

CyberScribe 175 – March 2010

Even if he wanted to do so, there is no way the CyberScribe could avoid starting the column off with the biggest news story from Egypt in a very long time. Zahi Hawass was the lead author (with sixteen other Egyptian and foreign experts) for a wild and wooly paper entitled "Ancestry and Pathology in King Tutankhamun's Family" in the Journal of the American Medical Association (JAMA), 2010;303(7):638-647.

This paper, and the two enormously long and heavily padded TV shows that followed immediately, purported to have recovered usable DNA from King Tutankhamun and a handful of his supposed closest relatives.

No matter what one thinks about the workers and their conclusions, the report and the TV shows that followed were masterful in their detail.

Not only that, using DNA analysis, the authors claimed to have also identified Yuya and Thuya, Amenhotep III, Queen Tiya, Akhenaten, Queen Nefertiti, and probably the paper boy. All these links depend on whether or not Amenhotep II is actually correctly labeled, when from the very beginning it has been noted that Amenhotep III doesn't resemble anyone else in the supposed family. If Amenhotep III is the wrong guy, the whole genealogy collapses.

These concerns aside, the authors claim to have produced a family tree (which is the same family tree that has been in use for decades), identified scoliosis in Tut (when no one else ever has, including the recent CAT scans), recognized a club foot condition (which when read carefully, and commented on by other specialists, turns out to be flat feet), identified Köhler disease II (and eliminated the possibility of Marfan's Syndrome), and while they did not say this, all the world news writers claimed they had fixed the fact of the king's death...malaria!

In fairness, the report is data packed and impressive, whether all of the conclusions will stand the test of time. The fact that it was published in JAMA is also impressive. This is one of the most prestigious medical journals in the world.

The CyberScribe regrets that he cannot cite the entire article here, but there are copyright issues. You can go to this site and read it for yourself: Ancestry and Pathology in King Tutankhamun's Family, February 17, 2010, Hawass et al. 303 (7): 638, however you will need to pay \$15 for a copy. The CyberScribe wishes to thank Dr. John O'Brian, Dr. Percy Leuke and Hiram

Patterson (all members of North Texas-ARCE) for providing him with copies of the original article.

Here is some of that important paper...the conclusions section (abbreviated somewhat):

“Kinship Determination

More than 55 bone biopsies were used to elucidate the individual relationships of 18th-dynasty individuals, with the result that several of the anonymous mummies or those with suspected identities are now able to be addressed by name. These include KV35EL, who is Tiye, mother of Akhenaten and grandmother of Tutankhamun, and the KV55 mummy, who is most probably Akhenaten, father of Tutankhamun (Figure 2, appendix, and online interactive kinship analysis and pedigree [here](#)). The latter kinship is supported in that several unique anthropological features are shared by the 2 mummies and that the blood group of both individuals is identical.

“Disease or Amarna Artistic Style?

Macroscopic and radiological inspection of the mummies did not show specific signs of gynecomastia, craniosynostoses, Antley-Bixler syndrome or deficiency in cytochrome P450 oxidoreductase, Marfan syndrome, or related disorders (eAppendix, Table 2). Therefore, the particular artistic presentation of persons in the Amarna period is confirmed as a royally decreed style most probably related to the religious reforms of Akhenaten. It is unlikely that either Tutankhamun or Akhenaten actually displayed a significantly bizarre or feminine physique. It is important to note that ancient Egyptian kings typically had themselves and their families represented in an idealized fashion.

“Walking Impairment and Canes

Tutankhamun had a juvenile aseptic bone necrosis of the left second and third metatarsals (Köhler disease II, Freiberg-Köhler syndrome). The widening of the metatarsal-phalangeal joint space, as well as secondary changes of the second and third metatarsal heads, indicate that the disease was still flourishing at the time of death.³⁵ Bone and soft tissue loss at the second metatarsal phalangeal articulation could further indicate that an acute inflammatory condition was present on the basis of an ulcerative osteoarthritis and osteomyelitis. The congenital equinovarus deformity (pes equinovarus) together with the malformed second toe of the left foot (oligodactyly [hypophalangism]) transferred additional joint load to the right foot, causing flattening of the foot arch (pes planus).

There is evidence that Tutankhamun may have had this impairment for quite some time. The walking disability can be substantially aided by the use of a

cane. Howard Carter discovered 130 whole and partial examples of sticks and staves (eFigure 3A) in the king's tomb, supporting the hypothesis of a walking impairment.³⁶ Traces of wear can be seen on a number of the sticks, demonstrating that they were used in the king's lifetime (eFigure 3B). Additional evidence for some sort of physical disability is found in a number of 2-dimensional images from Tutankhamun's reign that show him seated while engaged in activities for which he normally should have been standing, such as hunting (eAppendix and eFigure 3C).³⁷⁻³⁸

“Malaria Tropica

Macroscopic studies revealed areas of patchy skin changes on the pharaoh's left cheek and neck of uncertain anamnesis, possibly indicating an Aleppo boil, a plague spot, an inflamed mosquito bite, or a mummification artifact.³⁹ However, the genetic identification and typing of plasmodial DNA in Tutankhamun, Thuya, Yuya, and TT320-CCG61065 showed that they must have had malaria tropica, the most severe form of malaria (eAppendix). Further research is required to typify these alterations in more detail and to assign these potentially unknown patterns to ancient Egyptian Plasmodium strains that date back to 3300 to 3400 years before present. To our knowledge, this is the oldest genetic proof for malaria in precisely dated mummies. When the infection occurred, its severity, and whether it could have caused the death in the 4 mummies testing positive is not known.”

Hawass himself makes several interesting comments about the project and the findings. (<http://tiny.cc/zSBaU>). He states:

“In support of this lineage, the DNA also traces a direct line from Tutankhamun through the KV 55 mummy to Akhenaten's father Amenhotep III. DNA shows that the mother of the KV 55 mummy is the “Elder Lady” from KV 35. This mummy is the daughter of Yuya and Tjuya, and thus definitively identified as Amenhotep III's great queen Tiye.

“Another important result from the DNA analysis is that the “Younger Lady” from KV 35 has been positively identified as Tutankhamun's mother. The project is not yet able to identify her by name, although the DNA studies also show that she was the daughter of Amenhotep III and Tiye and thus Akhenaten's full sister. Thus Tutankhamun's only grandparents, on both his paternal and maternal sides, were Amenhotep III and Tiye.”

Another commentator (<http://pling.livejournal.com/237092.html>) stated some interesting items for further consideration:

“They do, however, make it clear that everyone involved in the handling of the DNA was also analyzed, and they state none of them had the same profile. It's unlikely anyone who handled the mummies prior to this study could have contaminated the data as the sample were taken from within the bone.

The mummies tested were:

Thuya (female)

Yuya (male)

Amenhotep III (almost certainly identified, male)

KV55 (an unknown male mummy thought to be maybe Akhenaten)

KV35EL (an unknown older female mummy)

KV35YL (an unknown younger female mummy)

Tutankhamun

Fetus 1 (from Tutankhamun's tomb, female)

Fetus 2 (from Tutankhamun's tomb, female)

KV21A (unknown female)

KV21B (unknown female)”

The CyberScribe would note that this is a very small sample, and a sample drawn from mummies that were already believed to have been correctly identified. The pool of data needs to be very considerably deepened by sampling more mummies.

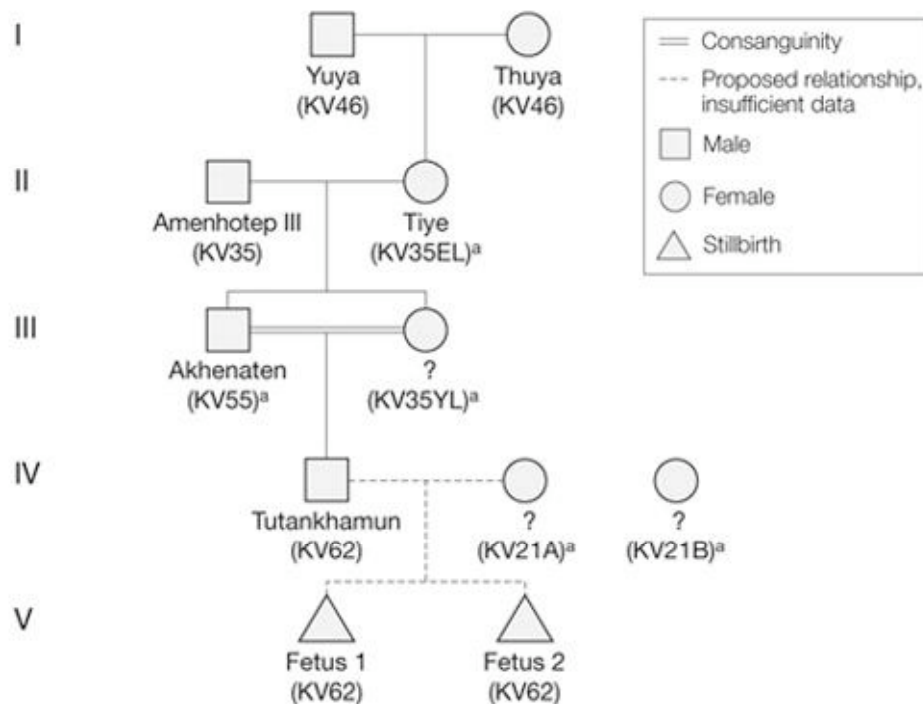
Others have come forth, especially a couple of malarialogists, to say that the malaria data are not all that firm. One in Nature Magazine (<http://tiny.cc/stz7M>) stated that:

“But other experts argue that finding evidence of malaria is unsurprising, given that the parasite was probably common in Egypt at the time. Moreover, in malarious regions people who survive the disease in childhood often acquire partial immunity that protects them against full-blown malaria later in life. The lack of internal organs in mummies makes a definitive diagnosis impossible. "No data are available to assess that malaria was the cause of death," says Giuseppe Novelli, head of the medical genetics lab at Tor Vergata University of Rome.

“The authors also believe that the malaria finding is "the oldest genetic proof for malaria in precisely dated mummies". Experts say this is no big deal,

however, as mummies thought to be from this period and earlier have already been shown to have had *P. falciparum* malaria. Moreover, changes in the human genome that have been attributed to malaria's influence show that the disease has been around since ancient times.”

Nature Magazine also published the proposed new genealogy:



As the CyberScribe stated at the start of this section, the news is exciting, puzzling, and opens new doors for Egyptologists.

Other writers here and there commented on the apparent genetic closeness of the relationships between Tut and his immediate ancestors. The comments referred to the myth of the ‘incest’ problem, stating that when you breed too closely to your near relatives, you get genetic weaknesses and ultimately death to the line.

This harkens back to bad genetics and the old ideas of eugenics. Closeness of relationships do not breed in weakness. Acquisition of a weak gene means that it spreads rapidly through the line and causes trouble, but ‘incest’ by itself is not inherently bad.

We all eat line-bred ‘incestuous’ pure-bred cattle, and we love our ‘incest’ driven lineages that give us purebred dogs and cats. However when a bad gene arises, such as the one Queen Victoria gave to her children...the one

that led to hemophilia...the gene spread rapidly through the royal houses of Europe and significantly contributed to their fall. The reason? Most of the royal marriages in the next generation were between first cousins.

Another medical paper recently appeared: "Atherosclerosis and diet in ancient Egypt", by A. Rosalie David, Amie Kershaw, and Anthony Heagerty. This paper appeared in the journal 'The Lancet', like the JAMA, this is one of the premier medical series in the world. The paper (<http://tiny.cc/o0WP5>) discussed a potential link between status, religious practice and arterial diseases in ancient Egypt. Edited for length, some of the main points made stated:

"Atherosclerosis and vascular calcification are usually regarded as circulatory phenotypes associated with advanced modern lifestyles. However, although rare, such conditions have been identified in human remains from some early societies. Multidisciplinary investigations of mummified remains have provided evidence of arteriosclerosis among elite groups in Egyptian society, particularly those individuals with priestly status and their immediate family members. Last year, computed tomography was used to assess atherosclerosis in a selection of 22 mummies of Egyptians with high social status. In 16 of these where the hearts or arteries could be identified, nine mummies showed evidence of vascular calcification. However, although arteriosclerosis has been clearly identified in mummies, it seems to have been fairly uncommon in ancient Egypt. This perhaps reflects the life expectancy at the time of between 40 and 50 years, even among the more affluent members of society, but may also result from differences in intakes of foodstuffs between most Egyptians and the affluent elite.

"The palaeopathological evidence can now be examined in conjunction with ancient texts to provide further insight into the occurrence of the disease among the ancient Egyptian elite. We have undertaken a new translation of hieroglyphic inscriptions on Egyptian temple walls that give details of the food offered daily to the gods. Since this food was subsequently eaten by the priests and their families, the inscriptions also provide details of their dietary habits. This has enabled an estimation of the fat content to be made. Interpretation of the hieroglyphs indicates that the diet consisted mainly of beef, wildfowl, bread, fruit, vegetables, cake, wine, and beer. Many of these food items would obviously have contributed to an intake of saturated fat, and our analyses of the individual meat and wildfowl they consumed would demonstrate that all provided greater than 35% of energy from fat. Goose, which was commonly consumed, contains around 63% energy from fat with

20% being saturated, while the bread that was eaten differed from that consumed today, often being enriched with fat, milk, and eggs. The cakes were typically made with animal fat or oil. Although it is difficult to calculate exactly how much was consumed in terms of portion size, variance in food storage, preparation, and cooking methods, it is still evident from a conservative estimate that the dietary energy was more than 50% from fat with a significant portion of this coming from saturated fat.

“Other components of the diet may have also increased the risk of cardiovascular disease: fruit and vegetables in addition to a reduction in fat intake are thought to play a key role in prevention. Current recommendations state that the daily energy intake should contain no more than 25—30% fat in total, with the saturated fat being less than 7% of this amount. It is difficult to establish whether the dietary intake of priests achieved this amount. Moreover, Egyptian priests consumed little fish, and while oily fish is a major source of omega 3 fatty acids, which are also advocated in cardiovascular disease prevention, it is unlikely that the intake would have achieved anything like that required. Finally, salt intake is likely to have been high, because it was often used as a preservative. Similarly alcohol, known to increase triglyceride levels, was a common feature of the diet and the intake would probably have exceeded today's recommendations.

“The priests functioned as a powerful bureaucracy in ancient Egypt: at certain historical periods it was customary for a man to combine a career as a lawyer, doctor, scribe, or teacher with part-time priesthood. The priests were organized around a system of alternating groups of officials who served the temple god in rotation with each man undertaking 4 weeks of continuous religious and ritual duties, thereby completing 3 months of annual service within the temple. The temple itself was never a place of congregational worship and accommodated and protected the resident god whose spirit was believed to reside in the cult statue in the sanctuary. The main function of the priests known as “servants of the god” was to perform regular rituals designed to ensure the wellbeing and comfort of the god who was believed to reciprocate by providing benefits for Egypt, its King, and the population at large.

“The most important duty of the priest was his three times daily performance of this temple ritual during which the priests, while acting on behalf of the King who could not be present in every temple, cleansed, dressed, and fed the god's statue in the temple sanctuary. The foodstuffs offered to the gods were rich and varied but also included a selection of meat cuts. At the conclusion of the service, the priests removed the consecrated food from the altar and as part of their regular payment, it was

divided up among the senior temple personnel who took it home to feed their families.

“The vast bibliography associated with the examination of Egyptian mummies provides overwhelming evidence that atheroma was seen in a variety of vascular beds. Also there is clear evidence of vascular calcification, which has been increasingly linked as an adverse prognostic finding associated with accelerated atherosclerosis and an increased incidence of coronary artery disease. The presence of vascular calcification would suggest that these findings are true ante-mortem effects rather than those produced by the mummification agents such as natron. The explanation for these frequent pathological findings almost certainly resides in a diet rich in saturated fat that was confined to the elite, while most of the population remained vegetarian.”

Let's look at something very different. Anyone who has visited the temple of Luxor has been impressed with the grand Avenue of Sphinxes that extends northward, toward Karnak Temple. The avenue was mostly buried in ancient times, and just a few of the sphinxes were visible today...or until very recently.

As has been noted here in this column, Zahi Hawass is implementing plans to clear all, or at least most, of the area between the two great temples in Luxor...and part of that clearance was to include uncovering the vast array of sphinxes. The work is largely complete on the Avenue of Sphinxes. Those members of the ARCE chapter who recently visited Egypt saw the advanced stage of this project.

The exposed avenue is certainly awesome, but it has displaced a great many structures and a huge number of residents, most of whom lost their property for very little payment. People who have not visited Luxor within the last year will be astonished by the changes.



Avenue of the Rams, viewed from the Precinct of Mut toward the Temple of Karnak.

A good article on the excavations appeared in *Al-Ahram* (<http://tiny.cc/5Z5u>), and is reproduced here (edited for space reasons):

“The magnificent aspect of the Avenue of Sphinxes that once connected the temples of Luxor and Karnak, where priests, royalty and the pious walked in procession to celebrate the Opet festival, is being rekindled. Many of the 1,350 human-headed sphinxes with the bodies of lions that once lined the avenue have been restored.

“The 2,700-metre-long avenue of sphinxes was built during the reign of Pharaoh Nectanebo I of the 13th-Dynasty. It replaced one built formerly in the 18th Dynasty, as Queen Hatshepsut (1502-1482 BC) recorded on the walls of her red chapel in Karnak Temple. Sadly, however, over the span of history the avenue was lost, subjected to destruction as some of its sphinxes were destroyed and those sections of the avenue that were far removed from both temples were covered with sand and were buried under random housing.

“Within the framework of the Ministry of Culture program to restore ancient Egyptian monuments with a view to developing the entire Luxor governorate into an open-air museum, a project was planned to recover the lost elements of the avenue, restore the sphinxes and return it to how it was in ancient Egypt.

“The excavation team unearthed a large number of fragmented sphinxes that are now undergoing restoration in an effort led by SCA consultant Mahmoud Mabrouk. Once restored, they will be placed on display along the avenue.

“Zahi Hawass told Al-Ahram Weekly that the avenue was divided into five excavation sections, each revealing more sphinxes as well as the cartouches of several kings and queens. Excavators have unearthed only 650 sphinxes of the original 1,350, since many were reused during the Roman period and the Middle Ages.”

Every visitor to Egypt had better be aware that it is against the law to remove any artifact from Egypt...and the penalties can be severe. Well, they are getting even more harsh, as related in the following piece (<http://tiny.cc/kD6sx>) from Al-Ahram Weekly Online (edited for length):

“Over the past year various committees in the State Council and the People's Assembly have been reviewing the new antiquities law, which has finally been approved and will be endorsed on Monday. Parliament also rejected every suggestion made by some MPs to allow licensed antiquities trafficking in Egypt.

“The new law prohibits all antiquities trading and cancels the 10 per cent of unearthed goods previously granted to the foreign excavation missions who discovered them. "In fact, when I took over Egypt's cultural portfolio in 1987 I made a decision to call a halt to this practice, but my decision had to be ratified since anyone could file a lawsuit on the grounds that it was permitted by the old law. Now the division of any discovered objects is prohibited by the new law, and no one can ever divide newly- discovered artifacts with Egypt," Hosni said.

“The (law faced obstacles concerning) the essence of the law and five of its articles, those concerning the definition of an antiquity; prohibiting

antiquities trafficking; intellectual property rights; the possession of antiquities; and the penalties for the crime of antiquity trafficking.

“As for the definition of an antiquity, some MPs wanted to widen the definition by classifying every artifact in Egypt according to its historical era. They justified their opinion to the identification of antiquities provided in laws in Europe and elsewhere. They classified antiquities into three categories: historical objects; items of national heritage; and cultural assets.

“MPs are in agreement with the SCA's definition of an antiquity as laid out in the new law. An antiquity is every building or object that is a product of the Egyptian civilization or any further civilization. It is also a product of art, science or religion on Egyptian soil from the pre-historic era up to 100 years before present time. According to the new law an antiquity also covers any item with a historical, archaeological or artistic value that has contributed to the Egyptian civilization or was created in Egypt for any other civilization. It is also covers anything produced in Egypt or bearing any relation to Egypt's history. All human remains are considered as antiquities.

“Sanctions were placed on using photographs of archaeological sites or artifacts for commercial purposes without the permission of the SCA. Professional photography inside museums and archaeological sites is now completely prohibited unless permission has been given. Using photographs for educational purposes, by governmental authorities, for tourist attraction and for personal use is free of charge; although the intellectual property on its own logos and trademarks remain with the authority.

““We must exploit our archaeological assets properly in order to earn more money from providing efficient services instead of letting others do so,” Hawass said. He told the story of an Italian group that paid \$60,000 to photograph all the objects exhibited within the Egyptian Museum. The Italians quickly recouped their investment -- and made an additional \$50,000 in profit -- by selling the right to re-use the photographs. “The Chinese are making lots of money selling replicas of our antiquities,” Hawass commented.

“As for penalties, according to El-Ashmawi, all these have been doubled or more. A smuggler who was sentenced to 15 years and fined LE50,000 will now be sentenced to 15 years' imprisonment and fined up to LE100,000. Anyone who steals, hides, or collects authentic artifacts, or owns them without permission, will be imprisoned for 10 years and fined from LE50,000 to LE250,000 instead of three years' hard labor and a smaller fine. According to the new law, stealing or helping to rob a part of a genuine piece or any

deliberate intent to disfigure it will land a sentence of 15 years and a fine of from LE50,000 to LE100,000.”

And for the final report. One of the great draws for Egyptology visitors in Germany has been the famous bust of Nefertiti. Many were able to take photos in her new display setting, but no more. ‘Der Spiegel’ (<http://tiny.cc/mW02K>) reported on the change in rules (Translated by the CyberScribe from the original German):

“No more photos of Nefertiti. Nearly one half million flashes may have met the ancient face of Nefertiti since the reopening of the museum in October - without permission.

“Most who visited the Bust of Nefertiti in the north dome hall, wanted a memory photo - and because of the dark light, used for conservation protection for the approximately 3300 years old relic, used their camera flash without permission. Nearly half a million flashes may have met the ancient face of Nefertiti since the reopening of the museum in October.

“That would result in unfortunately too much according to the museum conservators view of high lux numbers,” said Stefanie Heinlein of the foundation Prussian cultural possession. “With the high number of visitors, who visit the bust daily, for conservation reasons no other choice remained for us. Because most visitors ignored the flashlight prohibition. It is a precautionary measure, to protect the colored pigments,” said Heinlein. Non-flash photography is permitted throughout the remainder of the building. In the north dome hall of Nefertiti we tried first with „NO flash“- signs and tried to reduce the frenzy of personal flashes, but the regulations did not take. Since personnel cannot recognize if the modern cameras flash units are activated, the approximately 4000 visitors per day left no other choice, according to Heinlein.”

This is most unfortunate, notes the CyberScribe, as this issue was played out years ago. The pigments on most Egyptian artifacts are mineral colors, not organic pigments. Such pigments are not changeable by photo flashlighting. There is simply no measureable change in many millions of flashes. One suspects that the museum just didn’t want to fool with tourists and their cameras...alas.

That’s enough for this Month.