ONCOLOGY AND INFECTIOUS DISEASES IN ANCIENT EGYPT

The Ebers Papyrus' Treatise on Tumours 857-877 and the cases found in ancient Egyptian human material

A dissertation submitted to the University of Manchester for the degree of

Master of Science in Biomedical and Forensic Studies for Egyptology

In the Faculty of Life Sciences

2008

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Abstract

This dissertation focuses on pathogenic elements found in the Ebers papyrus: a series of prescriptions that are believed to be the remains of a "book of tumours" which deals with what appear to have been benign ganglionic masses, polyps, sebaceous cysts, varicose veins and aneurysms. Discussion of this Treatise on Tumours (paragraphs 857-877) includes the previous probable identification of a disease, the analysis carried out to date by several Egyptologists, and my own interpretation which combines the linguistic approach adopted by these scholars in the past, and the medical observations of scientists in more recent years: in total we have descriptions of neoplasias versus swellings. This work also includes some references to the plants mentioned as treatments for the illnesses described in the 21 paragraphs of the Papyrus' last section on tumours (what it is now thought to be oncological concerns) taking into account the problem of translation, since some plants are still unidentified today.

References are made to material evidence found in Egyptian mummies in several sites revealing the presence of a tumour, e.g. Brothwell, 1981, Strouhal, 1999, (Ruffer, 1914), Cockburn, 1998, 1980, (Spigelman, 1997), Van Hasselt, 1999, Estes, 1989, Capasso, 2005, Leslie and Levell, 2006, Halperin, 2004, Mark, 2006, and Nerlich and Zink, 2006.

Acknowledgements

This dissertation is dedicated to Professor Rosalie David as an acknowledgement for her friendship, support and proficiency in Biomedical Egyptology.

I would also like to thank Dr. Ahmes Pahor for his invaluable help and professional medical advice due to his interest and vast publications on ancient Egyptian medicine.

All my gratitude goes also to Dr. Mervyn Harris and Dr. Roger Forshaw, colleagues and friends, for their advice, support and knowledge.

Also, I want to thank enormously my friend Dr. Angelique Corthals for her support, friendship and expertise.

And I also have to thank Professor Judith Adams for allowing me to take part in some sessions at the MRI where mummies were radiographed and CT scanned which was a source of valuable information for my research.

I also like to thank Dr. John Denton for his relentless help and professionalism, allowing me to understand difficult and very technical subjects as Histology.

My eternal thanks go also to my dear colleagues and friends Jacky Finch, Dr. Jacky Campbell, Natalie McCreesh, Gillian Riley, Dr. Ryan Metcalf, Dr. Jenny Cockitt, Vicky Gashe, David Counsell and Angela Thomas for all their help, in many occasions, exchange of information, and support, both personal and professional,

INTRODUCTION

The knowledge about medical practices in ancient Egypt in the past was not acquired through autopsies and studying human bodies like today; embalmers knew about the human body and doctors, *swnw*, learned their trades in the Houses of Life, studying from the knowledge compiled in old texts. Many names of internal organs are drawn from butchery and cooking (Strouhal 1992: 243-245). Some hieroglyphic determinatives[1] used to describe human bodily parts and diseases use the features of animal body parts[2] and this explains they were more familiar with animal bodies and knew they would not be very different from humans.

The study and research of all practices carried out in ancient Egypt that focused on health and well-being has to be a multidisciplinary one, as different areas are called into action when researching for information.

The contribution of Biomedical and Forensic Techniques for Egyptology has an important role. The study cannot be pursued only by historical and literary knowledge, as it would be a single-sided approach to the matter. It is only after some years of historical and literary analysis that, with acquired scientific knowledge, this work can be finalized.

Although more evidence of cancer may be found in Egypt in the future, this is an attempt to bring together the most updated collection of references to these two types of

[1] (Gardiner 2005: 461-467)
[2] Sixty three hieroglyphs of the human body in Gardiner's sign list, and fifty one show parts of mammals. (Nunn 1996:52-3)

diseases affecting ancient Egyptian health: cancer and related infectious diseases (affecting the liver).

Being Paleopathology a science demonstrating the presence of infirmities in human and animal remains from ancient times, according to Ruffer's definition in 1913, the study of the incidence of neoplasias in humans in ancient Egypt can be considered a section of this science.

The word tumour, used today to describe neoplasias (new growth of tissue cells), should be applied to all swellings as ancient Egyptians seem to have done in these 21 studied paragraphs of the Ebers Papyrus (EP). A neoplasm, being an abnormal mass of tissue, may arise in any tissue of the body, in any organ and in any individual without consideration of any age, sex, ethnicity, health status, social factor and they can be either benign or malignant (Roberts and Manchester 2005: 252).

Since the legacy of ancient Egyptian bodies consists of mummified and skeletized ones, soft tissue analysis is almost out of the question for diagnosis since it is very difficult to retrieve this kind of information due to the state of preservation of the bodies.

Tumours usually kill the person in a short period of time and only bone metastasis can be identified in ancient bodies. It is from bones that the majority of information is retrieved.

Bone neoplasias are important individualization factors and, among those, we still have to distinguish between benign and malignant. Benign tumours, osteomas, are better delimitated as opposed to malignant lesions that are much more invasive and have irregular forms. These lesions are almost always metastasis being the more affected bones the vertebrae, the pelvis, the ribs and the skull. Different types of cancers can provoke different types of lesions; lung and breast cancers provoke both osteolytic and

osteoblastic ones, forming mixed lesions in the bones closer to the affected organs. Nevertheless, age and sex of the victim are to take into consideration for the diagnosis of the tumour type (Cunha, 2006).

The difficulty to diagnose with certainty that a bone shows the presence of a tumour is when assigning bumps on post cranial bones for; sometimes it is difficult to decide whether an exostosis (warty outgrowth) is a tumour or the end result of an inflammatory process (Brothwell 1965: 139).

The most common form of tumour to be found in archaeological material (bones) are ivory or benign osteomata, seen as simple mounds of compact bone, usually on the external face of the cranial vault. They may also develop in the orbital cavity or in one of the air sinuses. They can also be simple tumours made up of inner cancellous tissue as well as compact bone (Brothwell 1965: 141); (Roberts and Manchester 2005: 255); (Campillo, 2001: 151).

The malignant tumours, osteosarcomata, grow inside or may extend to the original surface of the bone but only the first case was found in archaeological material such as cases like the ones described by Smith and Dawson in 1924 and Ruffer in 1920 (see Table 4). Multiple myelomas, for instance, the formation of multiple tumours, take the form of very small clear rounded lesions (<1 cm in diameter) (Brothwell 1965: 141-142).

In general, primary malignant bone's neoplasias represent only 0, 52% of total observed, while 12 to 15% of non-bone malignant neoplasias are metastasis located in bones. It is not difficult to diagnose cancer in these cases but several doubts may arise, the morphological traits are not enough to determine a correct and accurate diagnosis; lesions of a similar morphology may erupt and look like cancer. Other parameters are to

be considered when reaching a conclusion: topography, age, sex, and imaging results[3] taken from the specimen (Campillo, 2001: 155).

The observation of bone lesions in mummified human remains can be more difficult to appreciate because the bones are covered with desiccated soft tissue. And lesions in soft tissue are even more difficult, if not almost impossible to detect, using rehydration methods applied by histology, as bacteria and fungi deteriorate the human remains (Campillo, 2001: 74).

The aim of the research conducted to produce this dissertation is to provide a summary collection of information on the cases found and discuss the different interpretations given by different authors at different times, as to get closer as possible to a conclusion of these type of diseases and if they would exist in ancient Egypt. I believe I have gathered the available information so far; presenting the possible data collected from all available sources.

Cases in ancient Egypt

All diagnoses to date are controversial; what has been published since 1825 until today makes us conclude that, the average age at death being 36 years of age, shows that tumours essentially affected young people. Billiary duct[4] infectious diseases (due to the high prevalence of infection by water snail) affected obviously the liver, but there is no reported case found of liver cancer in ancient Egypt so far. Nasopharyngeal and uterus carcinomas were the most common and rarer cancers such as breast and colorectal may be attributed to a fat enriched diet.

[3] Radiological methods have been able to identify several diseases but cancer has been 'absent' from images of mummified human remains (David and Tapp, 1993: 105).

[4] There is a record of an analysis made to a mummy from a priestess of Thebes, c. 1500 a. C., at The Royal College of Surgeons Museum in London, regarding a well preserved gall bladder containing 30 calculi; unfortunately, this mummy was destroyed by German bombings from the II WW, as stated by Knut Haeger in *The Illustrated History of Surgery*. A more recent example from this kind of pathology, linked to liver and bile duct and gallbladder; the famous Umm Kulthum, Arabic song diva, (May 4, 1904 – Feb, 3, 1975), became sick in the 1930s and, at the end of the summer of 1937, doctors recommended treatment with mineral waters. Next summer, Umm Kulthum spent a month at Vichy and came back to Egypt feeling better, although, according to her: «I am restricted by a rigid and limiting diet that forbids most part of foods». She later died of nephrites, a kidney inflammation provoked by an infection.

In one study, around fifty cases of bone tumours in Egypt and Nubia were diagnosed as malignant[5] and benign. Their classification amongst the cases reviewed in this study, made by an Italian team, has the following statistics[6]: osteosarcoma – 6; multiplex myeloma – 8; osteolytic metastatic carcinoma– 17; mixed metastatic carcinoma– 4; nasopharyngeal carcinoma – 7; others (male, osteolytic in right maxillary), (female, ovarian bilateral cistoadenocarcinoma) – 2.

There is also a case exhibited at the Natural History Museum in London of a humerus demonstrating what might be diagnosed as a chondroblastic tumour. Other examples include benign tumours in skulls and, at Deir el-Medina, the case of a woman where a malignant tumour destroyed the facial skeleton. She may have lost her eyesight as a consequence of the neoplastic invasion of the orbit[7].

A case found at Naga ed-Der, Upper Egypt, at 235 kilometres north of Luxor, in tomb n. 217, which can be found today at the Lowie Museum of Anthropology, Berkeley, USA, shows a skull with extensive destruction. A large part of the face, with the exception of the orbits and the sphenoid region are destroyed, probably by a soft tissue originated tumour in the nasopharyngeal area. The eroded bone borders reveal osteolites of malignant nature and this indicates a probable carcinoma.[8]

Five cases of soft tissue tumour originating in the nasopharyngeal region[9] were detected in Egypt and Nubia which denotes that the incidence of this type of carcinoma in Africa (7.8%) is much more frequent than in the occidental world. Four are Byzantine/Christian period cases (300-1400), and this may reveal an increase in the incidence of this type of carcinoma. Environmental conditions may favor this carcinoma

[5] 28 malignant in ancient Egypt, GAMBA, S., FORNACIARI, GINO (2006).
[6] GIUFFRA, V., CIRANNI, ROSALBA, FORNACIARI, GINO (2006).
[7] Tumours are called neoplasias because they are new (neo) formations being benign and malignant and those are called cancers too, (Campillo 2001:150).
[8] (Strouhal 1978: 290-302).
[9] The word cancer has its origin in Hipocrates, which used the Greek word *karkinos* (crab) and *karcinoma* to describe tumours as they are similar in shape.

as the Epstein-Barr virus.[10] Aufderheide states that this relationship may still be undefined (Aufderheide 2003: 431).

Fig. 1 - Nasopharyngeal Carcinoma, from the Elliot Smith Nubia Collection, courtesy of Dr. Mervyn Harris

It is also very probable that a multilocular cyst[11] found by Salama[12] in the mandibular ramus of a 2,800 B.C. Egyptian mummy was a keratocyst. It was not associated with an impacted tooth and had greatly expanded the overlying cortices, causing a pathological fracture. This skull also contained a dentigerous cyst around the crown of an impacted maxillary bicuspid, which may suggest Gorlin's syndrome or basal cell nevus syndrome.[13]

[10] Epstein-Barr virus, *Lymphocryptovirus, Human herpesvirus 4* (HHV-4), that causes mononucleosis, a glandular fever that affects B-lymphocytes'' cells and it is associated to Burkitt's linfoma and nasopharynx carcinoma, identified in 1964.
[11] Cysts are embryonic remnant masses. (Aufderheide 2003: 433).
[12] (Salama 1951, 90: 17-18).
[13] Professor Gorlin suggested that it might best be called the nevoid basal cell carcinoma syndrome, although 10% of adults do not develop basal cell carcinomas (BCCs), http://www.gorlingroup.co.uk/syndrome.htm It has a dermatological appearance but after death it is diagnosed by the associated skeletal abnormalities, (Ebeid 1999: 103). This syndrome is characterized by multiple cutaneous nodules not exposed to the sun that tend to become malignant with age (basal cell nerves); multiple odontogenic keratocysts.

In another study the remains of 905 individuals were analyzed from three different areas of ancient Egypt and 39 neoplasms were detected.[14]

Several medical articles and professional literature attest that the references in the Ebers Papyrus (EP) named as 'The Treatise of Tumours' are really considering the cases described as cancers (Lunghi 2002: 11).

Strouhal finds a correlation between the knowledge of the common occurrence of tumours, including malignant ones, and these medical papyri from ancient Egypt: Ebers, Hearst, and Kahun (Strouhal, 1981). Just as a curiosity, none of the Egyptian mummies (170 complete bodies and various detached heads and limbs) belonging to the Czechoslovak Collections studied by Strouhal and radiologist Vyhnanek, had any sign of malignant pathologies; the majority of pathological findings in these were: extreme tooth wear and other dental diseases, also osteoporosis, osteophytosis, and degenerative arthritis. (Strouhal, 1992) 248, (Strouhal 1980b: 25-129).

To treat the tumours or abscesses different knives[15] were used, first heated over a fire so that they would staunch the bleeding (Strouhal 1992: 251), (Jean 1999: 30, 53, 56), (Majno 1975: 96).

For cutting the flesh they used *ds* (Ebers 875), *ḥpt* (Ebers 767), *šꜣs* (Ebers 875), *psš-kf*, or *swt* knives, fashioned from reed stems. It was excellent for discarding pus or other amorphous formations as its shape could be changed at ease. As the blade was heated until it was red hot the incision made with both cut and sealed the wound. Most often, however, ancient texts do not mention the instruments (Győry 2006: 1). We are left with specimens like the ones given by Clot Bey to the Musée de l'Histoire de la Médecine de

[14] (Nerlich et al 2006, 16, 6.: 197-202).
[15] Bronze surgical knives from Egypt have been described, but their origin is either uncertain (Majno 1975: 481, note 55).

l'Université René Descartes, Paris, reliefs and descriptions of the practices and proceedings in medical papyri as such as the paragraphs shown here.

At Haroeris temple, Kom Ombo, showing reliefs of 37 instruments some are unidentifiable as surgical instruments. Some are too big and could represent ritual instruments, not medical ones.

Another question is important to mention; could some of these instruments have been 'imported' from Greek or Roman practices? The same instrument could be used for cosmetic purposes, mummification and medical and, in some cases, domestic care.[16]

[16] Győry 2006: 2.

Fig. 2 – Kom Ombo instruments, photo by the author, March 2007

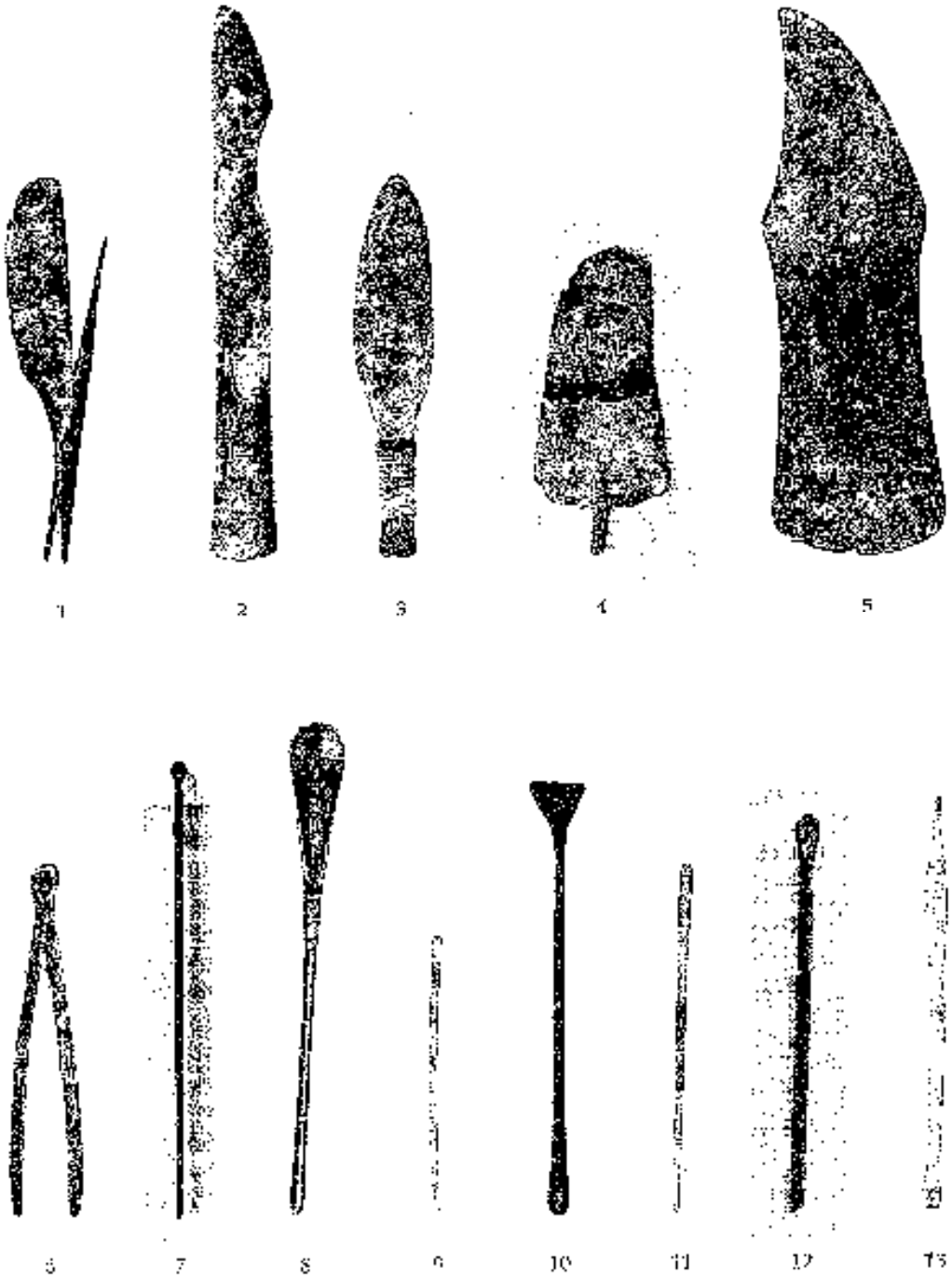


Fig. 3 - A cauterizing instrument (knife n. 13) in a group of Egyptian instruments at the Musée de l'Histoire de la médecine de l'Université René Descartes, Paris (Jean 1999 : 9).

Different types of tumours seem to have been identified or are indicated as so by the medical papyri. The *bnwt* seems to indicate complicated, perhaps gangrenous or cancerous ulcers, the definition coming from the Edwin Smith Papyrus: "*Bnwt*, Brother of Blood, Friend of Pus, Father of the [smelly] Jackal." (Majno 1975: 101)

Fig. 5. Hieroglyphic script of tumour (*bn'wt*) as it appears in the Edwin Smith papyrus.

Fig. 4 - The Egyptians were the first to recognize urinary bladder tumour (Shokeir and Hussein, 1999).

A group of authors state that ancient Egyptians also seemed to have treated oral cancer (Folz, 2007) but, as Folz refers to an eating ulcer of the gum from the Ebers Papyrus (EP) as other authors do, and this is only one translation from the hieroglyphic, as Ghalioungui says 'breaking down ulcer', Faulkner suggests pounding, and Hannig bruising; so, stating that it was really oral cavity cancer is a risky affirmation.[17]

Neoplastic diseases can be either benign or malignant, depending on particular histo-pathology. They theoretically would only appear at an advanced age. Since in ancient Egypt the average life expectancy was between 30 to 40 years of age, these types of diseases should not be present in the populations. (Nunn, 1996); (Estes, 1989: 46-47); (Rowling, 1961)

According to a study carried out in 1972, the average life expectancy for ancient Egyptians was approx. 36 years in the Dynastic and 30 years in the Pre-Dynastic Period.

[17] Roger Forshaw personal communication.

Mortality in young adults was extremely high in both periods (Masali and Chiarelli, 1972). Infant mortality was also extremely high, but, of those that survived to 20 years of age, two thirds would live to more than 45 years of age and less than half of these would reach 65. This indicates a population of middle and early old age, an age group showing a higher incidence of tumours.

Although computed tomography (CT) can reveal different layers of tissue, separate objects such as amulets, that can be identified; and reveal bones that can be located in regard to their position in the cartonnage; when we deal with an unwrapped mummy, little evidence of soft tissue tumours has been found. There are, nevertheless, more examples of bone tumours detected in ancient Egyptian mummies, but still they are a minimal amount in comparison to present statistics. (Harris 2007: 201)

Nevertheless it should be noted that because bones are much better preserved than soft tissues, they have provided the bulk of the material with evidence of metastatic carcinoma. (Weiss, 2000)

The appearance of cancer is due to the transformation of normal cells into cancer cells. According to recent studies in oncogenesis, the concerted changes in the expression of those genes are crucial to provide insight into the mechanisms underlying malignancy. (Luo and Elledge, 2008)

Benign neoplasms usually remain at their original site, growing in size but not spreading (metastasize), while malignant tumours can be locally invasive or can metastasize via the blood and lymphatic system forming secondary metastatic deposits at distant sites. But, depending on the anatomical site, benign lesions can be as fatal as malignant ones. (Harris 2007: 201)

The majority of neoplastic disease was found in skeletal remains as demonstrated further in part 7, Known cases of ancient Egypt.

The concept of tumour in ancient Egypt, according to another author, researching mummies from ancient Egypt in 1956-59 (Marcsik, 2000), having distinguished between simple ulcers and tumours, make no distinction is between benign and malignant tumours. The descriptions from the Ebers and Hearst Papyri mention tumours[18], *sfw*. But the notion tumour designates both tumours and swellings (Gyula, 1974), (Nunn 1996: 168).

Neoplasms appear to have been less common in antiquity, as researchers such as Nunn and Ebeid have stated. A possible reason for this is that cancers may have led to death sooner than they do now. Ancient Egyptians did not possess the paraphernalia of chemical solutions we have available now for cancer treatment.

Also, cancer is more commonly a disease of the elderly. As the life expectancy in antiquity was considerably lower than today, this may be one of the reasons; also the changing habits of populations, the indoor environment to which we are all more exposed now is characterized by particular types of pollution like radon gas, uranium, and other heavy metal ores. (Capasso, 2005)

After referring generalities about some found cases pertinent to the question of: Were there cancers in ancient Egypt, information on the Ebers Papyrus is mentioned: (1. Papyrus Ebers' provenance, description and editions published). Then, some discussion on the pathogenic substances that ancient Egyptians thought to be circulating in the human body, affecting its functions is explored: (2. The Ebers papyrus and the pathogenic elements). The work continues with the description of the 21 paragraphs that are the basis of this dissertation: (3. The Treatise on Tumours 857-877). Also, some

[18] (Filer 1995: 76)

notes about what type of measuring units ancient Egyptians had and used when manufacturing medical and magical prescriptions are described: (4. Udjat - The Eye of Horus as a measuring system for medical prescriptions). Included is a compared analysis between the past and present of Egypt as when we study patterns of disease we must consider that they have not changed much: (5. Relationship between schistosomiasis and hepatic cancer - Parallel with present day Egypt). The plants referred in the 21 paragraphs of the Ebers Papyrus as being used to treat the tumours they describe in them are analyzed in the light of ancient Egyptian usage and medicinal properties known: (6. Phyto-pharmacopeia prescribed by the Treatise on Tumours). Finally, the cases found so far by researchers in human material from ancient Egypt are shown in a table at the end and discussed here: (7. Known cases of ancient Egypt).

1. PAPYRUS EBERS' PROVENANCE, DESCRIPTION AND EDITIONS PUBLISHED

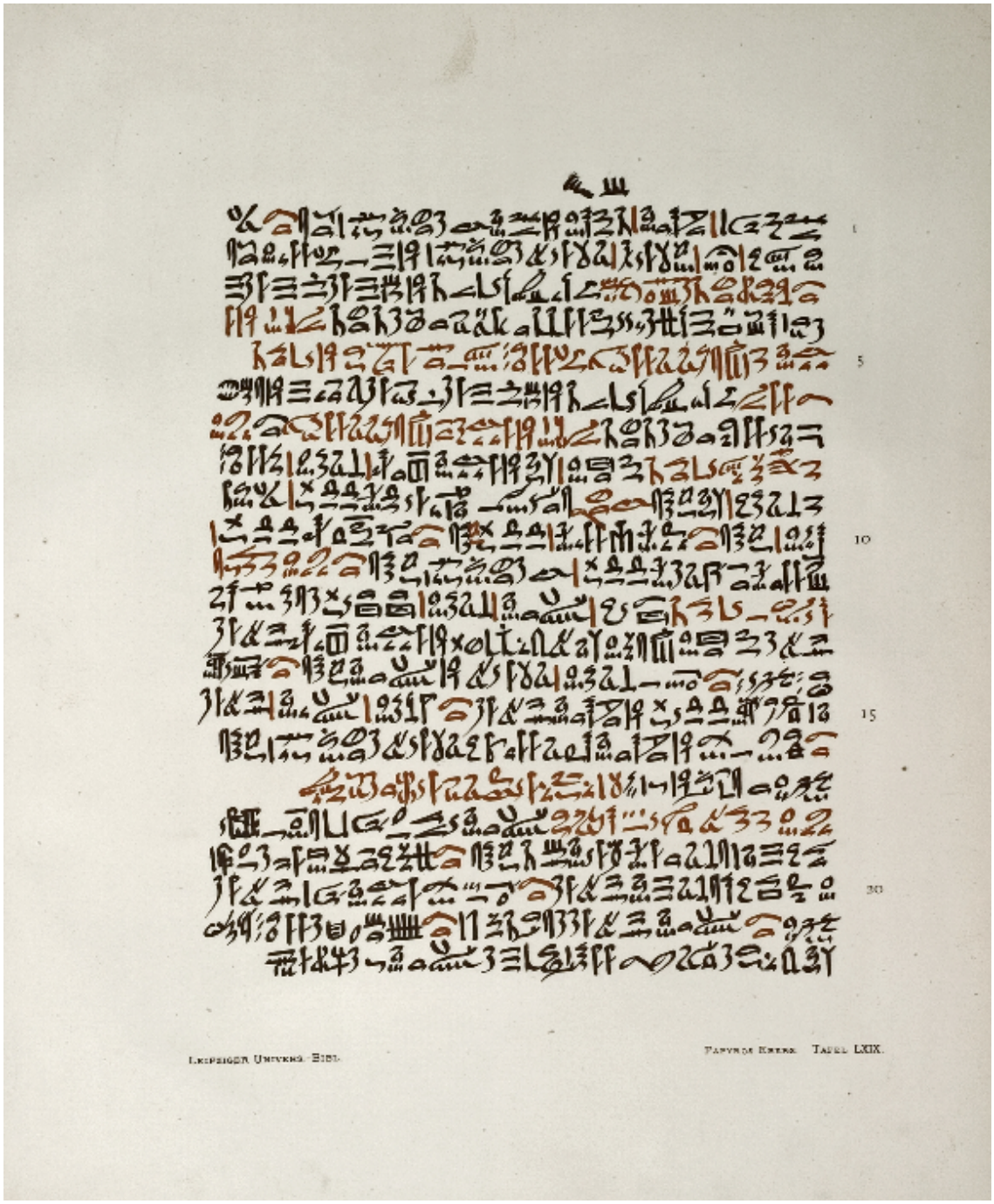


Fig. 5 - Papyrus Ebers, Leipzig University, http://digi.ub.uni-heidelberg.de/diglit/ebers1875bd1/

This papyrus is thought to be dated from the year 1553-1550 BC[19], and it contains 877 prescriptions (Ebeid 1999: 23) but as other ancient Egyptian literature, it must have been made from ancient copies and the knowledge contained in it must have passed from generation from generation of *swnw*.

Fig. 6 – Georg Ebers, http://gutenberg.net.au/widger/home.html#ebers

[19] 1553-1550 BC according to Ebers (Bryan 1930: 2); 1534 BC according to Nunn, 1996: 31.

Named after George Moritz Ebers (1837-1898), who bought it for the sum of approximately 350 English pounds, this papyrus was allegedly found together with the other medical papyrus now called Edwin Smith Papyrus, between the legs of a mummy, in a Theban tomb. Both papyri were acquired by Edwin Smith in Thebes in the winter of 1872/73. The Ebers Papyrus is a scroll measuring 0.30 x 18.63 m, dating from the reign of Amenhotep I. It is kept today in the University Library of Leipzig's special collections department, and some columns are damaged since the Second World War.

It is written from right to the left, in Hieratic, in black and red ink, and it is not accessible to public for conservation reasons. (UB Leipzig, 2004). This papyrus comprises 110 pages. Its texts include magical incantations, a section on digestive pathologies, intestinal parasites, dermatological concerns, pathologies of the anus, a brief treaty on the heart, migraines and urinary tract perturbations, treatments for cough hair and burn as well, the pathology of extremities (toes, fingers), tongue, teeth, and even gynecological conditions, and a last section on tumours (what it is now thought to be oncological concerns).

Editions

A small brochure: Scholl, Reinhold, *The Papyrus Ebers, The largest book role for the medicine of old Egypt* (writings from the University Library, 7), Leipzig 2002, to be acquired for 5 Euro at the University Library or over the book trade. (UB Leipzig, 2004)

With facsimile:

A two-volume colour photographic reproduction of the entire text, including a hieroglyphic-Latin dictionary by Ebers' colleague Ludwig Stern. G. M. Ebers, L. Stern: *Papyrus Ebers. Das hermetische Buch über die Arzneimittel der alten Aegypter in hieratischer Schrift, mit Inhaltsangabe und Einleitung versehen Mit hieroglyphisch-latei-nischem*. W. Engelmann, a Facsimile with a partial translation, 2 volumes, Leipzig,

1875. Available online at the University of Heidelberg Library: http://www.ub.uni-heidelberg.de/helios/fachinfo/www/aegypt/digilit/

Joachim, H. *Papyros Ebers*, The first complete translation from the Egyptian, Berlin, G. Reimer, 1890;

Wreszinski, W., *The papyrus Ebers, Transcription, translation and comment, I part: Transcription*, Leipzig, 1913.

Von Klein, Carl, H., Chicago, USA, *The Medical Features of the Papyrus Ebers*, English translation, publication announced and subject by 1000 subscriptions needed to undergo the endeavour; consisted of 650 pages, in red and black, similar to the original, with six plates in one volume, 1905[20]

Ebbell, B., *The papyrus Ebers*, *The greatest Egyptian Medical document*, Copenhagen, Levin & Munksgaard, 1937;

In 1987, Paul Ghalioungui, the head of the medical department at Ain Shams University in Egypt, provided a new English translation, based largely on the *Grundriss* along with the support and encouragement of Wolfhart Westendorf, unfortunately, the book, although printed and bound, was not on sale until 2004, 17 years after Ghalioungui's death.[21]

Ghalioungui, P., *The Ebers papyrus, a new English translation, Commentaries and Glossaries*, Kairo, 1987;

Bardinet, Thierry, *Les papyrus médicaux de l ' Egypte pharaonique*, Paris, 1995.

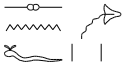
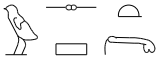
Different translations of the Ebers Papyrus (EP) have produced different interpretations of words, therefore the conclusions made by both Egyptologists and medical specialists can differ and influence the probable diagnosis.

[20] biology.bard.edu/ferguson/course/bio407/Carpenter_et_al_(1998).pdf; infoshare1.princeton.edu/rbsc2/pamphlets/Call_number_D810.P6.P356/185-%20contents%20listing.pdf

[21] Farag, Talaat I., *The Unveiled Ebers Papyrus*, http://ambassadors.net/archives/issue17/selectedstudy4.htm

2. THE EBERS PAPYRUS AND THE PATHOGENIC ELEMENTS

The ancient Egyptians thought that the body was covered by *mtw*, and that these were both the carriers of body fluids (subject to obstructions that conducted the person to a disease state); they were not far from reality, as the human body is really a 'territory' served by highways, smaller roads, or better said, by rivers and smaller affluents, that make its functioning dependable on the 'traffic', what we ingest, exterior influences like infections and traumas and, as ancient Egyptian thought, some 'not treatable' conditions as we still deal with incurable pathologies today. Almost all of the authors studying ancient Egyptian medicine agree about the functions of the *mtw.*

The *metu*  , *mtw*, that can be interpreted as: respiratory duct vehicles, tear, glandular or sperm channels, ligaments and substances that flow in all of them, as blood, *senef*,  , *snfw*; and urine, *weseshet*  , *wsš* (Nunn 1996: 44-5, 48-9, 60-2, 91, 158). These *mtw* were assimilated as representatives of the Nile's affluents.

They were the carriers of both nutrients and diseases, disseminating the substances. (Ghalioungui, 1968) All *mtw*-vessels came from the heart, but they had a second assembly centre around the anus (Majno 1975: 116, 129), ancient Egyptians thought.

As Ghalioungui states, quoting Marti-Ibañez, "the physiology of ancient Egypt stated the existence of conduits in the human body to carry the blood and humors, where obstructions caused floods in some parts of the body and droughts in others (...) Another author agrees: "But the *mtw*, that conveyed health, could also carry disease" (Ghalioungui 1973: 57).

The *mtw* converge to the anus, and, if obstructed, gave place to pathologies of all kinds. In his interpretation, Bardinet states that the word *mtw* is referring to several channels, or vessels in the body. Sometimes the described pathologies have recognizable symptoms such as obstructions, but also frequently the untranslatable words *wekhedu*[22], *wḫdw*  , or *aaa,* ꜥ3ꜥ,  *are* used. These were considered to be malevolent substances which were the carriers of disease and transmitters of pain and pathology.

According to Ghalioungui, the *mtw* can contain air, water, faeces, blood, urine, sperm or mucus; disease appears when a certain matter is found in its improper place in the *mtw* (Ghalioungui 1987: 264).

The harmful substances, *wekhedu*, were conceived to be the agents of pain and illness. (Strouhal 1992: 245) The *wḫdw* were originated by a type of putrid process in the intestine and these substances circulated all over the body while resting. Their removal was vital, and therefore ancient Egyptians carried out daily purges in order to get their bodies pure and cleanse them of disturbing substances and infections of all kinds. According to written sources like the medical papyri, these would be *les agents provocateurs*, or circulating pathogens, ꜥ3ꜥ and *wḫdw*.

ꜥ3ꜥ is mentioned 28 times in the EP, and, according to Ghalioungui it can be caused by a parasite (worm) (Ghalioungui 1973: 58-59), this would be consistent with an infection like schistosomiasis. But this is doubtful because there are no references to hematuria in the fifty known prescriptions mentioning ꜥ3ꜥ and, also, ancient Egyptians were not able to develop techniques to identify microscopic parasites (Ghalioungui 1973: 60); (Daglio

[22] *Wekhedu* is written as plural, but syntactically is not a plural, in regard to Grapow, in the Grundriss, that translates *wekhedu* as plural (Majno 1975: 485, note 226). It is translated as purulence by Ebbell (Ebbell 1937: 130).

1998: 45). The only possible references to hematuria are in Ebers 49, referring to the word *wesesh* (urine) (Nunn and Tapp, 2000). Although they were unable to identify microscopic parasites they often recognized the cause of a disease correctly; as being a worm. But, on the other hand, if the determinative hieroglyph for  is a discharging phallus,  schistosomiasis is a real possibility of an infectious disease present in ancient Egyptian times.

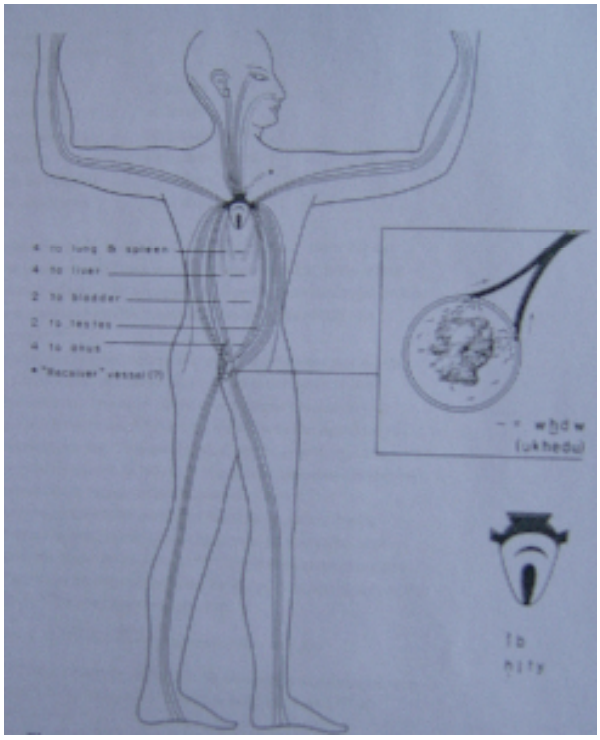


Fig. 7 - the *metu* and the *wekhedu*, the interior-*ib*, the heart (Majno 1975: 116)

3. THE TREATISE ON TUMOURS 857-877

The EP has a series of prescriptions that are believed to be the remains of a 'book of tumours', which deals with tumours and swellings[23]; *sf<u>t</u>* was commonly translated as swelling (Nunn 1996: 168) but can be also a liquid content, including abscesses, or *ḥnḥnt* and *ꜥ3.t*, denoting tumours (Strouhal 1992: 246-247).

Since *ꜥ3ꜥ* is considered an evil influence causing disease, *ꜥ3.t* can be interpreted as the ultimate disease: a tumour.

These tumours, (*ꜥ3.t*), appear to have consisted of benign ganglionic masses, like case 45 in the Edwin Smith Papyrus (Bardinet 1995: 515); polyps, sebaceous cysts, varicose veins (Zimmerman, 2004) and aneurysms. The probability that aneurysms of the peripheral arteries, but not those of the aorta, were encountered may be closer to the truth. The EP definitely lists aneurysms among the diseases mentioned. It must be recalled that, in mummification, there was practically a complete removal of the intrathoracic and intrabdominal organs. Only remnants of the aorta and its major branches remained for study by future pathologists. Arteriosclerosis was present during that era. Ruffer's description of arterial lesions both in the aortic remnants and peripheral arteries, amply attests to this (Ruffer, 1921). From the vantage point of current knowledge regarding arteriosclerosis as an important etiologic factor, aneurysms of the aorta must have occurred in those who managed to live long enough (Acierno 1994: 97).

Case 45 of the Edwin Smith Papyrus refers to chest tumours. The tumours are described to be ball-like (in the chest of a man), a type of swellings (Allen 2005:101).

[23] A Greek Medical Treatise on Tumours, posterior in date (middle of first century AD), is at the Princeton University Collections: Papyrus Princeton 114 (Jordan 1975: 75-77; plate).

Abscesses are described by Kamal in a manner that can resemble some of the descriptions in the Treatise of Tumours from the EP. An abscess is a localised collection of pus (Kamal 1967: 11). Tubercle bacillus is only one pathogen that might cause a chronic abscess, many abscesses can become chronic, e. g. apical abscesses in the alveolar bone surrounding teeth caused by staphylococcal bacteria.[24]

In the 1800's William Coley (1862-1936) developed a bacterial vaccine for cancer after having discovered that, in the past, physicians treating acute infections inspired the rudimentary cancer immunotherapies. In the EP the recommended treatment for tumours (swellings) was a poultice followed by incision. Such a regimen would inevitably lead to an infection at the tumour site. (Hoption Cann et al., 2003)

There is also reference to oral cancer in the EP. A prescription for treating an 'eating[25] ulcer on the gums' suggests treating it with a mixture of cinnamon, gum, honey and oil (olive oil[26]) by the ancient Egyptians (Folz, 2007).

In a brief note on breast cancer: Aufderheide states that benign fibrocystic disease and carcinoma (of the breast) may not have been common problems in antiquity (Aufderheide 2003: 493) and that the referenced case 39 in the Edwin Smith Papyrus regarding a treatment for breast cancer is now believed to be insubstantial for such a diagnosis (Aufderheide 2003: 495).

Cockburn states that are no examples of breast cancer (Cockburn 1980: 38), but he must be referring to malignant cases as, in the same work; he confirms the discovery of a fibroadenoma, a benign tumour of the breast in PUM III, a female mummy provided by the Pennsylvania University Museum (Cockburn 1980: 93).

[24] Roger Forshaw's personal communication.
[25] Ebbell suggests that eating in this context means cancer, a graphic description of advanced malignancy according to (Nunn 1996: 81).
[26] Olive oil is one of the natural products to be considered potentially protective against cancer growth and individuals with gallstones could experience billiary colic, according to (Montbriand, 2004).

Estes also agrees that no example of a breast tumour was ever found on a mummy, either benign or malignant (Estes 1989: 46).

Another author states that the oldest description of human cancer referring to eight cases of tumours of the breast was found in the Edwin Smith Papyrus (Sullivan, 1994).

This case 39 from the Edwin Smith Papyrus, concerning a tumour, is called *bnwt*, and it may affect different regions such as the breast, the vagina, or the gums. Cautery was used in opening abscesses as in the case of this one[27], with a prominent head on the breast (Kamal 1967: 12). The treatment for this case, described as 'One having tumours with prominent head in his breast, and they produce [pockets] of pus [boils?]. An ailment which I will treat with the fire-drill' (Majno 1975: 96) is also the cauterization by fire.

In this case 39, the practices described are to treat a 'chest infection'. There is reference to an 'eruption with flattened head' in the chest of a man, with risings formed by pus, interpreted as a superficial abscess by Allen, and this is treated by incision and drainage probably with heated metal (Allen, 2005:97) like in some of the cases' studied paragraphs from the EP in this work.

Podzorski refers a probable case of metastatic carcinoma of the breast in a female skeleton from Naga ed-Der, N7355B, 55-60 years old; the observed lesions are centred on the rear of the left eye which may suggest blindness before death. The tumour also invaded the left supra-orbital sinus endocranially (Podzorski 1990: 64-65); (Filer 1995: 75).

An Italian author has diagnosed that some metastasis in a skeleton may have been originated by a primary breast carcinoma (see Marro in Table 4).

[27] The *ḏ3* 'fire-drill': "You have to say concerning him [i.e. the patient]: the one who has prominent tumour in his breast, and it produces pus; an ailment which I will treat with the fire-drill" (Győry 2006: 1).

But Ebeid tells us: “Cancer, it appears, is not a disease of modern civilisation. There is a paucity of evidence of its incidence in ancient Egypt; nevertheless, some indication of tumours does exist from the earliest times through to the Ptolemaic period.” (Al-Ahram Weekly Cures for the Pharaoh, 2004).

Ebeid also states that the difficulty of finding medical information on oncology in ancient Egypt is due to lack of terminology corresponding to our modern nomenclature (Ebeid 1999: 102).

In ancient Egyptian descriptions there is no distinction between benign and malignant tumours. We can find all descriptions in EP (Gyula, 1974). Also, tumours mentioned in Egyptian medical papyri have been interpreted as neoplasms by one author but simply as swellings or possible varicose veins by others (Zimmerman, 1977) as demonstrated by the Table 1, and this makes it even more difficult to agree to an uniform diagnosis.

The following translations are illustrative of the descriptions made by ancient Egyptians of what they called tumours. Following each translation, different interpretations from different authors are provided, enabling a tentative medical diagnosis to be made.

Some other paragraphs in the EP besides the ones considered as ‘The Treatise of Tumours’ were added as they may also be descriptive of cancer situations; these are Ebers 206, 551-554, 813-16, 818, 831.

206

“If you proceed to the examination of a man having an obstruction at the entrance of his interior-*ib*[28]; his interior-*ib* trembles; noxious is everything that enters him, no matter what nourishment he eats; the passage (oesophagus) that conducts to the entrance of the interior-*ib* is tightened; he is attacked (by pain) on his hips, and legs but not in his

[28] The heart-*ib*  (Faulkner 2006:14) was considered the centre of body fluids; all circulation began here and ended here.

thighs. If you proceed to his examination and you realize that the entrance of his interior-*ib* is blocked (as the one) from a woman which child she carries in the womb is broken, and that its above (the skin of the chest above the entrance of the interior-*ib*) is faded – you shall tell this subject: It is an obstruction due to *stt*.[29]

Pay attention to him, do not abandon him!

You shall prepare the treatment for him that remains secret even for the doctor's assistant – except for your own daughter: fresh barley that was not roasted. (It) will be cooked in water, without boiling. The water will be taken out of the fire to be mixed with dates' cores. (It) will be filtered, then absorbed in four following days and until the (obstruction) cures perfectly" (Bardinet 1995: 281-282).

A serious condition featuring loss of appetite, failing heart, gastrointestinal obstruction, loss of weight showing in the face, pain in the hips and upper legs and this condition has a secret medicine that can only be revealed to the physician's daughter (Ghalioungui 1973: 123) A serious wasting disease like cancer ventriculi[30] with symptoms such as pain after eating, narrowness of the cardia, non allowance of food to pass easily, pains in the legs, weakness of the abdominal muscles resembling those of a woman who had thrown her fetus, and a shrunken face (Kamal 1967: 88).

[29] The *stt* are pathogens circulating in the body and Papyrus Ebers paragraph 856, just before the 'tumours' section, deals with them, the *wekhedu* Treatise as it is named and some other considerations over the metu (Bardinet 1995: 363-4). Translated by Ebbell as phlegm, the disease producing humour (Ebbell 1937: 131)

[30] Cancer ventriculi: a gastrointestinal cancer of the oesophagus or the stomach.

551

"Prescription to drive out the abscesses- *bnwt* that are found in the superficial flesh of a man, in no matter what part of the body: flour of (laid on) air (beating of corn): 1, sea salt: 1, honey : 1, coat with (this), frequently" (Bardinet 1995: 330).

An abscess in any part of the body (Bardinet 1995: 330, 552).

"Another prescription: fruit-*ḳny-ta*: 1/8; honey: 1/8: wine: 5 *ro*. (This) will be crushed to dust and drank" (Bardinet 1995: 330).

553

"Another prescription to drive out the bruises (fistulae) due to abscess-*bnwt* that are in the teeth: *khpš*-plant: 1, gum: 1, honey: 1, fat/oil. Bandage with that (the fistulae)" (Bardinet 1995: 330).

Fistulae derived from abscesses in teeth.

Ghalioungui translates it as 'to eliminate a breaking down ulcer in the teeth.' In antiquity osteomyelitis was more common than oral cancer so, it can be possibly a description of a simple chronic suppurating abscess-granuloma.[31]

554

"To drive out the abscesses-*bnwt* that are in the teeth and to push the superficial flesh (gum): *bšbš*-plant: 1, fruit of sycomore: 1, *ỉnst*-plant: 1, honey: 1, terebinth[32] resin: 1, water: 1. (This) will be laid to rest during the night with the dew and then chewed" (Bardinet 1995: 330). Abscesses on the gums or gingiva/teeth.

[31] Roger Forshaw's personal communication.
[32] The liquid oleo resinous exudation of the *Pistacia terbinthus*, a small tree common in southern Europe and the Mediterranean area, http://www.violins.ca/varnish/violin_varnish_glossary.html

809

"Another prescription to prevent the (action of the substance) *ḥsw* against the...of the woman: liver of swallow (*Hirundo* species bird). (This) will be dried and crushed in the mucilaginous of *ʿwit*, and applied to the woman on her breasts, on her womb, allover her body where the substance-*ḥsw* will show" (Bardinet 1995: 447).

Kamal refers to this application of the swallow's liver as anti-abortive (Kamal 1967: 279).

810

"Another prescription for painful breast: calamine[33]: 1, gall from an ox: 1, flyspecks: 1, ochre: 1. (This) will be prepared into a homogenous mass. Coat the breast with (this) four days in a row" (Bardinet 1995: 447).

811

"Conjure of the breast: This one here is the breast which Isis reached in the marshes of Chemmis when she gave birth to Shu and Tefnut. What she did for them (the breasts) was to conjure them with the *iʿr*-plant, with a pod from the *snb*[34]-plant, with the *bkt*-part of the frog-grass (*Juncus* species), with the hair (fibers) of its *ib*-part (core of the *Juncus* plant), (all that) that was brought to drive out the action of a deceased person, male or female. (This) will be prepared with the form of a bandage turned to left, that will be placed over (the place of) the action of the deceased person, male or female, (with the following words): Do not provoke the evacuation! Do not make substances that corrode! Do not make blood! Take guard that (the malignant substances that) do not develop (against you) and do not make obscurity (develop) against humans. Words to be said over *iʿr*-plant, over the *ḏ3*-part of *snb*-plant, over the *bkt*-part of *Juncus*, over the

[33] *htm* in ancient Egyptian, (Kamal 1967: 86).
[34] A curiosity: *snb* is also the meaning of health.

hair above his *ib*-part, over the bandage turned to left, in which seven knots are made into. (This) will be applied over that" (Bardinet 1995: 447).

This is carcinoma of the breast, arising from milk ducts, if the word 'eating', so widely used in these selected paragraphs concerning what seem to be tumours, is taken to be another word for cancer (Nunn 1996: 197). These paragraphs can refer to either 'an eating lesion' or 'a glandular swelling' as symptoms to a tumour (Filer 1995: 75). We have to take into consideration that ancient Egyptians were not able to distinguish between cancer and an acute ulcerative condition, and this makes the interpretation of this paragraph slightly dubious.

Ebbell translates as 'eating in the womb' – cancer – the expression *wnmt m ḥmt* (Ebbell 1937: 130).

813

"Another prescription for a (woman) corroded in her uterus and her vagina where the abscesses-*bnwt* are developing: fresh dates, 1, *hknw*: 1, stone from shorefront. (This) will be crushed in water, left to rest during the night with the dew, and poured onto her vagina"(Bardinet 1995: 448).

Although no malignant tumours of female internal genitalia have been identified in mummified bodies the EP suggests that Egyptian physicians must have been aware of them (Aufderheide 2003: 482), a graphic description of advanced malignancy (Nunn 1996: 81). Corroded uterus and vagina with developed abscesses (Bardinet 1995: 448). Cancer, phagedena[35] (Ebbell, 1937). An eating on the uterus and an ulcered vagina (Ghalioungui, 1987). An 'eating' in the womb which produces phagedena in the vagina,

[35] Phagedena is an old term for serious deep, necrotic and gangrenous skin ulcers. In the past these have been regarded as severe infections. In acute, spreading, gangrenous phagedena with surrounding erythema, fever and systemic toxic effects, immediate excision of dead tissue may be lifesaving. JACKSON, R. & BELL, M. (1982) : 363-368.

'the devouring disease' (Kamal 1967: 88, 206, 502). A cancer of the uterus, according to Ebeid, (Ebeid 1999: 111).

814

"Another prescription: fresh dates: 1, pig brain: 1, *ḳsnty*: 1, water. (This) will be crushed in water, left to rest during the night with the dew, and poured onto her vagina" (Bardinet 1995: 448).

A disease from the same category as the one described in the previous paragraph (Kamal 1967: 206) Similar to the one before, a lesion in the vagina (Bardinet 1995: 448).

815

"Another prescription to prepare for the evil that represents danger: boiled cow milk: 1, acacia leaves: 1, *ksnt*: 1. (This) will be crushed into a mass, left to rest during the night with the dew, and poured onto her vagina. It is (a treatment to) cool down" (Bardinet 1995: 448).

Evil that represents danger, in the vagina (Bardinet 1995: 448) acute vaginitis or metritis[36]: acacia is prescribed in a vaginal enema (Kamal 1967: 13) an evil disease (Ghalioungui, 1987) Acute vaginitis or metritis[37]; acacia is prescribed here, for a vaginal enema (Kamal 1967: 13).

816

"Another prescription: fresh dates: 1, white oil: 1, acacia leaves: 1, fat/oil: 1, water. Use as the former" (Bardinet 1995: 448).

[36] Metritis is infection of the uterus after delivery and is a major cause of maternal death. Delayed or inadequate treatment of metritis may result in pelvic abscess, peritonitis, septic shock, deep vein thrombosis, pulmonary embolism, chronic pelvic infection with recurrent pelvic pain and dyspareunia, tubal blockage and infertility (WHO 2008)
[37] inflammation of the lining of the uterus (of the endometrium)

Another evil that represents danger in the vagina (Bardinet, 1995) Cancer of the uterus. (Kamal, 1967) Evil disease (Ghalioungui, 1987).

818

"Another prescription for (a woman) where the *ḳmit*-substance is inside the uterus and the vagina, from where the abscesses-*bnwt* are developing: *khpr*-our-plant: 1. (This) will be crushed in water. Terebinth resin: 1, *ḳsnty*: 1. (This) will be poured into her vagina" (Bardinet 1995: 448).

A substance that produces abscesses in the uterus and vagina (Bardinet 1995: 448). Erosion of the uterus and vagina. (Kamal, 1967) Phagedena by Ebbell. (Ebbell, 1937) Uterus ulcers that appear in the vagina (Ghalioungui, 1987).

831

"If you proceed to the examination of a woman to whom things have occurred like (it will have) water with boiled blood at the bottom. (What) you shall say to this subject: that is the scraping substance that is inside her uterus.

(What) you shall prepare for that: Nile lemon from the brick-maker, (this) will be crushed in honey with a crystal. A piece of fine linen coating (with the mixture) will be placed onto her vagina four days in a row" (Bardinet 1995: 449).

The text can be referring to hyper menorrhea, which occurs with clots of coagulated (baked) blood; tumours can originate such heavy flows. (Habiger, 1998) Liquids originating in the vagina that resembles cooked blood, a substance originating from the uterus (Bardinet 1995: 449), erosion of the uterus (Kamal 1967), (Ebbell, 1937), (Ghalioungui, 1987).

The 21 paragraphs of The Treatise of Tumors[38]

857

"Therapeutic instructions for a *ḥnḥnt* -ulcer on the throat of man. If you examine this on the throat of man as a forward (consequent) spread of morbid material, and you find it (the ulcer) like something on which a coat is found; and it is soft under your fingers; something on it is like *pʿpʿj.t*[39] you must then say concerning it: one with an ulcer of fat and with spread of morbid material on the throat of the man, a disease that I can treat;

You must then prepare a remedy to cause the morbid material to leave it (the ulcer) by means of efficient remedies: *sj3*-mineral; *t̲wn*-plant; flies' blood; bile (*bnf*) from an ox; (Lower Egyptian)[40] sea salt; flour from the broad bean ( , *pwr*, *Vicia faba*[41]) ground; bandage therewith on (Ghalioungui 1987: 232-233); (Bardinet 1995: 365) for four days" (Ghalioungui, 1987: 233).

An external tumour with several granulations, *pʿpʿj.t* (nodules), a furuncle of the neck. (Graber-Baillard 1998: 19). The *ḥnḥnt* pus is here described as of a greasy type in the throat (Bardinet 1995:194, 196, 365). A type of 'morbid material' (ulcer) wrapped in a 'coat' (Ghalioungui 1987: 232) An 'attack of bile' is another description for this enlarged gland in the throat of a man (*angina phlegmonosa*) (Ebbell 1937: 121). A carbuncle in the neck, from an enlarged gland. Bile (*bnf*)[42] is prescribed for a dressing of the wound (Kamal 1967:12, 64).

[38] The next compilation of expressions regarding the 21 paragraphs of this Treatise were taken from all the bibliography available on these paragraphs referred to in the EP; there are also some additional remarks. All the references are given. The following version of the paragraph was done using several translations from the original (Kamal 1967, Ghalioungui 1987, Bardinet 1995, Nunn 1996, Ebeid 1999).
[39] Ebbell thinks these are vesicles (Ghalioungui 1987: 233).
[40] The sea salt comes from Lower Egypt (Ghalioungui, 1987: 233).
[41] (Manniche, 1989: 153)
[42] (Ebbell 1937: 132)

858

"Therapeutic instructions for a *ḥnḥnt* -ulcer that has appeared owing to a spread of pain matter, *wḫdw*, in any part of the body of a man. If you examine a *ḥnḥnt* - ulcer that has appeared owing to a spread of pain matter, *wḫdw* and you find it (the ulcer) like the appearance of a *ḫsd*-swelling that decays; its (*ḫsd*-ulcer) skin is hard but not very hard. If it (*ḫsd*-ulcer) decays with pus inside his (man's) flesh, then you must say: one with an ulcer of pain-matter, *ḥnḥnt nt wḫdw*[43] that has given rise to pus; a disease that I treat; you must prepare a remedy to break down the elevations (and) to bring out the pus: *ṯwn*-plant; peas; flies' blood; (Lower Egyptian)[44] sea salt; *bddw-kꜣ*-plant; *ḥmꜣj´t*-fruit; flour from *ʿmʿʿ*-part (of cereal); broad bean flour; ox fat; wax; cooked; bandage therewith so that he gets well" (Ghalioungui 1987: 233-234); (Bardinet 1995: 365).

A tumour with pathogenic germs, anthrax or circumscribed phlegmon[45] (Graber-Baillard 1998: 20-21). Tumour with pus, *ḥnḥnt*, that is developed by the action of the *wḫdw* which cause the formation of pus and it can happen in any body part (Bardinet 1995: 194, 365). An ulcer, an enlarged gland, through an attack of purulence (*wḥꜣw*), and it can spread to another part of the body besides the throat (Ghalioungui 1987: 234). A cystoid, enlarged gland on the neck (*ʿꜣt nt ʿḏ*) (Ebbell 1937: 121). A suppurating lymphatic gland (Kamal 1967: 12).

859

"Therapeutic instructions for a *ḥnḥnt* –ulcer that appeared through the spread of morbid material of pus. If you examine a *ḥnḥnt* –ulcer on the throat of man that appeared as a result of the spread of pus on any part of the body of a man, and you find its head pointed and raised, like a female breast; pus has run (together) from its site: a disease

[43] Ebbell takes *ḥnḥnt* for 'lymphatic gland swelling' (Ghalioungui, 1987: 232).
[44] (Ghalioungui, 1987: 234)
[45] A diffuse inflammation of the soft or connective tissue due to infection, http://medical-dictionary.thefreedictionary.com/phlegmon

that I can treat. you should then prepare a remedy to let it decay by means of a medicine: onion, date juice, peas, cumin, (Lower Egyptian)[46] sea salt, yeast, *Vicia faba* flour, Pyrethrum (*š3ms*) grains, honey, oil mixed into a homogenic mass; bandaged therewith this on four days so that he improves" (Ghalioungui 1987: 235); (Bardinet 1995: 365-366).

A tumour formed by nodules of pus; an infectious thyroiditis or an adenolipomatosis (Graber-Baillard 1998: 21-23), or even Madelung's disease (symmetric benign cervical lipomatosis), a rare condition, (Souza et al., 2003) that fits the description from the EP on this adenomas, being located in the cervical and clavicle area (Graber-Baillard 1998: 21-23). The same pus, *ḥnḥnt*, that 'ascends', maybe some infection climbing from the digestive tract (Bardinet 1995: 194, 365-366). The morbid material of pus, *ʿrw.t*, that has run from its site; the pus has formed in throat following its appearance somewhere else in the body (Ghalioungui 1987: 235). Another enlarged gland on a neck of a man as example, scrofuloderma[47] (Ebbell 1937: 122). An abscess in the throat, simply (Kamal 1967: 12).

860

"Therapeutic instructions concerning an ulcer of fat *ḥnḥn.t nt ʿḏ* on the front of his throat. If you examine a an ulcer of fat *ḥnḥn.t nt ʿḏ* on the front of his throat, and you find it like a swelling of flesh it (the ulcer) being soft under your fingers its appearance white and weak, you must then say thereon: one with an ulcer of fat *ḥnḥn.t nt ʿḏ* on the front of his throat, a disease that I treat with the knife treatment. Beware of the *mtw*-vessels! You should then prepare a remedy to treat him with a dressing and to break down the prominences: *ṯwn*-plant, peas, Pyrethrum (*š3ms*) grains, blood of the *ḥwr*-

[46] (Ghalioungui, 1987: 235)
[47] a disease of the skin of tuberculous origin, inflammation of the neck from draining tuberculous lymph nodes.

insect, flies' blood, valerian (*šȝšȝ*), honey, *ꜥȝmw*-plant, *sȝ-wr* resin, (Lower Egyptian)[48] sea salt; ground; made into a homogenic mass; bandaged therewith" (Ghalioungui 1987: 235); (Bardinet 1995: 366).

A tumour- *ḥnḥnt*, a tuberculous ganglion, sebaceous cyst, perhaps a lipoma (Graber-Baillard 1998: 24-25). Another greasy purulence (Bardinet 1995: 196, 366). An ulcer of fat on the front of the throat, soft to the touch (Ghalioungui 1987: 236). Perhaps a fistula is remaining after an abscess; an enlarged gland of bile (*ꜥrwt*) lasting for many days, producing a warm liquid (Ebbell 1937: 122).

861

"Therapeutic instructions concerning an ulcer of pus *ḥnḥnt nt rj.t* on the throat of a man. If you examine an ulcer *ḥnḥnt* of pus *ḥnḥnt nt rj.t* on the throat of a man; it is large; it has thereby given an elevation; it has created flesh of pus it has lasted years and months, the appearance of what has come out of it is like the excretion of a catfish (or the seed of a big ram), you must then say thereon: one with an ulcer *ḥnḥnt* of pus, a disease that I fight. You must then prepare for it a remedy to draw out the elevations on his throat: wax, ox's fat, *ḫt-ds* tree, ochre *ṯrw*, *ṯwn*-plant, cumin, copper waste (hammer flakes[49]), malachite, clay *bsn* for glass frit *ṯḥn.t*, (Lower Egyptian)[50] sea salt, fat from a goose, grains of (…), terebinth resin, galena; cooked and bandage the throat with that" (Ghalioungui 1987: 236-237); (Bardinet 1995: 366-367).

A purulent tumour, tuberculosis, maybe, some chronic abscesses with developing fistulae (Graber-Baillard 1998: 26-7). Again referring to the pus located in the throat (Bardinet 1995: 195, 366). Another ulcer of pus, suppurating enlarged gland on the throat that has lasted years or months, with a secretion such as "the sperm of a fish"

[48] (Ghalioungui 1987:235)
[49] (Ghalioungui 1987:237)
[50] (Ghalioungui 1987:237)

(Ghalioungui 1987: 236-237). A subcutaneous tumour (fibroma), a swelling of the flesh in any limb (Ebbell 1937: 122-123). A suppurating enlarged gland on the neck which has given off the overlying skin and produced suppurating granulations lasted for years or months and from which comes a secretion. (Kamal, 1967)

862

"Therapeutic instructions concerning an ulcer of pus *ḥnḥnt, ꜥrw.t*; it has lasted several days. If you examine a *ḥnḥnt* ulcer of *ꜥrw.t* after several days have passed, a content has arisen in it; has accumulated some fat, the elevations of its border are large and the man is hot. You must then say: one with an ulcer of pus *ḥnḥnt, ꜥrw.t*; it has produced accumulation of pus, content has arisen in it, and the man is hot because of this, a disease that I shall fight. You should then prepare for it (the ulcer) a remedy to treat it by eliminating the disease-case: dried blood[51], cumin, oil, colocynth[52], acacia leaves, *tp3w.t*-part (from the sycamore), *ḳ33*-part of the acacia tree, *ns-š* ()[53], wood-charcoal for copper made into a powder" (Ghalioungui 1987: 238-239); (Bardinet 1995: 367).

A tumour caused by secretions lodged in the nodules for some days, an infectious process (Graber-Baillard 1998: 27-29). The same pus, *ḥnḥnt* now 'ascends' the body for some days, not being the original pus but some pus that developed inside the body (Bardinet 1995: 195, 367). An ulcer concerning an enlarged gland of bile lasting for several days with liquid protected by a membrane, the borders of it perhaps having a special meaning (Ghalioungui 1987: 238).

863

"Therapeutic instructions for a swelling of flesh, *ꜥ3.t nt ḥꜥw* in any part of a man's body. If you examine a swelling of flesh, *ꜥ3.t nt ḥꜥw* in any part of a man's body and that, you

[51] Possibly from an insect (Ghalioungui 1987: 238).
[52] (Ghalioungui 1987:238)
[53] (Ghalioungui 1987:238)

find it like the skin of his flesh, it is stretched; it does not come and go under your fingers, but it stays, (something) has arisen in it, then you must say: this is a swelling of flesh, a disease that I treat, it (the tumour) being tested (cauterizing) with fire, and being treated like the treatment of a *s3-ḥmm* patient" (Ghalioungui 1987: 239-240); (Bardinet 1995: 367).

From this one onwards, the pouches are originated by the *aat*, *ʿ3.t*, a lipoma or a fibroma (Graber-Baillard 1998: 30-32). A chronic hygroma, lipoma or fibroma; a not complicated epigastric hernia or umbilical hernia, to be treated with a transcurrent cauterization (Jean 1999: 30). Another medical interpretation from this work is that it can be either: a chronic lymphamgioma[54], a simple epigastric hernia, or an umbilical hernia (Jean 1999: 30). Pouch formed showing a superficial step? (Bardinet 1995: 196). An *ʿ3.t* swelling of the flesh, *ḥʿw* or any of the limbs; *ʿ3.t* suggesting a solid tumour (Nunn 1996: 165-6). A swelling of flesh in any body part (Ghalioungui 1987: 240).

864

"Instructions for a swelling *ʿ3.t* of the coverings of the brow, *wp.t*, of his abdomen. If you examine a swelling of the coverings of the brow of his abdomen above his umbilicus. Then you should place your finger on it and you should palpate his abdomen...That which comes into being comes forth when he coughs. Then you shall say concerning it: This is a swelling of the coverings of his abdomen, an illness which I will treat. It is the *t3w* heat of his bladder in front of his belly which creates it. Falling to the ground, [it] returns likewise. You should heat *sšmm* it to imprison it in his belly. You treat it like the *s3-ḥmm* treatment" (Nunn 1996: 165-166); (Ghalioungui 1987: 240-241).

[54] A rare disorder involving the lymphatic channels, one of the causes of underlying conditions that could possible cause gynaecomastia, a condition portrayed, in some authors' opinion, by the pharaoh Akhenaten.

An enlargement- *ꜥ3.t* of the epigastric tissue, a hernia, maybe (Graber-Baillard 1998: 32-33). As in the previous case, a chronic hygroma, lipoma or fibroma; a not complicated epigastric hernia or umbilical hernia, to be treated with a transcurrent cauterization (Jean 1999: 30). Another interpretation: an umbilical hernia too. (Jean, 1999) Pouch formed by substances whose provenance is an exterior dressing of the upper part of the body (Bardinet 1995: 196, 367-8). The *ꜥ3ꜥ* disease, is again referenced giving instructions for its treatment in a swelling of the brow (maybe an image of the fat pleat in the belly), *wp.t*, of the abdomen above the umbilicus (Nunn 1996:165-166). Nunn considers it to be a classic description of an umbilical or epigastric hernia. A swelling of the covering of the belly above the pudenda, the lower abdomen (Ghalioungui 1987: 241-242) maybe located in the bladder, since the EP states that the bladder lays in front of the belly. (Kamal, 1967)

865

"Therapeutic instructions concerning a swelling *ꜥ3.t* in his lower abdomen, (hypogastrium[55]). If you examine this in his lower abdomen the water of his belly goes up and down, you should say thereon: The *ḥrw* (?) in his lower abdomen, (hypogastrium), a disease that I can treat. It is the *t3w* burning substances that are in the bladder that provoke this. You must then hit (the swelling) with the *ḥmm*-instrument[56]; it (the instrument) must not descend to the *msjn.t* part of his body. Treat it (the lower abdomen, hypogastrium) like the treatment of the *s3-ḥmm* patient" (Ghalioungui 1987: 242); (Bardinet 1995: 368).

A tumour of the lower umbilical abdomen (peritoneal cavity), ascites (Graber-Baillard 1998: 34-35). Ascites, treated with the cauterizing knife (Jean 1999: 30). Pouch formed

[55] (Ghalioungui 1987: 242)
[56] The *ḥmm*, mentioned in Ebers 865, was it a knife or a probe, as it was used for the opening of a tumour (?): "you have to pierce it [i.e. the *ꜥ3.t* tumour in the stomach] with the *ḥmm* tool, which must not go down to his *msnj.t* [may be the peritoneum]"(Győry 2006: 1).

by substances whose provenance is the lower abdomen. (Bardinet 1995: 196, 368). A description giving the image of water going up and down is given. Maybe ascites (effusion of fluid into the peritoneal cavity). A recommended treatment is to pierce the swelling with an *ḥmm* -knife, a similar treatment employed by Celsus in the 1st century AD (Nunn 1996: 167). A swelling of the hypogastrium, having water going up and down, "the heat of the bladder" may be an infection of the bile duct, thus ascites condition present. A puncture and evacuation of liquid is performed (Ghalioungui 1987: 242).

Fig. 29. a. Bistouri-cautère-*djoua*, *djw* :  ,
ou
Bistouri-cautère-*hemem*, *ḥmm* :  ,
Copte : gom (B).

Grec : καυτήριον.

Musée d'Histoire de la Médecine.
Inv. n° 89.46.13.
Col. Clot-Bey ; Don, J. Cloquet, 1850.
Bronze. Technique : coulé.
Haut. 13 cm.
État : oxydé.
Époque gréco-romaine.
(voir texte, infra, p. 56 to 58.)
Cliché de l'auteur, 1998.

Voir par exemple :

P. Ebers 106, 13-17 : « *tu ouvriras (la* *, sans atteindre le péritoine-xesin.t*[ms] ; *ouvriras (la poche ascitique) avec l'instrument-h. feuillet péritonéal viscéral* ».

Fig. 8 - The *ḥmm*-instrument (Jean 1999: 56).

866

"Therapeutic instructions for a ʿ*3.t* swelling (resulting from) the *sf̲t̲*-substance originating from a *mtw*-vessel. If you examine ʿ*3.t* swelling (resulting from) the *sf̲t̲*-substance originating from a *mtw*-vessel; it (the vessel) has produced a ʿ*3.t* swelling on his belly. If your finger examines it, it is like *ḥp*ʿ under your fingers; it is (?). You must then say: this is a ʿ*3.t* swelling of a *mtw*-vessel, a disease that I treat with the knife treatment. You should then bandage it with fat. You should then apply the treatment of wounds on any body part of a man" (Ghalioungui 1987: 243); (Bardinet 1995: 368).

A soft tumour of the muscular tissue (Graber-Baillard 1998: 35-36). A soft abdominal tumour or lipoma to be treated with an incision (Jean 1999: 30). The *mtw*-vessels carry a *sf̲t̲* substance that will produce a pouch itself (Bardinet 1995: 196, 368), the swelling of the *mtw* channels; Nunn suggests a vascular tumour (hemangioma) (Nunn 1996: 167). The swelling in the belly is caused by a manifestation of the vessel (Ghalioungui 1987: 244).

867

"Therapeutic instructions for a swelling of fat, ʿ*3.t nt* ʿ*d̲*. If you examine a swelling of fat in any part of the body of a man, and you find it moving under your fingers and that, because of your hand, it is in parts that stay, you must then say: this is a swelling of fat, ʿ*3.t nt* ʿ*d̲*: a disease that I treat. You should then perform for it a knife treatment, whereby it is given the treatment of a wound" (Ghalioungui 1987: 244); (Bardinet 1995: 368-369).

A lipomatosis tumour, a lipoma (Graber-Baillard 1998: 36), to be treated with an incision (Jean 1999: 30). Another greasy purulence (Bardinet 1995: 368-9). This

swelling of fat, *ꜥ3.t nt ꜥḏ*, comes and goes under the fingers. Maybe a subcutaneous lipoma, according to Nunn (Nunn 1996:167). A swelling of fat in any body part that can be manipulated (Ghalioungui 1987: 244). A ganglionic mass, according to Ghalioungui, diagnosed by Ebbell as a tumour with liquid contents (Ghalioungui 1963: 84), (Ebbell 1937: 124).

868

"Therapeutic instructions for a 'son' swelling *ꜥ3.t nt sꜣ*. If examine a 'son' swelling on any part of the human body, and you find it (the swelling) single or numerous; it is like the skin of his flesh, solid under your finger, but not too solid; it is large, painful in his flesh. You must then say: this is a 'son' swelling: a disease that I treat. You should then perform for it a knife treatment, whereby it is treated like the treatment of a wound on any body part of man" (Ghalioungui 1987: 244).

An extensive multiple tumour with epidermis coloration (Graber-Baillard 1998: 37-38). A fistula or abscess to be treated with an incision (Jean 1999: 30). Another interpretation: a tuberculous abscess (Jean 1999: 30). A swelling of the flesh, *ꜥ3.t nt sꜣ*, solid under the finger, large and painful. Unclear to what it may be (Nunn 1996: 167). Can include aneurysms and sebaceous cysts (Ebeid 1999: 102). A polypoid tumour. (Ghalioungui 1963: 85). The use of the word *sꜣ*, meaning son can refer to a small clot, a metastasis? Maybe (Ghalioungui 1987: 244). A pouch of *sꜣ* that may appear in any body part (Bardinet 1995: 196, 369). A polypoid tumour (Ebbell 1937: 124).

869

"Therapeutic instructions for a swelling of pus. If you examine a swelling of pus *ʿ3.t nt rj.t* in any body part of man and you find that its head is raised and that it is enclosed (and) spherical, you should then say thereon: this is a *ʿ3.t* swelling of pus that has run (together) from his body; a disease which I will treat with the knife treatment. There is in it something (vegetable mucilage[57]) like viscous humor, something comes out after that like wax; it (the swelling) makes a pocket. If anything remains in its pocket, it recurs" (Ghalioungui 1987: 245).

Another translation is provided in Nunn, he calls matter-pus and operation-knife treatment (Nunn 1996: 76).

A localized tumour in a pocket containing waxed water (Graber-Baillard 1998: 38-39). An abscess or atheroma to be treated with an incision (Jean 1999: 30). The word *ʿ3.t* appears relating to the pus, translated by tumour in the *Grundriss*, It describes a pouch in the scalp (Bardinet 1995: 195, 369). Probable abscesses (Nunn 1996: 167). Called atheroma (sebaceous cyst) of the hairy scalp by Ebbell (Ebbell, 1937); if it was a tumour, total extirpation would be necessary and the knife treatment suggested only refers to the 'pouch' (Ebeid 1999: 115). A swelling of pus that has something originating out such as wax, in a pocket, that has to be extracted in full (Ghalioungui 1987: 245). In a tumour with a capsule such as this one, it was strongly recommended (to be extracted) to avoid a relapse. A swelling that seems to be a sebaceous cyst (Ghalioungui 1963: 85).

[57] (Ghalioungui 1987: 245).

870

“Therapeutic instructions for a swelling of hair *ꜥ3.t nt šnj*. If you examine a swelling of hair, and you find it spherical and soft and its content solid, you must then say: a disease that I treat with the knife treatment. Its appearance is like a *ꜥ3.t* swelling of pus from *ꜥrw.t*” (Ghalioungui 1987: 245-246); (Bardinet 1995: 369).

A tumour with a solid content, a furuncle with pus (Graber-Baillard 1998: 39-40). A furuncle to be treated with an incision (Jean 1999: 30). Swelling of hair, *šnj*, perhaps a dermoid cyst, lined with skin appendages including hair or a sebaceous cyst of the scalp (Nunn 1996:167). An atheroma of the hairy scalp. Maybe also a sebaceous cyst (Ghalioungui 1963: 85). Spherical and soft, with a solid content (Ghalioungui 1987: 246).

871

“Therapeutic instructions for a swelling of pain-matter *ꜥ3.t nt wḫdw* at the top of both your arms and you find that it is producing water. It is solid under your fingers and it is firm/unyielding. It is soft but not very. You must then say: this is a swelling of pain-matter *ꜥ3.t nt wḫdw* at the top of both your arms, a disease that I treat. You should then perform for it the knife treatment but beware of the *mtw*-vessel. What comes out of it is like water of gum/resin. It forms a pocket. You should not allow anything in it so it may not recur. Treat it like the treatment of a wound in any part of the human body. Allow it to close itself. Ease the *mtw*. It swells again after it is eliminated; it is the *ỉnw.t*-manifestation (of pain matter) that does it against a man” (Ghalioungui 1987: 246); (Nunn 1996: 76).

A big abscess containing purulent matter, maybe a tendon enlarged by tuberculosis (Graber-Baillard 1998: 40-41). A phlegm of the tendons or a tuberculosis synovitis[58] to be treated with a prudent incision, bandaging and immobilization (Jean 1999: 30). A pouch of *wḫdw*, in the description this pouch has water in it, but not as hard as in other cases. As the treatment is carried out, a type of glue comes out of it and this can also happen in any body part (Bardinet 1995: 196, 370). Swelling of pain-matter, at the top of both arms, producing water, solid under the fingers, a kind of gum-water comes out of it (Ghalioungui 1987: 246-247).

872

"Instructions concerning a swelling of vessels: If you examine a swelling of vessels in any limb of a man, and you find that it is hemispherical (?) and grows under your fingers on every going (pulsation of the heart) (but) if it is separated from his body, it cannot on account of that become big (grow) and not give out (diminish) then you shall say concerning it: it is a swelling of a vessel; it is a disease which I will treat. It is vessels that cause it, and it arises through injury to a vessel. You shall perform an operation for it, heat with fire, it shall not bleed much[59]. Thou shalt treat it as a *sꜣ-ḥmm* (the surgeon) treats" (Kamal 1967: 43); (Ghalioungui 1987: 247).

A haematoma of the soft tissues, muscle-tendon, a floating cyst (Graber-Baillard 1998: 41-42). Muscular haematic cyst[60] treated by heated knife (Jean 1999: 30).

There is a reference to the tumours of Chons[61] in which Brothwell found possible evidence of malignancy but which Ghalioungui (...) believed that the description better

[58] Synovitis is a painful inflammatory condition affecting the synovial membrane which lines the joint cavity of joints that facilitate movement

[59] The *ꜥꜣ.t* tumour of the *mtw*-canals was treated with a burning knife, in order to avoid bleeding. The patient should be treated then as any one having survived a fire-drill treatment (Győry 2006: 1).

[60] The persistence or late appearance of a floating tumour around the initial lesion (Benezis 2007).

[61] The name of the moon God Khonsu, son of Amun and Mut, frequently identified with Thoth, probably meant placenta of Kings, *kh* (placenta) and *nesu* (king). The placenta was also considered as a stillborn twin among the ancient Egyptians. ABULEMIN (1999) Fertility and reproduction in ancient Egypt. *Middle East Fertility Society Journal,* 4**,** 257. Maybe there was a metaphoric

represented (...) was possibly cancer. (...) The word tumour appears frequently but always in the sense of swelling (Micozzi 2007: 29). Another option would be a plague but, according to Nunn, there is no convincing evidence that bubonic plague reached Egypt until after the Muslim conquest. (Nunn and Tapp, 2000)

The 'pouches' here are described as carrying a *sf̲t* substance through the *mtw* channels (Bardinet 1995: 196, 370-371). The swelling of the *mtw* here is described as rounded and hard under the fingers, which may again support the diagnosis of hemangioma. (Nunn, 1996) A swelling of Chons that is terrible. Several interpretations are possible although it is stated not to be treated (Nunn 1996:167). Treated with a scalp/lancet heated in fire (Ghalioungui 1963: 85, 91); (Kamal 1967: 13). A swelling of perhaps the blood vessels, in any body part, solid under the fingers (Ghalioungui 1987: 247).

Lippi also suggests that this description in the EP is an aneurysm with cystic aspect as a consequence of a vessel lesion, a difficult one to treat as the doctor has to be able to stop the haemorrhage (Lippi, 1990); an aneurysm too, according to Kamal (Kamal 1967: 42-43).

873

"Therapeutic instructions concerning a swelling of vessels *ʿ3t nt mt.w*. If you examine a swelling of vessels on the *ḫn.tj* leather layers[62] (the cutis) of any part of the human body, its (the swelling's) appearance is solid; it does not wriggle a wriggling[63] they (the vessels) have formed many knots that which is like something inflated with air, you must then say thereon: this is a swelling of vessels *ʿ3t nt mt.w*. You must not lay your hand on anything like it; this is an injury of a body part in its (the vessel's) position. You should then perform: relieve the vessels on any body part of man. What is

image for a non treatable- tumor, considering it part of the body and not to be touched by humans. He was also the expeller of demons according to the myth of the princess of Bekhten.

[62] The determinative 'book scroll' against Ebbell's translation as leather layers (cutis) (Ghalioungui 1987: 249).

[63] (Ghalioungui 1987: 248)

efficiently said as its magic: you shall flow down to earth, you *štw*-vessel that laces me, that hops between these body parts. You may not unite with a union of Chons. If you examine a swelling of Chons make me *nhḳ*; you might let me offer the truth of Re the brilliant in the morning. Is recited four times very early in the morning" (Kamal 1967: 43); (Ghalioungui 1987: 248-249).

An inflammatory lesion from a lymphatic origin (Graber-Baillard 1998: 42-43). Lymphatic filariasis[64] treated with both medicine and magic (Jean 1999: 30). A swelling of the vessels that have formed many knots, of Chons, an externally recognizable finding (Ghalioungui 1987: 248-249). Maybe lymphariasis.

Sanchez et al suggest EP 873 to be a neurofibromatosis[65], a type of cancer; a neurogenic rather than vascular. In his translation of the EP the instructions are given to treat a tumour of the *mtw* and the location of this tumour appears to be in the interior layers of the skin and its shape can look like a snake. A solid, shaped mass where the *mtw* have formed knots, all of them visible and palpable. These neurofibromas may occur at cutaneous, subcutaneous and deeper levels in the body. The skin-pigmented lesions are variable in number and size and not necessarily in proximity to neurofibromas. No further manipulation is advised, stating the authors that "only a neurogenic tumour could respond to manipulation in a manner compatible with the Egyptian description." (Sanchez, 2002) This probably refers to an aneurysm *arterioso-venosum* (Kamal 1967: 43).

[64] Elephatiasis (WHO 2008)
[65] Benign neurofibromas that grow along the nerves' roots. (Dr. Mervyn Harris' personal communication)

874

"Therapeutic instructions for a swelling of Chons (*ꜥ3t nt ḫnsw*). If you examine a large tumour of Chons in any part of a man and it is uneven and it has made many swellings. Something has arisen in it somethings therein being like something containing air, causes an injury to the swelling; it is conjured before you. It is not like these *ꜥ3t* swellings; it is even; it makes *ḫp3.wt* ; every part of the body on which they exist is heavy. You should say concerning it: this is a swelling of Chons. You should not do anything against it" (Ghalioungui 1987: 249-250); (Nunn 1996: 75); (Nunn and Tapp, 2000).

A big necrotic tumour of gangrenous nature (*leprae* or leper) (Grabber Baillard 1998: 45-46). Gangrene, necrotizing fasciites[66] or bubonic plague with no available treatment (Jean 1999: 30). Swelling or blister, the Chons-swelling, (Bardinet 1995: 196, 371), (Ghalioungui 1963: 79), perhaps the blister accompanying the emergence of the worm. Given the risk of tissue inflammation from secondary infection if the blister is broken, treatment of the swelling is best kept to a minimum. (Miller, 1989) Another swelling of Chons, a large one, in any body part, having produced many swellings (metastasis?), and magic has to be set upon it.

Ancient Egyptians thought that kind deities could, if offended, punish with disease. This thought was connected to this kind of tumour, also called the 'healing god' and this illness could only be cured by the same god that have caused it (Ghalioungui 1973: 62). Ebbell and Lefèbvre seem to think of this one as an indication of tubercular leprosy (Ghalioungui 1987: 250); (Nunn and Tapp, 2000)

[66] Extensive tissue death (necrosis) caused by infection that spreads the tissue that surround and lie between muscle bodies called the fascia.

875

"Therapeutic instructions for a *ꜥ3t* swelling on any part of the body of a man. If you examine a *ꜥ3t* swelling on any part of the body of a man you must apply thereon a bandage; and if you find it coming and going and clinging to the flesh under it, you must then say concerning it… *ꜥ3t* swelling. You must perform the knife treatment, cutting it out with the *ds*-knife[67] and that which is in its interior is seized with a *hnw*-instrument[68]. This being seized, its interior is (seized) with the *hnw*-instrument. You must then extirpate it with the *ds*-knife. There is one herein in which are things resembling *mnḏr* a gall bladder from a mouse. Then you must extirpate it with a *š3s*-knife, without fetching those boundaries that are at its borders and touching the flesh; it shall be seized with the (cauterized) *hnwj.t*-part of any colocynth (*ḏꜥr.t*). A swelling that is like a head is seized with *hnwjt* "(Ghalioungui 1987: 251-252); (Bardinet 1995: 371-372).

A soft tumour, the echinococcosis hydatid cyst, dracunculosis (Grabber Baillard 1998: 48). A tumour or hydatid cyst treated with a series of knives and a leather bandage (Jean 1999: 30). Swelling identified as provoked by the guinea worm, (Miller, 1989), (Nunn 1996: 168), *Dracunculus medinensis* according to Ghalioungui, (*dracunculiasis*), (Ghalioungui, 1968) 42; disease confirmed to exist by the Manchester Mummy Project (MMP) which found a calcified male guinea worm in Mummy 1770. (David, 1979, David, 1978) 99 135; (Nunn and Tapp, 2000)

The final section of EP 875 deals with the treatment of cases where surgery is required (Miller, 1989), a "multiple pouch" (Bardinet 1995: 196-7, 371). Are we in the presence of the first examples of tumour excision? Larvae in any limb, on any body part, must be

[67] At the Musée Royal de Mariemont, Belgium, there is a relief showing a *ds*-knife (Jean 1999: 35).
[68] The *hnw* used for discarding pus or other amorphous formations, tweezers or spoons and spatulas were also useful (Győry 2006: 1).

extirpated, without taking away the fibrous capsule, like a head is to be treated likewise (cut off?) (Ghalioungui 1987: 251-252). A myasis[69] tumour being extracted with a scalpel (Kamal 1967: 454).

876

"Therapeutic instructions concerning a *sf̲t* –manifestation of a vessel in any body parts of a man. If you examine a *sf̲t* –manifestation of a vessel in any body parts of a man and you find it red and round like a blow from a stick that resulted from something hitting any body part of man appears; it (the vessel) has made seven knots. You must then say: this is a *sf̲t* of a vessel; it is the blow injury that has done it. You should then incise it with a reed of making a knife-treatment. If it bleeds much you must burn it with fire. You shall treat him in the same way as a *s3-ḥmm*-patient is treated. If you find it on the *ḫ̲nwtj*-part of any body part of man with many wrigglings, inflated with air, it is an enemy of the vessel. You should not lay the hand on the like of this: this is 'head on floor'" (Ghalioungui 1987: 252-253).

A haematoma with vascular rupture, showing tissue ischemia (nodules) (Graber-Baillard 1998: 52-53). A *sf̲t* manifestation, in any body part, and the vessel has knots, the area affected is red and round (haematoma), and hands are not to be laid upon this while treating (Ghalioungui 1987: 252-3) the *sf̲t* substance is all around the body, Inexplicable rupture of vessels, suggests a demon has entered the body and there are some magical papyri concerning the expulsion of these demons. This description may scientifically be trying to reproduce gangrene. The coloration of the lesion is described as black (Bardinet 1995: 197, 372). Suggests that *sf̲t* may be the result of a haematoma (effusion of blood under the skin) caused by blunt force which can cause an infection

[69] Myiasis is a common ectoparasitic infestation that occurs in developing countries, particularly where poverty and poor standards of basic hygiene exist; it is a parasitic infection of the skin and mucous membranes in which the larvae of *Diptera* insects penetrate healthy or altered skin. CESTARI, T., PESSATO, S., RAMOS E SILVA, M. (2007): 158-164.

(Nunn 1996:168), this may also seem to describe varicose veins (Ghalioungui 1963: 85), the 'leather layers' and 'serpentine windings' described in Ebbell's translation are another visual aid for the identification of varicose veins, we may add (Ebbell 1937: 127).

Fig. 9 - Some examples of ancient Egyptian knifes (1 to 6 in fig. 3 too) at the Musée d'Histoire de la Médecine de Paris

877

"Therapeutic instructions for an ʿ*nw-t*-swelling of Chons. If you examine an ʿ*nw-t*-tumour of Chons in any body part of a man and you find its head pointed and its base (?) is straight; his two eyes are green (*wꜣḏ*) and burning; his flesh is hot under it...If you find them on his two arms, his pelvis and his thighs, pus [being] in them, you should not do anything against it" (Nunn 1996: 75). If you find it, however like any swelling of a wound or bruise on the breast, the nipples, or any body part of man (the ʿ*nw-t*-swelling) coming, going, sinking under your fingers and exuding water you must say… You must then prepare for him an eliminating remedy: fly's excrement; wheat flour; natron; flour

of the *psḏn*- barn; bean; galena; oil; mixed with ꜥ*msw*-plant without adding any water. The remedy is applied until (he) is well" (Ghalioungui 1987: 253-254).

Ebbell considered this one to be descriptive of *lepra*, in its *arthritis mutilans* version, a disfiguring disease (Zias, 1996), and Leca also suggested it could be leprosy in deed. A note is added by Nunn reinforcing the difficulty to identify these so called tumours as these descriptions could relate to cancer, bubonic plague or neurofibromatosis (Nunn 1996: 75). Another group of authors, more recently, also stated that this paragraph concerns a case of leprosy. (Yu, 2004)

A ganglionic infection (bubonic plague)[70], the eyes are yellow-coloured proving a liver failure, jaundice (Graber-Baillard 1998: 54-57). The last one is described as applicable to leprosy (anaesthetic leprosy) stating that pigmented areas and colouring of the corneas (eyes) may indicate leprosy, incurable in ancient Egypt. (Ghalioungui, 1963) (Ebbell 1937: 79-127) A comparison must be made by the doctor before applying the treatment; there are some places in the body which there will be no treatment for it (arms, armpits, low abdomen, thighs), and others that are more suitable for treatment (Bardinet 1995: 197, 372-373) another swelling of Chons, with change of pigment, is not accurate enough to decide if it deals with a tumour or an ulcer (Ghalioungui 1987: 254-5).

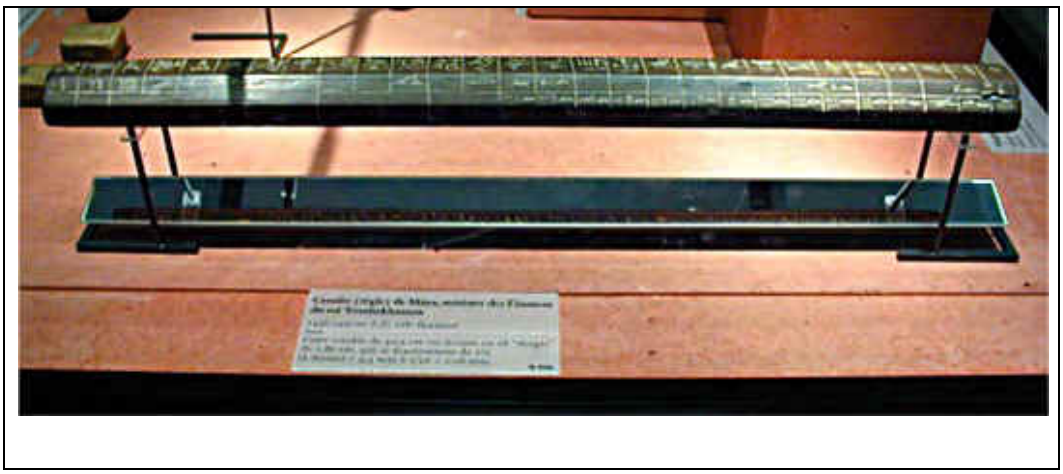
[70] The swellings of Bubos are caused by very swollen lymph glands as a result of the infection. (Dr. Mervyn Harris personal communication)

4. UDJAT - THE EYE OF HORUS AS A MEASURING SYSTEM FOR MEDICAL PRESCRIPTIONS

The users of the *hekat* system continued the splitting with the '*ro*-measure' or 'mouthful' of about half a fluid ounce, which turns up frequently in the medical papyri, and was also consistently the measure of all the tablespoons studied from the first to the eighteenth Dynasties.[71] The *Rx* was then the unit for measuring portions both for medical prescriptions and grains (bread and beer production).

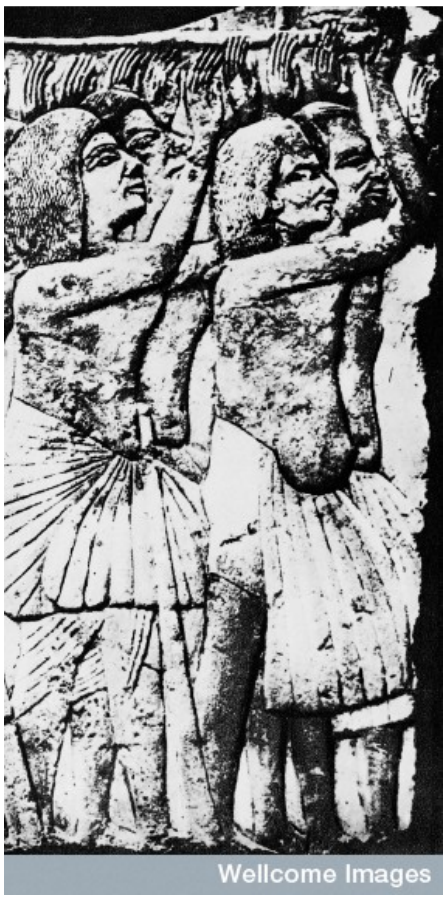
The *Rx* as a measuring system was engraved in the Akhmim wooden tablet, in the Cairo Egyptian Museum, c. 2000 BC, with five division calculi, registered in 1901, analyzed and published in 1906, by Georges Daressy.[72] Then fraction, *ro* = 1/320 *hekat* was then used in magical-medicinal prescriptions' elaboration.[73]

[71] (Leake 1952: 21-25).
[72] Daressy, Georges, Cairo Musée des Antiquités Egyptiennes. *Catalogue General Ostraca hiératiques, 1901, [item] Numéros: 25001-25385 par M.G. Daressy*); task not completed. In 2002, Hana Vymazalova completed it and retranslated it from the French. Hana Vymazalova, *The Wooden Tablets from Cairo: The use of the grain unit Hekat in Ancient Egypt, Archiv Orientalni* (2002); (Gardiner, 2005: 197-198); BMJ, The mysterious and the prosaic, *BMJ* 1999; 318; 0-; http://akhmimwoodentablet.blogspot.com/ http://www.math.buffalo.edu/mad/Ancient-Africa/mad_ancient_egypt.html
[73] Metrical ruler exhibited at the Louvre and at the Cairo Egyptian Museum.



Figs. 10 and 11 - Akhmim wooden tablet, Egyptian Museum, Cairo, photos courtesy of Milo R. Gardner

Both Ghalioungui and Nunn consider that some tomb scenes depict individuals with gastrointestinal afflictions: Saqqara's VI Dynasty tombs of Mehu, Ptahotep and Ankhmahor may show umbilical hernias (Nunn 1996: 166); (Filer 1995: 77), abdominal and scrotal tumour of some sort (Estes 1989: 73, 87), as Bilharziosis causes hepatic cirrhosis in its latter state, with splenomegaly, ascites, umbilical (besides Mehu and Ankhmahor representations there is also an example from the mastaba of Sekhemankhptah at Giza, in the Museum of Fine Arts, Boston), and scrotal hernias caused by increased endo-abdominal pressure (Daglio 1998: 49-50, 86-87), probable representations of late manifestations of bilharzial hepatic fibroses with ascites (Shokeir and Hussein, 1999).



Figs. 12 and 13 – A man carrying a vessel and showing an umbilical hernia in his small prominent belly, Louvre, photo by the author, June 2006; an elderly man suffering from umbilical hernia, Egypt, tomb of Horemheb, Albin Michel Paris 1936-1949, Volume II, Page 360, M0009458, Wellcome Library, London

Daglio adds some more examples, still under discussion, of more probable cases, like those depicted in other art representations: the tombs of Sekhemankhptah at Giza, Ti at Saqqara, Ankhifi at Moalla, Senuseret' stela at the Louvre, the tombs of Insnefruistef at Dashur, Ipuy at Thebes, Pepiankh and Ukhhotep at Meir, and Puyemra and Neferhotep at Thebes. Also the god Hapi, representing the Nile and shown with a prominent belly and pendulous breasts, may be displaying features associated with these diseases (Daglio 1998: 50) or just a depiction of a 'mother' that is nourishing her 'son', being the mother Hapi, the Nile and the son Kemet, the country.

Fig. 14 - The Nile God with pendulous breasts, photo by the author, Luxor, October 2002

Also it has been suggested that Bak, the sculptor of Akhenaton, is depicted on a stela in the Berlin Museum as a person suffering from ascites. Nunn also states that he shows gynaecomastia, a known complication of liver diseases, secondary to schistosomiasis. (Nunn 1996: 82)

Fig. 15 - Ascites, the accumulation of fluid in the abdominal cavity, in Bak, dated to Akhenaten's reign, Berlin Museum

5. RELATIONSHIP BETWEEN *SCHISTOSOMIASIS* AND HEPATIC CANCER – PARALLEL WITH PRESENT DAY EGYPT

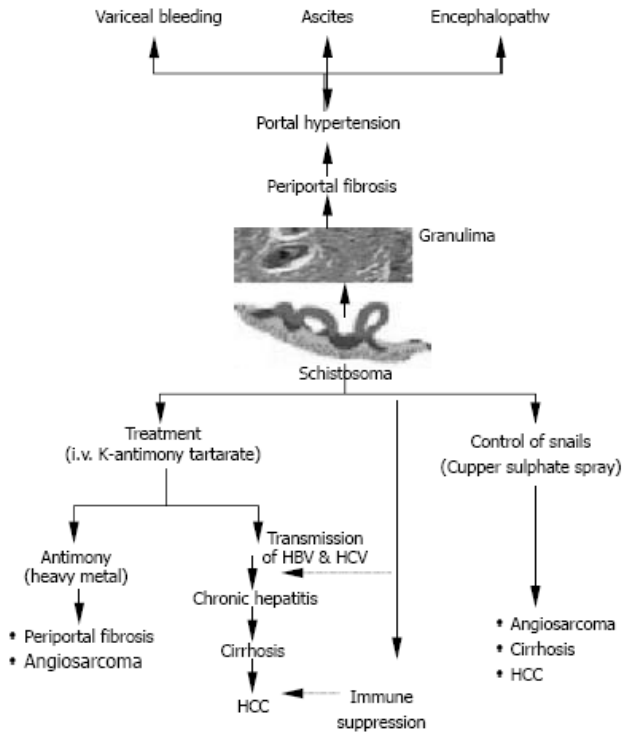


Figure 1 Impact of pathogenic mechanisms, therapeutic and control meaures of schistosomiasis on the liver (El-Zayadi, 1998).

Fig. 16 – The schematics of a liver infection, (El-Zayadi, 2004)

According to David, the schistosome (*schistosomiasis* parasite) infects the bladder and this causes chronic irritation that markedly increases a person's risk of developing bladder cancer, one of the most common cancers in certain regions of Egypt (David, 1999).

As today, there seems to have been a close relationship between *schistosomiasis*/*bilhiarziosis* and bladder cancer in ancient Egypt (Nunn 1996: 69) as is still the case today. It is most predominant in males, as they who work in the fields and are in contact with infected water. The disease commonly leads to hematuria; hence the reports from Napoleon's troops that Egypt was the land of 'menstruating men'. (Paton, 1996) The incidence of this bilharzial infection in Egypt occurs below the age of 50; the

worm being the prime cause of disease and consequent premature death from bladder cancer in Egypt for several thousand years (Hicks, 1983). This goes against the 'normal' incidence of this cancer in non-infested populations, which is between the ages of 65 and 75. (Mostafa, 1999)

Written 16 years after Hicks' article, Mostafa is more affirmative on this relationship. He says that "the association of bladder cancer with *schistosomiasis* seems to be related to the endemicity of the parasite." As hepatic carcinoma can be the next step after infection, the bacterial infection of the urinary tract by the *Schistosoma* itself increases the risk of bladder cancer. (Mostafa, 1999) One year later, another author states that "bladder cancer complicating *schistosomiasis* constitutes 30.8% of all cancers in Egypt", Egypt being the country with the higher frequency of bladder cancer in the world. (El-Rifai, 2000) Their data is supported by Ibrahim, A. S., (1984) *Site distribution of cancer in Egypt: twelve year experience (1970 - 81)*, in *Cancer Prevention in Developing Countries, Proceedings of the 2nd UICC Conference on Cancer Prevention*, Kuwait.

There is an association between schistosomiasis and bladder cancer, perhaps due to liberation of nitrosamines[74] which are known to be carcinogenic (Nunn 1996: 69).

Since the liver is the first organ to be affected by these types of transmitted infectious diseases, there is a curious parallel in the ancient medicine book, Nei Ching, from China, which states that bodily organs are named after expressions relating to the state's civil servants: Liver, the Chief, is a commander, who is in charge of the military operations.

Gall bladder is a senior civil servant of the central government who has a decisive

[74] Nitrosamines are chemical compounds that were first described over 100 years ago, but not until 1956 did they receive much attention when two British scientists, John Barnes and Peter Magee, reported that dimethylnitrosamine produced liver tumors in rats (Scanlan, 2000).

influence.[75] This must enhance the importance of liver function in the whole human body in the thought of ancient civilizations. We know now that Egypt had trade routes with peoples from the Arabian Peninsula, who, by their side, had commercial relationships and routes to Persia, India and China. Spices used for medicinal purposes and doctors were travelling along these routes so did the prescriptions for sure and the knowledge about diseases and their consequences in human organs.[76]

After death autolysis deletes ante mortem patterns of primarily hepatic epithelial cells in the liver, such as hepatitis. The hepatic cells degenerate quickly but the fibrous portal skeleton of the liver still allows ante mortem conditions of the portal area to be identified. A light brown, spongy structure of a liver can be sufficient to recognize cirrhosis. A normal liver appears black and firm (Aufderheide 2003: 446).

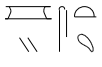
Ruffer has examined several livers from Egyptian mummies and found no tumours. He did a brief description of the placement of the organ following mummification procedures: "The liver is usually flexed round its transverse axis, so as to form a hollow tube open on one side, and either the upper or lower surface may form the surface of the tubular cylinder. Inside the cylinder thus prepared a wax statuette, usually the human Amset (or Imsety), is found in most cases. In other respects the liver was treated exactly like the intestines. It would appear, however, that in many cases the embalmer was unable to remove or reintroduce the liver without tearing it. In such cases he was content to replace only a fragment of the organ into the body" (Ruffer 1921: 58).

The curse of schistosomiasis on the liver has a direct offensive effect and also had an indirect effect as, in recent years, the treatment for this endemic disease was carried out

[75] http://www.spkpfh.de/Iatrocracy_Work_papers.htm, The Yellow Emperor's Classic of Internal Medicine, also known as the Nei Ching, written around third century B.C. in the form of a dialogue in which the Emperor seeks information from his minister Ch'I-Po on all questions of health and the art of healing.

[76] In several occasions of different lectures at the Geographic Society of Lisbon, in the group for the History of Medicine, the relationship between African and Indian and Chinese medicines is made frequently, as it was mentioned that trade routes emphasized the commerce of 'spices' not only for culinary purposes, as it was thought until recently, but mainly for medicinal purposes. Some planst used in ancient Egyptian medicine are not endemic to Egypt; this is a statement to atest the importance of the influences that ancient civilizations had among themselves.

using improperly sterilized glass syringes, transmitting hepatitis C, (El-Zayadi, 2004) (Strickland, 2006) which, considering the world pattern is at its peak of infection today in Egypt.

In Ebers 854 the liver, *mjs.t*,  [77] is said to receive four *mtw* which give it sickness of all kinds because it is full of blood; five paragraphs: 477-481 (Bardinet 1995: 320), deal with diseases of this organ without defining them (Ghalioungui 1973: 124).

Daglio considers the paragraphs on liver from the EP to be too vague to infer any virological type of hepatitis (Daglio 1998: 36).

Kamal adds that Ebers paragraph 188 is designated as a liver case; a liver affection like tropical hepatitis (Kamal 1967: 194).

The bile produced in liver from cholesterol and stored in the gall bladder is used as an ingredient in some medicinal prescriptions[78]. The gall bladder receives the bile from liver through the common bile duct which is formed by the union of two hepatic ducts and is concentrated to more than ten times in the gallbladder.

There is a synonym to the word bile, *snf*, which is the animal bile used in prescriptions from: tortoise – Ebers 350-, cow/ox – Ebers 113-, *gu*-bull, goat – Ebers 433-, *ꜥbḏw*-fish – Ebers 405-, pig – Ebers 392 (Nunn 1996: 149), and this synonym is *wdd*[79],  , that might refer to human bile. This word also defines an organ which must be the gall bladder (Lefèbvre 1952: 34). Bile is formed by liver cells and two problems of interest to Paleopathology can arise from the route bile takes, since it leaves the bile ducts in the

[77] Liver: *mjs.t* according to Westendorf's translation (Westendorf 1961: 357) and (Walker 1996: 269).
[78] In China bear and snake bile are used for medicinal purposes.
[79] (Walker 1996: 268).

liver until it reaches the intestine: the formation of gallstones and infection of the billiary tract (Aufderheide 2003: 452).

Fig 17 and 18 - Mummified liver with Imsety statuette (Ruffer 1921: fig. 2 plate XII); http://images.wellcome.ac.uk/

6. PHYTO-PHARMACOPOEIA PRESCRIBED BY THE TREATISE OF TUMOURS

Fig. 19 – Plants' depictions at Karnak precinct, photo by the author, April 2008

From the German editions consulted on EP 857-877, (Westendorf, 1961) and (Westendorf, 1999) (for the extant data, these are the most accurate translations, since they were done from the original writings), the use of plants as treatments (and the number of applications) are described in the 21 paragraphs and the paragraphs concerning liver diseases (477-481) in Table 4.

The use of plant preparations for treating cancer, first mentioned in the EP, has long been widespread in spite of the general ineffectiveness of such remedies. At present, several compounds of plant origin are known to have demonstrable oncolytic activity. These include colchicines[80], the vinca alkaloids[81], podophyllotoxin[82], the

[80] Originally extracted from Autumn crocus, *Colchicum autumnale*, also known as the Meadow saffron; BUTCHER, R. W. (1954) Colchicum Autumnale L. *The Journal of Ecology,* 42**,** 249-257.; Liber Herbarum: http://www.liberherbarum.com/Pn0167.HTM

[81] Extracted from *Catharanthus roseus*, native to Madagascar, which contains alkaloids vincristine and vinblastine, that have anticancer properties: http://biotech.icmb.utexas.edu/botany/perihist.html

cucurbitacins[83], lapachol[84] and the steroid tumour inhibitors from certain of the Solanaceae[85]. The only antitumoral agent reported in lower vascular plants is calagualine, a saponine isolated from the fern *Polypodium leucotomos*. (Creasey, 1969)

Some Italian forensic scientists have already carried out some research on ancient Egyptian medicine related to EP, already referred to in this dissertation (Lippi). They state that most of the anticancer agents available today in the oncology clinic derive from plants like: vincristine, irinotecan, etoposide and paclitaxel, that are classic examples of plant-derived compounds, like present new generations of taxanes, anthracyclines, vinka alkaloids and camptothecins. (Lippi, 2008)

Contemporary plants used to treat liver infections include the native Egyptian glycyrrhizin (*Glycyrrhiza glabra*), which induces the production of natural interferon, protects and heals the liver cells from damage, and also acts as an anti-allergic, anti-inflammatory and detoxifying element; and olive (*Olea europaea*) leaf extract, which interferes with the specific amino acid production processes vital for the life cycle of the virus and also interferes with viral invasion by inactivating the virus and prohibiting its shedding, budding or assembly at the cell membrane.

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[82] Extracted from ***P****odophyllum peltatum,* native to North America, it contains high concentrations of the compounds podophyllotoxin and alpha and beta peltatin, all of which have anticancer properties: http://biotech.icmb.utexas.edu/botany/mayhist.html

[83] Extracted from *Ecballium elaterium*, which has been used to test on three cancer cell lines (breast, prostate and melanoma) with significant effect: Attard, E., Cuschieri, A., Cytotoxicity of Cucurbitacin E extracted from *Ecballium elaterium in vitro,* Journal of Natural Remedies, 2004 (Vol. 4) (No. 2) 137-144

[84] A natural organic compound isolated from the lapacho tree, *Tabebuia avellandedae*, known in Latin countries as pau d'arco, used as therapy for prostate cancer cases: http://www.prostatecanceralternatives.com/The%20Way%20of%20Herbs%20Taheebo.htm

[85] Big family of South American plants that includes the potato: http://www.liberherbarum.com/-PlanteNavne00_083.htm#SO all these footnotes include websites accessed on June, 2, 2008

Fig. 20 - The left hand of Akhenaten holds an olive (*Olea europea*) branch, at the Metropolitan Museum of Art, New York (Ancient Art Gifts from the Norbert Schimmel Collection 1992: 26)

Some Asia natives are today used in herbal treatments for cancer in Egyptian clinics that are recommending them to patients: Schizandra fructus (*Magnolia Vine*) rapidly reduces liver enzymes and improves liver cell function, ligustrin and dandelion root are herbs used to cure liver cell inflammation, and the caterpillar mushroom (*Cordyceps sinensis*), the reishi mushroom, a form of (*Ganoderma lucidum*) and milk vetch, a type of bean or legume (*Astralagus membranaceus*) root powder are also native to Asia and immune stimulators (el-Jesri, 2008).

7. KNOWN CASES OF ANCIENT EGYPT

Figure 1. Young adult male, Saqqara (Egypt), Late period. Distal quarter of the right ulna in radial view showing a 'kissing' type of osteochondroma (by Eugen Strouhal).

(Strouhal, 1999)

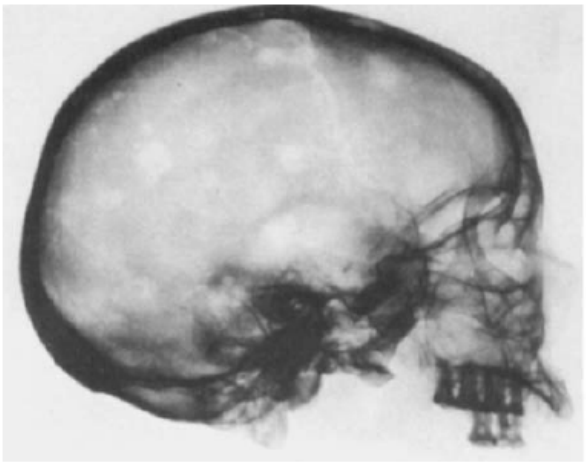


Figure 3. Probable lytic metastatic carcinoma: less dense scatter of irregular lesions with more varying dimensions (small to larger) and poorly demarcated, cloudy edges (lateral radiograph of calvaria of a 40-60 year old female, Saqqara, Egypt, 1st millennium BC).

(Strouhal, 1991)

Tumour in the pelvis (iliac bone) (Ruffer, 1921: fig. 1 plate XLV)

Osteochondroma: Fig 7 shows a lesion in the femur of an Old Kingdom mummy which has previously described (Smith & Dawson 1924) as an osteogenic sarcoma. However, the lower femoral epiphysis is fused, and the bone shows no evidence of periosteal reaction, nor does the growth show any spiculation. The evidence points to a diagnosis of osteochondroma rather than sarcoma.

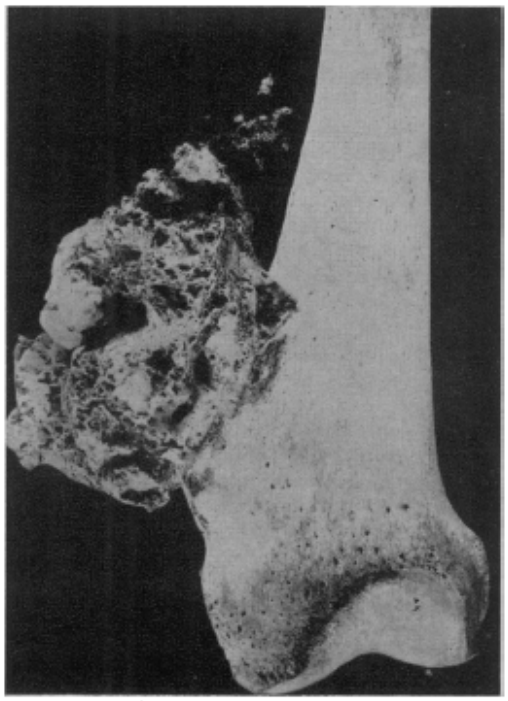


Fig 7 *Osteochondroma of the femur. Old Kingdom*

(Smith 1924: 144 fig. 64)

Fig. 21 - Some examples of tumours found in ancient Egyptian human remains.

Strouhal, one of the specialists in the identification of malignancies in ancient Egyptian human material, claims that, although some authors state that malignant tumours are rare to find in ancient Egypt, literature favours the occurrence of these neoplasias, especially the EP that describes 21 cases. In his article (Strouhal, 1976), he detected even more, and up until 1994, sixty cases were reported, the majority being bone localized neoplasms (as soft tissue is almost impossible to retrieve, due to preservation issues), metastases like osteogenic sarcomas or myelomas[86] (Bauduer, 2004), (White 2005: 325). In 2005, Strouhal identified that the skull had been perforated by a

[86] Multiple myeloma is a rare primary malignant tumour of hematopoietic tissue; its effect on bone tissues is a widespread pattern of lytic lesions on various skeletal elements (White 2005: 325).

malignant tumour in more than a thousand individuals from a New Kingdom necropolis at Saqqara (Strouhal 2005a: 114-117).

In an article from 2006, 39 malignant tumours have been described showing either primary or secondary manifestation in the skeleton, from various periods of Pharaonic Egypt, and different sites (189 individual skeletal remains from pre to early dynastic Abydos, 211 individual skeletons from a Middle Kingdom Theban necropolis and 505 individuals from a New Kingdom Theban necropolis). These provide clear evidence that malignant tumours were present in ancient Egypt. Five cases were identified with macroscopic and radiological evidence, showing a destructive growth pattern; three of the cases being likely metastatic carcinomas (Nerlich, 2006).

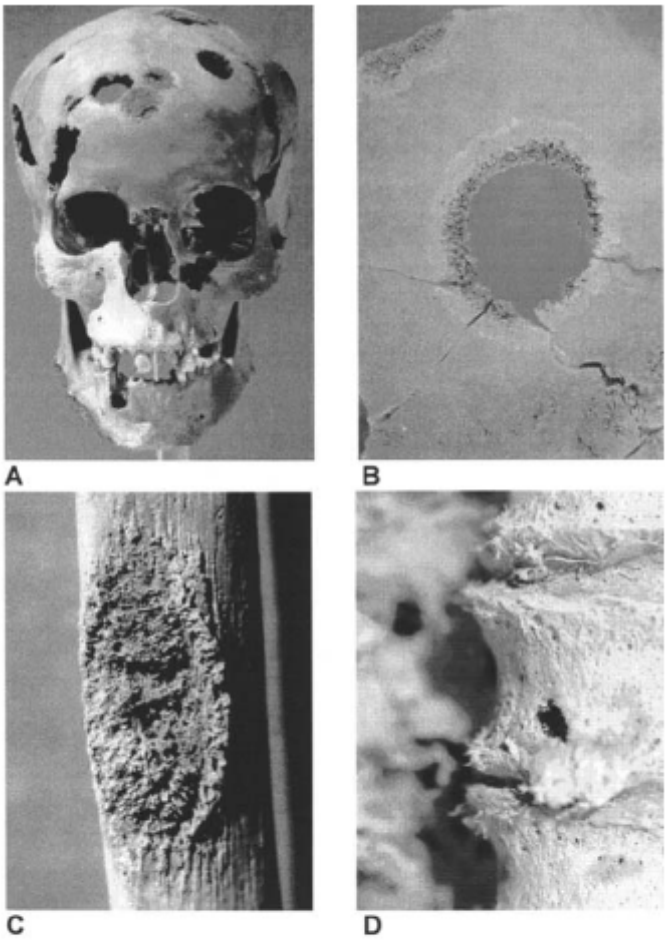


Figure 1. Macroscopic aspects of malignant tumors in ancient Egyptian skeletons. (A) Adult female skull with multiple osteolyses (case 1). (B) Close-up view of (A) showing minor osteoblastic reaction at the margin of the lesion. This strongly suggests bone metastasis. (C) Superficial osteoblastic-osteolytic bone tumor in case 2 showing partial destruction of the bone and marginal osseous reaction. (D) Osteolysis of vertebral body (case 4) suggestive of plasmacytoma (multiple myeloma). The lesion, such as multiple others in this case, revealed almost no osseous reaction.

(Nerlich 2006)

Table I. Summary of ancient Egyptian malignant tumor cases.

Age	Gender	Localization	Osteoblastic/lytic	Presumed diagnosis
40-50	Female	Skull, vertebrae. humerus	Mixed	Metastases (carcinoma)
20-25	Male	All skeletal regions	Mixed	Metastases (carcinoma)
40-50	Male	Pelvis, vertebrae	Purely lytic	Plasmacytoma
50-60	Male	Skull, vertebrae	Purely lytic	Plasmacytoma
30-50	Female	Skull, vertebrae	Mixed	Metastases (carcinoma)

Fig. 22 - Examples of malignant tumours in ancient Egyptians, (Nerlich 2006).

The cases reported from ancient Egypt are: cartilaginous exostosis dated to the 12th Dynasty and a meningioma in a skeleton from the 5th Dynasty; Ruffer's pelvis' osteosarcoma (Ruffer, 1914), Zimmerman's histiocytoma, 44 cases of neoplastic

diseases including cranial osteomas, 7 of which are nasopharyngeal carcinomas[87] - reported frequently by Strouhal, (Strouhal, 1978); (Aufderheide 2003: 431) and 9 are multiple myelomas. 71 (2%) of reported cases in ancient Egypt date to pre-Christian times, 18 (8%) to the centuries after this may be related to population density. Cranial osteoma was more prevalent in ancient Egypt than today (2, 5% against 1%). The high prevalence of nasopharyngeal carcinoma in ancient Egypt was related to the presence of the Epstein-Barr virus and to the presence of chemicals that encouraged carcinogenesis in large Egyptian towns. Myeloma was the most frequent type of malignancy. (Capasso, 2005)

Egyptian oncologists report that asbestos[88] has been recognized in ancient Egypt as it was used in mummification, wrapping bodies in asbestos clothes to offset the ravages of time. Mesothelioma, a tumour of mesothelial cells[89], increasing today due to the long latency period (30-40 years) is the cancer of toxic origin that results from exposure to this chemical. (Gaafar and Eldin, 2005); (Abratt et al., 2004).

In 1969, Gray stated he did not find any evidence of malignant neoplasias and attributed that to the low average life expectancy of ancient Egyptians (Gray, 1973).

Spigelman found in literature and in his own work 44 cases of neoplasms of bones and soft tissues (Spigelman, 1997).

Strouhal has made some analysis of the bone tumours that are usually found in ancient Egyptian cases; osseous metastases are much more common than primary malign

[87] Nasopharyngeal is a squamous cell carcinoma that usually develops in the lateral wall of the nasopharynx. It was the most common types found in ancient skeletons (Mark 2006); (Capasso 2005: 2-13). It arises from the soft tissues of the posterior nasopharynx and invades aggressively the surrounding structures, including the bone, of the palate, sinuses, orbits and cranial cavities. Regional lymph node involvement is common (Aufderheide 2003: 431).

[88] Known in ancient Egypt as the magic rock, is mentioned by Pliny (Circo 2004); Chrysotile asbestos, the fibrous variety of the mineral serpentine, forms in metamorphic rock, that is, rock that has been altered by intense heat and pressure.

[89] These cells line the body's serous cavities and internal organs and lubricating the layers; a mesothelioma, cancer of the mesothelium happens when cells of the mesothelium become abnormal and divide uncontrolably invading and damaging nearby tissues and organs most frequently in the pleura or peritoneum (by inhalation of asbestos). More than 90% of mesothelioma cases are linked to asbestos exposure (Asbestos Resource Centre 2008)

osseous tumours. Their frequency reaches up 85% in most common carcinomas out of which the outstandingly osteolytic nature characterizes metastases of the renal, thyroidal, pulmonal, breast and gastrointestinal carcinoma (Strouhal 1981: 183).

Examining skeletons, Strouhal argues also that benign tumours can be found in skeletal collections, although literature only mentions seven recognized cases of malignant soft tissue lesions to which he adds another one. The 'ovarian carcinoma' found by Granville in 1824 in a mummy from the British Museum, after being re-examined by Tapp was found to be a benign cyst of the ovary (Spigelman 1997: 107); (Nunn 1996: 81); (Nunn and Tapp, 2000). Again it is stated by this author that theories say that cancer was not so common in ancient Egypt because of the low life span expectancy of peoples as only 15% of the population would survive beyond 46 years of age. A reference to the carcinogenic nature of the bitumen is also given, since it was available in Egypt and people were exposed to it. The importance of the infection caused by schistosomiasis as an inducer of bladder cancer is also again stated as in earlier reports from Ruffer.

Fig. 3. Sacrum of Imakhetkherresnet in posterior view, showing its composition of six segments and a large orifice in posterior aspect of body as well as a secondary perforation in body of second segment (photograph by E. Strouhal).

Fig. 4. Postero-anterior radiograph of sacrum, disclosing oval orifice and cavity in right half of second segment, continuing as large cavity in left half and edge of right half of third segment, and two small lobes in left half of second segment (X-rays by S. Ikram and R. Walker).

(Strouhal et al., 2004)

Fig. 573.—Outer appearance of calvarium of skull from the Royal Excavations at Helouan (Ilnd Dynasty, circa 3400 B.C.). A circumscribed hyperostosis is seen in the right parieto-occipital region.

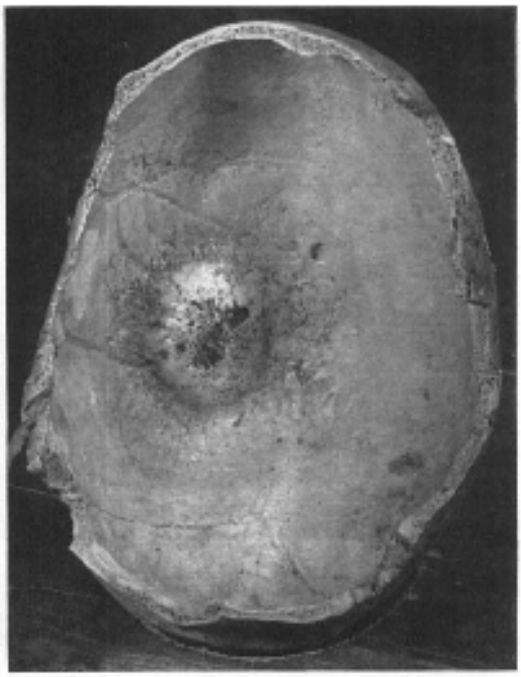


Fig. 574.—Inner aspect of same skull as in Fig. 573, showing hyperostosis involving inner table to the right of the superior longitudinal sinus.

Fig. 23 - More examples found in ancient Egyptian material (Rogers, 1949).

Y quizás el caso más interesante, una metástasis ósea maligna craneal de tumor primario desconocido con un diámetro máximo de 15x13mm. en la zona de la escama occipital de un esqueleto alofiso (fig.5).

Fig. 5. Metástasis ósea craneal

Fig. 24 - "and who knows the most interesting case, a skull malignant metastasis of an unknown primary tumour with a maximum diameter of 15x13mm in the area of the occipital scale of an unidentifiable skeleton (gender)" (Baxarias 2007).

The incidence of cancer in ancient Egypt seems to have been much less due probably to: shorter expectation of life, and the absence of carcinogenic factors in the environment (Nunn 1996: 64), 81; 75% of human cancers are related to environmental factors, a characteristic of industrialized societies (Zimmerman, 1977). However, diseases found in Egypt today are not very different from the ones that afflicted the ancient population if we consider parasitical infections.

Both environment and diet are factors to be considered in the analysis of cancer in ancient Egypt (Ebeid 1999: 114).

Another author says that cancers in ancient Egypt should be detected in wealthier individuals as their diet and sedentary type of living made them more prone to this kind of pathology and that these cancers must have been incurable for sure. (Halperin, 2004)

The diet factor is really difficult to consider as the people belonging to upper social status had access to beef and wine and other different foods than the ones on lower status of the society. Up to what point does this difference in eating has relevance to the incidence of cancer is really uncertain.

The type of living, sedentary or more active, is another arguing factor as the populous working class of ancient Egypt was more exposed to infections as they worked outdoors, most of them and the majority in contact with Nile water, a source of pathogens.

8. CONCLUSIONS

By the end of this dissertation the conclusions point to a possible small incidence of cancer in ancient Egypt, although the cases found indicate that there were patterns to which the disease can be linked. This refers to both the location of the found tumours in the body and the affected functions, e. g. nasopharyngeal carcinoma.

Having summarized the research and diagnoses of other authors, my own interpretation is based mainly on medical interpretations derived from the described symptoms rather than on simple linguistic translations. With regard to the 'pus' or 'bile' that is frequently mentioned; the 'water' or 'liquid inside the pouch' can, in some cases, be lymph that has blocked lymph nodes, affecting general lymphatic circulation. This can be caused by genetic inheritance, or infection from a mosquito bite in tropical climates (the most probable cause in Egypt since it is still endemic to Africa), or trauma that destroys the lymph nodes and prevents lymph circulation from being fluid all over the body. A case in art that portrays this possible condition is the 'Lady of Punt' a relief in the Egyptian Museum of Cairo, taken from Deir el-Bahari's Hatschepsut's funerary temple.

Fig. 25 - The Lady of Punt, Cairo Egyptian Museum, c. 1470 BC.

Some seem to be real malignant tumours. The yellow colour demonstrated in some patients can be bilirrubin[90] in excess (which produces gallstones[91] in many cases), a pathological symptom as the liver is the first organ to receive the impact of an external infection.

[90] Brownish yellow substance found in bile produced when the liver breaks down old red blood cells.
[91] Gallstones were found in Egyptian mummies by Gray, in Gray, P.H.K., *Radiography of Ancient Egyptian Mummies, Medical Radiography and Photography*, Rochester, Eastman Kodak Co. 1967 and (Smith 1924) and also in a mummy of unknown provenance from the University of Leiden that had identified radiopaque gallstones through x-ray (Aufderheide 2003: 453).

Gallstones in the liver of a mummy of the XXI Dynasty., (Smith 1924: 136 Fig. 60), from a priestess of Amun, 21st Dynasty; (Aufderheide 2003: 453)

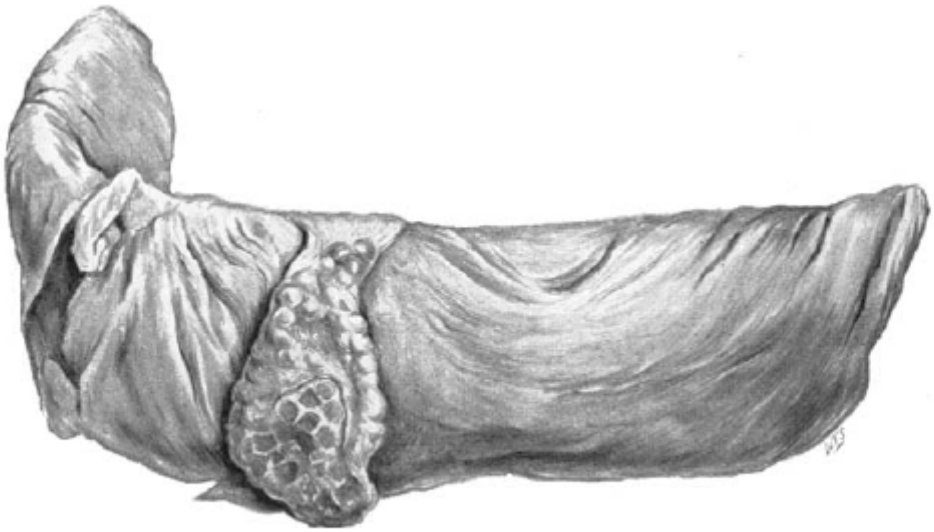


FIG. 177.—Liver and gall-bladder containing calculi from mummy priestess in the Museum of the Royal College of Surgeons of England. (*By kind permission of the Royal College of Surgeons.*)

(Gordon-Taylor, 1937)

Fig. 26 - Gallstones found in a mummy from the XXI dynasty, formerly at the London Royal College of Surgeons, now destroyed after the II World War bombings.

When a powerful infection occurs, such as jaundice[92], cirrhosis, hepatitis[93] then, liver cancer may follow. The ancient Egyptians did not use the same medical terminology as we do and therefore we have difficulty in identifying an exact pathology from the described symptoms.

Since the liver liquefies before dehydration is completed, liver metastases cannot be detected and these are the most common and earliest manifestations of metastasis from gastrointestinal cancers. (Weiss, 2000) Secondary spread (metastasis) of cancer cells from the soft tissue to the skeleton is the most common cause of bone cancer and these occur most often in people over the age of 50. (Podzorski, 1990: 63-64)

In the EP (477-481) liver diseases appear among skin diseases as jaundice changed the colour of the skin, due to a pathological state in the liver (Kamal 1967: 194).

Some royal mummies appear to show skin tumours; these were not sampled yet but a biochemical approach would be appreciated to identify the type of lesion showed.

The mummy of Ramesses II has small brownish skin tumours on the forehead, senile comedones of acne[94] (Bucaille, 1989: fig. 3).

[92] Jaundice or icterus is yellowish discoloration of the skin, sclerae (whites of the eyes) and mucous membranes; it is caused by hyperbilirubinemia, increased levels of bilirubin in the blood. Bilirubin is made when red-blood cells are broken down. The body is usually able to get rid of it easily unless there is something wrong with your liver or billiary system. There are three types of jaundice: hemolytic jaundice, hepatocelular jaundice and obstructive jaundice. Hepatocelular jaundice is the most common and usually caused by a problem with the liver. http://www.nhsdirect.nhs.uk/articles/article.aspx?ArticleID=219# There are five prescriptions in the Ebers Papyrus (477-481) for what seems like jaundice, from the description, included in the 'skin' section maybe because of the symptoms. KAMAL, H. (1967) *Dictionary of Pharaonic Medicine,* Cairo, The National Publication House. 194, 251

[93] It is difficult to diagnose hepatitis from a desiccated liver, even if the liver has been removed from a 'fresh' cadaver and stored in a canopic jar with plenty of natron to accelerate desiccation, no report of hepatitis identification on Egyptian mummies was published so far. Some irregularity on the surface of the liver of Nakht did identify cirrhosis, after schistosomiasis infection, REYMAN, T.A., *Schistosomal cirrhosis in an Egyptian mummy*, Yearbook of Physical Anthropology, 1976, 20, 356-358.

[94] Senile comedones arise on the face of the middle-aged and elderly affecting areas that have been exposed to sunlight over a long period of time which may become yellow and leathery (solar elastosis), NYC Acne Treatment Centre, 2008

Fig. 27 - Ramesses II' skin tumours visible, http://members.tripod.com/anubis4_2000/mummypages2/19A.htm#Ramesses II ;

(Smith, 1912: plate XLIV)

Ramesses V has also some lesions in his face, small tumours thought to be smallpox but of undetermined nature so far (Bucaille, 1989: fig. 16).

Fig. 28 Ramesses V skin abscesses (Bucaille, 1989: fig. 16), (Smith, 1912, plate LVI).

Amenhotep II also shows skin tumours on the neck, especially around the lower part, these are also present elsewhere on the body (Bucaille, 1989: fig. 17).

Fig. 29 - Amenhotep II showing also skin tumours (Bucaille, 1989: fig. 17)

An examination done on a mummy of an Egyptian who died in 892 BC +/- 53 years showed the skin to be well preserved, with inguinal sub corneal vesicles of the type seen in sub corneal pustular dermatosis (Zimmerman 1976). This condition can be similar to these skin lesions; is most common in individuals aged 40 years or older, and it was first described by Sneddon and Wilkinson in 1956 being a rare, benign, chronic relapsing sterile pustular eruption typically involving the flexural sites of the trunk and proximal extremities (Dick 2006). The relevance to this work is that, tumour necrosis levels have

been found to be significantly elevated in the serum and blister fluid of patients with sub corneal pustular dermatosis (Dick 2006).

Tumours mentioned in Egyptian medical papyri (EP and Edwin Smith Papyrus), have been interpreted as neoplasias by one author, but simply as swellings or possibly varicose veins by others. And there are only a handful of reports of tumours in ancient remains. Zimmerman made some experiments trying to mummify cancerous tissues to see if they stay preserved or not for future analysis. The results showed that "malignant tumours were found to be much better preserved after mummification than normal tissues." Zimmerman also said that, 'There are only a handful of reports of tumours in ancient remains.' (Zimmerman, 1977) We can now add some more to the reported cases thanks to the development of techniques and studies done on material found in excavation sites, which were not available before. Later on, this author's experimental work suggested that malignant tumour cells would survive better than benign (Aufderheide 2003: 452).

If the evidence for carcinogenic cases amongst the ancient Egyptians is almost untraceable, then this may explain the apparently low incidence of this disease in the ancient remains. It is also possible that the evidence is missing because cancer really was less prevalent then than in present societies. However, in this case, how can we explain that the EP has so many prescriptions for the treatment of 'swellings' that are interpreted as tumours?

There is reason to think, from studies done on the EP, that oncology was a fact in ancient Egypt. Ancient Egyptian doctors already had some information that enabled them to diagnose and treat cancers, although the literary sources do not clearly describe how they distinguish an abscess from a pustule or neoplasia (Temkin, 1938);

(Meyerhof, 1926). Egyptian art sometimes depicts what may appear to be an image of a pathological condition of a cancerous nature (Estes, 1989) and all the literature used mentions examples of conditions of this nature.

Also, although the material evidence of tumours found at several sites in Egyptian mummies is not extensive, it is nevertheless considerable, and includes many examples (Brothwell, 1981), (Strouhal, 1999), (Ruffer, 1921), (Cockburn, 1998, 1980), (Spigelman, 1997), (Van Hasselt, 1999), (Estes, 1989), (Capasso, 2005), (Leslie and Levell, 2006), (Halperin, 2004), and (Mark, 2006).

In 2006, 28 cases of malignant tumours in ancient Egypt and Nubia were reviewed by an Italian team and they state an important fact; the occurrence of malignant tumours represents a quantification of the digging activity in the region (Gamba, 2006). This does not mean, of course, that greater excavation activity in Egypt will necessarily reveal more cases of tumours, but it is an indicator that, as well as the fact that this population may have been less exposed to this diseases, there is also a lack of material to study. This is not only because this type of disease is difficult to detect in ancient tissues (including bone tissue) but also because not everything has been excavated yet. This analysis of a further 44 cases of malignant tumours gives us more information on the age, rank, geographical location and gender of the diseased individuals as well as the specificity of the tumour. (Giuffra, 2006) Nerlich et al also identified 39 malignant tumours in human remains from ancient Egypt (Nerlich, 2006).

If carcinomas were common in ancient Egypt, we might detect them in mummies of older individuals (Halperin, 2004).The examinations already performed and some more that will be done on Egyptian mummies in the near future will provide additional material on which to base an interpretation of these pathologies.

Many excavations continue in Egypt and the Sudan that may reveal buried bodies and this will be a source of valuable information for Egyptologists and medical researchers to find more about incurable diseases.

APPENDIXES

TABLE 1 - TUMOURS IN THE EBERS PAPYRUS:

N.	Author	Different author's Diagnosis	Ancient Egyptian	Anatomical location
206	Hassan Kamal Pahor	Stomach cancer Stomach cancer with Hippocratic fascias	Obstruction at the entrance of his interior-*ib* due to *stt*.	Oesophagus
551	Ghalioungui Kamal Pahor	Eating ulcer	*bnwt*	Any
552	Ghalioungui Kamal Pahor	Eating ulcer	*bnwt*	Any
553	Ghalioungui Kamal Ebbell Pahor	Eating ulcer of gum Eating ulcer of gum Ulcerative stomatitis Cancerous lesion (Jonckheere) Tumour, ulcer (Breasted) Cancer mouth	abscesses-*bnwt* that are in the teeth	Gums
554	Ghalioungui Pahor	Ulcer of teeth Ulcerative stomatitis	abscesses-*bnwt* that are in the teeth	Teeth
809	Nunn	Cancer of breast	action of the substance *ḥsw*	Breast, womb
810	Nunn	Cancer of breast		Breast
811	Nunn	Cancer of breast		Breast
813	Hassan Kamal Ebbell Ghalioungui Pahor	Eating lesion (cancer) of uterus Cancer, phagedena "Eating" on uterus, ulcers vagina Erosion uterus, ulcers vagina	uterus and vagina where the abscesses-*bnwt* are developing	Uterus, vagina
814	Hassan Kamal Pahor	Cancer uterus Erosion uterus, ulcers vagina		Uterus, vagina
815	Hassan Kamal Ghalioungui Pahor	Cancer uterus Evil disease Erosion uterus, ulcers vagina, more advanced		Vagina
816	Hassan Kamal Ghalioungui Pahor	Cancer uterus Evil disease Erosion uterus, ulcers vagina		Vagina
818	Hassan Kamal Ebbell Ghalioungui Pahor	Erosion uterus and vagina Phagedena Uterus, ulcers, appeared in vagina Erosion uterus and vagina	*ḳmit*-substance inside the uterus and the vagina, from where the abscesses-*bnwt* are developing	Uterus, vagina
831	Hassan Kamal Ebbell Ghalioungui	Erosion uterus Erosion uteri Abrasion of uterus		Uterus

	Pahor	Erosion uterus		
857	Graber-Baillard Bardinet Ghalioungui Ebbell Hassan Kamal Pahor	Tumour Greasy pus Ulcer *angina phlegmonosa* Cystoid enlarged gland Carbuncle	a *ḥnḥnt* -ulcer on the throat of man	Throat
858	Graber-Baillard Bardinet Grapow et al Ghalioungui Ebbell Hassan Kamal Pahor	Pathogenic tumour Tumour with pus Ulcer Ulcer Suppurating lymphatic gland Suppurating lymphatic gland Suppurating lymph node	a *ḥnḥnt* -ulcer that has appeared owing to a spread of pain matter, *wḫdw*, in any part of the body of a man	Any
859	Graber-Baillard Bardinet Grapow et al Ghalioungui Ebbell Pahor Souza et al Hassan Kamal	Purulent tumour, infectious thyroiditis, adenolipomatosis Infected digestive tract manifestation Pus in throat Purulence, ulcer in throat Boil in the throat (Angina phlegmonosa) Quinsy[95] Mandelung's disease (benign tumour) Angina phlegmonosa	a *ḥnḥnt* –ulcer that appeared through the spread of morbid material of pus	Throat
860	Graber-Baillard Bardinet Ghalioungui Ebbell Hassan Kamal Pahor	Tumour, sebaceous cyst, lipoma Purulence Ulcer Cystoid enlarged gland in neck, soft tuberculous gland Softened tuberculous gland	an ulcer of fat *ḥnḥn.t nt ḏ* on the front of his throat	Neck
861	Graber-Baillard Bardinet Ghalioungui Ebbell Pahor	Purulent tumour, TB Purulence Ulcer subcutaneous tumour (fibroma) Either Lymphatic node infection or malignant tumour	an ulcer of pus *ḥnḥnt nt rj.t* on the throat of a man	Throat
862	Graber-Baillard Bardinet Ghalioungui Pahor	Pathogenic Tumour Purulence Ulcer, accumulated bile Lymphatic node infection	an ulcer of pus *ḥnḥnt, ʿrw.t*	Any

[95] Quinsy is an abscess between the back of the tonsil and the wall of the throat also known as a peritonsillar abscess. It happens when infection spreads from a swollen tonsil to the area around it, usually during a severe case of tonsillitis, http://www.nhsdirect.nhs.uk/articles/article.aspx?ArticleId=307

863	Graber-Baillard Bardinet Nunn Ghalioungui Ebbell Hassan Kamal Pahor	Lipoma/fibroma Purulence Tumour Swelling Subcutaneous tumour (fibroma or the like) Fibroma Subcutaneous tumour (benign)	a swelling of flesh, *ʿ3.t nt ḥʿw* in any part of a man's body	Any
864	Graber-Baillard Bardinet Nunn Ghalioungui Pahor	Hernia Purulence Umbilical or epigastric hernia Swelling Hernia	a swelling *ʿ3.t* of the coverings of the brow, *wp.t*, of his abdomen	Any
865	Graber-Baillard Bardinet Nunn Ghalioungui Pahor	Tumour, ascite Purulence Ascite Ascite Ascite (deriving from a liver pathological condition)	a swelling *ʿ3.t* in his lower abdomen	Abdomen
866	Graber-Baillard Bardinet Nunn Ghalioungui Ebbell Pahor	Tumour Purulence Vascular tumour (hemangioma) Swelling Hydrocele[96] Haemangioma	a *ʿ3.t* swelling (resulting from) the *sf̲t*-substance originating from a *mtw*-vessel	Any
	Hassan Kamal	Hydrocele		
867	Graber-Baillard Bardinet Nunn Ghalioungui Ebbell Hassan Kamal Pahor	Lipoma Purulence Lipoma Tumour, fat (Lipoma) Tumour with liquid content, hygroma[97], chronic abscess or the like Lipoma	a swelling of fat, *ʿ3.t nt ʿḏ*	Any
868	Graber-Baillard Nunn Ebeid Ghalioungui Bardinet Ebbell Hassan Kamal Pahor	Tumour Swelling Aneurysms, sebaceous cysts Metastatic tumour Purulence Polypoid tumour Polypoid tumour Neurofibroma	a 'son' swelling *ʿ3.t nt s3.* on any part of the human body, single or numerous	Any

[96] A hydrocele is a collection of fluid in a sac in the scrotum next to a testes (testicle). It usually occurs on one side, but sometimes a hydrocele forms over both testes, http://www.patient.co.uk/showdoc/23068886/

[97] Cystic hygromas are fluid-filled sacs that result from a blockage in the lymphatic system, Emory University School of Medicine, http://www.genetics.emory.edu/pdf/Emory_Human_Genetics_Cystic_Hygroma.PDF

869	Graber-Baillard Bardinet Nunn Ebbell Ebeid Ghalioungui Hassan Kamal Pahor	Tumour Infectious tumour? Abscess Atheroma (sebaceous cyst) of the hairy scalp Tumour? Swelling of pus, Atheroma Sebaceous cyst with punctum	a swelling of pus *ʾ3.t nt rj.t* in any body part of man	Any
870	Graber-Baillard Nunn Ghalioungui Pahor	Tumour Swelling Swelling Lymphatic node infection	a swelling of hair *ʾ3.t nt šnj*	Hair scalp
871	Graber-Baillard Bardinet Ghalioungui Pahor	Abscess/TB Purulence Swelling Infectious/TB?	a swelling of pain-matter *ʾ3.t nt wḫdw* at the top of both arms producing water	Any
872	Graber-Baillard Micozzi Bardinet Nunn Ghalioungui Hassan Kamal Ebbell Pahor	Cyst Tumour Purulence ? Swelling of vessels Aneurysm Aneurysm Aneurysm	a swelling of vessels in any limb of a man,	Any
873	Graber-Baillard Ghalioungui Sanchez et al Ebbell Hassan Kamal Pahor	Lymphatic inflammation Swelling Tumour (neurofibromatosis 1 type of cancer) Aneurysm arterioso-venosum, AV aneurysm (AV fistula) Circoid aneurysm or A-V fistula	a swelling of vessels *ʾ3t nt mt.w* on the *ḫn.tj* leather layers (the cutis) of any part of the human body	Skin
874	Graber-Baillard Bardinet Ghalioungui* Miller Pahor	Necrotic tumour of gangrenous nature (leprae). Swelling Swelling Swelling Infectious/leprae?	a swelling of Chons (*ʾ3t nt ḫnsw*) a large tumour of Chons in any part of a man; it is uneven and it has made many swellings	Any
875	Graber-Baillard Miller Ghalioungui David Miller Bardinet Hassan Kamal Ebbell	tumour, echinococcosis hydatid cyst, dracunculosis Swelling (guinea worm) *Dracunculus medinensis* (Dracunculosis) Guinea worm ? Purulence Subcutaneous parasitic infestation, Subcutaneous parasitic larvae Swelling due to parasitic	a *ʾ3t* swelling on any part of the body of a man	Any

	Pahor	infestation		
876	Graber-Baillard Ghalioungui Bardinet Nunn Ebbell Pahor	Haematoma Haematoma Gangrene Haematoma Varicose veins Haematoma	a *sf̱t* –manifestation of a vessel in any body parts of a man	Any
877	Graber-Baillard Ghalioungui Ebbell Bardinet Hassan Kamal Pahor	Tumour Leprae Leprae Incurable (tumour) Varicose veins Leprosy	an *ʿnw-t*-tumour of Chons in any body part of a man	Any

TABLE 2 – AVERAGE LIFE EXPECTANCY IN ANCIENT EGYPT

	Ancient Egypt	Egypt, 1998 Data from *Der Fischer Weltalmanach 98*, Fischer Taschenbuch Verlag
Infants up to one year	30%	4.0%
Children from one to five	20%	5.1%
Life expectancy at birth in years	Life expectancy at birth in the Roman Empire has been estimated to have been 23.9 years. Censuses held in Egypt during the same period give similar results: 20 for women and 25 for men. (Bagnall, 2006) 90, 104	65
Average age at death	30-40 Upper class Egyptians had a life expectancy which exceeded the average by possibly up to a decade - Nerlich does not think there was much of a difference between the pharaohs and their peasants Women lived about five years less than men because of childbed fever and other complications at birth (Nerlich, 2001) According to census data recorded in Roman Egypt 33% of rural and only 19% of urban males survived beyond the age of 40. (Bagnall, 2006)	Variable, around 35, with exceptions e.g. 80 or more (pharaohs)

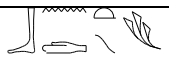
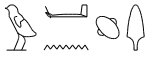
TABLE 3 - PHYTO-PHARMACOPEIA PRESCRIBED BY THE TREATISE ON TUMOURS (TT) AND LIVER (L) DISEASES' PARAGRAPHS[98]

Name of plant	Latin name	Egyptian name	TT	L	References	Magical properties[99]
Fruit *išd* [100]from the persea tree	*Mimusops laurifolia*  *šȝw3b* (Manniche, 1989: 121)  (Faulkner, 2006: 263)	Persea – *šȝw3b* Ished –*išd*		477 480	Ointment for white spots (Manniche, 1989: 122)	
Bryony	*Bryonia dioica*  (Manniche, 1989: 81)	*ḫȝsjt*		477		
pr.t-šnj fruit (umbrella Pine of Byblos (Yu, 2004))	*Pinus pinea*	*pr.t-šnj*		478		
Seeds?				1		
Terebinth resin/frankincense[101]	*Pistacia terebinthus*  (Loret, 1887: 63)  incense (Faulkner, 2006:234)	*sntr*	861	477 478 479 480	The resin is mentioned from ancient times in ancient Egyptian texts (Loret, 1887: 44) From the resin, incense was made, as today, so, for this treatment the resin must have been burned into smoke.	Paris Papyrus 1312 (Wessely, 1931)

[98] The unidentified plants were not mentioned in this table but are mentioned in each paragraph when they appear in the text.
[99] Some of these plants are thought to have magical properties, so, it is possible to think they would be more effective in the medicine, (Wessely, 1931).
[100] The *ished* or persea tree existed in ancient Egypt and is recorded in literature from the pharaonic Period. The edible fruit is about 4 cm long and samples were found in Tutankhamun's tomb. Leaves were found in garlands like the one from Ramesses II. The fruit of the persea comes to maturity at the time of the Nile's rise so, it is associated with fecundity. The tree is shown in many tombs as surrounding the owner/king or not. The fruit resembled a heart and the leave a tongue, related in mythology to Thoth as he inscribed the king's name when ascending the throne. Spells 17 and 335 from The Book of the Dead show the *ished* tree and it is also mentioned in the Coffin Texts.
[101] Ebbell refers to this one as frankincense (Ghalioungui 1987: 237).

Acacia leave/thorn[102] 'Kind of' acacia[103] gum	*Acacia nilotica*  *šnt* (Loret, 1887: 63)  (Manniche, 1989: 65)	*q3ȝ* *ṯwn* *ḳmyt*	858 861 862 5 1	477	Leaves were taken to kill worms, swollen legs, eye remedies, psoriasis treatment, uterus, diarrhoea. (Manniche, 1989: 67) The gum from this tree was used frequently (Loret, 1887: 39)	
Sycamore[104] figs (ripen fruit)	*Ficus sycomorus*  *nht* (tree) (Loret, 1887: 62)  *nht* (tree) (Manniche, 1989: 103)	*tp3w.t* *nḳʿwt* (ripe fruit)		477 480 481	Laxative, kill worms, toothache, limbs' trauma, tumour [105], skin ailments (Manniche, 1989: 104-105)	
Figs	*Ficus carica*  (Manniche, 1989: 102)	*d3b*		477 478 479 480 481	Laxative, heart. lung treatments, suppository for anus (Manniche, 1989: 102-103) The fruits and the latex of this plant were both used frequently (Loret, 1887: 22)	
Peas	*Pisum sativum*  (Manniche, 1989: 136)	*tḥw*	858 859 860 4		Tumour[106], cure wounds, vaginal bleeding, demonic disease (Manniche, 1989: 136-137) Mixed with sea salt and honey peas were used in external medication for tumours and burns and also gynaecological afflictions, stomach aches (Carvalho 2004:40)	
Melon	*Cucumis melo*	*bndt*	858 (?)			

[102] The thorn of an acacia seems to have been used for cutting up blisters; Eb. 504 says "Another remedy for driving out the white spot of burn: *kšw* mineral 1, honey 1, fruit of the carob 1. "It has to be pricked by the thorn of an acacia and oint with them" (Győry 2006: 1).
[103] A tea made with dried flowers from acacia is used for treating gall bladder troubles in Kharga and Dakhleh Oases (Osborn 1968: 165-177).
[104] The milky juice of the sycamore was used to heal wounds and abscesses.
[105] Ebers 570
[106] Hearst 132

	 (Manniche, 1989: 96)					
Bitter almond	*Prunus Africana* *Pygeum Africana*	*ḥm3j.t*			To bring about perspiration (*Prunus dulcis*, another tree in the same species) (Manniche, 1989: 138)	
Barley[107] grains	*Hordeum vulgare*  (Loret, 1887: 61)	*3mꜥꜥ*			Poultice, stomach disorders, kill round worm, broken bone, remove white spots from burn (Manniche, 1989: 108)	
Jujube bread/flour Jujube (wood powder, from bark?)	*Zizyphus jujuba*			479 480 1		
Long beans, (from lotus?)/ bean flour Leaves	*Nelumbo nucifera*		857 (?) 858 859 877			
Juniper berries	*Juniperus phoenicea*  (Manniche, 1989: 110)	*wꜥn*		479 481		
Wine Raisins Grapes	*Vitis vinifera* *i3rrt* (grapes)  Wine (Loret, 1887: 61)			477 479 478 480	Raw grapes were used to treat diseases of demonic origin and in other remedies such as this one, grapes were used combined with other fruits e.g. the *persea-ished*. (Manniche, 1989: 156) Used as excipient for medicines where active substances of plants were dissolved (Carvalho 2004: 54)	
Sweet beer	*Sorghum vulgare*			479		

[107] Barley is one of the natural products to be considered potentially protective against cancer growth according to Montbriand, 2004

	Triticum dicoccum emmer  (Faulkner, 2006: 86)	*bdt*		480		
Onion bulbs	*Allium cepa*  *bḏr* (Loret, 1887: 62)  *ḥḏw* (Manniche, 1989: 69)	*ḥḏw*	859		Antibiotic, diuretic, expectorant, stops menstruation, prevents blood eating (Manniche, 1989: 69) The liquid obtained from squashed bulbs was used to treat auditive and gynaecological afflictions (Carvalho 2004:50)	Paris Papyrus 936, 2585, 2651, 2690, 2211 (Wessely, 1931)
Date syrup /wine/juice	*Phoenix dactylifera*  (Loret, 1887: 61)  (Manniche, 1989: 133)	*Bnjw* *srm.t*	859		Bleeding wounds, swelling of limbs, kill worms, heartburn, stomach ache (Manniche, 1989: 133-134) Laxative (Loret, 1887: 16) Digestive and circulatory problems (Carvalho 2004:39)	Paris Papyrus 904, 1343, 3203, 3201 (Wessely, 1931)
Cumin	*Cumin cyminum*  (Manniche, 1989: 96)	*ṯpnn*	859 861 862		Ill belly, chest-coughs, kill pains, poultice after an enema, teeth, headache, uterus (Manniche, 1989: 97-98)	Paris Papyrus 1333, 2708 (Wessely, 1931)
Fruit of *pyrethrum* (anti histaminic?)	*Tanacetum cinerariaefolium*	*Šȝms*	2			
Honey		*bit*	2			
Valerian?		*ŠȝŠȝ*	860			
Plant/fruit	*?*	*ʿmȝw*	2			
Agnus castus/Chaste berry (hormonal?)	*Vitex agnus castus*  *sʿȝm* (Manniche, 1989: 155)	*ḫt-ds*			For bandages, easy swellings, teeth strengthening, laxative, diuretic (Manniche, 1989: 155)	(Wessely, 1931)
Incense (frankincense, myrrh)	*Boswellia species*	*snṯr*	861		Incense is a gum-oil-resin obtained from some of the *Boswellia* species; the gum is	*Boswellia thurifera* Roxh.

					extracted from the tree which is secreted by periodical incisions. (Carvalho 2004:11)	Paris Papyrus 907, 1991, 2462, 2678, 3196, Plinius 12.32 (Wessely, 1931)
Carob (pod pulp)	*Ceratonia siliqua*  (Manniche, 1989: 85)	*ḏ3r.t*			Digestive disorders, eye inflammation, periodontal disease, dry wounds, treat white spots of wounds, stop smells (Manniche, 1989: 85-86) To treat digestive problems (Carvalho 2004: 43)	

TABLE 4 – REPORTED CASES OF NEOPLASMS

Author	Reported cases/Diagnosis	Date of publication	Number
Granville Tapp 1997 Rowling Strouhal	Irty Senu, 50-55 year old female from 27th Dynasty., 600 BC, "ovarian dropsy"; malignant ovarian tumour, later re-examined to correct diagnosis to: Ovarian adenocarcinoma Ovarian cysadenoma (benign)	1825 (Strouhal, 1992) (Filer 1995: 75) (Rowling, 1961) 1976 (Aufderheide 2003: 3, 482) (Ebeid 1999: 110) (Cockburn 1998: 51)	1
Ruffer & Willmore	Possible case of large Ewings sarcoma[108] on a pelvis from the catacombs of Kom el-Shouqafa, from the Roman period, Alexandria, 250 AD	(Ruffer 1921: 179-183) (Cockburn 1980: 38) (Cockburn 1998: 51) (Ebeid 1999: 105-6, 113)	2
Museum of Fine Arts, Boston	Enlarged facial bones of male mummy (acromegaly) caused by hypersecretory tumour of the pituitary gland	1933 (Estes 1989: 44)	3
Batrawi	Osseous metastases with bone destruction of facial bones, caused probably by a carcinoma of soft tissues.	1935 (Strouhal, 1981)	4
Strouhal	Four skulls from Abusir, 5th Dynasty. Malign pathology showed by small perforations in three of the cases. Osteoma in the skull (benign) in the other case	1981	5,6,7,8
Strouhal	Skeletons up to the Christian period four more cases of nasopharyngeal carcinoma	1989 (Aufderheide 2003: 431)	9,10,11,12
Strouhal	seven more osteomas and a bone cyst on a	1992	13,14,

[108] Named after James Ewing, who described the tumour in the 1920's, in Ewing J. Diffuse endothelioma of bone, *Proc N Y Pathol Soc* 21, 17-24, 1921; Ewing J., Further report of endothelial myeloma of bone, *Proc N Y Pathol Soc* 24, 93-100, 1924. It is a cancer which can develop anywhere in the body, although it most often starts in the bone (a primary bone tumour). Any bone can be affected, but the pelvis, thigh bone (femur) and shin bone (tibia) are the most common places. Ewing's sarcoma is most commonly found in teenagers and young adults, and is slightly more common in males than females. The development of Ewing's sarcoma may be related in some way to rapid bone growth, which could explain why more cases of Ewing's sarcoma are seen in teenagers. Although Ewing's sarcoma is a type of bone cancer, Ewing's sarcoma can also very rarely occur in the soft tissues rather than starting in bone. This is called an extra osseous Ewing's sarcoma, Ewing's sarcoma of the bone, http://www.cancerbackup.org.uk/Cancertype/Bone/Typesofbonecancer/Ewingssarcoma

	femur from a male individual, one osteosarcoma and two others still being studied (one sarcoma in the left forearm of a young adult male), as well as one large cell tumour of the skull from material found in the tomb of Maya at Saqqara; nasopharyngeal carcinoma from the Old Kingdom in a middle aged man from Naga ed-Der; malignant lesion in the skull (myeloma) of a woman, 6th to 11th century AD at Sayala, Nubia	(Strouhal, 1992) (Filer 1995: 75-76) (Ebeid 1999:105, 108, 114) (Daglio 2005: 104)	15,16, 17, 18, 19, 20, 21, 22, 23,24,25,26
Sandison	squamous papilloma[109] on the hand of a late Dynasty mummy	(Ebeid 1999: 102)	27
Strouhal & Jungwirth	123mm long nodular structure in the pelvis of an adult Nubian (Sayala) female skeleton, 3rd to 4th century AD	1977 (Aufderheide 2003: 480)	28
Janssens	Vesicovaginal fistula in Egyptian mummy of princess Hehenit, 11th Dynasty., product of a protracted delivery	(Aufderheide 2003: 480)	29
Elliot Smith & Jones	Byzantine Nubian mummy with a vaginal cyst, a fibrous vaginal polyp probably responsible for an ante mortem vaginal mucosal prolapse.	1910 (Filer 1995: 75) (Aufderheide 2003: 479)	30
Hussein	Probable underlying soft tissue tumour of the brain covering (meningioma) on two skulls, malignant lesion on another skull (20th and 21st Dynasty.)	1949-50 (Filer 1995: 75) (Daglio 2005: 104)	31,32,33
Rogers	Meningiomata; hyperostotic lesion of the right parietal on two skulls, one from the 1st Dynasty. A cranial angioblastic meningioma with hyperostosis from the 20th dynasty.	(Rogers, 1949) (Rowling, 1961) (Ebeid 1999: 108) (Aufderheide 2003: 422) (Cockburn 1998: 51) (Daglio 2005: 104)	34,35
Strouhal	Calcified myoma, benign tumour of the uterus in a 35-45 old woman from Sayala	1976 (Strouhal, 1981) (Ebeid 1999: 111)	36
Strouhal	Nasopharyngeal carcinoma in a skull from Berkeley Collection; Osseous metastases with bone destruction of facial bones, caused probably by a carcinoma of soft tissues	(Strouhal, 1978) (Strouhal, 1981)	37

[109] A type of papilloma or benign tumor of the skin or oral mucosa usually associated with infection by the human papilloma virus.

Zimmerman	Histiocytoma	1981	38
Zimmerman	Colon cancer in a Ptolemaic mummy from Dakhleh Oasis	1995 (Aufderheide 2003: 463)	39
Harer	Small benign skin growths	1993	40
Molleson	Early dynastic humerus showing chondroblastoma and cancer of sphenoid bone from 30 AD	1993	41
Satinoff	Multiple destructive lesions in a skeleton from Asyut diagnosed with malignant deposits; multiple osteolytic lesions, metastatic carcinoma or myeloma multiplex.	1968, 1972 (Strouhal, 1981)	42
Armelagos	Multiple osteolytic lesions, metastatic carcinoma or myeloma multiplex.	1966 1969 (Strouhal, 1981)	43
Nielsen	Multiple osteolytic lesions, metastatic carcinoma or myeloma multiplex.	1970 (Strouhal, 1981)	44
Rowling Sandison	Osteochondroma[110] in a femur from the 5th Dynasty. From Giza, considered first an osteosarcoma by Smith & Dawson in 1924 (fig. 18) Sandison suggests these tumours were not as such and that they were osteochondromatous.	(Smith, 1924) (Bryan 1930: xxvi) (Rowling, 1961) (Filer 1995: 75) (Ebeid 1999: 107)	45
Salama & Hilmi	Osteosarcoma of the orbit on a skull of a young male from Giza, 600 BC A 2,800 B.C. Egyptian mummy with a keratocyst and a dentigerous cyst around the crown of an impacted maxillary bicuspid, Gorlin's syndrome/basal cell nevus syndrome.	1950 (Ebeid 1999: 103)	46
Wells Mark	Nasopharyngeal lesion with multiple erosions in a specimen from the Cambridge collection, 3rd to 5th Dynasty, Naga ed-Der. Osseous metastases with bone destruction of facial bones, caused probably by a carcinoma of soft tissues	(Wells, 1963) (Mark, 2006) (Strouhal, 1981) (Ebeid 1999: 109) (Daglio 2005: 104)	47
Pahl	Malignancies in three mummies from Tubingen: cranial osteolytic lesion, osteolytic suggesting metastatic cancers, maxillary	1980	48,49,50

[110] A benign tumour risen in epiphyseal lines and protruding at right angles to the long axis of a bone, resembling ossified tendons (White 2005: 325).

	tumour		
Spigelman	Two individuals from Teti cemetery in Saqqara with tumour of the femur in one sub adult and an adult skullcap showing evidence of bony malignant metastasis. Also a clavicle with a benign bone tumour or cyst and one adult skull with two small benign osteomas on the right frontal bone.	1996	51,52,53,54
Leca	Osteochondroma of femur of the 5th Dynasty	1988	55
Sandison	Hypersecretory tumour of the pituitary gland shown by acromegaly	1933	56
Braunstein	Lesions of the right proximal femur and left ilium that may represent skeletal metastases in an Egyptian royal mummy	1988	57
Derry	Nasal carcinoma (probable) in a pre Christian Nubian	1909 Brothwell (Cockburn 1998: 50)	58
Smith and Derry	Sacral erosion in a Nubian male; rectal cancer or chordoma	(Cockburn 1998: 50)	59
Smith & Dawson Wells Ho Mark	Byzantine base of skull with considerable absorption of the sphenoid (epithelioma); multiple osteolytic lesions, metastatic carcinoma or myeloma multiplex. Sacrum/rectum sarcoma.	1924 (Bryan 1930: xxvi) (Kamal 1967: 88) 1963 1972 1967 (Mark, 2006) (Strouhal, 1981) (Cockburn, 1980) (Ebeid 1999: 108) (Cockburn, 1998: 50)	60
Waterman	Multiple osteolytic lesions, metastatic carcinoma or myeloma multiplex.	1960 (Strouhal, 1981)	61
Rowling	Carcinoma of the rectum	1961 (Aufderheide 2003: 463)	62
Smith & Dawson Rowling	Large femur osteosarcoma and two cases of sarcoma of the head of the humerus from 5th Dynasty, interpreted as a Benign Osteochondroma by Rowling	(Smith 1924: 157) (Kamal 1967: 88) (Rowling, 1961)	63,64,65

		(Daglio 2005: 104)	
Baxarias	Tomb of Montemhat, el Asasif, a case of possible parietal meningioma, a malignant metastasis in a skull.	(Baxarias, 2007)	66
Pahor	A skull from Birmingham Museum's collection shows a meningioma or osteoma of the inner occipital surface	(Pahor, 1996)	67
Zimmerman	Rectal carcinoma, 3rd century AD	2004	68
Strouhal & Jungwirth	123mm long nodular structure in the pelvis of an adult Nubian female skeleton from 4th century AD, extensively calcified. Myoma	1977 (Strouhal, 1980a) (Aufderheide 2003: 480)	69
Strouhal	Benign sacral neurilemmoma observed by a large smooth orifice	(Strouhal et al., 2003) (Strouhal et al., 2004) (Strouhal, 2005b)	70
Macke & Macke-Ribet	Cranial osteoma, temporal-parietal hemangioma, chondroma of a phalanx, femur osteochondroma, femur metastasis	(Daglio 2005: 104)	71
Marro	Multiple mieloma in the skull and carcinoma metastasis in left femur, right humerus, and in an almost destroyed sacrum of a skeleton at the Museo di Antropologia di Torino, Italy, according to the author these metastasis were originated by a primary breast carcinoma	1952 (Daglio 2005: 104)	72

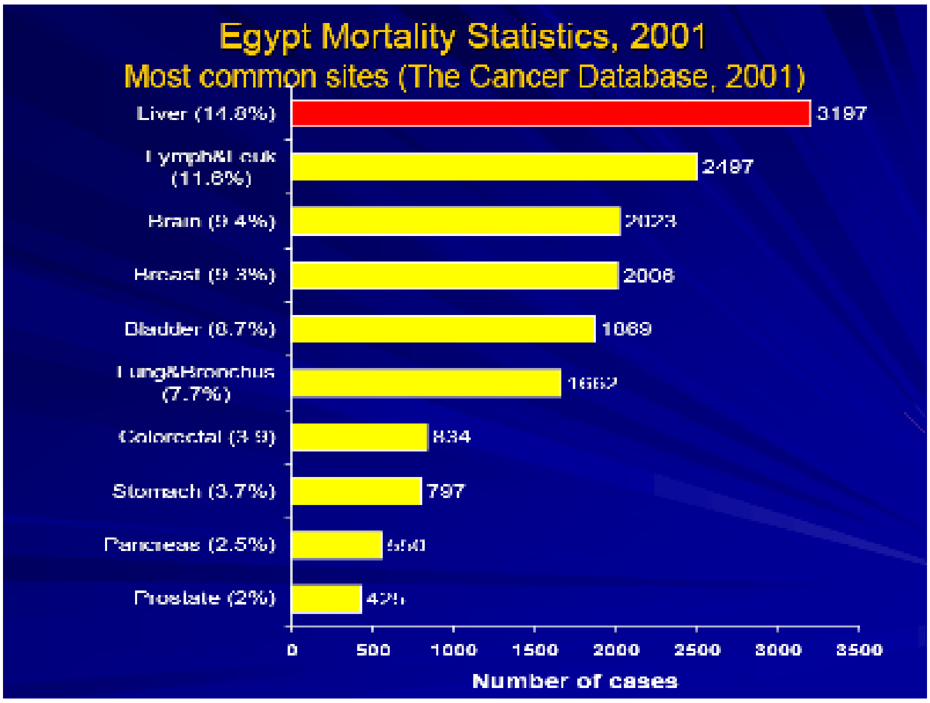
TABLE 5 – CONTEMPORARY STATISTICS OF CANCER IN EGYPT

Table 5.4. Liver and Intrahepatic Bile Duct Cancer: Distribution of Cases and Age-Standardized Incidence Rates,* by Subsite and Sex, in Cyprus, Israel (Jews and Arabs), Egypt, Jordan, and US SEER – 1996-2001†

		Cyprus 1998-2001	Israel (Jews) 1996-2001	Israel (Arabs) 1996-2001	Egypt 1999-2001	Jordan 1996-2001	US SEER‡ 1999-2001
Distribution							
Liver	Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Male	[illegible]	91.2%	[illegible]	[illegible]	[illegible]	[illegible]
	Female	94.1%	85.9%	93.8%	98.9%	81.1%	81.4%
Intrahepatic bile ducts	Total	[illegible]	11.0%	-	[illegible]	[illegible]	[illegible]
	Male	15.4%	8.8%		2.4%	7.7%	10.1%
	Female		14.1%			18.9%	18.6%
Rates*							
Liver	Total	1.5	2.0	1.5	12.5	1.4	3.8
	Male	2.4	2.7	2.6	20.1	1.7	5.8
	Female	[illegible]	1.4	[illegible]	[illegible]	1.0	[illegible]
Intrahepatic bile ducts	Total	0.2	0.2		0.3	0.2	0.5
	Male	[illegible]	0.2	-	[illegible]	[illegible]	[illegible]
	Female	-	0.2	-	-	[illegible]	[illegible]

*[illegible]
†The symbol '-' = 1-2 cases and '[numeral]' (italic) = 0 or 3-15 cases.
‡SEER 13 Registries, Public Use Data Set, from data submitted November 2004.

(Ibrahim, 2005)



(Elattar, 2003)

NEW CANCER CASES IN EGYPT PROJECTIONS FOR 2002

CANCER TYPE	AGE STANDARDIZED INCIDENCE PER 100,000
Bladder cancer	61
Trachea, bronchus, lung cancers	11
Liver cancer	8
Leukaemia	8
Prostate cancer	7
Colon and rectum cancers	7
Stomach cancer	5
Lymphomas, multiple myeloma	5
Pancreas cancer	2
Oesophagus cancer	2

NEW CANCER CASES IN EGYPT PROJECTIONS FOR 2002

CANCER TYPE	AGE STANDARDIZED INCIDENCE PER 100,000
Breast cancer	29
Cervix uteri cancer	13
Bladder cancer	11
Leukaemia	5
Colon and rectum cancers	4
Lymphomas, multiple myeloma	3
Liver cancer	3
Trachea, bronchus, lung cancers	3
Stomach cancer	3
Corpus uteri cancer	2

10 LEADING CAUSES OF CANCER DEATHS IN EGYPT PROJECTIONS FOR 2005

CANCER TYPE	AGE STANDARDIZED DEATH RATE PER 100,000
Bladder cancer	36
Trachea, bronchus, lung cancers	12
Liver cancer	8
Leukaemia	6
Colon and rectum cancers	5
Stomach cancer	4
Prostate cancer	4
Lymphomas, multiple myeloma	4
Pancreas cancer	2
Oesophagus cancer	2

10 LEADING CAUSES OF CANCER DEATHS IN EGYPT PROJECTIONS FOR 2005

CANCER TYPE	AGE STANDARDIZED DEATH RATE PER 100,000
Breast cancer	16
Cervix uteri cancer	6
Bladder cancer	6
Leukaemia	4
Liver cancer	3
Trachea, bronchus, lung cancers	3
Colon and rectum cancers	2
Stomach cancer	2
Lymphomas, multiple myeloma	2
Pancreas cancer	1

The Impact of Cancer In Egypt - Data Tables, http://www.who.int/infobase/report.aspx?rid=153&iso=EGY

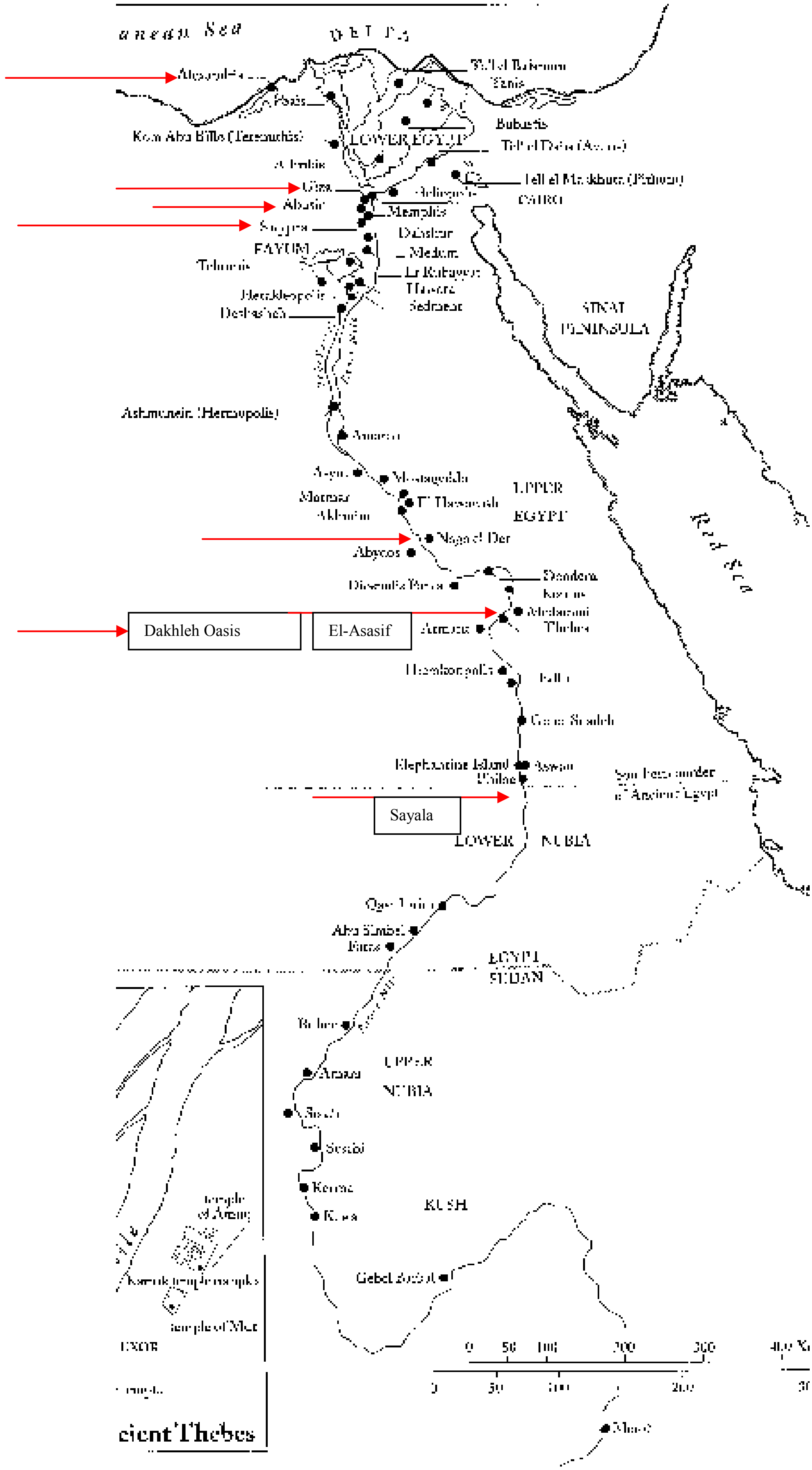
A more recent compilation of data is available from the 1990's showing liver-related cancers, the second in the GIT (gastro-intestinal tract) cancer totals: http://www.nci.edu.eg/cancer_egypt.htm

Further data from 1999-2001 can be accessed from the National Cancer Institute where A.S. Ibrahim states more accurate differentiating elements for liver and bile duct cancer types: http://seer.cancer.gov/publications/mecc/

MAP 1 – GEOGRAPHICAL LOCATION OF CASES FOUND (approx. references taken from Google maps) [111]

NAGA ED-DER	**26° 22' N** **31° 54' E**
ALEXANDRIA **(KOM EL-SHOQAFA)**	**31° 13' N** **29° 58' E**
ABUSIR	**29° 90' N** **31° 20' E**
SAQQARA	**29° 52' N** **31° 13' E**
SAYALA **(NUBIA)**	**22° 98' N** **32° 65' E**
DAKHLEH OASIS	**25° 50' N** **29° 16' E**
GIZA	**31° 8' N** **29° 58' E**
EL-ASASIF	**25° 43' N** **32° 37' E**

[111] Map adapted from Eternal Egypt (Russmann 2001:15)


Tanis
Bubastis
LOWER EGYPT
CAIRO
Giza
Abusir
Memphis
Dahshur
Meidum
FAYUM
SINAI PENINSULA
UPPER EGYPT
Naga el Der
Abydos
Dendera
Dakhleh Oasis
El-Asasif
Thebes
Elephantine Island
Aswan
Sayala
LOWER NUBIA
Abu Simbel
Faras
EGYPT
SUDAN
UPPER NUBIA
Kerma
KUSH
Red Sea
temple of Amun
temple of Mut

No conclusion can be taken from the geographical location of the cases found as they are spread along the country; from the Delta (Alexandria) going through the Giza and Saqqara areas, showing cases in Dakhleh Oasis and Middle Egypt and near Thebes as well as several cases from Nubia.

We may say that cancer cases found in ancient Egyptian material are all over the territory and that climate may not be a factor as they have incidence in different and distinct climacteric zones of Egypt.

I believe that the diet factor can be excluded too as different populations had different food habits and culinary customs; some had access to foreign ingredients, others did not, but that does not seem to be a factor with relevance to cancer incidence in these ancient Egyptian populations.

Age related factors have already been discussed as being related to a low life expectancy.

The influence of the professional occupations is undetermined as we have specimens without provenance (and that also serves the purpose of trying to pin down geographically the incidence of cancer), thus being unable to determine if certain labour activities could induce certain types of cancer, which is a possibility.

Let us just hope that more specimens are found and that Egyptian authorities give permission to study them, even restricting these scientific studies to Egyptian territory and that biomedical technique can develop more and more with the aim of facilitating non invasive procedures that give more results.

Another important issue in helping diagnose cancer, especially concerning an ancient population is that, more funding from medical, academic and technology institutions can be available and also, as soon as studies are underway they can have the final outcome in an international basis, a journal or other type of publication that turns those studies easily accessed by people interested.

Needless to say that cancer is today a concern of everyone as we still cannot control its incidence and therefore, studies on cancer in ancient populations maybe of interest to everyone.

If civilization began in Africa as several authors claim, then, the study of ancient Egyptian genetics concerning pathogens may be of crucial importance for finding a cure to cancer in general.

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