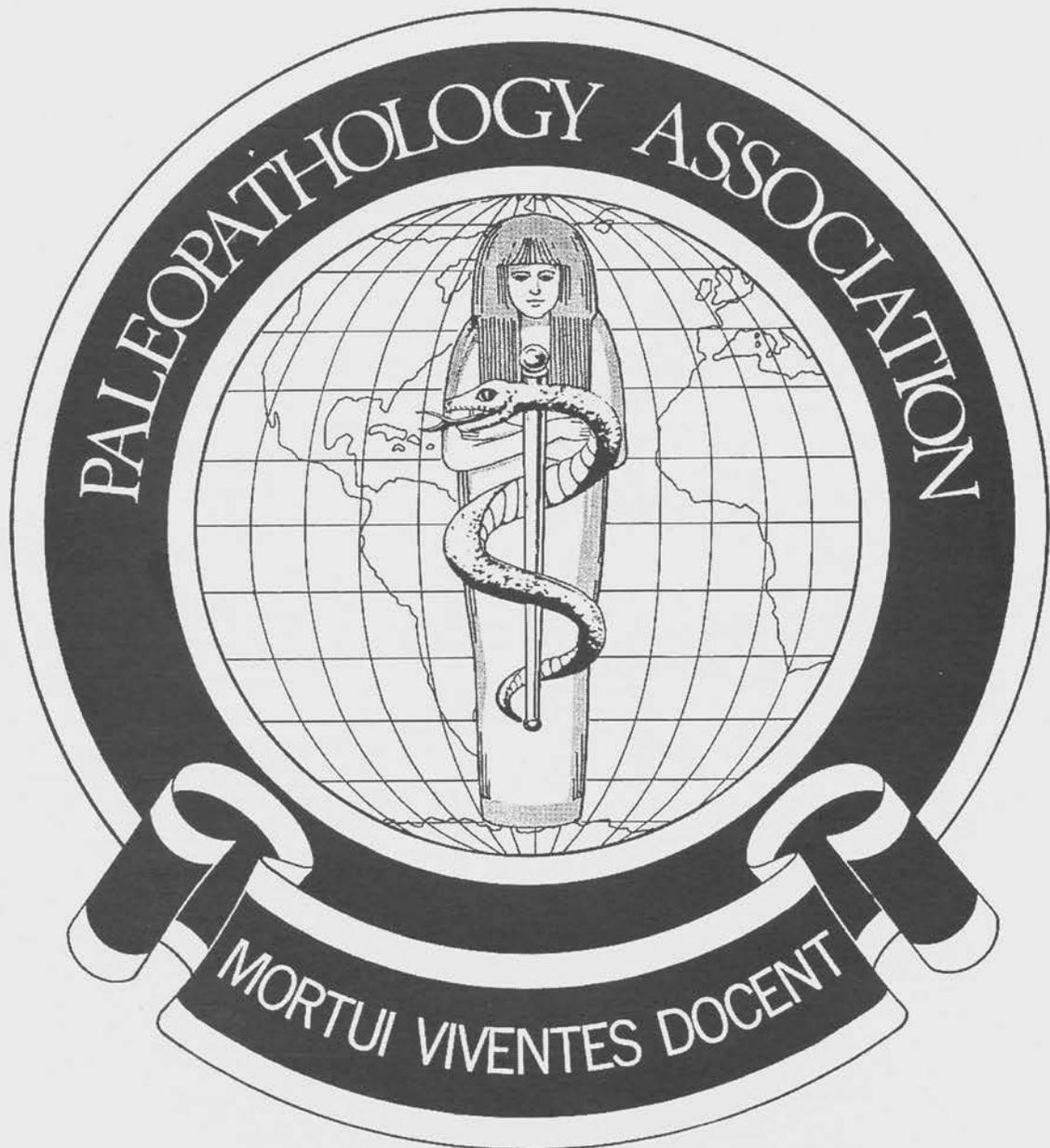


**PALEOPATHOLOGY ASSOCIATION**

**SCIENTIFIC PROGRAM**  
Twenty Ninth Annual Meeting



**9 and 10 April, 2002**

**BUFFALO, NEW YORK**

**PALEOPATHOLOGY ASSOCIATION  
29<sup>TH</sup> ANNUAL MEETING (NORTH AMERICA)  
BUFFALO, NEW YORK**

**SECTION 1: WORKSHOPS**

**DIFFERENTIAL DIAGNOSIS IN SKELETAL DISEASE**

Organized by Donald J. Ortner and David Hunt, Department of Anthropology, National Museum of Natural History, Smithsonian Institution

In collaboration with Dr. David Hunt, Don Ortner organized a morning workshop at the annual meeting of the Paleopathology Association in Buffalo, New York on 9 April, 2002, on the subject of "Differential Diagnosis in Skeletal Disease." Dr. Ortner's long time collaborator, Dr. Bruce D. Ragsdale, was unable to attend this year. After a brief introduction by Don, the 50 participants were invited to evaluate 17 cases of skeletal pathology and arrive at their own diagnostic conclusions. After this exercise, Don and Dave concluded the workshop by presenting their own descriptions and diagnostic opinions for each case. The cause of death was known for some of the cases, information which was helpful in forming a diagnosis of the skeletal pathology. The organizers stressed the importance of the pattern of distribution of lesions within the skeleton for reaching a plausible diagnostic conclusion. The major emphasis was on infectious diseases of the skeleton, with a particular focus on two closely related mycobacterial infections, tuberculosis (including skull, rib, spine, knee, and hip lesions) and leprosy. Two of the tuberculosis cases showed an atypical skeletal manifestation, illustrating the need for caution in placing too much emphasis on the classic, textbook descriptions of tuberculosis or any skeletal disease.

Other cases of skeletal pathology included possible echinococcosis (hydatid disease), normal metaphyseal porosity associated with growth, possible staphylococcus of the lower spine, adult and congenital treponematosi, septic arthritis, periostitis associated with ulcer, and possible histoplasmosis.

In preparing the cases for transportation to the meetings, Don and Dave were assisted by Mrs. Agnes Stix and Mr. Krishnan Nair, Department of Anthropology, Smithsonian Institution. The organizers also appreciate the loan of two cases of skeletal leprosy by the Department of Archaeological Sciences, Bradford University, England. These cases were from the medieval site associated with the Hospital of St. James and St. Mary Magdalene in Chichester, England. Ms. Hope Williams and Ms. Laura Bullen, graduate students in the Department of Anthropology, George Washington University, assisted with workshop set-up and repacking at the end of the session.

## PATHOLOGICAL PRESENTATIONS: HOW TO AVOID TRAUMATIZING YOUR AUDIENCE

Organized by Brenda J. Baker, Department of Anthropology, Arizona State University, and Elizabeth A. Miller, Department of Anthropology, University of California at Los Angeles

Contributors: Brenda J. Baker, Scott E. Burnett, D. Troy Case, Diana Dupuis, Rod Faccio, Anne L. Grauer, M. Cassandra Hill, Elizabeth A. Miller, Thomas Nielsen, and Sara K. Simon

This workshop invited the participants be the judges and pick on the Ph.D.s. The interactive workshop focused on aspects of presenting successful podium and poster presentations, through evaluation of purposely “pathological” presentations. Points to be addressed were drawn from the judging guidelines developed by the Student Concerns Committee for the Cockburn Student Prize. Themes covered in this workshop included (1) content, (2) organization, (3) effective use of graphics, and (4) presentation style. Participants were given copies of the judging guidelines and evaluation sheets on which to record their comments. Three podium presentations and three posters were critiqued. Each oral presentation was followed by a discussion of what was wrong and how to improve it. Viewing and evaluation of “pathological” posters was followed by a discussion of poster problems and how to avoid them. The workshop concluded with a vote on which “pathological” presentation should be awarded the booby prize!

### **Pathological Podium Papers:**

➤ Bones Baker: Bad to the Bone at Abydos, Egypt

Discussion Moderator: Case Study

➤ Anne-kylosis Grauer: Paleopathology of Skeletal Remains from Medieval British Cemeteries

Discussion Moderator: Spondylitis Simon

➤ Killer Miller: The Pirates of Nunivak: Bonked Heads and Raided Villages

Discussion Moderator: D. Capitation Dupuis

### **Pathological Posters:**

➤ Brainless Beth, Simple Simon, and Robot Rod: Anencephaly: Something Missing from the Archaeological Record?

➤ D. Troy Caseous, Snot E. Boneit, and Tumors Kneelson: Os Acromiale in Medieval Danes and Native South Africans: Separated Shoulders or Familial Fusion Failures?

➤ P. Hyperostosis Hill: Crooked Crania and Messed Up Metabolism: A New Slant

Poster Discussion Moderators: Bejel Baker and Dactylitis Dupuis

## SECTION 2: CONTRIBUTED PAPERS

### PHYSICAL ANTHROPOLOGY AND PALEOPATHOLOGY AT THE ANCIENT NECROPOLIS OF THASOS ISLAND IN GREECE

A. Agelarakis, Adelphi University

This paper reflects on updated demographic and paleopathologic data relevant to studies of the human skeletal remains recovered from the Classical necropolis of the ancient city of Thasos, in Greece. In the tradition of an ongoing investigation aiming to elucidate aspects of the human condition in antiquity at the Aegean island of Thasos anthropological archaeology studies were conducted focusing on physical anthropology and paleopathology. The results of this undertaking along with the rest of the archaeological record, further facilitate the decipherment, understanding and interpretation of the intricate web between the physical and social environments, as well as of aspects of the dynamics and organizational capacities of the Thasians.

### ANATOMY, PHYSIOLOGY, AND PATHOPHYSIOLOGY OF THE CIRCULATION OF THE CALVARIUM

Scott Aubry, Southern Illinois University

Despite the extensive body of literature focusing on the vascularization and regenerative capacity of long bones, there is almost nothing pertaining to the calvarial bones of the skull. This research focuses on the vascular anatomy and physiology of the calvarium, scalp, and dura mater in order to better understand the regenerative and degenerative changes of calvarial bones. Knowledge of both the unique vascularization of the calvarium, and the different angiogenic and osteogenic potential of different regions of the skull are important for understanding the pathophysiology of cranial lesions for differential diagnoses.

### A HISTORIC MILESTONE IN THORACIC SURGERY - THE ORIGINAL SPECIMEN OF THE FIRST THORACOPLASTY PERFORMED IN ZURICH (SWITZERLAND) BY FERDINAND SAUERBRUCH (1875-1951)

Thomas Böni and Frank J. Rühli, University of Zurich, Switzerland

The pre-antibiotic treatment of tuberculosis (TB) has been revolutionised since Hippocrates' (approx. 460-370 BC) initial air injection through the use of different approaches (limited rib resection, phrenicotomy, artificial pneumothorax, and high pressure air application). After early experiments by Carl Sprengler (1860-1937), Ferdinand Sauerbruch established thoracoplasty (*pleuro-pneumolysis thoracoplastica*) as the most advanced form of surgical treatment for pulmonary TB. By resecting multiple ribs and their intercostal musculature, this technique forced a total collapse, and therefore paralysis, of the affected lung parts with remarkable clinical relief. Our aim is to present a unique historic example of surgical treatment of pulmonary TB and to outline the major strategies to cure this disease, which is well present in the archaeological records. A macerated bone specimen (male, 60y, nr. 125, Galler collection, temporarily at the Natural History Museum in Basel Switzerland) was removed surgically during the first

thoracoplasty performed by Sauerbruch in 1911 at the Cantonal Hospital in Zurich. The patient's original autopsy report (written 14 years after his right-side thoracoplasty) with clinical and radiological background information is still available. This well documented historic specimen, representing a milestone in surgical treatment of pulmonary TB, is of importance to medico-historical and - as a comparative model - paleopathological audiences.

#### BIOLOGICAL STATUS OF HELLENISTIC AND ROMAN ELITES IN WESTERN CRETE (GREECE)

Christa Bourbou, Wiener Laboratory, ASCSA, Greece

Elite and commoner burials can be distinguished by archaeological evidence such as grave goods, tomb construction, and spatial segregation within or among cemeteries, as well as ritual treatment; but was life harder for the poorer and easier for the wealthy? In order to shed more light on the general hygiene and disease patterns of upper class individuals in Western Crete, two skeletal collections, one from the Hellenistic era, (beginning of the 3<sup>rd</sup> century BC, city of Khania) and one from the Roman era (1<sup>st</sup> century AD, Sfakaki-Rethymno) received anthropological and paleopathological analysis. The excavators of both sites suggested that individuals of high status were buried in these cemeteries, based on tomb construction and the extremely rich grave goods found within the burials. Among the most striking pathologies are a high rate of dental disease, most probably suggesting a high-carbohydrate diet rich in sugars, and three cases of DISH, a disorder often associated with upper-class individuals who had a better standard of living and nutrition and longer lifespan than the general population.

#### HEALTH AND THE ONSET OF URBANISATION AND INDUSTRIALISATION IN 18<sup>TH</sup> AND 19<sup>TH</sup> CENTURY: INVESTIGATIONS AT, ST. MARTIN'S CHURCH BIRMINGHAM

Megan Brickley, and S. Buteux, University of Birmingham, UK

Excavations between May and November 2001 at the churchyard of St. Martin's, Birmingham in advance of redevelopment by the Birmingham Alliance produced almost 900 individuals (including 150 named individuals) from the late 18<sup>th</sup> and 19<sup>th</sup> century. Already a huge amount of information has been recovered and further study of these burials and associated historical records will enable a picture to be built up of life in Birmingham, as represented by one of its most central parishes. This study is important because this period was one of huge social and economic change sparked by the Industrial Revolution, which had its origins in the Midlands region of Britain. This paper seeks to highlight work in progress and also to bring the existence of the collection to the attention of other researchers, as re-burial plans mean the time frame for study is limited.

#### MUMMIFIED REMAINS AND THEIR PRESERVATION IN COASTAL BRITISH COLUMBIA

Jerome S. Cybulski, Canadian Museum of Civilization, Canada

Published worldwide surveys of preserved ancient human bodies do not include British Columbia, but mummies are known from both island and mainland archaeological sites, and appear in Northwest Coast ethnographic accounts. Most bodies appear to have been preserved accidentally. Burial associations, as known historically, may have encouraged mummification. Cedar, used for wrappings, coffins and charnel houses, contains natural preservatives, and wool blankets, in which bodies often were shrouded, have a high moisture absorbency rate. Copper ornaments left with the dead also helped to preserve soft tissue. On occasion, a human corpse may have been smoke-cured for ritual use.

*FASCIOLA HEPATICA* AND *CAPILLARIA* EGGS IN A SOIL SAMPLE FROM THE ABDOMINAL CAVITY OF A PREHISTORIC BOVID FROM KARSDORF (SAXONY-ANHALT, GERMANY).

Katharina Dittmar, University of Leipzig, Germany and Brigham Young University, and W.-R. Teegen, University of Leipzig, Germany

During large scale excavations at the multi-period prehistoric site of Karsdorf 9 (Saxony-Anhalt, Germany), a tomb containing a complete bovid skeleton and a human neonate were found. AMS dating of the bovid is under way. During excavation, soil samples were taken from the animal's abdominal cavity near the sacral vertebrae. The sample was rehydrated, treated by several parasitological techniques and microscopically examined. Eggs of the trematode *Fasciola hepatica* and of the nematode species *Capillaria*. *Fasciola hepatica* is a common liver fluke of sheep and cattle, and may have also infected prehistoric man from Karsdorf 9 (Dittmar & Teegen 2000). Due to careful sampling techniques, a true infestation with this endoparasite seems more likely than a contamination. Regarding the *Capillaria* eggs, contamination by rodents is highly probable, as found in other investigations.

SCIENCE AND STORYTELLING: THE MUMMY ROAD SHOW

Larry Engel and Mary Olive Smith, Engel Brothers Media, New York City

Storytelling is a fundamental cornerstone of culture and society. Documenting the history of individuals, cultures and their things proves a fundamental activity of most groups of people, whether done orally, pictorially, graphically or textually. We humans love a good yarn. But what happens when story people meet science people? Can good stories and good science result? How is science narrative? Are archeologists storytellers? Looking at the potential overlaps and conflicts between narrative and science may offer clues about their sometimes rocky and sometimes symbiotic relationship. We use the recent filming of *The Mummy Road Show* series for National Geographic Channels as a case study.

EVIDENCE OF HYPEROSTOSIS FRONTALIS INTERNA IN PREHISTORIC NATIVE AMERICAN CRANIA

Melanie A. Everett, Indiana University

Hyperostosis frontalis interna (HFI) is the accretion of bone on the inner table of the frontal bone. Though the etiology of HFI is poorly understood, clinical studies have

shown it to be an age-related phenomenon, linked with obesity and prolonged estrogen stimulation. In contemporary populations, HFI is found predominantly in females, with a peak incidence in the 40-60 year age group. Although HFI has been documented in several archaeological samples, it has yet to be identified in prehistoric Native American populations. In this study, 181 adult individuals from the Pete Klunk Middle and Late Woodland Mounds (Illinois) were examined for evidence of HFI. Three individuals (aged 50+, 2 female, 1 male) have clear signs of mild stage HFI, while other individuals show similar, though less distinct manifestations. The results suggest that the presence of HFI in prehistoric Native American populations has been largely overlooked, possibly due to mild expression.

#### IDENTIFICATION OF MARFAN'S SYNDROME IN SKELETONIZED INDIVIDUALS

J. Gardner, University of Iowa, and K. Hattman, University of Nevada, Las Vegas

Two skeletons from the Stanford-Meyer Human Anatomy Skeletal Research Collection, University of Iowa, are analyzed for pathologies associated with the genetic disorder Marfan's Syndrome. This syndrome has a documented prevalence in the clinical literature in extant populations, indicating that it could be equally prevalent in skeletal samples but not currently recognized. This disorder is usually diagnosed in living patients using DNA and soft tissue analyses. Using macroscopic observation, radiology and morphometrics, this study attempts to determine if using new diagnostic criteria, identification of Marfan's Syndrome can be made on skeletal remains. If these two individuals meet the clinical criteria for skeletal markers, the Stanford skeletons may serve as valuable comparative specimens for paleopathology and human biology researchers and the methods may be useful in identifying the syndrome in other samples.

#### PATHOLOGIES ASSOCIATED WITH DIETARY DIFFERENCES IN SOUTHERN CALIFORNIA

Tori Heflin, University of California, San Diego

Skeletal remains from southern California representing marine foragers and hunter-gatherers have been analyzed to evaluate the health of two populations. Prior to 3000 BP, coastal southern California was inhabited by marine foragers (commonly referred to as La Jollans). Subsequent to AD 1000, the region's inhabitants (commonly referred to as Kumeyaay) utilized a broader range of terrestrial food with sites inland as well as nearer to the coast. Pathological conditions such as porotic hyperostosis, dental abscessing, and enamel hypoplasia have been noted in each collection, and occur in higher frequencies in the Kumeyaay skeletal remains. These variations appear to reflect differences in subsistence between the two populations.

#### HEALTH AT THE BRITISH NEOLITHIC SITE OF WEST TUMP LONGBARROW

Janet Jackson, University of Birmingham, UK

The Neolithic period in Britain (ca.4000-2500) saw the construction of impressive funerary monuments. The very visibility of these prominent structures in the British

landscape saw many of these monuments 'excavated' and the bone material they contained analysed by antiquarians of the 17<sup>th</sup> and 18<sup>th</sup> centuries. In the present study, bones and teeth, first excavated from the West Tump Longbarrow in 1880, were re-examined using modern methods of assessment. The aim of the analysis was to determine the age, sex of the individuals and note any evidence for disease and trauma. Comparisons of stature and dental health are also made with other Neolithic long-barrow skeletal samples.

#### CONGENITAL KYPHOSCOLIOSIS IN AN ADULT MALE FROM THE MEDIEVAL SITE OF KULUBNARTI IN SUDANESE NUBIA

Lynn Kilgore and Dennis Van Gerven, University of Colorado, Boulder

Evidence of congenital scoliosis in ancient human remains is rare. This report presents an example of severe scoliosis in a mummified 25-35 year old male from the site of Kulubnarti in Sudanese Nubia. The remains reveal a host of developmental defects including absence of one cervical vertebra and the partial absence of the C1 arch. The excellent articulation of all cervical vertebrae makes post-mortem loss unlikely. C4-C6 exhibit anomalies of the left laminae. The most severe malformations include block vertebrae (T1 and T2), incomplete formation of the T4 arch, and ankylosis dorsally at T6 through L1. There is also an extreme lateral curve to the right at T8-T12. The survival of this individual well into adulthood bears testament to the care he was given from birth. Further support of social buffering includes the absence of several generalized stress indicators common to the population.

#### EPIDEMIOLOGY AND ETIOLOGY OF SELECTED PATHOLOGICAL CHANGES IN THE MEDIEVAL POPULATION FROM BUGGINGEN (GERMANY)

Kerstin Kreutz, Institute of Anthropology, University of Giessen, Germany

The appearance, distribution and frequency of certain diseases are indicators of the living conditions of historic and prehistoric populations. In paleopathological and paleoepidemiological studies, the frequency of selected pathological changes of the skull and post-cranial bones can be estimated and compared with other populations. Paleopathological methods (Schultz 1987, 1988, and 1993), including macroscopic, endoscopic, radiological, light- and scanning-electron microscopic techniques were used to examine 59 skeletons from the medieval population of Buggingen (Germany), which dates from the 9<sup>th</sup>-10<sup>th</sup> century A.D. The aim of this study was to analyze the kinds of diseases present and to establish whether there is a specific pattern of diseases for the populations and the epoch they lived in. The investigation deals with infectious and deficiency diseases such as meningeal reactions, scurvy, and the so-called "stress related" changes to the skeleton, as well as traumatic and degenerative lesions of the bones and joints.

#### INFECTIOUS MIDDLE EAR DISEASE: A MARKER FOR CHANGES IN GENERAL HEALTH IN MEDIEVAL DENMARK

Niels Lynnerup, Morten Qvist and Preben Homøe, University of Copenhagen, Denmark

We present a new method to evaluate general living conditions in earlier populations. Our method relates to occurrence of chronic middle ear disease (IMED) in childhood. We applied this method to three medieval skeletal series from Denmark: two rural parish churchyards, one early (AD 1050 - 1250) and one later (AD 1150 - 1350); and a late (AD 1240 - 1530) city parish churchyard. The intact skulls from these churchyards were X-rayed and the area of the pneumatic cells in the temporal bone was measured. From earlier studies we have proved the relationship between cell size and occurrence of IMED. The results showed that there was a pronounced rise in the frequency of IMED from early to later medieval period. Also, our results also showed that the highest IMED frequency was among the population of the city churchyard, probably indicative of an increased pathogen load in the more densely populated city.

#### RIB LESIONS: TB OR NOT TB?

Simon Mays, English Heritage, M. Fysh and G.M. Taylor, Imperial College London.

Since the mid 1980s, a number of studies of visceral surface rib lesions in early 20<sup>th</sup> century skeletons of documented cause of death have found an association between these lesions and pulmonary infectious disease, particularly tuberculosis. However the extent to which this type of rib pathology may be taken as indicative of pulmonary tuberculosis in ancient skeletons is as yet unclear. The present study is an attempt to evaluate this for a British Mediaeval population using analysis of ancient DNA. Bone samples from individuals showing visceral surface rib lesions, together with samples from a group of controls without bony signs of infection, were subjected to polymerase chain reaction assays aimed at detecting traces of *Mycobacterium tuberculosis* complex DNA. The rationale was that if the rib lesions were regularly associated with tuberculous infection in this population then one might expect a greater proportion of PCR positives in cases than in controls. The osteological and biomolecular findings are described, and their significance for the interpretation of visceral surface rib lesions in palaeopopulations is discussed.

#### THERE'S SOMETHING FISHY GOING ON AROUND HERE: INTERPERSONAL VIOLENCE AT KARLUK CANNERY, ALASKA.

Elizabeth Miller and Sara K. Simon, California State University, Los Angeles

During his 1931 field season on Kodiak Island, Alaska, Dr. Aleš Hrdlička recovered 60 individuals from an abandoned unmarked cemetery associated with several canneries on western Kodiak Island, near Karluk, dated to about 1900. The individuals are male, between c. 15 - 50+ years old. Alaskan canneries heavily used Chinese immigrants, and our individuals probably were Chinese. We found 16 individuals with fractures (27% of 60) and ten with skull fractures (17%), ranging from nasal fractures to unhealed, and probably fatal, depressed cranial fractures. Cannery work was physically demanding and potentially dangerous, and probably caused the postcranial fractures. Based on their size and location, the skull fractures are more likely the result of violence. The high level of violent injury among the 60 cannery workers in this study supports both the presence of gangs in the canneries and a report of a Tong mini-war.

INSTANCES OF NON-INFECTIOUS AND NON-TRAUMATIC LESIONS IN INDIVIDUALS FROM NORTHERN VIET NAM 6,000 TO 2,000 YEARS BP.

Marc Oxenham, Colorado College, Nguyen Lan Cuong and Nguyen Kim Thuy, Institute of Archaeology, Hanoi

This study examines skeletal remains representing 190 individuals from pre-Metal and Early Metal period northern Viet Nam for evidence of pathological conditions attributable to causes other than trauma or infectious disease. The aims of this paper are to document the evidence for such pathologies in an under-researched region of the world and to contribute to the development of a global database of ancient disease in general and tropical, sub-tropical disease in Southeast Asia specifically. Four individuals, identified with skeletal pathologies, were explored by way of differential diagnoses. Among those possibilities reviewed, some of the more likely conditions accounting for the observed lesions include a benign tumor (chondroblastoma?), Langerhan's cell histiocytosis and an epidermoid cyst. The health implications of these conditions, both individual and populational, are discussed.

A HIGH STATUS BURIAL FROM RIPON CATHEDRAL, NORTH YORKSHIRE, ENGLAND: DIFFERENTIAL DIAGNOSIS OF A CHEST DEFORMITY

Charlotte A. Roberts, S. Groves, C. Johnstone and K. Dobney, University of Durham

Ripon Cathedral in North Yorkshire is an imposing building that recently revealed a burial which was radiocarbon dated to the late 15<sup>th</sup> century AD. The burial was that of a young adult female with a funerary context suggesting a high status person. The very well preserved skeleton revealed abnormal changes to the thoracic cavity elements, including anterior bowing of the sternum, flattening of the spinous processes of thoracic vertebrae 3-9 against the process below each one, and changes to the ribs that suggested anterior displacement of the rib cage. The skeletal changes are described and differential diagnoses presented. These vary from a pathological condition to external force applied to the chest for some reason (perhaps related to a treatment for an illness, or clothing). The skeleton is presented with the intention of gaining more insight into the aetiology of these changes from the attendees at this meeting.

CONSERVATION AND PALEOPATHOLOGY OF DIAGUITA SKELETAL REMAINS OF CHILE'S SEMIARID NORTH

Maria Araya Rosado, Rowan University and Museo Arqueologico, La Serena, Chile and H. Schiffer and S. Lodge, Rowan University

The Museo Arqueologico of La Serena, Chile, has substantial collections of skeletal remains spanning 3000 years. Several collections represent the Diaguita people (ca. 1000-500 years ago, from the sites Puclaro and Planta Pisco Control). Their reasonably intact state of preservation has permitted a variety of detailed osteological and paleopathological studies. Intentional cranial and dental alteration, osteoarthritis, osteomyelitis, limb fractures, and dental infections are among the interesting bone conditions and pathologies so far documented. Descriptions and frequencies of these

conditions are the subject of this communication. Efforts to estimate the collections' state of preservation for the application of conservation protocols are also described.

#### THE SIGNIFICANCE OF DISEASE PROFILES IN PALEOPATHOLOGY

Michael Schultz and T.H. Schmidt-Schultz, University of Göttingen, Germany

Etiology and epidemiology of diseases in prehistoric and historic populations are the most important research fields in paleopathology. During the last seventeen years, data were collected dealing with the epidemiology in prehistoric subadult populations. The populations selected for this study date from the Neolithic, the Early Bronze Age, the Early and Late Middle Ages and the Early Modern Times of Central Europe and the Near East. Additionally, pre-Columbian populations from Central Mexico and the North American Southwest and Southeast were investigated. The disease profiles obtained by the interpretation of the frequencies of diseases enable us to establish more significant conclusions to ancient living conditions.

#### TRAUMA IN LATE ROMAN TRIER/*AUGUSTA TREVERORUM* (GERMANY).

Wolf- Rüdiger Teegen, University of Leipzig, Germany

In the present study, seven calvaria and one tibia were studied from a palaeopathological and traumatologic point of view. Six (5 males and 1 female) of the seven calvaria showed trauma. Three cases showed a single lesion, 2 cases showed two injuries, and in one case 4 traumata were present. In one case medical treatment in form of trephination was noted. An epidural hematoma and inflammation of the middle ear were also observed, as well as 2 cases of benign osteoma, sinusitis, inflammation of the venous sinuses, and degenerative changes of the occipital condyles and the temporo-mandibular joint. The jaws showed dental caries, dental calculus, intravital tooth loss, abscesses, parodontopathies and linear transverse enamel hypoplasias. These alterations are also common in other Roman skeletal series. The tibia showed a badly healed fracture that probably also involved the fibula.

#### TOWARDS AN UNDERSTANDING OF TREPONEMAL DISEASES IMPACT ON ABORIGINAL POPULATIONS IN SOUTH EAST AUSTRALIA

Michael Westaway, National Museum of Australia, and P. Dowling, Biological Anthropologist Consultant

Immunological and osteological evidence indicates that there was a treponemal presence in arid, semi arid and tropical regions of Australia prior to European settlement in 1788. Firm archaeological evidence, however, still remains elusive. Be that as it may, a comprehensive palaeodemographic model has been proposed which suggests that high levels of treponemal disease in South East Australia are the result of increasing sedentism in Aboriginal populations (Webb 1995). An alternative model suggests that a considerable amount of the recorded lesions for treponema may reflect the impact of venereal syphilis introduced by Europeans on virgin soil populations (Dowling 1997). This paper will review the available evidence for treponemal disease in South East Australia and provide a revised palaeo-historic demographic model for treponemal diseases impact on Aboriginal populations.

### **SECTION 3: POSTER PRESENTATIONS**

#### **HYPOPLASTIC ENAMEL DEFECTS IN PREHISTORIC NORTHERN CHILE**

Marta P. Alfonso, University of Nevada, Las Vegas and Vivien G. Standen, Universidad de Tarapacá, Chile

The frequency of hypoplastic enamel defects (HED) was examined among the prehistoric populations of the Azapa Valley, northern Chile. Twenty archaeological populations that inhabited the coast and valley between 8000-1000 a.p were considered. All the teeth present and suitable for observation (n=6,798) were analyzed. HED were identified, classified and the age at its formation determined according Goodman and Rose's (1990) recommendations. The results showed an increase in HED through time, especially among the populations in the valley and less dramatically among the coastal ones. In general this study showed the expected trend for the adoption of agriculture.

#### **ANALYZING QUIDS FROM MEXICO: CASTING DENTAL PATHOLOGY AND MORPHOLOGY**

Melissa Baier and Karl Reinhard, University of Nebraska

Excavations of Cueva de los Muertos Chiquitos in Durango, Mexico recovered thousands of quids (masticated plant material). We have been analyzing these quids for two years to relate dietary behavior to dental health. In the first stage of this analysis we identified the botanical origin of the quids. The vast majority (85%) were produced by chewing agave fiber. The second part of the analysis was making dental cast of tooth impression from the quids. The impressions show both adult and child dentitions. The impressions also show dental wear and tooth loss. Our methods show that it is possible to recover information about ancient dentition from quids. Since quids are very common artifacts in many cave sites, we anticipate that our method can be used in many other regions.

#### **IMAGING SPINE PATHOLOGY IN CHACHAPOYA MUMMIES**

Anthony J. Bravo and Gerald Conlogue, Quinnipiac University, and Sonia Guillén and J. Salazar, Centro Mallqui of Peru

A total of 188 Chachapoya mummy bundles were examined over a three year period in a remote field radiographic facility established by one of the authors (GC). Images that included the spine were divided into five categories and the prevalence of each condition determined with certain mummies being reported in more than one category. The results were as follows: 73% of the images were normal with no clear signs of pathology; 8.5% demonstrated congenital anomalies including scoliosis; 11.3% revealed osteoarthritis; 4.8% indicated osteomalacia; 6.4% had evidence of infectious processes; 2.1% showed traumatic injuries; and 1.6% suggested malignancies.

#### **BIPARTITE MEDIAL CUNEIFORM: CHARACTERISTICS OF AN INFREQUENT ANOMALY**

Scott E. Burnett and Troy D. Case, Arizona State University

The medial, or first, cuneiform is the most frequently encountered bipartite tarsal in the human foot. Although rare, when bipartition is present, the medial cuneiform is divided into dorsal and plantar segments of roughly equal size. The dorsal and plantar portions articulate with each other, and with distinct facets on the first metatarsal. These two halves of the first cuneiform, particularly when encountered independently, can be quite difficult to identify. The purpose of this presentation is to describe the morphological characteristics common to five recently identified examples from Northern Europe, Egypt, South Africa, and the American Southwest. Two features of the bipartite cuneiform are of particular interest. In our experience, all cases were bilateral where both sides were observable. In addition, all cases exhibit pit-like lesions indicative of non-osseous coalition between the plantar and dorsal segments.

#### AN IMAGING EXAMINATION OF THE LEGEND OF HAZEL FARRIS

Larry W. Cartmell, Gerald Conlogue and Ronald Becket, Quinnipiac University, and Larry Engel, Engel Brothers Media

Conventional radiography using Polaroid photographic film, computed tomography and videoendoscopy followed by an autopsy were undertaken to substantiate or refute the legend associated with the mummified remains of Hazel Farris. The elaborate story of this sideshow mummy included that she had committed suicide by drinking arsenic. The study established several facts, including the probable cause of death.

#### OS ACROMIALE AMONG MEDIEVAL DANES AND MODERN NATIVE SOUTH AFRICANS

Troy D. Case, T. Nielsen, and Scott E. Burnett, Arizona State University

The term "os acromiale" describes a persistent acromial epiphysis of the scapula. According to studies of epiphyseal union, the acromial epiphysis usually begins fusing by age 17 or 18 years, and partial or complete fusion is found in approximately 95% of males and nearly 100% of females by the 20<sup>th</sup> year. Delayed fusion into the 22<sup>nd</sup> year has also been reported, leading some authors to suggest that os acromiale should not be scored in individuals under the age of 25 or even 30 years. We present new frequency information for os acromiale gathered from medieval Danes and modern native South Africans of primarily Bantu heritage. In addition, we discuss the current state of knowledge concerning the os acromiale, and address the question of whether delayed fusion of the acromial epiphysis should have a serious effect on studies of this trait.

#### PALOEPATHOLOGY OF A NOBLEMAN FROM POPOLI, ITALY

Gino Fornaciari, University of Pisa, Luca Ventura, City Hospital of L'Aquila, Gerald Conlogue and Ronald Beckett, Quinnipiac University, Larry Engel and A. Bucher, Engel Brothers Media

The paleopathology of a mummified nobleman from a crypt under the Church of the Holy Trinity in Popoli, Italy is described. X-ray in the crypt with Polaroid film disclosed an artifact, which helped date the individual at the time of death to be the early 1800's. Initial paleopathologic data were obtained using Polaroid x-ray, and videoendoscopy.

Data were confirmed with CT scanning. Tissue biopsies were taken from the thoracic diaphragm and left kidney with histologic, microscopic, and X-ray diffraction studies conducted. Paleopathologic findings include poor dentition, pulmonary pathology with diaphragmatic involvement, and a kidney stone removed for analysis using radiographic localization and endoscopic guided extraction.

#### PRELIMINARY ANALYSIS OF A NATURALLY MUMMIFIED CHINESE IMMIGRANT FROM CARLIN, NEVADA.

A. Gallegos, J. L. Thompson, Bernardo Arriaza, S. F. Chung, and V. Cassman, University of Nevada, Las Vegas, Gerald Conlogue and Ronald Beckett, Quinnipiac University

In November, 1996 a Chinese cemetery was discovered in Carlin, Nevada. Of 13 individuals recovered, one male, approximately 30 years of age, was naturally mummified with much of his clothing preserved. This individual has been examined via x-rays, skin and hair samples, endoscopy, and visual examination of clothing and other features. The results indicate that he had osteoarthritis, a healed fracture of the humerus, and high levels of mercury in his body. Clothing indicates a mixture of Chinese and American traditions. The results add to our limited knowledge of the health and lifeways of Chinese immigrants in Nevada.

#### EVIDENCE OF POSSIBLE CEREBRAL HEMATOMA IN A CHRIBAYA INFANT WITH INTENTIONAL CRANIAL VAULT MODIFICATION

Sonia Guillén, Centro Mallqui de Peru, Ronald Beckett and Gerald Conlogue, Quinnipiac University, and Larry Engel, Engel Brothers Media

Intentional cranial vault modification in a Chribaya infant from Ilo, Peru may have led to a cerebral hematoma. Nondestructive analysis was used to examine the infant at Centro Mallqui, in the Osmore river valley near Ilo. Polaroid x-ray and videoendoscopy were employed to collect the data. Anomalies in the remnants of the dura suggest a hematoma may have existed.

#### OSTEOLOGICAL AND BIOMOLECULAR STUDY OF A POSSIBLE CASE OF HYPERTROPHIC OSTEOARTHROPATHY FROM MEDIAEVAL ENGLAND.

Simon Mays, English Heritage, and G.M. Taylor, Imperial College London

A skeleton is described showing osteological indications of hypertrophic osteoarthropathy (HPO). The most common cause of HPO is chronic pulmonary disease, usually caused by either cancer or infection; in the pre-antibiotic era it was normally the latter. Biomolecular analyses indicated the presence in this specimen of *Mycobacterium tuberculosis* DNA, suggesting that pulmonary tuberculosis was the eliciting factor in this case. This finding is consistent with early clinical data that indicate that HPO was not an uncommon accompaniment of pulmonary tuberculosis. This is the first time that the primary cause for HPO has been firmly identified in an ancient skeleton. It illustrates the value of a combined biomolecular and osteological approach for enhancing our understanding of ancient disease.

#### THE ANALYSIS OF HUMAN HAIR FROM THE PRECOLUMBIAN SITE OF PACATNAMU, PERU: CHEMICAL CHARACTERIZATION OF POST-DEPOSITIONAL DIAGENESIS

Andrew J. Nelson, R. Martin, M.C. Biesinger, and S.J. Naftel, University of Western Ontario, Canada, I. Kempson, and B. Skinner, University of South Australia, and K.W. Jones, Brookhaven National Laboratory

Diagenesis affects the interpretation of chemical analyses of ancient human remains. Thus, an understanding of the post-depositional environment is crucial for meaningful interpretation. In order to characterize these environments, we explore the application of several advanced techniques to the analysis of human hair, including ultra-trace inductively coupled plasma mass spectroscopy, X-ray photoelectron spectroscopy, and time-of-flight secondary ion mass spectroscopy. These techniques analyze the elemental composition of hair from bulk to finer levels. This study has the following objectives: to characterize the metal content of this sample in comparison to samples from other sites, to assess the possibility of reconstructing the post-depositional environment based on changes in the surface chemistry of the samples, and to establish the effectiveness of these techniques, both singly and in combination. Initial results suggest that these analyses do yield important information, such as water inundation.

#### THE SULMAN MUMMY: PRINCE, PRINCESS OR PAUPER?

Andrew J. Nelson and J. Marla Toyne, University of Western Ontario, T. Neave, Chatham-Kent Museum, Canada, Gerald Conlogue and Ronald Beckett, Quinnipiac University, Greg Garvin, St. Joseph's Health Care, and C. Nelson, City of London, UK

The Sulman Mummy came to Chatham, Ontario in the early 1900's. It was purchased from a Cairo museum, labeled as a "Princess", and remained in private hands for many years until she was donated to the Chatham-Kent Museum. In the 1980's, she went to the Canadian Conservation Institute for restoration, where an x-ray survey suggested that the "Princess" was a male. This spring, a research project was instituted to address the question of sex attribution and to construct an osteobiography for this individual, in order to turn this *artifact* into a *person*. We x-rayed and endoscoped the mummy, cartonnage and associated artifacts. Our conclusions are that she is female, but is unlikely to have been a Princess. Furthermore, although x-raying revealed bones that had shifted out of position, the endoscope encountered dense packing material, suggesting that the mummy may have been "repackaged" for the tourist market.

#### OSTEOARTHRITIS IN A BRITISH MEDIEVAL CEMETERY POPULATION FROM YORK, ENGLAND.

Johanna L. Nyden and Anne L. Grauer, Loyola University Chicago

The frequency and patterns of osteoarthritis are examined in 1014 individuals from the St. Helen-on-the-Walls cemetery medieval population from York, England. Results indicate that 703 individuals had at least one joint surface present from the lumbar vertebrae, ankle, knee, hip, elbow, or shoulder. Osteoarthritis was found in 71.5% of the

lumbar vertebrae, 48% of the ankle joints, 44.8% of the knee, 51.7% of the hip, 47% of the shoulder, and in 41.9% of the elbow joints. These frequencies are explored in relation to age at death and sex within the population, and are compared to data from other populations in an effort to understand the presence of osteoarthritis in this sample.

“FALLING OUT OF A WAGON UPON HIS HEAD”: TWO CASES OF HEALED CERVICAL VERTEBRAE FRACTURES IN A NINETEENTH CENTURY ASYLUM CEMETERY

Shawn M. Phillips, Indiana State University

This poster presents analyses and descriptions of two individuals associated with the Oneida County Asylum, a 19<sup>th</sup> Century asylum for the mentally ill (1860-1890; NY, USA), who exhibit healed fractures to the cervical spine. The skeletal sample from the Asylum (n=100), documents, and historical medical texts were examined. The methods for this study focus on differential diagnosis protocols to assess the trauma and state of healing visible in the fractured cervical vertebrae. One individual exhibits trauma to the first and second cervical vertebrae with a pseudoarthrosis of the articular facet. The other individual exhibits trauma to the second cervical vertebra in the form of a fractured and detached dens with excessive remodeling of the original attachment site. That individual also suffered a Charcot joint of the left elbow. The elbow joint demonstrates extensive osteoarthritic remodeling and was immobile at the time of death.

PATTERNS OF DENTAL HEALTH IN AN IMPERIAL ROMAN SKELETAL SAMPLE FROM ISOLA SACRA, ITALY

Tracy Prowse and Shelley Saunders, McMaster University, Canada, L. Bondioli and L. Pigorini National Museum of Prehistory and Ethnography, Italy, and Roberto Macchiarelli, Université de Poitiers, France

The people buried in the necropolis of Isola Sacra were middle-class inhabitants of *Portus Romae*, one of the main maritime ports for the Roman Empire during the 1<sup>st</sup> to 3<sup>rd</sup> centuries AD. The necropolis contains a variety of burial structures, ranging from simple pits to elaborate monumental tombs. This study examines dental health within the sample based on sex, age, and burial type, and compares overall level of dental health with other Roman period samples. Data on caries, antemortem tooth loss, tooth wear, abscesses, and calculus were collected from 364 individuals. There are differences in dental health between the sexes within different age groups, but only the calculus data are significantly different. There is no significant association between dental health and burial type. The results indicate a moderately good overall level of dental health.

MINERALOGICAL CHARACTERISTICS OF FOSSILIZATION OF THE LE MOUSTIER HUMERUS

Heather L. Ramsay and L. M. Ross, University of Missouri, David S. Weaver, Wake Forest University

In a previous study of a Le Moustier Neanderthal humeral fragment, portions of a cross-section appeared histologically rock-like. Other regions of the cross-section retained bone

microstructure and may be preserved bone tissue. To verify that 42,000 year old bone tissue was present, EDS was conducted on the cross-section. Calcium to phosphorus ratios in the "bone" and "rock" regions were identical to each other and to ratios in modern human bone tissue. The same Ca/P ratio is known for the mineral brushite, which is formed in caves in the presence of bat guano. The Le Moustier Neanderthal skeleton was excavated from a cave. SEM images of the "rock" portions of the cross-section match the physical description of brushite.

#### USING DIFFUSE IDIOPATHIC SKELETAL HYPEROSTOSIS TO DETERMINE BIOLOGICAL AGE AT DEATH

Jennifer Riddle and Bernardo Arriaza, University of Nevada, Las Vegas

Approximately 1000 skeletons from the Terry Collection (Smithsonian Institution) of known sex, age and cause of death were studied to create an aging method using diffuse idiopathic skeletal hyperostosis (DISH). We found that about 7% of the skeletons had DISH. The affected cases were scored for degree of severity, number of vertebra involved and extraspinal involvement. Incipient cases of DISH appeared as early as age 40, while classic cases were noted in individuals as old as 100 years. If individuals have classic DISH, then this condition is a good indicator of age at death. The authors independently scored cases of DISH and had a 97 percent concordance rate.

#### LINEAR TRANSVERSE ENAMEL HYPOPLASIAS IN PIGS FROM PREHISTORIC SITES IN ITALY AND FRANCE.

Wolf-Rüdiger Teegen, University of Leipzig, Germany

Several pig teeth from the Bronze Age settlement Monte del Castellaccio (Imola, Italy) and the Celtic oppidum Bibracte/Mont Beuvray (Burgundy, France) were examined. Pathology was recorded according to Baker/Brothwell (1980), Schultz (1988) and Teegen/Wussow (2001), and linear transverse enamel hypoplasias was studied according to Teegen (2002). Both transverse linear enamel hypoplasia (LEH) and pit like enamel hypoplasias (PEH) and other enamel defects were recorded, following the Federation Internationale Dentaire protocols. Enamel hypoplasias and developmental age can both be detected relatively easily in prehistoric and historic pig teeth. In the Imola sample (3/43 mandibles) the defects developed between 3-4 months, and in the Bibracte sample (3/17 teeth) they developed between 5 and 11 months with a maximum at 8 months. Malnutrition as well as disease could be responsible, but the causes remain unknown.

#### A POSSIBLE CASE OF LANGERHANS' CELL HISTIOCYTOSIS/HISTIOCYTOSIS X FROM LATE ROMAN TRIER/AUGUSTA TREVERORUM (GERMANY): A CT INVESTIGATION.

Wolf-Rüdiger Teegen, University of Leipzig, Germany

The skull of a 12 (+/- 2) year old child from Late Roman Trier/Augusta Treverorum (Germany) was examined by macroscopic, microscopic and computer tomographical techniques. The CT was carried out by D. Henke MD, Trier, using a CT-Tomoscan E-MG

scanner (Philips Medical Systems). The skull, scanned in 5 mm slices, showed at least 28 lytic defects on its skull vault, mostly located on the frontal and both parietal bones. All front teeth of the upper jaw were lost *intra vitam*. Cribra orbitalia at different stages was observed. The following differential diagnoses were discussed: Langerhans' Cell Histiocytosis, multiple myeloma, osteomyelitis, treponematosi, metastazing carcinoma, or osteoclastic-osteoblastic tumour. The most likely diagnosis is Langerhans' Cell Histiocytosis or Histiocytosis X in its appearance as eosinophil granuloma. LCH is a rare disease, appearing mainly in children.

#### DEVELOPMENTAL DEFECTS IN TWO INDIVIDUALS FROM A HISTORIC MUNSEE CEMETERY IN NEW YORK

Tamara L. Varney, University of Calgary, and Brenda J. Baker, Arizona State University

Two of 24 individuals from the Van Etten Farm site, a historic Munsee cemetery in New York, exhibit developmental defects in skeletal formation. The first individual is a male adolescent exhibiting caudal shifting, including occipitalization of the atlas associated with basilar impression and C2-C3 block vertebrae. The second individual is a middle-aged adult male exhibiting ankylosis of both elbow joints involving all three arm bones and bilateral hip dysplasia. The developmental abnormalities are described and discussed in terms of alternative pathological conditions and their implications for the affected individuals. The presence of cranial shaping in both of these individuals suggests Shawnee ancestry, which is supported by historic documentation indicating the Munsee incorporated a Shawnee group in the late 17<sup>th</sup> century. Artifacts date the site between A.D. 1650 and 1750, with heaviest use from 1720 to 1750.

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