



THE AMERICAN
UNIVERSITY IN CAIRO

SCHOOL OF
HUMANITIES AND
SOCIAL SCIENCES



Institute for
Bioarchaeology



THE BIOARCHAEOLOGY OF ANCIENT EGYPT

ABSTRACTS

Thursday, January 31 - Saturday, February 2, 2013

Cairo, Egypt



SCHEDULE

Time	January 31	February 1	February 2
7:15-8:45	<i>Registration</i>		
8:45-9:00	<i>Welcome</i>	<i>Late Registration</i>	
9:00-9:25	Antoine	Khairat	Malleson
9:25-9:50	Sabbahy	Haddow	Thanheiser
9:50-10:15	Norris	Williams	Vartavan
10:15-10:40	Hashesh	Dupras	Cappers
10:40-11:10	<i>Break</i>	<i>Break</i>	<i>Break</i>
11:10-11:35	Dabbs/Zabeki	Lösch	Creasman
11:35-12:00	Wahba	Walker	Lesur
12:00-12:25	Ogunmakin	Saad	El-Dorry
12:30-13:30	<i>Lunch</i>	<i>Lunch</i>	<i>Lunch</i>
13:30-13:55	Merghani	Zakrzewski	Bertini
13:55-14:20	Bianucci	Nerlich	Nasr
14:20-14:45	Gad	Lichtenberg	Wyatt
14:45-15:10	Al-Khafif	Crosby	Hansen
15:10-15:45	<i>Break</i>	<i>Break</i>	<i>Break</i>
15:45-16:10	Baker	Horackova	Sigl
16:10-16:35	Gabr	Pieri	Callou
16:35-17:00	Barta	Rühli	Van Neer
17:00-17:30	<i>Break</i>	<i>Break</i>	<i>Break</i>
17:30-18:00	Keynote: Rose	Poster Session	Redding
18:00-18:30	Keynote: Rose	Poster Session	Strouhal
18:30-19:30	<i>Break</i>	Poster Session	<i>Break</i>
19:30-21:30	<i>Reception</i>		<i>Dinner</i>

KEY-NOTE LECTURE
(31 JANUARY 17.30-18.30)

Jerry Rose
(Anthropology Department
University of Arkansas, USA)

*Bioarchaeology of Ancient Egypt: An Outsider's
Personal Adventures and Opinions of Its Past,
Present, and Future*

A student not only studies Egyptology, but is also inducted into a community of fellow students, faculty, and scholars. This community is expanded by attending meetings and participating in fieldwork. The budding scholar not only grows in knowledge, but is socialized into a scholarly culture with its own attitudes and perspectives. When a researcher who has spent a career working in another geographic area decides to enter the Egyptology community some might say "who is this person and what are they

doing here?" I describe my personal adventures in Egypt and my interactions with the community of Egyptologists and Bioarchaeologists over the past 24 years. I point out how participation in meetings, fieldwork, and skeletal analyses has possibly shaped my views of this field differently from those who participated from the time they were students. I certainly had to learn how I conducted myself in my research. I discuss the separate research paths of mummy and skeletal studies, the overwhelming influence of the various dam projects, and the transformations of the "Egyptian Antiquities Service" over the past 150 years have all had on the development of bioarchaeology in Egypt. It appears to me that the future of bioarchaeology in Egypt has great promise with the development of new methods, such as ancient DNA analysis, in addition to the development of new theoretical perspectives, but it will continue to be hampered by the scarcity of comparative skeletal collections and the absence of uniform data recording.

ARCHAEOBOTANY

(P) indicate 'poster'

Charlene Bouchaud

What Type of Fuel Was Used for Heating the Collective Baths in Egypt? Evidences from the Plant Macro-remains and Textual Data During Ptolemaic and Roman Periods (P)

The development of private and public baths in Egypt is strongly linked first to Greek and then Roman influences from the 3rd and 2nd c. BC, respectively. In the Egyptian semi-arid and arid environments, wood resources are scarce and the fuel management for heating the baths is a critical point. Data concerning that question mainly come from textual evidence and indicate that fuel is especially constituted by straw or reed. Recent archaeological excavations conducted at Greek (Taposiris Magna, Karnak) and Roman (Xéron in the Eastern Desert, Karnak) baths notably reveal their spatial organisation and their heating systems. Sediment samples were taken inside the oven complex or in the ash pits in order to start an archaeobotanical analysis on macro-remains. The preliminary results complete the papyri data and give a new insight on the fuel used, showing a great variety and a strong dependence from the local plant resources.

René T.J. Cappers

Modelling Shifts in Cereal Cultivation in Egypt from the Start of Agriculture Until Modern Times

The extensive archaeobotanical record of ancient Egypt can be used to reconstruct past agricultural practices, including major shifts in crop assemblages. This communication deals with shifts in cereal cultivation from the early Neolithic (6000 BC) to modern times. Three major shifts will be discussed:

- 1) The shift in predominance between barley and emmer wheat in the New Kingdom;
- 2) The replacement of emmer by Hard wheat in the Greco-Roman Period;
- 3) The replacement of Hard wheat by Bread wheat in modern times.

The work is aimed at modeling the criteria that may explain the cultivation of particular cereals during specific eras. These criteria are related to:

- 1) The availability of crop plants;
- 2) The environmental constraints related to soil conditions and climate;
- 3) Economic arguments dealing with yield, labour (grinding and de-husking), space (storage of grain and protection against decay), and fuel (frequency of the use of ovens).

Health may also have played a role in the selection of cereals, because the quantity and chemical composition of the gluten has an impact on resistance against bacterial infections and on gluten intolerance. This criterion, however, must have played an indirect role, because this relationship between food and health has only recently been recognized.

Pearce P. Creasman

The Potential of Dendrochronology in Egypt: Understanding Ancient Human/Environment Interactions

Basic tree-ring analyses have been applied to wooden archaeological remains around the world for nearly a century and with great success (e.g., dating the prehistoric ruins of the US Southwest). 'Dendroarchaeology', as it is known, is primarily employed to address chronological questions, for which there is a great need and exceptional utility in Egypt. However, dendroarchaeological interpretations are not only limited to questions of time. While the study of timber, its uses and acquisition in ancient Egypt has received much attention, more can be learned. Specifically, there is much knowledge to be gained by systematically analyzing ancient timber, including the areas of resource management, responses to environmental change, timber selection processes, patterns of reuse and repair, stockpiling, deadwood use, economy of wood use, and timber supply and trade. This paper discusses the great potential of dendrochronology in enhancing our understanding of ancient Egyptian human/environment interactions, aside from its clear chronological benefits.

Mennat-Allah El Dorry

Grapes, Raisins and Wine? Archaeobotanical Finds from the Monastery of John the Little in Wadi El Natrun

Very little archaeobotanical material from Egyptian monastic settlements or early medieval contexts has been studied, leaving somewhat of a lacuna in our knowledge. Instead, the traditional reconstruction of monastic history has been based on textual sources. This paper will present some of the archaeobotanical material recovered from the ninth-to-eleventh-century monastic residence of John the Little in Wadi El Natrun, Egypt, excavated by the Yale Monastic Archaeology Project (YMAP-North) since 2006. Particularly attention will be given to remains that point to grapes pressing.

Several cooking areas were uncovered during the excavations of this monastic cell. These areas include several ovens and kanoons, and possible storage and food preparation spaces. Large amounts of soil have been sampled, from which hundreds of charred botanical items were recovered. The material studied has already provided us with an insight into animal husbandry and agricultural practices within this monastic residence, and points to trade with its neighbours.

Claire J. Malleson

Archaeo-Botanical Investigations at Tell el-Retaba in the First Four Years

Since 2009 archaeobotanical materials have been systematically sampled and studied as a part of the Warsaw University investigations at the multi-period tell site of Retaba in the Wadi Tumilat. Initially intended to be a research project, road widening plans posed an imminent threat to a large part of the site in 2009, so rescue excavations were initiated along the line of the proposed expansion. Excavations are conducted systematically, following a single-context technique allowing for in-depth stratigraphic analyses to take place. Over four years the site has yielded over 60,000 identifiable specimens of seeds, grains and other plant parts dating to the 18th Dynasty through the Late Period. The materials are predominantly charred, and overwhelmingly appear to derive from the

use of cereal crop processing waste as fodder and fuel.

The site offers an exceptional insight into ancient Egyptian settlement remains at a site that was occupied for over 1000 years. The rich charred plant remains present the opportunity to study changing patterns of agriculture and the local ecology, as well as the influences of differing populations in the town. There are very few (if any) comparable sites at which botanical work has been carried out so systematically from the outset of excavations, and this is the first time that Third Intermediate Period plant remains from non-funerary contexts have ever been studied/published.

This paper will present an overview of the findings from this site, summarising the results of the analyses.

Islam M. Mostafa

*Genetic Efficacy of *Penicillium* sp. and *Bacillus cereus* in Ancient Organic Artifacts from the Egyptian Museum in Cairo (P)*

The Egyptian Museum in Cairo is home to an extensive collection of ancient organic materials that provide information for the genetic history and evolutionary principles of some microorganisms dwelling within the cellular synthesis of these artifacts. Cellulose-composite ones such as wood and textiles had been focused on in this pilot study entailing the long-term survival of *Penicillium* sp. and *Bacillus cereus* with their various bio-activities in selected wood and textile objects. A Late Period *Ficus sycomorus* sarcophagus (CG 1025) sustained *Bacillus* and *Penicillium* species. A linen manuscript (CG 66218) dating to the New Kingdom reveals the metabolic activity of both organisms through the Linear cell-meiosis and binary fission.

We coupled Rapid Identification of *Penicillium* (RNA) by Polymerase Chain Reception (PCR) Based Detection of specific sequences on 16S RNA Gene, which investigated the long-survival of fungal genomes and enzymatic treatments for the bacterial strains. Atomic Force Microscope (AFM) and X-ray Photo-Electron Spectroscopy (XPS) was used to give virtual stages of cellulose decomposition and the elemental variation occurring in comparison with caller experimental samples of wood and linen.

Our results show the survival of fungal and bacterial materials up to thousands of years. DNA repair and dormancy properties of both organisms had been elucidated through RNA polymerase activity assayed in textiles samples more than in wood ones. AFM results showed the persistence of cellular decomposition of cellulose chains, elucidating the consequences of the rates of deterioration over thousands of years, and helping inform a suitable conservation plan to stabilise the objects.

Pauline A. Norris

The Lettuce Connection: Oil = Two Lettuces? (P)

Apart from a handful of seeds dating to the Third Intermediate Period through to the Roman Period, there is no primary evidence for lettuce in Egypt. Until further robust evidence in the form of physical remains of the plant dated to before the Third Intermediate Period is found, one must rely upon secondary evidence in the iconography and texts.

Lettuce (*Lactuca sativa L. var. longifolia*) was offered to the god Min because the latex, which exudes from the stem and leaves, was thought to resemble semen. In the selective breeding of lettuce for seed oil production and food, the production of latex may have been compromised and, as a result, at least two species developed. The research examines the effects of selective breeding in Egypt for specific traits and how evidence in the iconography indicates that more than one lettuce species was present from at least the 4th Dynasty.

Renata G. Tatomir

Some Remarks on the Bioelectrical Frequency and Wavelength of the Sacred Scents: Myrrh, Frankincense, and Kyphi (Kapet) (P)

Incense, aromatic materials which release fragrant smoke, has been used all over the world from ancient times to the present day. Myrrh, Frankincense, and Kyphi are famous for the Pharaonic times because as incense materials they were connected to the ancient Egyptian rituals both for the gods and the dead. They were all used in Egyptian funerary rites, either in ritual incense or as embalming agents. Plutarch's *De Iside et Osiride*, (80), recorded that ev-

ery day they (*i.e.*, the Egyptian priests) make a triple offering of incense to the Sun, an offering of resin (or frankincense) at sunrise, of myrrh at midday, and of the so-called kyphi at sunset, "they burn resin and myrrh in the daytime, for there are simple substances and have their origin from the sun; but the cyphi, since it is compounded of ingredients of all sorts of qualities, they offer at dusk". The Egyptological investigation focused mainly on the religious and funerary records of these materials, particularly on their use in the mummification process. However some questions are still raised: why the Egyptians used these precious aromatics both as essential oils/perfumes, fragrant smoke, and as pellets to fill the abdominal cavity of the corpse before burial? In what way did these resins affect the corpse during the mummification process? The research dedicated to these scented materials offered to the gods and dead focused either on the chemistry of the resins or on aromatherapy.

This paper is an attempt to offer an in-depth analysis of their structure in terms of Physics, namely the relationship between their particular bioelectrical frequencies, wavelengths, and how these may alter both the living body and the corpse, taking into account that achieving immortality was the ultimate goal for the after-life of the ancient Egyptians.

Ursula Thanheiser

Island of the Blessed: Eight Thousand Years of Plant Exploitation in the Dakhleh Oasis, Egypt

The palaeo-oasis in the Dakhleh Basin, Western Desert of Egypt, has been inhabited since the mid-Pleistocene but continuously only since about 3500 BC.

During the early and middle Holocene Northeast Africa witnessed several pluvial and arid phases. The general trend, however, was a shift towards arid conditions that resulted in a change of vegetation affecting the subsistence strategies of the local population. For the reconstruction of the environment during prehistoric times, and the availability and utilisation of resources, two archaeobotanical methods were combined: analysis of charcoal and macro-remains. Unfortunately, pollen analysis, otherwise a powerful tool for the reconstruction of palaeo-environments, proved

impossible, as no pollen is preserved; the same applies to phytoliths.

Extensive human activity in the area during the first half of the Holocene resulted in some 200 sites which can be divided into three more or less consecutive cultural units: Masara, Bashendi, and Sheikh Muftah, distinguishable by site location, architecture, artefact assemblages, and biological remains. For this period the recovered archaeobotanical remains reflect the changing environment and human response to continuous aridification. While in Masara times subsistence strategies were based on collecting small seeded dicotyledons, the emphasis in Bashendi times was on wild cereals. Hardly any plant remains were recovered from Sheikh Muftah sites that might reflect hyper-arid conditions towards the end of the Neolithic period. At this time the surrounding desert was already depopulated.

Towards the end of the Old Kingdom Egyptians from the Nile Valley colonised the oasis. For about a century the indigenous Sheikh Muftah population and the Egyptian newcomers lived peacefully side-by-side. Then the cultural remains of the Sheikh Muftah disappear. The Egyptians introduced agriculture to the area and from now on the effects of aridification were compensated by irrigation and the Dakhleh Oasis features all the cultivated plants and associated segetals known from the Nile Valley.

Population density seems to have declined after the Old Kingdom. The number of recorded sites dating to a time span of almost 2000 years from the First Intermediate Period to the conquest of Egypt by Alexander the Great in 332 BC, is smaller than in the Old Kingdom. But the area has never been completely deserted and intensification of settlement set in during Ptolemaic times, presumably triggered off by the employment of innovative water lifting devices. By Roman times the oasis appears to have been densely populated. Farms, villages and cemeteries are found throughout the oasis with major administrative centres at Ismant el-Kharab (ancient Kellis) and Amheida. Trade routes connected Dakhla to the other oases and to the Nile Valley and facilitated the exchange of goods. Thus, luxury items found their way from the Nile Valley and beyond to this oasis.

Christian T. de Vartavan

Pistacia Varnishes as Clear Markers of Ancient Egyptian Imperial Art and New Kingdom Foreign Activities

Ancient Egyptians discovered the art of complex media varnishes 1000 years before expected, as our analysis of Maanakhtef's unique varnish recipe reveals (Deir el Medineh, New Kingdom). Such varnishes, probably made most often with the resins of the nearby Palestinian *Pistacia atlantica* Desf., otherwise known as the Mount Atlas Pistachio, rather than that of the more remote *Pistacia lentiscus* or Mastic tree, were used extensively by the ancient Egyptians during the New Kingdom to varnish sarcophagi. In most cases this alters their colours, and gives them their typical yellow appearance following their varnished oxidization. The appearance and subsequent disappearance of these complex-media varnishes on ancient Egyptian sarcophagi and other objects during the New Kingdom and after coincides chronologically with the rise and fall of Egypt's imperial ambitions in Asia. Aside from being supplementary markers of Egypt's foreign policy and activities, it is suggested that these varnishes be labeled as 'imperial', a useful contribution not only to the history of ancient Egyptian power and trade, but also to ancient Egyptian art and art history in general.

Lana Williams, Tosha Dupras, Sandra Wheeler and Peter Sheldrick

Mortuary Mixtures: Botanicals Used in Body Treatment Within the Kellis 2 Cemetery, Dakhleh Oasis, Egypt (P)

The application of botanicals during preparation of a body for burial in ancient Egypt was primarily for preservation. Many botanicals, however, also served as ritual offerings or ensured retention of the deceased's individuality. This study investigates the botanicals associated with body preparation of 136 individuals recovered from Kellis 2 cemetery (c. 100-360 AD), Dakhleh Oasis, Egypt. Excellent preservation allowed for characterization of organic materials using Raman spectroscopy. Results indicate that rosemary, myrtle, red and yellow myrrh, and henna were used to preserve not only body tissues, but also

individuality and spiritual needs. All detected botanicals are commonly used in contemporary fungicides, insecticides, and antibacterial agents, as well as in preparations used to mask strong odors. Henna applications were detected in the hair styling of most adult females and a few younger males, and also in the nails of six adult females. Yellow myrrh oil was used with henna, indicating need for a dye accelerant to speed the preparation process. Myrrh resin droplets were included in wrappings, commonly located on the heads of infants. Myrrh, sourced to the Saudi Arabian peninsula, was not readily available during Roman rule, but was used earlier in embalming and offerings, indicating cultural pluralism in this practice. These findings question the characterization of early Christian body treatment and preparation in Kellis 2 as being uniform and dogmatic in simplicity; rather, mixing of botanicals and methods of preparation provide a highly individualistic characterization, fitting needs of the living in preserving body, image and spirit of the deceased.

ARCHAEOZOOLOGY

Louise C. Bertini & Edwin Cruz-Rivera

The Presence of Wild Boar (Sus scrofa) in Dynastic Egypt: A Biometrical Analysis Using Molar Size

While the use of wild boar by ancient Egyptians has been suggested through interpretations of paintings or anecdotal accounts, no zooarchaeological evidence has been provided to either support or refute this. In this work, pig remains from eleven ancient Egyptian sites dating from the Old Kingdom through the Ptolemaic-Roman period (c. 2686 BC and up through 400 AD) were analyzed and their morphometrics compared to:

- 1) An established standard from the United Kingdom;
- 2) A wild boar standard from Turkey;
- 3) A modern pig standard from Egypt.

Age at death, sizes of first, second, and third molars (M₁, M₂, and M₃), and coefficients of variance (V) were consistent with the presence of domestic pig-only populations for most sites. However, tooth sizes, V, and tendency to-

wards bimodality in the distribution of sizes for Mendes and Kom Firin suggested two populations of similar animals. For these two sites, comparisons with established and new standards were consistent with the presence of both domestic pigs and wild boar, sometimes at similar densities in these sites. Furthermore, results for the Abydos Settlement Site suggested that wild boar might have been hunted occasionally. Consistent with previous studies, mandibular wear scores (MWS) showed that pigs were slaughtered within the first 18-21 months of age. Neither MWS, data distribution tendency, molar width nor V alone were sufficient to distinguish between pure and mixed pig populations, but taken together they provided strong evidence for the presence of wild boar in ancient Egyptian civilization.

Cécile Callou, Françoise Dunand & Roger Lichtenberg

Archaeological and Archaeozoological Study of Dogs from El-Deir

Hundreds of mummies and skeletal remains of dogs have been discovered inside three tombs of the Ptolemaic-Roman Necropolis at El-Deir (Kharga Oasis). Human tombs had been reused to bury dogs which, obviously, had been offered as ex voto to a canine deity, whose temple has not been discovered till now. Other dog remains have been discovered at Dabashiya, not far from Deir. On this site, about 80 well preserved mummies have been X-Rayed, showing some off-hand practices of embalmers, even though the mummies were carefully wrapped and painted. A thorough study of the dogs has been pursued by the author, from the Museum of Natural History in Paris, in order to establish as far as possible their breed, physical conditions and possibly circumstances of death.

Nicole B. Hansen

Foul Fowl: Birds as Agricultural Pests

Birds are often thought of by Egyptologists for their frequent appearance as hieroglyphic signs, as a significant source of dietary protein, as animal mummies, or for the reverence shown to them in the ancient religion. Because Egypt was, and still is, an important migratory corri-

dor for birds and a place where they have long refueled themselves before continuing on their journey over sea and desert, they are also one of a number of fauna that posed a threat to the food supply in ancient Egypt, alongside insects, mice, monkeys and even hippopotami. This paper will explore the role of birds as agricultural pests in ancient Egypt, using ancient archaeological, artistic, and textual as well as modern ethnographic and ornithological evidence. The species of birds responsible for such depredations, the food sources (fruit, grain and animal) that they targeted, and behavioral and seasonal aspects will be discussed. In addition, various preventative tactics, means of scaring, and traps used to reduce the damage that birds caused will be covered.

Carolin Johansson & Geoffrey Metz

Investigating an Unusual Cat Mummy: A Multi-disciplinary Approach (P)

The present investigation demonstrates the difficulty of securely determining the species of certain ancient Egyptian cat remains with regards to a previous discussion on the eventual presence of the Jungle cat (*Felis chaus*) among the tame and/or domestic cats of ancient Egypt.

An exceptionally large cat mummy was studied by means of X-ray computed tomography and molecular methods. The skeletal remains revealed by radiology displayed features characteristic of both the *Felis chaus* and the ancestral species of the common domestic cat (*Felis silvestris*) as well as attributes with values intermediate between the two candidate species.

Together with results of the analyses of ancient mitochondrial DNA extracted from a single caudal vertebra belonging to the cat mummy in question and a review of quantified ancient Egyptian cat remains in the literature we arrive at the conclusion that identification of a possible mummified Jungle cat is not straight-forward. We argue that more reference material is needed to precisely describe the taxonomic positions of the different kinds of cat remains of ancient Egypt and that a possible impact of hybridization between the Jungle cat and the domestic cat held by the ancient Egyptians should be considered.

Joséphine Lesur

Herding During the Final Neolithic in the Egyptian Western Desert: The Fauna from KS 43 & 52, Kharga Oasis

The sites of KS 43 & 52 are located in the southern part of the Kharga Oasis, in the Western Desert of Egypt. The archaeological remains, as well as a series of radiocarbon dates, have allowed attribution of the site to the Final Neolithic of the eastern Sahara, between 4800 and 4400 BC. The bone assemblages are expansive with more 40,000 fragments. The faunal spectrum shows a clear predominance of domesticates especially caprines and cattle. The rest of the spectrums include the domestic dog, and wild animals such as Barbary sheep, dorcas gazelle, hare and bird. Some remains of catfish and bivalves were also found, suggesting contact with the Nile Valley. The fauna from site KS 43 & 52 are of great interest, as they are the first Neolithic sites from the Western Desert to provide such large assemblages. The high representation of caprines and cattle testifies to a well-developed pastoral economy, relying partly on the water resources of artesian wells. Wild animals represent only a sporadic complementary resource, with the presence of Barbary sheep, dorcas gazelle and hare providing an image of a semi-arid environment suggestive of the start of aridification.

Rasha Nasr

The Faunal Remains from the AA Bakery with a Comparison to Other Areas of the Heit el-Ghurab, Giza, Egypt

The AA Bakery is one of several known in the Heit el-Ghurab (HeG) site at Giza, but it is the only known bakery in the western town, located in the south west corner of HeG. I have completed the analysis of the faunal remains from the AA Bakery, which was excavated in 1988, 1991, 2005 and 2006-2007. The faunal remains from AA Bakery are characterized by a large number of cattle, few pig, and some fish. The fish are dominated by Nile catfish and Nile perch. I compared the faunal remains from the AA Bakery to other areas of the site. AA Bakery is different from all other faunal samples from Heit el-Ghurab, although it shares similarities

to the fauna from the Pottery Mound in the number of cattle and in the age structure of the cattle sample.

Wim Van Neer & Renee Friedman

An Update on the Burials of Wild and Domestic Animals at the Predynastic Elite Cemetery of Hierakonpolis (Upper Egypt)

The excavations in the elite predynastic cemetery HK6 at Hierakonpolis continues to yield the remains of animals that were buried as part of large mortuary complexes surrounding large elite tombs. The cemetery was in use for elite burials of the Naqada IC-IIB period (3800-3650 BC) and then used again in the Naqada III period (3300-3050 BC), but the animal burials appear to occur only in the earlier phase. The site is unique for the number and variety of wild animal taxa that occur. An overview will be given of the finds from the 2009-2012 excavations which revealed both domestic and wild animals buried in tombs of their own or occasionally with human accompaniment. Among the domestic animals are numerous dogs and several well-preserved male and female individuals of Egyptian Longhorn cattle, as well as very large goats and sheep. Wild species include baboon, young hippo, elephant, aurochs and hartebeest, also known from earlier excavations, but also crocodile, leopard and ostrich, which are new to the site. The pathologies observed in some of these animals indicate that they had been held in captivity for an extensive period of time before their burial.

Johanna Sigl

The Cataract Pigs. Thoughts on Pig Husbandry in Syene/Aswan in Times of Change

Throughout the history of Egypt pigs have been used as a source for meat, fat and bristles. Despite the often negative view on these animals given by pictorial and textual evidence from e.g. Pharaonic and Ptolemaic times, archaeozoological analyses show that they were and are held and bred throughout the country until nowadays.

The ancient Egyptian town Syene (modern Aswan) was in the centre of ethnic, cultural and religious change throughout its history. As

the southernmost town of Egypt it functioned as military outpost and trade centre. It was a melting pot of traditions and customs from all around northeastern Africa and the Mediterranean area. Egyptians, Persians, Greeks and Romans, believers in the Pharaonic, Greek and Roman cults, Christians and Muslims brought their own beliefs and knowledge of food preparation and breeding to this town.

While studying the faunal material from Aswan from the Late Period till the destruction of the town in the early Mameluk Period – the main habitation phases of the town – pig remains were found in nearly every stratigraphic unit. These provided the possibility to follow several lines of thought: How did the ethnic, cultural and religious changes influence animal husbandry in this area? What can the bones tell us about the living conditions of pigs compared to other sites? Can religious or ethnic groups be distinguished and located in Aswan by their household animals?

In my paper I will try to give some preliminary answers to these questions. More research has to follow my proposals but this paper provides an initial forum for discussion.

John H. Wyatt

Africa: The Missing Link in the Identification of the Birds of Ancient Egypt

By the end of the 1980s, some 131 bird species had been identified, from hieroglyphs, bone remains, bird mummies, art and literature, as having probably occurred in ancient Egypt. Only 45 of these, however, could be considered as truly African, with the rest being from the Western Palearctic (Europe). It seemed that three main categories of African birds might be being under-identified:

- 1) Species which migrated solely within Africa on a N-S or E-W basis;
- 2) Species following the annual African flood cycle from South-West Africa each October/November through to Egypt each August/September before returning south;
- 3) Species which might have moved into ancient Egypt during times of climate and habitat change such as northwards during the last great pluvial period from c. 10,000 to c. 3,000 BC.

This paper looks at each of these categories individually and, by using normal ornithological identification techniques coupled with evidence from the combined hieroglyph, bone, mummy, art and literature record, suggests which additional birds might have been present and when. At least 48 possible individual species have now been identified from hieroglyphs, 151 from bone remains, 76 from mummies, and 110 from art, sculpture and literature, with a revised overall total of 241 possible species once duplications have been taken into account. The bone and mummy findings have also served to confirm whether various birds, thought to be portrayed in art and hieroglyphs, were actually present at the relevant time. Conversely art and hieroglyphs have indicated some very similar Palearctic and African species where bone identifications might need to be re-examined to determine whether both or just one species had occurred.

ARCHAEOZOOLOGY/ARCHAEOBOTANY

Richard Redding & Claire Malleson

Modeling Old Kingdom Food Production: What is the Limiting Factor?

In a 2012 article Redding using the faunal data from the Heit el-Ghurab (HeG) site at Giza and data from animal husbandry and agricultural literature to establish estimates for the number of animals, land and labor required to provision 10,000 workers. We will expand this work to include the production of grains, wheat and barley, for consumption of bread and beer at HeG. Comparing data on rations and human physiologic needs, we will establish levels of consumption for 10,000 workers at Giza. These are used to estimate land and labor requirements using estimates of productivity and labor derived from texts and agricultural literature. The question is, as with animal production, is labor or land the limiting factor?

HUMAN REMAINS

Daniel Antoine

The British Museum Human Remains from the Nile Valley: Curation and Research

Human remains in the British Museum collections reflect the varied ways different societies

have conceived of death and prepared the remains of the dead. They are a unique record of past human biology and add to our understanding of the people that produced the objects in the museum's collection. Curating and displaying human remains is balanced with a duty of care and the British Museum has developed a policy that sets out the principles governing the holding, display, curation and study of human remains in its collection. As part of the Museum's efforts to study and publish the material in its collections, the human remains are being actively researched. Their analysis is providing valuable information on human biology, ancient diseases, injury patterns, past activities and diet. The Department of Ancient Egypt and Sudan curates one of the largest collections of ancient human remains from the Middle Nile Valley, a substantial part of which consists of skeletal remains and naturally mummified bodies recovered during the Merowe Dam Archaeological Salvage Project. The construction of the new dam at the Fourth Nile Cataract resulted in a major international rescue campaign in which the British Museum, in conjunction with the Sudan Archaeological Research Society, excavated burials from the Neolithic to Medieval period. This unique collection is allowing us to investigate how changes in environment, living conditions, diet and culture affected the biology and health of the past inhabitants of the Middle Nile Valley. In addition, older collections are being reanalysed and CT scans of the naturally preserved mummies from Gebelein have revealed new insights into Predynastic Egypt.

Brenda J. Baker

Sacrifices for the State? The Subsidiary Burials from Aha's Funerary Enclosures at Abydos

Early Dynastic royal funerary enclosures in the Abydos North Cemetery, 1.2 miles (1.9 km) northeast of the royal tombs, have been investigated intensively by the University of Pennsylvania Museum, Yale University, New York University Institute of Fine Arts Expedition (PYIFA) over the past decade. Three enclosures are attributed to Aha, an early First Dynasty pharaoh, c. 3000 BC. In 2002-03, five of six subsidiary graves around Aha's principal enclosure were excavated. Looted in antiquity, these graves contained skeletons that were largely disarticulated,

though some elements were still *in situ* in each. Five more subsidiary graves, one still intact, were excavated in 2004-05 around two smaller enclosures attributed to Aha that are just northwest of the main enclosure.

The skeletal remains of those interred in the subsidiary graves around these three enclosures provide critical information concerning the identity, lifestyle, and manner of death of these individuals. Based on age, sex, health status, and the quality and quantity of grave goods, the identities of individuals interred around the principal versus the two smaller enclosures differ. The richly furnished graves around the main enclosure present a more diverse group that includes a child of 3-5 years, a young adult male, two middle adult females, and one old adult female. Graves around the two smaller enclosures had fewer objects of lesser quality and were all occupied by women with a younger age profile (four young adults and one middle adult) than those associated with the principal enclosure. Skeletal remains show no evidence of perimortem trauma indicative of sacrifice, though archaeological evidence indicates the graves around the principal enclosure were roofed simultaneously. These individuals, however, were not dispatched by blows to the head, decapitation or slashed throats, strangulation, or any other means that would be evident on their bones. Instead, they were presumably poisoned or asphyxiated. The lack of skeletal evidence for sacrifice of any of these individuals, however, suggests that alternative explanations should be considered.

Compared to later commoners from the North Cemetery, these royal courtiers were taller and had better dental health, but healed trauma, infection, hyperostosis frontalis interna, and other pathological conditions are present. Though sample sizes are quite small, similarities and differences in health status among those buried around the principal funerary enclosure and the two smaller enclosures are evident. Significantly, all the adults show angulation and torsion of proximal femora and other indicators that suggest habitual donkey riding by courtiers.

Miroslav Barta & Petra Havelkova

Memphis' Population of the Third Millennium BC

Despite all excavation projects on the pyramid fields of Memphis, Old Kingdom archaeology

features several major deficiencies. One of them is a detailed knowledge of the third millennium BC population. In this contribution, some most important results of a long-term project dealing with Old Kingdom burials carried out by the Czech Institute of Egyptology in Abusir will be presented. In particular, dozens of burials dating to the Third-Sixth dynasties and belonging to different social strata will be analyzed in detail.

Giovanna Bellandi, Roberta De Marzo, Stefano Benazzi & Angelo Sesana

Burials Under the Temple of Millions of Years of Amenhotep II in Luxor, West Thebes, Italian Archaeological Project (P)

The area of the Temple of Millions of Years of the pharaoh Amenhotep II was partially investigated by the British archaeologist Sir W.M.F. Petrie in 1894-95. Only in 1997 were excavations resumed in the area of the Temple under the direction of Angelo Sesana, president of the CEFB (Francesco Ballerini Centre for Egyptology, Como, Italy). The excavations, now approaching their 15th season, have permitted the development of a notably detailed plan of the Temple, expanding and rendering more precise the summary data recorded by Petrie. Excavation has been continued down to bedrock and has revealed numerous funerary structures and complexes that occupied the area before the temple's construction and again after its abandonment and the looting of its stones.

Prior to the construction of the Temple of Amenhotep II the area was occupied by a necropolis dating back to Middle Kingdom. Two underground tomb complexes from this pre-temple cemetery consisting of a ramp, a hallway and several chambers are still being studied. The tomb-fill has provided unexpectedly rich finds: vessels of many different types and sizes, ceramic offering trays, faience beads and semi-precious stones amulets found along with skeletal remains.

The whole area was again used as a necropolis from the Third Intermediate Period onwards. To date, 22 tombs in the necropolis have been investigated but only 14 still contained human remains: each has a square shaft of 2 to 6 m depth with one or more small irregularly shaped rooms leading off it. Most of the graves

had already been sacked in ancient times or, in some cases, were identified and cleared by Petrie. In other cases, however, elements of the funerary assemblages remain. The use of the area of the temple complex as a cemetery continued into the Ptolemaic-Roman period.

The human remains found in the tombs of the Temple of Amenhotep II are currently being studied. We are focused on reconstructing the health status and life-stories of the individuals buried in two specific contexts:

- 1) The large tomb, consisting of a ramp, a hallway and several chambers, in area A17 that was used in the Middle Kingdom and again in the Late Second Intermediate Period-early New Kingdom. It contained the partially or fully articulated skeletons of 19 individuals along with some other scattered remains. The remains are still being analyzed so as to provide a more precise number of individuals and data on sex, age and pathology;
- 2) The tomb in area C3 dating to the post-temple period (Third Intermediate Period) divided into two chambers which contained six articulated skeletons and scattered fragmentary remains.

The picture that emerges from a preliminary anthropological study is of a very precarious state of health with high infant mortality and degenerative joint disease amongst almost all adults. The frequently very pronounced muscle insertions suggest intense daily physical labour, sometimes so heavy as to induce the formation of osteophytes and enthesophytes in tendon insertions at the margins of the vertebral bodies.

Raffaella Bianucci, Ibert Lalremruata, Markus Ball, Beatrix Welte, Andreas G. Nerlich & Carsten M. Pusch

Tuberculosis and Malaria Co-Infections in Late to Graeco-Roman Period Mummies from the Fayum

Due to the presence of the lake Birket Quarun and to the particular nature of its irrigation system, it has been speculated that the Fayum, a large depression 60 km south-west of modern Cairo, was exposed to the hazards of malaria in historic times. Similarly, it has been speculated that hu-

man tuberculosis also might have been far more widespread in antiquity than in the recent past. These hypotheses, if confirmed, would imply that also cases of co-infection between protozoan and mycobacterial pathogens could have occurred.

To substantiate those speculations, molecular analyses were carried out on sixteen Third Intermediate to Graeco-Roman mummified heads (806 BC-124 AD) recovered from the necropolis of Abusir el Meleq (Fayum Valley, Lower Egypt).

Soft tissue biopsies were used for DNA extractions and PCR amplifications using well-suited protocols. A 196-bp fragment of the *Plasmodium falciparum* apical membrane antigen 1 (AMA1) and a 123-bp fragment of the *Mycobacterium tuberculosis* complex insertion sequence IS6110 were amplified and sequenced, respectively, in six (38%) and five (31%) mummified heads. Concomitant PCR amplification of *falciparum* malaria and human tuberculosis specific fragments was obtained in four of sixteen individuals (25%). Here we extend back-wards to ca. 800 BC new evidence for single malarial and tuberculosis infections plus add first evidence of four cases of malaria tropica/MTB complex co-infections in individuals from the Fayum depression.

Victor S. Bittar, Claudia R. Carvalho, Antonio B. Junior, Jorge Lopes & Sergio A. Azevedo

A Non-invasive Bioarchaeological Research Approach on Sha-Amun-Em-Su: A Mummy Inside a Sealed Coffin (P)

The mummy of a Singer of Amun, identified as Sha-Amun-em-su, came to Brazil in the 19th century as a gift of the Khedive Ismail to the Emperor Dom Pedro II, when it was added to his collection and where it has been ever since. Today, it is part of the Museu Nacional, da Universidade Federal do Rio de Janeiro (MN/UFRJ)'s collection.

This mummy is unique in the Museum as the original coffin remains preserved and sealed, indicating that it never had been opened.

Non-invasive studies on the mummy were conducted in 2006, when the scanning, imaging techniques and equipment became more accessible in Brazil. At this time the coffin was CT Scanned. Those procedures were possible through a partnership between the

Museum, the *Instituto Nacional de Tecnologia/Ministério da Ciência, Tecnologia e Inovato* (INT/MCTI) and the access of the CT equipment at the *Clinica de Diagnosticos por Imagem* (CDPI).

This new research was added to the previous ones, now with the objective of getting further knowledge about this mummy, working on the bioanthropological aspect, checking the burial procedures and funerary artifacts and the actual condition of the whole set (the mummy, the coffin and artifacts).

The research is now at the imaging documentation stage, going from simple external photographs to the virtual rebuild of the whole skeleton without the coffin or bandages, been this last task done at the *Laboratorio de Processamento de Imagem Digital* (LAPID/MN).

Svetlana B. Borutskaya

Paleoecological Study of Medieval Copts from Deir el-Banat Necropolis, Egypt. Preliminary Report (P)

The necropolis is located in the eastern part of Fayum Oasis in the desert (about 2 km from the monastery of Deir al-Malak). The cemetery was partially excavated by the researches from the sector of Islamic and Coptic monuments of the Fayum Inspectorate for five seasons (1980, 1982, 1983, 1984, 1995). According to the information from the inventory book and inspectorate reports on the excavations, the cemetery was used starting from the Greco-Roman period to the Early Medieval. We worked at Fayum during field seasons 2003-2006. We studied 209 Coptic skeletons. Among them, 42.6% belonged to female, 39.7% to men and 17.7% to children.

Joanna A. Ciesielska

Life and Death in the Fayum Oasis. Living Conditions in the Byzantine Period (P)

This paper introduces recently begun doctoral research concerning the matter of diet, living conditions and health of the Fayum oasis residents at the end of the Roman period and during Byzantine times. Most of the research will be based on the previously published and currently conducted anthropological analysis

of human remains from all respectively dated cemeteries in the area of the Oasis. Thorough examination of human skeletal remains can reveal the full range of palaeopathological indicators pointing to the successful assessment of one's health condition and diet. The identification of all signs of disease, skeletal trauma and nutrition will hopefully enable the reconstruction of the quality of life in early medieval Fayum. We will also try to recreate the average life expectancy and mortality rate, especially among the youngest members of the community.

The starting point of this research were the excavations of 14 rock-hewn graves, dating back to 6th/7th c. AD, from cemetery C at Deir el-Naqlun. These works were carried out during three seasons between 2004 and 2006, by the mission of the Polish Centre of Mediterranean Archaeology, University of Warsaw. Apart from the basic anthropological analysis of the remains, a number of soft tissue samples were collected. These samples will be used for histopathological and microbiological examination, identification of parasites and insects, as well as ancient DNA analysis.

In the future, all of the data obtained during anthropological analysis of human remains will hopefully be complemented by other bioarchaeological material, including study of animal and plant remains. The research will also include written sources analysis, especially Greek and Coptic papyri and ostraka found in corresponding contexts. Some of them relay to goods that have been the subject of trade, transportation between distribution points, or payment from one party to another. Among these goods are food products, including various types of grains (wheat or barley), wine, beer, meat, or even molluscs. Through the analysis of these texts it is theoretically possible to determine what kinds of products were ordered, by whom and in what quantities. This information will in turn be confronted with anthropological data.

Jason J. Crosby

Diet, Subsistence, and Dental Pathology: Studies from Prehistoric Egypt to the Khartoum Mesolithic of Central Sudan

Dental pathology recorded in human skeletal remains from archaeological contexts informs

the relationship between diet and health in past populations. Prehistoric Africa, however, remains a poorly documented area despite our knowledge of their diverse populations and subsistence practices. The present study provides a background for the current understanding of how subsistence practices and diet are linked to oral health indicators, examines issues concerning poorly documented regions in dental disease-subsistence research, and highlights the importance of an overall biocultural approach to the study of human remains. Encompassing prehistoric Egypt (>3100 BC) and placing it within the broader framework of ancient Nubia and neighboring regions along the White and Blue Nile, the significance of geographical, cultural, and ecological contexts in dental disease prevalence and distribution is explored.

Given the importance of a regional perspective within the oral health and diet relationship, the present study uses standard macroscopic data collection protocols for paleopathological assessment to provide relevant information regarding evidence for dental disease and enamel defects from the Khartoum Mesolithic (7000-5000 BC) site of Shabona (n=7; six adults, one subadult). Health and subsistence information from prehistoric hunter-fisher-gatherers of central Sudan is essential in delineating sectional and temporal differences along the Nile river system and illustrates the need for additional fieldwork and research in the region. Atypical for African Mesolithic skeletal samples, the Shabona remains exhibit a relatively high frequency of dental caries (26/89 teeth, 29%; n=5 individuals). Excluding the most complete individual (#11049) from the overall rate due to exceptionally severe oral pathology, however, yields a low frequency of carious teeth (2/61 teeth, 3%; n=4 individuals). Linear enamel hypoplasia (LEH), a marker of childhood physiological stress, was identified in the maxillary incisors and canines of two individuals, but was otherwise absent in the collection. Evidence for possible dental ablation of the central maxillary incisors was also documented (#11044) and is consistent with the pattern of cultural modification found at the Khartoum Mesolithic site of Khartoum Hospital as well as in later chronological periods in central Sudan.

The small number of individuals at Shabona limits the ability to generalize about the relationship between oral health and hunter-fisher-

gatherers of the Khartoum Mesolithic. When combined with evidence for dental disease and enamel growth disturbances in contemporaneous skeletal samples and subsequent Neolithic groups in the region, however, a broader perspective is achieved for this crucial area along the White Nile. A larger comparative framework encompassing prehistoric Egypt and ancient Nubia also demonstrates the importance of a multifactorial approach in our understanding the history of past populations and the association between subsistence, diet, and dental disease.

Jerome Cybulski, Robert Stark & Tamas Bacs

Bioarchaeology, TT65 Project, Hungarian Mission in Thebes (P)

TT 65 is a private tomb in the Theban Necropolis on the west bank of the Nile opposite Luxor, Egypt. Our poster presents a contextual overview of human remains from five burial locations studied on site during the 2010 (14th) field season of the Hungarian Mission in Thebes. Highlighted are Shaft 1 in the forecourt of TT65, which held the known latest burial occupant, and Shafts 3 and 4 on the eastern slope of the forecourt, which held the earliest. Shaft 1 was intended for the original 18th Dynasty owner of TT65 but never used by him and the tomb itself abandoned for reasons unknown. Instead, the remains of a naturally preserved Coptic period 'half-mummy' was found in the shaft, possibly disturbed by looters of a nearby grave and hastily discarded. We descended Shaft 4 to study its lone occupant, an 18th Dynasty mummy that had obviously been damaged by looters. The estimated length of this probable male, a reasonable proxy indicator of stature during life, was 165 cm. Shaft 3 provided a challenging mix of at least 17 individuals, some represented only by one or a few bones, others by limbs wrapped in high quality linen plus loose bones matched during the analysis. The latter may have been the original 18th Dynasty occupants: three adult males, a female, a child and an infant as determined from the skeletal remains. Possible later intrusions, accidental or intentional, included three infants, three children, a juvenile, two adult males and two

females. Pathology in the overall collection was minimal: porous orbital roofs in youngsters and foci of bone spicules and joint surface erosion in adults that did not resemble the usual scars of degenerative joint disease.

Gretchen R. Dabbs, Melissa Zabeki & Jerome Rose

The Bioarchaeology of Akhetaten: Unexpected Results from a Capital City

The short-lived capital city of Akhenaten, Akhetaten (modern Amarna), is unique among ancient Egyptian cities in that it was built, occupied, and abandoned in a narrow temporal spectrum during Akhenaten's reign (c. 1349-1332 BC) and a brief aftermath that ended during the reign of Tutankhamun. The city, as home to Akhenaten and his court, swelled quickly to perhaps as many as 30,000 residents as the officials, soldiers, artists, manufacturers, and others responsible for its construction, and those in service to higher officials arrived and began the process of building lives in the new capital city. As Egypt's most accessible urban archaeological site, Amarna has long been a source of information on the domestic architecture and material culture of life during the Amarna Period. Recently, the addition of bioarchaeological data from the ongoing excavations of the South Tombs Cemetery (STC) at Amarna has enhanced the understanding of life at Akhetaten by providing data to examine not only the conception of death and spirituality through burial treatment, but also the biological ramifications of living during this period of religious and social upheaval through analysis of human skeletal remains.

While probably never intended to reflect the lives of the non-elite public, the themes portrayed in the daily life scenes on the walls in the rock cut tombs of the Amarna elites are dominated by depictions of abundance and opulence, with offerings to the Aten consisting of heaping piles of grain, shanks of meat, and vessels of hearty drink. The ready interpretation of this is the suggestion that life at Akhetaten was of a life full of dietary diversity and surplus. The analyzed skeletal remains from the non-elite STC at Amarna (n=275) reflect the antithesis of this dominant theme,

presenting a contrasting picture of a life filled with high levels of general, nutritional, and workload stress. General indicators of stress include the mortality profile (high post-infancy sub-adult mortality in some areas of the cemetery), adult stature (Amarna adults are the shortest of any known ancient Egyptian population), and the frequency of linear enamel hypoplasia (30.4% with at least one LEH). Nutritional stress is directly reflected in the skeletal lesions of cribra orbitalia (22.4%), porotic hyperostosis (3.1%), and those lesions characteristic of scurvy (3.1%). Workload stress in adults (n=175) is manifest in the frequency of spinal trauma (Schmorl's nodes 34.9%; compression fracture 20.6%), and degenerative joint disease (overall spine 47.4%; limb joints 24.0%). These health patterns are hardly what one would expect for any group of people living in the capital of Egypt during the prosperous New Kingdom. Perhaps the social, religious, and political upheaval caused by Akhenaten's devotion to the Aten extended into the realm of individual health as well.

Tosha Dupras, Sandra Wheeler, Lana Williams & Peter Sheldrick

Birthing in Ancient Egypt: Timing, Trauma, and Triumph? Evidence from the Dakhleh Oasis

The mortuary landscape and inclusion of all individuals, no matter age or pathological condition, in the Kellis 2 cemetery has allowed for the interpretation of birth cycles and elements of the birthing process. While ancient epigraphic sources have provided sparse evidence of seasonal birthing cycles for populations of the Roman Empire, bioarchaeological analyses of Kellis 2 indicate a pattern of seasonal birth amplitude occurring during March-May, which correlates directly with the seasonal amplitude in mortality for birthing age women. Skeletal birth trauma, or any injury that occurs to the fetus or infant during delivery, may be caused by large fetal size, prolonged labor, abnormal fetal position, or compression and traction forces during the birth process. An examination of these types of injuries may help us to understand birthing practices and the possible use of midwives in Egypt during the Romano-Christian period. This presentation will explore the seasonal birthing

cycle and injuries resulting from birth trauma, including cases of humerus varus deformity, and fractures of the ribs, clavicles, humeri, and cervical vertebrae. The majority of birth injuries recorded in individuals from the Kellis 2 cemetery are most likely due to factors such as prolonged labor, compression and traction forces, and extraction practices during the birth process.

Tosha Dupras, Lana Williams, Peter Sheldrick, Brittany, Bart VanThuyne & Sandra Wheeler

Cancer, a Disease of Modern Industrial Society? Not Likely! A Review of Old and New Evidence from Ancient Egypt (P)

Although considered a disease of modern industrial societies, skeletal and soft tissue evidence of secondary malignant cancers is becoming more evident in the ancient world. Here we examine the evidence of cancer as a disease of antiquity in ancient Egypt, particularly focusing on evidence from Deir al-Bersha and the Dakhleh Oasis. We present two cases of advanced metastatic carcinoma, both most likely representative of breast cancer that metastasized throughout the skeleton. The first case, from the site of Deir al-Bersha, dates to the 2nd to 4th Dynasty (ca. 2686-2494 BC) and may well represent the earliest skeletal evidence for this disease. This individual, an adult female approximately 45 years of age at death, displays multiple characteristic metastatic lesions throughout her skeleton. The second case, from the Kellis 2 cemetery in Dakhleh Oasis dating to the Romano-Christian period (c. 100 to 360 AD), is also an adult female approximately 40 years of age at death and displays similar characteristic metastatic lesions, however, in limited distribution. Given the advanced stage of cancer represented in both cases, we also explore possible medical and pain management strategies used in ancient Egypt.

Rokia Elbanna & Azza M. Sarry el-Din

Activity Pattern Reconstruction from Hip Bones in Bahriyah Oasis - Greco-Roman Period (P)

Musculoskeletal stress markers have been widely used to reconstruct activity pattern in human population. This study was to reconstruct activity pattern focused on pelvic bones. The sam-

ple was excavated from Bahriyah Oasis. They belong to the Greco-Roman period (332 BC-30 AD). The skeletal sample used consisted of 80 pelvic male bones (33R, 47L) & 64-female bones (34R, 30L). Stress muscle markers were observed in 75.75% of the right side and 72.34% of the left side in males. In females the percentages were 61.76% and 60% in the right and left sides respectively. These results confirm that two of the main activities in Bahriyah during the Greco-Roman period in Egypt were textile and wine production.

Ahmed M. Gabr

Continued Excavations in the South Abydos Archaic Cemetery in the 2009 and 2010 Seasons

The SCA South Abydos Excavation was initiated in 2007 in order to investigate an area thought to have archaeological remains. The site is located approximately 350 m south of the temple of Seti I, and about 1400 m northeast of Umm el Qaab, adjacent to the modern village El Araba El Madfuna.

The 2007 season confirmed that the site indeed held archaeological remains, as a cemetery with two distinct phases was uncovered; the earliest phase, dated to the Archaic period (based on pottery, body treatment of the occupants and funerary items) consisted of several mud brick tomb structures, and the later phase was represented by numerous inhumations surrounding the older structures in what appears to be an intentional way. This second phase, excavated during the 2007 season, was dated to the Late Roman/Byzantine period based on fabric patterns on the shrouds of the bodies, and comprises more than ten burials, some of which were the topic of an earlier paper presented at the CHRAE 2010 conference.

This paper will deal with the continued excavation of the site during the 2009 and 2010 seasons, during which the team was able to focus on the Archaic period tombs on the site. A brief overview of the work carried out during the last two seasons will be given, with two tombs, numbers 14 and 8, described in more detail.

Tomb 14 is unusual because it belonged to a sub-adult, and epiphyseal closure suggests the age of this individual was under 14 years

of age, while dental eruption points to an even younger person, between 8.5 to 13.5 years of age. The burial had been disturbed in antiquity, but enough of the skeleton was left in situ to determine that this was a coffin burial, with the occupant buried lying on his or her left side, facing west.

Based on its prime location within the site, Tomb 8 appears to be one of the most important tombs of the cemetery. The tomb owner in this case was an adult, most likely male, and was buried in a semi-flexed position in a wooden coffin, with his head to the Northwest. The analysis of this tomb is ongoing, and the burial itself was left in situ in the tomb awaiting final excavation next season.

Yehia Z. Gad, Carsten M. Pusch, Dina Fathalla, Rabab Khairat, Angelique Corthals, Sally Wasef, Amal Ahmed, Ahmed Z. Gad, Suzan Fares, Rama Saad, Eslam El-Shahat, Mohamed Fateen, Naglaa Hasan, Albert R. Zink & Somaia Ismail

A Systematic Approach Towards Studying Ancient DNA from Egyptian Mummies

The study of ancient DNA (aDNA) is a discipline that has many challenges. A systematic approach has been proposed to execute aDNA studies on ancient human remains. Moreover, over the years, a considerable effort has been exerted towards devising a set of criteria for authentication of the results of aDNA studies. In the case of Egyptian mummies, certain additional distinctive features do exist. This implied adopting some modifications to the previously proposed ones.

This presentation will shed light on the short-lived experience of the first dedicated Egyptian aDNA labs that have been instituted in the Egyptian museum and Cairo University Medical School. The technical challenges during establishment of the methodologies will be illustrated. In addition, experiments showed that there were distinctive profiles of post-mortem DNA damage among Egyptian mummies. The effect of these changes on the generated results will be discussed.

Stacy L. Hackner

Platycnemia in Two Nubian Populations: An Activity-Based Explanation of Shape Change in the Tibia (P)

This study analyzes the difference in tibial shape between two groups from the area that is now northern Sudan. The cnemic index is the ratio between the antero-posterior and medio-lateral diameters of the tibia, and has long been known to be influenced by habitual activity.

Additionally, the study developed categorical systems for analysis of other features of the tibia, including robusticity, lateral grooving, posterior buttressing, and height of the interosseous crest. The groups addressed were both excavated in the course of the North Dongola Reach Survey; one is Kerma and the other Meroitic. Significant differences were evident between the groups; primarily, the former is 'platycnemic', with elongated, diamond-shaped tibias, and the latter is 'eucnemic', with rounded tibias. The platycnemic Kerma group's scores were evenly distributed between gracile and robust, while the eucnemic Meroitic group was more gracile overall and was more sexually dimorphic. It is likely these differences represent changing activities and sexual divisions of labor within these groups, about whose daily life little is known.

Scott D. Haddow

Dental Morphological Analysis of Roman-Era Burials from the Dakhleh Oasis, Egypt

Kellis (Ismant el-Kharab) is an archaeological site in the Dakhleh Oasis, Egypt, which dates from the late Ptolemaic to the late Roman period. Previous studies of skeletal material from Kellis and other oasis sites suggest that the ancient population of the Dakhleh Oasis was largely homogenous and inbred as a result of geographic isolation. Archaeological and textual evidence however, indicates a record of contact with the Nile Valley since the Neolithic. In order to test these apparently conflicting narratives, descriptive and multivariate statistical methods are employed in an analysis of heritable dental morphological variants in 186 individuals from Kellis using the Arizona State University Dental Anthro-

pology System. The present study has two main components:

- 1) An intra-cemetery assessment of inter-sex and inter-group morphological variation in order to identify related individuals within the Kellis 2 cemetery and provide evidence for post-marital residence patterns;
- 2) An inter-regional comparison between the Kellis skeletal assemblage and groups from Egypt, Nubia, North and Sub-Saharan Africa in order to place the ancient Dakhleh Oasis population within a broader regional context.

The results of the intra-cemetery analysis demonstrate low levels of inter-sex phenetic variation consistent with an isolated and possibly interbred population. Spatial analysis within the Kellis 2 cemetery has tentatively identified one area containing individuals with distinctive dental trait frequencies. This may indicate a kin-structured area of the cemetery, or alternatively, an area reserved for individuals who are not native to the Dakhleh Oasis. The results of the inter-regional comparison of trait frequencies demonstrate an overall affinity with North African populations, especially with several early Upper Egyptian and contemporary Lower Nubian groups. Despite these similarities, however, the Kellis assemblage remains relatively distinct in relation to the comparative groups. This is consistent with a geographically isolated population experiencing limited gene-flow.

Zeinab S. Hashesh

Seasonality of Death at the Heit el Ghorab Cemetery, Giza

Though the reason for differing orientation of burials may vary, the most common explanation is that Egyptian burials were aligned with the sun. If we assume that graves were aligned intentionally according to the position on the horizon of the setting sun, then the incongruence in orientation are quite possibly due to the different seasons during which the deceased were interred. The present study is a presentation of the results of the investigation of solar burial orientation at the Heit el Ghorab (HeG) cemetery in Giza that was part of the author's

recently submitted PhD thesis. In the HeG cemetery, more adult males than women and children were interred during the autumn and/or spring, while we find a much higher incidence of young children interred during summer, compared to the number of adults in the same season. Surprisingly, the number of interments during the winter season was comparatively low for all age groups. This is interesting as the data differs significantly from that published for the Secondary Cemetery in the mastaba of Ptahsepses in Abusir, which is a cemetery of similar type and close in time to the HeG cemetery. This paper will outline the percentages of interment for both cemeteries, correlated with age, sex and some pathologies, and suggest possible explanations for the disparity in orientation between these different groups.

Tina Jakob

Health and Disease in Meroitic Al Khiday 2, Central Sudan (P)

This contribution aims to assess the health and disease of a small skeletal population from the multi-period site of Al Khiday 2 in Central Sudan. Situated on the western bank of the White Nile, 35 km south of Khartoum, the site has been excavated since 2005 and has proved to be one of the southernmost examples of Meroitic burials in the Nile Valley. Radiocarbon and artefact dating has established that the Al Khiday 2 Meroitic cemetery was in use ca. 100 BC to 200 AD. Macroscopic and radiographic analyses of the 35 individuals so far excavated allows us to draw a detailed picture of how an adverse and increasingly arid living environment may have led to compromised health. While there was an even number of male and female individuals, more than half of the population died before reaching adulthood and this might indicate a high level of stress and ill adaptation leading to the premature death of parts of the population. Health stress was also portrayed in low adult stature with an average of 149 cm for females and 157 cm for males. Equally, evidence for non-specific infectious disease and maxillary sinusitis was common in adults and non-adults. Dental disease indicated a diet high in carbohydrates causing high dental caries rates. Trauma was found in form of healed fractures, mainly to the ribs and small bones of the hand

and feet. These palaeopathological findings are compared to data from other contemporaneous and medieval skeletal populations from Sudan to place the individuals from Al Khiday 2 into their bioarchaeological context.

Rabab Khairat, Markus Ball, Chun-Chi Hsieh Chang, Raffaella Bianucci, Andreas G. Nerlich, Martin Trautmann, Somaia Ismail, Gamila M.L. Shanab, Amr M. Karim, Yehia Z. Gad & Carsten M. Pusch

First Insights into the Metagenome of Ancient Egyptian Mummies Using Next Generation Sequencing

Next generation sequencing (NGS) technology was applied for the first time on Egyptian mummies to test the degree of information, which could be gained. Seven NGS datasets obtained from five randomly selected Third Intermediate to Graeco Roman Period Egyptian mummies (806 BC-124 AD) and two unearthed pre-contact South-American skeletons were generated and characterized. The datasets were compared to three recently published NGS datasets obtained from cold climate regions, *i.e.* the Saqqaq, the Denisova hominid and the Alpine Iceman. Analysis was done using one million reads of each newly generated or published dataset. Blastn and Megablast results were analyzed using MEGAN software.

The NGS datasets showed variable contents of endogenous DNA harboured in tissues. Three of five mummies displayed a human DNA proportion comparable to the human read count of the Saqqaq permafrost-preserved specimen. Furthermore, a metagenomic signature unique to mummies was displayed. Utilizing a 'bacterial fingerprint', discrimination among mummies and other remains from warm areas outside of Egypt was possible. Plant kingdom representation in all mummy datasets was distinct, especially in comparison with cold climate samples datasets, and could be partially associated with their use in embalming materials. In addition, NGS data encompassed *Plasmodium falciparum* and *Toxoplasma gondii* DNA sequences indicating the presence of malaria and toxoplasmosis in these mummies.

We demonstrate that endogenous ancient DNA can be extracted from mummies and

serve as a proper template for the NGS technique thus opening new pathways of investigation for future genome sequencing of ancient Egyptian individuals.

Ghada Al-Khafif

Assessing Diet Quality Changes through the Elemental Analysis of Ancient Egyptians Bones (Qubbet el-Hawa Cemetery) Using LIBS

Calcified tissues as bones and teeth are considered to be the biological 'archives' of living organisms as they can contain the indicators of their diet and the environmental conditions during their life. Bone chemistry studies *e.g.* trace elements promotes the understanding of archeological populations dietary behavior. In general, social, economic and belief systems of a society can be reflected in food.

Benefiting from the advantages of LIBS technique, trace elements analysis of the archeological bones excavated from Qubbet el Hawa cemetery, Aswan is conducting in order to estimate the Sr/Ca ratio of two samples belonging to the middle class and dated to the Middle Kingdom and the First Intermediate Period. The main argument against diagenesis was the significant correlation between bone Sr/Ca and Ba/Ca ratios. The Sr/Ca of the First Intermediate Period is significantly lower than that of the Middle Kingdom which was interpreted in the light of the point of view concerning the use of Sr/Ca ratio in paleodiet reconstruction as an indicator of the extent of calcium biopurification and not as an indicator of the plant/meat ratio. It is suggested that the very low Sr/Ca of the First Intermediate Period may be interpreted as a result of the introduction of unusual sorts of foods with low strontium or high calcium levels during the years of famine. Another possible cause is the consumption of cereals imported from neighboring nomes. These cereals may differ in their strontium content according to soil type. The Sr/Ca ratio of the Middle Kingdom can be considered as a reflection of an amelioration of political, climatic, economic and social conditions. Thus, the Middle Kingdom Sr/Ca ratio reflects the consumption of typical Dynastic diet with no need for exceptional sorts of foods, nor for the import of cereals.

Iwona Koziarzka-Ogunmakin*A Case of a Metastatic Carcinoma in an Old Kingdom Skeleton from Saqqara*

Bone tumours, both benign and malignant, have been identified in a number of ancient Egyptian skeletal remains. Another case comes from Burial 554 uncovered in one of the shaft-tombs in the Old Kingdom necropolis at Saqqara-West. This disturbed burial comprised the skeletal remains of a female, aged 50-60 years at the time of death. Macroscopic examination of the remains revealed an extensive osteolytic lesion in the neurocranium, with osteoblastic reactions at the margin, and further smaller perforations surrounding the lesion. Such lesions perforating both cortical tables are characteristic of metastatic carcinoma, a malignant neoplasm that could spread to bone directly from an adjacent soft tissue tumour, or metastasise from a cancer of internal organ. In the present case, the bone tumour is likely to be a metastasis from carcinoma of the brain; however, a metastasis from carcinoma of the breast should also be considered. The latter has been identified as the most common cause of metastatic bone disease in females, according to modern clinical studies.

Roger Lichtenberg*Study of Growth Arrest Lines Upon Human Remains from Kharga Oasis*

Since 1982, almost 300 mummies and far more numerous skeletal remains belonging to 3 cemeteries of Kharga oasis (Douch, Ain el-Labakha and El-Deir), have been studied through radiography at the sites. The study of Growth Arrest Lines (GAL) was part of the whole work. These lines occur inside bones after a long disease or periods of malnutrition. It is possible to see them only by X-rays or with a microscope. The research was initiated after I learnt of P.H.K. Gray's work.

Gray found about 30 % of GAL in mummies. From the start, at Douch, it was astonishing to find almost twice the number of GAL. It was the same at Labakha and Deir, with some variations. GAL are undoubtedly connected with the standard of living, so they seem to be an excellent criterion to evaluate health and social level inside populations.

Sandra Lösch, Estelle Hower-Tilmann & Albert Zink*Mummies and Skeletons from the Coptic Monastery Complex Deir el-Bakhit in Thebes-West, Egypt (P)*

Deir el-Bachit is the largest known Coptic monastery complex in Thebes-West. It dates to Late Antiquity, between the 6th and the beginning of the 10th c. AD. So far, at least 26 individuals from the site were analysed anthropologically. 22 of them were excavated directly in the necropolis, the other four are special burials that were found at other locations nearby. Most individuals from the necropolis are male adults. There are two categories of human remains: 'mummified' and 'skeletonised.' The differences are probably due to social stratification. A substance similar to bitumen was found in the mummies. In the Coptic era, resin containing oils and bitumen were thought not to be used any more. Several special burials were found – one was an approximately three years old child who was found enclosed within a wall. Another was a juvenile or young adult female who was found in the vault of an abandoned granary. She was most likely pregnant and fell victim to a violent crime. This is indicated by the bones of a six months old foetus and an intravital skull fracture. She was not contemporary from the time the monastery was cultivated but was later deposited here.

Samia M. El-Merghani*Bones Reveal Secrets: Ramose, an Egyptian Story*

Eternity was the dream of all the ancient Egyptians, not only for wealthy people but also for low-income ones. Mummification was a way for the wealthy to preserve their bodies to reach eternal life, while the common people were buried in the dry/hot sand in desert, which was also their way to preserve their bodies to reach the eternal life.

The study of human bones is an important source for information about the ancient population. From the traditional study of any skeleton, we are able to determine the sex of the person and estimate the age at the time of death, cause of death and study of certain diseases. Moreover, some studies give attention

to the effect of stress and hard work in human skeletons.

But what of the common, poor people who were buried in the desert sand? Can we expect what were his dreams? What was the future of his children? Was education one of the human rights for the common people in ancient Egypt? Was there social mobility?

This paper tries to answer these questions by studying the skeletal remains of a commoner: Ramose.

**Andreas G. Nerlich, Stephen Buckley,
Joann Fletcher, Sara Caramello &
Raffaella Bianucci**

An Interdisciplinary Study of the Mummified Remains of the 18th Dynasty Official Nebiri (P)

Following initial work by the University of York's Mummy Research Group with the University of Turin and *Fondazione Museo delle Antichite Egizie* of Turin in 2007, a long-term research project was set up to investigate the museum's mummified remains in detail.

In addition to the ongoing examination of the 18th dynasty tomb assemblage of Kha and Meryt, the Turin-York project has also begun to study other 18th Dynasty individuals, including Nebiri, Chief of Stables during the reign of Thutmose III (1479-1424 BC). His tomb (QV 30) was uncovered during the excavation campaign carried out by Ernesto Schiaparelli in the Valley of the Queens, Luxor, between 13th February and the end of March 1904, and although most of the body was missing, Nebiri's mummified head and canopic equipment were recovered from the tomb. Currently displayed in the *Fondazione Museo delle Antichite Egizie* of Turin (Room 3), they are now the subject of multi-disciplinary examination, the initial results of which are presented in this paper.

Small samples of skin were taken from the left parietal area of Nebiri's head (Suppl. 5109) and from the remaining linen wrappings at the left side of the neck. Small samples of linen wrappings and soft tissue were also taken from one of the four limestone canopic vessels (Suppl. 5111/01-02), each topped with a human-headed lid and inscribed with the name of one of the Four Sons of Horus. Since the jar inscribed for Hapy, guardian of the lungs, was partly broken, it allowed direct access to

sample two tissue biopsies and the associated wrappings.

In order to evaluate the conditions of tissue preservation, we first subjected a small tissue sample of presumed lung to histological examination. Following careful rehydration and embedding into paraffin wax, typical alveolar structures were seen, with some diagenetic alterations but still sufficiently well preserved to identify the pulmonary tissue structure. This contained occasional small deposits of anthracotic coal pigment, as frequently seen in pulmonary residues of ancient Egyptian mummies and most probably due to the inhalation of particles from an open fire. In addition, a very few small spots of haemosiderin deposits suggest the presence of siderophages, as seen in cases of chronic cardiac insufficiency. Lastly, the identification of intra-alveolar proteinaceous exudation might indicate that Nebiri also experienced acute heart failure of whatever cause.

The samples from Nebiri's head and canopic jar were also analysed by gas chromatography-mass spectrometry (GC/MS) in order to chemically characterise the organic constituents used in the embalming process of this non-royal 18th Dynasty individual. The suggestion that some non-royal individuals were subject to minimal, if any, mummification during the mid-18th Dynasty makes this aspect of the study of particular interest, and significant for understanding funerary practices at this time.

Following sample extraction and derivatisation procedures, the samples from both the head/neck area and from the canopic jar containing the lungs were then analysed using GC/MS. This revealed a complex mixture of an animal fat or plant oil, a balsam/aromatic plant, a diterpenoid (coniferous) resin and a triterpenoid resin. The inclusion of such non-native imported resins in the embalming materials employed for Nebiri is consistent with the high quality preservation of his head and the fact he had been eviscerated.

Andreas G. Nerlich

Old and Middle Kingdom Cemeteries of Dashur: Preliminary Paleopathological Investigations

The anthropological and paleopathological examination of the human remains from cemeteries provide deep insights into the population structure, its living conditions

and diseases. In an ongoing intense collaboration with Nicole Alexanian and Stephan Seidlmayer, German Archaeological Institute Cairo and Free University Berlin, in the last few years I had access to a series of burials from the Old and Middle Kingdom cemeteries in the area of Dashur that extend east of Snefru's Red Pyramid. Location and type of shaft tombs suggest that the Old Kingdom burials may have harboured inhabitants from the Red Pyramid town while the Middle Kingdom tombs were presumably that of members of the residence elite.

The excavations revealed 38 individuals from Old Kingdom burials, 12 from Middle Kingdom tombs and two Greco-Roman burials. All remains revealed good to even excellent preservation, with fairly complete skeletons.

The anthropological analysis showed in both populations a fairly balanced ratio between males and females, with an average age of death between the ages of 20 to 30, with few immature individuals. A significant number of various diseases was detected which included a broad range of lesions, such as trauma, metabolic alterations, joint and vertebral degeneration, and dental pathologies. In two cases malignant tumours were identified and three individuals showed severe chronic osseous tuberculosis with typical angulation of isolated vertebral bodies. This may suggest a significant infection rate by this chronic infectious disease in the small population.

Two individuals from the Middle Kingdom were only 13-16 years old and one Middle Kingdom burial was a child of only seven to nine years. The fact that these persons had despite their youth the right to be buried in single shafts close to the pyramid of Amenemhat II shows that they inherited their social status.

**Annie Laurie Norris, Lana Williams,
Tosha Dupras & Sandra Wheeler**

The Use of Multiple Tissues in Stable Isotope Analysis: An Example from the Dakhleh Oasis

Stable isotope analysis is routinely used in bioarchaeology to investigate a variety of topics, including diet reconstruction, weaning behavior, and migration. These studies typically

utilize bones and teeth, as these tissues are the most likely to survive in the archaeological record. Where exceptional preservation exists, as can be found in Egypt, soft tissues may also be available for inclusion in isotopic studies. Analyses of stable isotopes from different tissue types within the same individual reveal disparate isotopic values for a variety of physiological and biological reasons, and these differences have been used to study a number of topics, primarily diet variation. However, the effects of growth and development on these values are not well understood, and large samples of well-preserved juveniles are rarely available for analysis. The skeletal collection of the Kellis 2 cemetery (c. 100-360 AD), Dakhleh Oasis, Egypt, presents a rare opportunity to investigate such issues, due to the superb preservation of both adult and juvenile remains. Utilizing data collected from the remains of 52 juveniles, this project examines how the distances between ^{13}C values in bone collagen, skin, hair, and nail vary between different age groups. Although spacing between tissues was found to vary across all age categories, the distances between collagen and hair, collagen and skin, and collagen and nail are all substantially greater in the older juveniles than those in the younger age categories. Possible physiological, developmental and social factors that may lie behind the observed variation are presented. This research shows that, in addition to the general dietary variations that may be detected in multiple tissues, an individual's age must also be considered as a potential factor in variations of inter-tissue spacing.

Anna Pieri, Daniel Antoine & Renee Friedman

Dwarfism at Hierakonpolis: Two New Cases from the Predynastic Elite Cemetery (HK6)

Several examples of ancient Egyptian Achondroplastic dwarfs have been recovered from archaeological excavations. During the 2011 and 2012 seasons, two individuals with severe skeletal dysplasia, similar to Achondroplasia, were found in the Predynastic Elite cemetery (HK6) at Hierakonpolis in Upper Egypt. Achondroplasia is characterised by a shortness of stature and a proportionally large head with a protruding maxilla and a very prominent mental eminence with wide mandibular rami. Changes also in-

clude short limbs with enlarged epiphyses, small fingers and a reduced thorax and pelvis. The mid-shaft diameter of the long bones usually remains unaffected, resulting in short but robust bones. The two individuals described here presented most of the skeletal changes associated with Achondroplasia but the mid-shaft diameter of the long bones was also reduced, resulting in what appear to be miniature bones. The long bone morphology of the Badari dwarf found by Brunton, casts of which are curated at the Natural History Museum in London, shows similar changes to the Hierakonpolis dwarfs: small limbs with reduced mid-shaft diameters. In contrast, two other incomplete skeletons held at the Natural History Museum from the mortuary complex of Semerkhet at Abydos have large mid-shaft diameters and appear to show the more classical form of Achondroplasia. Additional research is ongoing but the examples from Hierakonpolis may have been affected by a different form of dysplasia or may simply reflect a previously unnoticed variation in Achondroplasia. The presence of two examples of such a rare condition in one elite cemetery once again highlights the importance dwarfs appear to have played in ancient Egyptian society.

Dario Piombino-Mascali, Lidija McKnight, Stephanie Panzer, Wilfried Rosendahl, Tadas Rutkauskas, Algirdas Tamosiunas, Ramunas Valancius, Rimantas Jankauskas

The Egyptian Mummy from Kaunas: Is it a Fake?

Important findings have recently been revealed concerning a mummy in the collection of Marija Rudzinskaite-Arcimaviciene, the first Lithuanian Egyptologist. From 1922 onwards, she lectured at the Vytautas Magnus University, Kaunas. As a consequence of her three visits to Egypt during the early 20th century she amassed a small collection of Egyptian objects which she bequeathed to the National Museum of Art in 1940. The collection included a mummy acquired from the Egyptian Museum in Cairo during her 1924 trip, together with the inner coffin, but without a lid. Although the exact provenance of the artefact is not known, it was reported to come from Thebes. According to Rudzinskaite-Arcimaviciene the coffin was as-

sociated with the mummy, and in the coffin inscriptions, the individual concerned is referred to as a singer of the god Amun. However, one cannot be absolutely sure of this, as there are no inscriptions associated with the mummy itself. The coffin has been approximately dated to the 21st Dynasty or slightly later (circa 1050-900 BC) although the exact date has not yet been established. The name of the owner is not mentioned in the coffin inscriptions. Seemingly, it was made for any woman of rank rather than for a specific individual. The owner's name may have been recorded on the coffin lid; however, this has now unfortunately been lost or at least separated from the base at some point in history. During conservation attempts of the mummy in 2011, a complete CT investigation was carried out. This revealed no evidence of craniotomy, as well as more than 24 ribs indicating that more than one individual was represented. Furthermore, post-mortem tooth loss was reported with the dislodged teeth visible intracranially and within the chest and abdominal area. The skeletal elements represented appeared embedded from the head to the pelvis and at the proximal femoral level within a inhomogeneous mass consistent with sand. Very little soft tissue was visible and disarticulations were also noted. Radiocarbon dating obtained from analyses of linen removed from the wrappings was compatible with the archaeological dating of 21st Dynasty (2843 a BP +/- 27,1 = cal BC 1041-941). The authors propose two possible hypotheses: either the body was wrapped when the body had become partly skeletonized, or that ancient linen was reused to produce a fake mummy at some point in history to be sold as a tourist souvenir. Scientific analysis of this mummy is ongoing in the hope of providing clarification to this mystery.

Mindy C. Pitre, Erika L. Davin, Holly J. Hunold, Nancy Lovell & Maria C. Gatto

A Possible Case of Infantile Scurvy at Nag Qarmila, Egypt (P)

The skeleton of a 1 year +/- 4 month old child was recovered from the Predynastic layers of a settlement area at the site of Nag Qarmila in Aswan, Egypt. Although no indication of cause of death was observed, some abnormally porous

areas were noted on the humeri, radii, femora, greater wings of the sphenoid, maxillae, mandibular rami, and zygoma. While difficult to discern between normal and abnormal porosity in woven bone, the porotic lesions in this case penetrate the cortical bone, and on long bones extend well beyond 40 mm from the metaphyses, rendering a diagnosis of abnormal porosity possible. Such lesions have been attributed to infantile vitamin C deficiency (scurvy) as well as to other conditions caused by depleted fetal and maternal stores of vitamins and nutrients. Suffering from a condition such as scurvy during the first years of life would have led to a compromised immune system and may have contributed to this child's early death.

Moheb M. Shaaban & Tamer G. Rashed

Oral Health of the Ancient People of Dakhleh Oasis, Egypt (P)

Dental health is an important indicator of oral health and of general health. The focus of this paper is the assessment of the oral health status of a sample population of the Dakhleh Oasis, Upper Egypt. This study group consisted of 198 skulls (97 males and 101 females) and 50 mandibles. The sample was recovered from Ein Tirghi cemetery, and dated back to 1070-404 BC. The assessment indicated generally moderately poor oral health. Carious dentition was moderately high in the sample (51.1%), with almost equal incidences for both males (48%) and females (51.9%). As expected, this defect was frequent in posterior teeth. On the other hand, alveolar abscessing was observed in 44.4% of the sample, with males had significantly higher incidence (56.8%) than females (43.12%). Dental attrition among the Dakhleh sample was considerably high (87.8%) with equal incidences for males (50%) and females (50%). Similarly, incidence of periodontal disease was high (92.9%) in the population with almost equal incidences for males (48.8%) and females (52.1%). Consequently, the observed incidence of tooth loss was also considerably high (64.1%), with males had significantly higher incidence (55.1%) than females (44.8%). Occupational stress was not considerable as observed by the patterns of dental attrition among the Dakhleh sample. Only 26% of the individuals showed evidence of using dentition as a tool, with males had higher incidence (58.5%) than

females (41.5%). On the other hand, childhood stress was indicated in the individuals from Dakhleh, with 27% having enamel hyperplasia. The incidence of the defect was somewhat higher among males (51.8%) than females (48.1%). Calculus was also detected in the sample. The overall incidence was 45.9% with no sex difference observed. These results indicate a population with a level of oral health that uses the dentition as a tool and consumes diet that contains abrasive material and high proportion of starchy foods.

Ladislava Horackova & Frank Rühli

Human Remains from the Tomb of Meryneith at Saqqara

The tomb with bones studied belonged to an 18th Dynasty high priest at the temple of Aten in Memphis named Meryneith and his wife. More substantial skeletal remains from burials were discovered in 2002 in the underground shafts and mummy chambers of shaft I (a labyrinth of subterranean rooms and niches) and shaft II (Late Period shaft complex). Skeletal remains found in the individual chambers and niches are incomplete; they are rather isolated bones. The deceased were probably buried here for centuries, so dating them is very difficult. Paleopathological changes were found from nearly all main categories of diseases except for malignant tumours. The most often occurring paleopathological condition of the spine was diagnosed as deforming spondylosis, forming osteophytic rims on the vertebral body margins. Almost all found fractures tended to heal well, except for six (from a total of 66 found fractures) which were complicated by osteomyelitis and/or posttraumatic arthrosis, and two fractures affected by posttraumatic ankylosis. One case has been found of healed polytrauma, complicated by posttraumatic osteoarthrosis and osteomyelitis. As far as congenital anomalies are concerned, we have focussed on the occurrence of spondylolysis, sacralization of the last lumbar vertebra, and spina bifida. Three cases of internal frontal hyperostosis (resulting from endocrine diseases) have been found in Meryneith's burial complex. Some inflammation processes and metabolic diseases have also been diagnosed. A relatively high frequency of dental cysts has been found in the permanent dentitions. The

frequency of some post-cranial bone variants has been studied, too. All obtained knowledge forms an information source for the comparison of demographic and anthropometrical data of similar Egyptian burial-grounds.

Frank Rühli, Michael Habicht & Abigail Bowman

Canopic Jars: A New Source for Old Questions

Canopic jars and their contents are a major part of the ancient Egyptian mummification tradition. Surprisingly, they have been widely neglected for modern paleopathological analyses. Very few histological and CT based studies exist. With advances of diagnostic imaging as well as molecular technologies, the content of canopic jars shall become a major research object.

The aim of this presentation is two-fold:

- 1) The known filled canopic jars currently stored in Egypt will be presented, such as the canopic equipment of Heteperes I (4th Dynasty), Hor I (13th Dynasty) or Kia (18th Dynasty);
- 2) We raise some specific research questions that hint at the enormous potential of canopic jar contents for future analyses of human remains in Egypt, including tissue identification and pathologies by CT and histology or kinship analyses and matching with 'corresponding' mummy by molecular techniques.

Mohamed Saad & Michaela Binder

Bioarchaeology of the Berber Meroitic Cemetery

This paper aims to present the first results of the bioarchaeological analysis of human remains excavated by the National Council of Antiquities and Museum of Sudan (NCAM) at the Meroitic cemetery at Berber (2nd-Third c. AD), Central Sudan. The site, located on the east bank of the Nile, was investigated prior to construction work in 2009 and 2012, with 34 single and multiple burials of adults and children being excavated so far. Funerary customs employed in the cemetery including both

extended and contracted burials potentially suggest cultural changes occurring in the area during the period of occupation of the site. Applying a biocultural approach, we report demographic and palaeopathological results in combination with contextual archaeological data in order to provide an insight into living conditions in this region during the middle and later Meroitic period. Several parameters, including low mean statures and evidence of infectious disease point towards the presence of significant environmental pressures affecting the people living at Berber.

This research project represents the first output of recent efforts undertaken by NCAM with the support of the British Museum and the Institute for Bioarchaeology to establish bioarchaeological research and training of local specialists in Sudan. All analyses were carried out within the newly created research facilities at the National Museum in Khartoum, Sudan.

Lisa Sabbahy

A Decade of Advances in the Palaeopathology of the Ancient Egyptians

The study of human remains from ancient Egypt has made great strides in the last decade, for the most part due to advances in medical engineering and biomolecular techniques. Ancient DNA has been retrieved from bacteria, viruses and parasites, giving specialists an entirely new method for recognizing disease. For example, this has totally changed our perspective on tuberculosis in ancient Egypt, not only concerning the extent of its presence in the ancient Egyptian population, but in identifying the specific Mycobacterium strains causing the infection. Recent CT scan studies have identified atherosclerosis and heart disease as a significant problem among the upper class of ancient Egypt, particularly the priestly families. Also, the question of whether or not cancer is an 'old disease' has been brought up again because of the recent MDCT identification of metastatic prostate cancer in an Egyptian mummy. This paper will present an overview of recent discoveries in ancient Egyptian paleopathology, made both in medical studies and excavations in the field.

Bonnie M. Sampsell*Resolving a Mummy Mismatch (P)*

The Wayne County Historical Museum in Richmond, IN (USA) owns an Egyptian mummy in a decorated wooden coffin. The coffin and its mummy were purchased by the museum's founder, Mrs. William Gaar, from the Cairo antiquities dealer, E. Hatoun, on her trip to Egypt in 1929. The design of the coffin allows it to be dated to the early 22nd Dynasty with confidence. Coffins of this type were made in great quantities for the priestesses at the Theban Temple of Amun (Karnak). The mummy has no distinguishing mummification features that would allow it to be dated. X-rays revealed that the bones are disarticulated and disarranged. An experienced Egyptian physical anthropologist studied photos of the skull, which is unwrapped, and concluded that the mummy belonged to a man. Mis-matches of gender or period between mummies and their coffins are fairly common in museums around the world with many of them arising from efforts of 19th Century dealers to make up attractive combinations. Two lines of evidence now suggest that the Wayne County combination of coffin and mummy was ancient: first, the presence of an intact set of tenons shows that the coffin was opened carefully (probably by employees at Hatoun, rather than by tomb robbers) and second, carbon dating of samples of the mummy and its bandages are consistent with the date of the coffin's manufacture arguing against a reburial or recycling of funerary goods.

Eugene Strouhal*People of Sayala (Nubia) During the Late Roman-Early Byzantine Period*

The site of Sayala was excavated by the Austrian mission to Egyptian Nubia as part of the International Action of Safeguarding Nubian Monuments of UNESCO. Beside several archaeological publications, an anthropological one concerning the C-Group and Pan Grave Culture was published by Strouhal and Jungwirth (1984). After a delay caused by political and professional reasons, a second volume dealing with Late Roman-Early Byzantine Period has been currently prepared; this paper presents some of the results.

Sergey V. Vasilyev*Craniological Study of Medieval Copts from Deir el-Banat necropolis, Egypt. Preliminary Results (P)*

The study focuses on the skeletal remains of the early medieval Copts from the monastic site of Deir el-Banat in Fayum Oasis (Egypt). The monastery of Deir el-Banat is located south-west from Faiyum and functioned from the 4th to 8th c. AD. Beginning from the early Middle Ages the most of the Copts lived densely near monasteries and monastic cemeteries were common for the local Christian population, where they were buried, often with lavish textiles. In the Middle Ages the tombs of the necropolis near the ruins of Deir el-Banat monastery were looted and damaged and the moving sands turned this cemetery almost into ossuary. Our research was conducted in conjunction with the Centre for Egyptological Studies of the RAS in 2003- 2010.

Fifty-three skulls (29 male and 24 female) were studied according to the full craniology programme. This research will allow us to understand whether the sample consists entirely of the indigenous population or if any migration had taken place there. In this paper we present the results of the study of the authentic Coptic skulls. One case of trepanation in the sagittal suture and one case of chopped wounds, also in the sagittal suture were scored. In both cases individuals stayed alive and lived after injury. A single case of strongly neglected otitis, which caused most likely the total deafness, was noted. The porosis of upper palate, which more likely is due to a lack of calcium in the diet, was scored very often. Three cases of the syphilitic plaques, few and solid, on the skull were identified. In all three cases, if there was a syphilitic disease, individuals died in the early stage of the disease's development.

The male skull from the Deir el-Banat necropolis was medium size in length, width and height, dolichocranial. Most skulls were ovoid. The nose is rather short and enough narrow, in terms of symotic width and height - strongly protruding. The parameters of the frontal and occipital bone are mid-level. With a relatively small bizygomatic diameter, the face has middle width and height sizes. The shape of the orbit is close to the round with lowered lateral edge. The naso-malar and zygo-maxillary an-

gles are small, indicating that means that horizontal face profile is expressed.

The female skull from the same cemetery is long, medium width and height, mesocranial, but has a tendency to dolichocranial ones. The skull shape is the most often ovoid, though rhomboid skulls can be seen. Sizes of frontal and occipital bones are medium at the world scale. The face is more narrow, bizygomatic diameter is small, the upper facial height is middle-sized. The nose is narrow, rather short, and strongly protruding. The orbits are small in size and round in shape. The naso-malar and zygo-maxillary angles demonstrate expressed horizontal face profile.

Thus, we can say that studied craniological material belonged to Caucasoid and, most likely, a homogeneous group. Further analysis of the material is related to the comparative studies that will help us to understand the origins of this group.

Paula A Veiga, Claudia Rodrigues-Carvalho & Sabina Malgora

Human Remains Found in TT 37: A Preliminary Survey (P)

The communication comprises the first overview of the human remains recovered in the funerary complex of Harwa (TT 37) and Akhimenru (TT 404). It is a result of two short stays on the spot (2009 and 2012). The work was carried out to evaluate the condition of the remains and possibilities for scientific studies. A preliminary survey, together with a rough evaluation of the minimal number of individuals, was carried on. The guidelines to follow in the next researches were also established. The study of the human remains from excavations in the funerary complex of Harwa and Akhimenru is mainly aimed at the archaeological needs of the research in the field above all absolute dates but can also provide important information about diseases, mortuary practices, and activities of robbers through the ages.

Tamer M. Abdel Wahab

Contribution of Dental Studies to the Bioarchaeology of Ancient Egypt (P)

Anthropologists often obtain data on health, disease, and death from ancient populations using

the methods of palaeopathology, the study of ancient disease. Dental palaeopathology, as a sub-discipline of palaeopathology, can provide vital insights into the lives of past peoples. It can add a new dimension to the knowledge we can gain about the past. In skeletal remains of ancient populations, evidence of dental pathology is often well preserved in the form of lesions on the teeth. Meticulous, detailed recording of these lesions provides baseline data on which a realistic assessment can be made of the probable impact of dental diseases and its sequelae on health of these earlier populations. Through dental studies palaeopathologist are able to extract an extensive record of the life of an individual, presenting insights into the stresses, diets and occupations which an individual and or population may have dealt with during their lives.

The purpose of the current paper is to show the validity of different aspects of dental studies as enamel defects, dental wear, dental calculus, dental stress indicators, occupation and dietary reconstruction in the life reconstruction and bioarchaeological study of the ancient Egyptians.

Tamer M. Abdel Wahab

Keeping Ahead of Time: Practicing Dentistry in Ancient Egypt (P)

The torment of toothache is something all the humans have in common. Dentistry has been around for almost as long as people have had teeth and dental problems, nevertheless evidence for dentistry in archeological context is an entirely different matter. Judging from existing archaeological evidence the antiquity of dentistry can be divided into three classes:

Class I: consist of the therapeutic or purely medical methods of combatting dental affections;

Class II: convenience retentive procedures or that type of dental art which has for its object the retaining of natural dental organs when the ravages of disease would otherwise have caused their loss;

Class III: is the highest grade of development reached in ancient dentistry: it introduces true dental treatment and prosthesis, that is, the art of applying solid medical and bio-

mechanical bases for treatment and substitution for dental organs.

According to a systematic review of all studies performed on Egyptian mummies published since 1977 when computed tomography was first applied to ancient Egyptian mummies, 18 percent of all mummies in case reports showed a nightmare array of dental diseases (worn teeth, periodontal diseases, abscesses and cavities). The current research addresses the questions of whether a dental profession existed in ancient Egypt and gives examples of the archaeological evidence of dentistry in the ancient Egyptian antiquity with special emphasis on the medical and biomechanical aspects of the dental treatments compared to modern dental practice.

Afaf Wahba

The Teti Cemetery Excavations

The Teti funerary complex is located in Saqqara to the northeast of the step pyramid and the funerary complex of King Djoser. The site has been under excavation by an Egyptian mission directed by Zahi Hawass and Hakim Karar since 2006, and to date approximately 100 burials have been unearthed, ranging in date from the Late Period (664-332 BC) in the later phases of the cemetery, to the reign of king Teti (c. 2345-2181 BC), the founder of the 6th Dynasty, in the phase related to the Old Kingdom structures. Some of these burials were *in situ*, and some were disturbed by later activity at the site. The osteological analysis of the burials is ongoing.

In 2008, the team discovered a small pyramid in an area of the cemetery directly associated with the pyramid of King Teti. While a cartouche or other means of positively identifying the owner of this pyramid is yet to be found, it has been suggested that the tomb may be that of queen Sesheshet, the mother of King Teti and grandmother of the 5th Dynasty king Pepi I. Though the pyramid had been looted in antiquity, human remains and other funerary items were found in the sarcophagus still present in the burial chamber. This paper will cover the general findings of the Teti cemetery excavations as well as the burial thought to belong to the queen.

Roxie Walker, Salima Ikram & Betsy Bryan

An Extraordinary Interment Found in Early New Kingdom Luxor

In January 2011, Ms. Walker was asked by project director Betsy Bryan to clear a flexed burial from the industrial section of the Mut Temple complex at Karnak in Luxor. The ceramics close to the body indicate a late Second Intermediate or early 18th Dynasty date. Initial examination of the partly-exposed body indicated that it lay on its left side, the head to the North, facing North. The knees, although tightly flexed, were not to the front of the body and thus pointing approximately North, but actually pointing to the South. Over the following days, the body's posture became increasingly interesting, as expected elements (arm, shoulder, iliac crest of the presumed upper side) did not appear where one might have expected to see them. Unfortunately, work was interrupted by early closure of the excavation due to political developments in Cairo.

When we returned to the site in June 2011, the authors were able to fully excavate this individual, revealing that it lay in an unprecedented position, covered and surrounded by large amounts of pottery including sherds originating from Nubian-made pots). The position of the body and its arrangement allowed the authors to posit the individual's cause of death. The skeleton, much of it excavated *en bloc*, was removed to the site storehouse. Detailed analysis of this individual took place in early June this year, and the results of this work are to be presented at this conference.

Lana Williams, Annie Laurie Norris & Tosha Dupras

The Long and Short of It: Biomechanical Effects of Leg Length Disparity from a Tibial/Fibular Fracture

Although various treatments for major fractures of the leg are known from the preserved medical texts of ancient Egypt, most individuals who received care may have still suffered from long-term effects such as chronic pain, weakness, neuromuscular imbalance, or skeletal deformity. Among the skeletal remains recovered from the Middle Kingdom period

tombs (ca. 2055-1650 BC) in the flood plains of Deir al-Bersha, Egypt, one individual, an adult male approximately 35 years in age, exhibited a well-healed fracture of the tibial plafond and distal fibula. As a result of these fractures, however, the individual also suffered a 3.5 cm foreshortening of the left leg. Asymmetrical skeletal indications, from the calcaneae through to the first and second cervical vertebrae and the mandible, point toward a reduced dorsiflexion and continual circumduction of the limb when walking to compensate for the foreshortening of the leg. This form of movement would cause an abnormal gait and biomechanical correcting for oppositional torso shift to maintain balance through the gait cycle. In addition, the abnormal pelvic tilt caused arthritic changes in the hips and spine, knee and shoulder joint pain formation of bone spurs on calcaneae and could have possibly resulted in associated neck pain and misalignment of the temporal-mandibular joint. This case study emphasizes the need to investigate beyond the trauma of the fracture itself and holistically consider possible long-term behavioral and biomechanical effects that could result in a reduced quality of life.

Sonia R. Zakrzewski

Egyptian Bioarchaeology and Ancient Identities

Bioarchaeology in Egypt has frequently focussed upon one site or one aspect of health and disease. This paper develops from these excellent foundations, and demonstrates the potential of integrative research into skeletal and mummified human remains and its use in further developing and modifying current ideas as to social identities within Egypt. The paper debates the theoretical aspects of archaeological identity and personhood. Biological expressions of identity are analysed and discussed, and the interactions with Egyptological expressions of identity are then evaluated. Studies of Egyptian identity have included aspects of ethnicity, gender roles and disability. This paper attempts to demonstrate the biological expression and interplay of these multiple strands of identity within past Egyptian populations.

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