the ancient Egyptians did not always arrive at correct conclusions, they had applied analogical reasoning in a rational manner.

This book is readily accessible and potentially of great interest to a broad audience including the layman. Much of the material presented is not news to Egyptologists. However as the book was written to a certain extent towards the medical, biological and ethnographic audiences as well, such information is not superfluous and is often welcome even to the Egyptologist as a reminder in order to follow the authors' chain of thought. Much of the medical, biological and ethnographic information is also fully explained, but a balance is not always achieved. For example, the types of society as defined by Riggs (pp. xxii & 202f) are not fully explained to the uninformed reader until the epilogue, yet they are crucial to understanding the underlying premises of the book. Furthermore, if the intent of this information is to facilitate reader comprehension, more of the ideas presented in other articles written by the authors, and so often referred to in the present work, should have been included – especially as these articles may prove to be difficult to obtain.

Due to the integrated nature of ancient Egyptian society, where areas such as medicine, magic, and religion were intimately related, it is often difficult to account for how a small detail relates to the larger picture without either voluminous explanation or demanding prior knowledge of your audience. In the case of this book,

there is a large degree of repetition which is irritating to the reader who consumes the book from cover to cover. A different structure of the text could perhaps have avoided this problem.

Although there are also specific details that can be criticized, they are mostly in the form of details glossed over or missed by the authors which would have supported their theories. For example: although the phallic connotations of the Was staff are thoroughly investigated and swords are mentioned among the phallic analogs, the authors do not mention in this context that the sword in question is the very *ḫpš* scimitar elsewhere referred to as an analog of the foreleg. This is of particular interest when viewed in connection to the iconography of the chariot of Tuthmosis IV shown in figure 7.1. Here, Montu–Re is shown holding a staff consisting of the Ankh–Djed–Was combination along with the *ḫpš* scimitar as though he were holding his penis erect. This supports the theory that the Ka energy of the foreleg and the reproductive energy of the spine were connected, a detail thus warranting emphasis. Another example of this is when semen analogs are discussed but it is not pointed out that the word for milk (*i3tt*) is spelled with the Was sign (S40).

As to the connection between Ka energy and movement, it would have been interesting conceptually to see something concerning other states of a lack of motion. For example, the bound and mummified state of the deceased and Osiris in contrast to that of the living and the majority of deities who are depicted as 'striding forth' – or other states of motionlessness described in the funerary literature, such as that defined by the verb *nny* meaning to 'be weary, inert' along with its derivatives such as *nnyw* 'inert ones = the dead', *nnw* 'inertness' and possibly *Nnw* 'the Primaeval Waters' – all used to describe precursors to a state of life and motion.

Perhaps these omissions were intended as I continually find myself adding further in my mind to the connections presented in this book. It has given me food for thought for many years to come and I look forward to the discussions, which no doubt will arise from this work. I suspect that, on the whole, the book will be well accepted and that we will soon see these theories integrated into the more popular literature and other media concerning ancient Egypt.

Gordon, A.H. & C.W. Schwabe. 2004. The Quick and the Dead: Biomedical Theory in Ancient Egypt. – Leiden, Brill (Egyptological Memoirs 4). 242 pp. ISBN 9004123911 (series and series number EM– –004). Price € 75.00/$ 99.00 (hardback).

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