PAPERS ON PALEOPATHOLOGY

presented at the

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Miami, Florida
SECTION 1: FORENSIC SEMINAR  

Arranged by Joseph H. Davis, Chief Medical Examiner, Dade County, Florida

FORENSIC ANTHROPOLOGY AND THE MEDICAL EXAMINER: PALEOPATHOLOGY  

Joseph H. Davis, Dade County Medical Examiner Department

The present is the yardstick for the past. Clinical, radiological, and pathological studies of diseased patients permit delineation of skeletal or mummified remains. Medical examiner studies of trauma likewise create skeletal indices for the interpretation of bone injuries, and heat and physical artifactual distortion of bone and teeth. Medical examiners encounter bodies that are well preserved, neoskeletonized, and completely skeletonized. The evidentiary skeletal museum of the Dade County Medical Examiner contains 330 death investigative cases, derived from a third of a century. These include 27 complete, 13 axial, 22 cranial, and 67 dental remains, plus an assortment of funeral, religious, and anatomical artifacts. Because of the evidentiary nature of these acquisitions, 140 pertained to homicide, 60 to accidents, 29 to suicides, and 27 to natural death. The ages varied from teenage to over 90 years, with the bulk representing the 20-60 age groups. Although injuries are acute, a few are healed, which is in keeping with the bias of selection in medical examiner case material. The greatest value to the paleopathologist is the ability to correlate age at death, known patterns of injury, and known postmortem artifacts with ancient skeletal remains, thus assisting in comprehension of the unknown.

SKELETAL ARTIFACTS IN AFRO-CARIBBEAN CULTS  

Charles V. Wetli, Dade County Medical Examiner Department

Post-skeletonization artifacts in modern days may result from trophy activity associated with warfare, funeral and burial practices, or religious activities: such skeletal manipulations probably occurred also in prehistoric times. The use of human skeletal material in religious practices is comparatively new in the United States, but we now encounter Santeria, Palo Mayombe, and Vodun, the last being uniquely Haitian. Of these, Palo Mayombe has been mainly associated with human remains. The human skull, preferably with some brain tissue, contains the spirit of the dead, and long bones are the scepter symbol of power. Palo is primarily devoted to malevolent sorcery, and is particularly evident in devotees of illegal drug activities. The focus of Santeria and Vodun is primarily benevolent.
The majority of skeletal religious artifacts are anatomical specimens, followed by some of foreign origin, plus local grave desecrations. Human remains are frequently commingled with non-human remains. Human sacrifice is not associated with the above, except in the occasional sociopathic application.

FORENSIC ODONTOLOGY AND PALEOPATHOLOGY

Richard R. Souviron, Dade County Medical Examiner Department

Modern forensic odontology is concerned with the identification and effects of trauma and disease. Identification is either preliminary to delineate oral characteristics of an unknown decedent, or exclusionary or confirmatory, to compare the decedent with existing records. It is the practice of the Medical Examiner Department to retain maxillary and mandibular jaws in badly burned or decomposed bodies even when identity has been accepted by police investigators and next of kin: an example was described in which a presumed accidental death was shown to be murder of a different person as part of a major insurance fraud. Because of long time preservation of bone and tooth structure, dental characteristics of skeletal remains are of value to the paleopathologist in determining age, race, sex, social habits, disease, and injury aspects of an unknown decedent.

SKELETAL RESEARCH POTENTIAL OF MEDICAL EXAMINER CASES

Susan R. Loth, Florida Atlantic University

Medical examiner autopsies number approximately 12,000 annually in the State of Florida. In centers of high concentrations of such autopsies, the opportunity arises to inspect and study skeletal components customarily exposed during routine autopsy procedures. These become a rich source to test some previously accepted indices, and to derive new valid indices such as rib costochondral interfaces as an indicator of age. The phases 0 (16 and younger) to 8 (65 and older) demonstrate progressive change from an articular surface that is flat or billowy with a regular rounded rim to a deeply pitted, widely U-shaped, fragile, walled, irregular articular surface. The comparative value of these observations to other methods of age estimation was discussed.

Following the presentations, seminar participants reviewed material on display in the auditorium, and in the skeletal preparation and repository area. They also viewed the new (2 years old) 88,000 square foot, three-building complex, which houses teaching, administrative, laboratory, and autopsy areas.
SECTION 2: CONTRIBUTED PAPERS AND POSTERS

Coordinator and Moderator: David S. Weaver, Wake Forest University

ENTEROBIUS VERMICULARIS INFECTION IN PREHISTORIC POPULATIONS FROM SAN PEDRO DE ATACAMA, CHILE


Enterobius vermicularis eggs (average size 56.8 x 28.8 u) were found in eleven out of sixteen coprolite samples collected at the archeological site of Tulan 54 in northern Chile. The desiccated feces were found in layers dated from 1080 B.C. to 950 B.C., and were associated with food remains that included Chenopodium quinua, Lama sp.; roots; rodents; birds; and aquatic plants. The distribution of this infection in prehistoric America is reviewed, and factors influencing transmission of the parasite in hunter-gatherers and in settled agriculturalists is discussed.

ADAPTING RADIOGRAPHIC EQUIPMENT AND PROCEDURES FOR AN EXAMINATION OF AN ADIPOCERE CADAVER (poster)

Gerald J. Conlogue, Gulf Coast Community College, and Gretchen Worden, Mütter Museum, Philadelphia

The study illustrates the use of 'outdated' imaging equipment, combined with state of the art technology, to produce satisfactory images of an adipocere cadaver.

THE IMPORTANCE OF ETHNOHISTORICAL SOURCES IN THE DETERMINATION OF MUMMIFICATION METHODS AMONG THE ANCIENT INHABITANTS OF THE CANARY ISLANDS

Fernando Estévez González, Museo Arqueológico y Etnográfico de Tenerife

The paleopathology of the Canary Islands has an important part in research on the mummies and mummified remains that are found in considerable number in some islands of the archipelago. The determination of the mummification methods used by the prehispanic inhabitants of the Canaries may help clarify the processes of conservation, funerary practices, social status, etc., because the variants show
specific cultural differences. Ethnohistorical sources in our archipelago provide valuable information on the different methods used by the Guanches for the mummification of corpses. In this paper, the texts in which these sources appear are reviewed, and a classification of the different methods is made. We insist on the importance of these sources, in order to know the actual techniques of conservation, and to improve histopathological investigation.

THE CRONOS PROJECT: THE BIOANTHROPOLGY OF GUANCHE MUMMIES

Rafael González Antón, Museo Arqueológico y Etnográfico de Tenerife

The Museo Arqueológico y Etnográfico, applying new techniques and methodology to the fields of paleopathology and bioanthropology, has started a major project of research on the mummies and mummified remains that are part of the collection of this institution. The collection is particularly interesting, not so much for the number of specimens, as for the fact that all of them come from the same culture, and consist of materials preserved by means of artificial mummification. The investigation includes not only paleopathology, but other disciplines, and in this way, we hope that the results will contribute to our understanding of the aboriginal culture of the Canary Islands in all its aspects.

STRIAE OF RETZIUS AS INDICATORS OF SYSTEMIC DISTURBANCES IN CHILDHOOD (poster)

R.J. Hillier and G.T. Craig, University of Sheffield

The striae of Retzius represent incremental markings in enamel, which are thought to reflect variations in the rate of amelogenesis. It has been suggested that systemic disturbances occurring during enamel formation can result in enhancement and increased frequency of striae. The present pilot study aimed to determine the presence, number, prominence, and periodicity of striae in children's teeth, and any possible relationship with systemic conditions. Of the 28 teeth examined, 18 came from individuals whose medical histories indicated chronic disease states. The striae were more easily observed and numerous in permanent teeth, and the teeth from individuals with a history of chronic disease showed more frequent and prominent striae. Irrespective of medical history, there were peak frequencies for intervals between striae at 16, 28, and 40 u, corresponding to possible 4, 7, and 10 day rhythms amelogenesis. The findings suggest that the characteristics of the striae of Retzius are influenced by systemic factors, and may serve as indicators of past disease experience in individuals: they are thus of potential value in determining disease incidence during childhood in archaeological populations.
MANUBRIO-STERNAL AND MANUBRIO-COSTAL SYNOSTOSIS: PATHOLOGICAL?

S.M. MacLaughlin, Guys Hospital, London

It is reported that the manubrio-sternal and first manubrio-costal joints are synchondrodial in nature, i.e. they lack joint cavities, with the cartilage being joined directly to the bone surface. All other sterno-costal joints are diarthrodial in form, having well defined joint cavities. Two types of manubrio-sternal synostosis have been described: a) sclerotic fusion, which is age related; and b) matrical fusion, which occurs after normal pubertal growth cessation. Despite being a synchondrosis, manubrio-costal fusion is not common, and its striking delimitation of the thoracic inlet may be noted as pathological. The prevalence of manubrio-sternal and manubrio-costal synostosis was examined in a documented skeletal collection of Portuguese origin (n = 162). Manubrio-sternal synostosis occurred in 17% of the total sample, and in almost twice as many females as males. The age at death of individuals showing synostosis ranged from 21 to 94 years. Bilateral manubrio-costal fusion occurred in 10% of the male sample, but in only one female where the fusion was unilateral. Manubrio-costal fusion was found to be restricted to individuals over 65 years of age at death. No individual exhibited both manubrio-costal and manubrio-sternal synostosis. The results are discussed in terms of their functional implications.

UNEQUAL IN DEATH, AS IN LIFE

Lourdes Márquez Morfín, Institución Nacional de Antropología e Historia, Centro Regional de Oaxaca

This study concentrates on the epidemic that occurred in Mexico City in 1813, which was principally due to typhus. The focus of the study is of an epidemiological nature, attempting to relate social and economic factors to the incidence of the disease (morbidity rate), and to the percentage of sick people who die (mortality rate). We based our research fundamentally on documents from the Mexico City archives. We used: 1) the census of 1811 as a basis for socioeconomic research, in order to get to know the composition of the population; 2) the parochial records of the city; 3) lists of sick and dead people during the epidemic, which were made by order of the city government in 1813; 4) maps of the city, showing divisions, urban equipment, sewage systems, drains, stone pavement, garbage collection, etc.; 5) narratives from the period, which recreated the atmosphere and the conditions in which the inhabitants lived. The results show the highest percentage of morbidity in the wards with the worst sanitary conditions, so that the people most seriously affected were those with the fewest economic resources.
OCCUPATIONAL CHANGES IN THE SKELETON: SIX CASES FROM THE STANFORD-MEYER COLLECTION

Charles F. Merbs, Arizona State University and Rose A. Tyson, San Diego Museum of Man

Skeletal parts from the Stanford Meyer Osteopathology Collection at the San Diego Museum of Man, representing six individuals of known occupation who died between 1936 and 1949, were studied relative to skeletal changes produced by stresses characteristic of those occupations. The occupations included barber, waiter, house painter, gardener, washerwoman, and railroad steward. Among the changes discovered were indications of shoulder elevation, such as coracoclavicular and costoclavicular articular faceting, partial dislocation of the shoulder and knee, extreme osteoarthritis of the shoulder and knee, and powerful development of the stabilizing muscles of the legs. Several examples of occupation-related accidents resulting in skeletal changes were also noted.

POSSIBLE PURPOSES OF TREPHINATION IN NEOLITHIC CRANIA

Plinio Prioreschi, Creighton University Medical School, Omaha, Nebraska

It is generally assumed that neolithic skull trephining was performed for therapeutic goals (treatment of headaches, infections, insanity, convulsive disorders), or for non-medical, magico-religious reasons. These explanations are unsatisfactory: we could expect that if neolithic man trepanned the skull for headache, he would also have trepanned other bones for pain -- but neolithic man had no concept of undisplaced fractures, no concept of pressure and of the necessity for relieving it, nor did he have any way of associating insanity and convulsions with the brain. He must, however, have noted that after head trauma, people would sometimes die, but at other times first 'die', then 'undie' (lose and regain consciousness). He probably concluded that there was a mechanism in the head for becoming 'undead'. Attempts to activate the 'undying' mechanism were the next logical step. For this purpose, he would use trephining to let spirits escape from or enter into the skull. We therefore suggest that neolithic man was trying, by skull trepanning, to recall to life people who had died or were dying, either from disease or from relatively small traumatic lesions of the head.

THE DEBATE ABOUT SYPHILIS IN THE PREHISPANIC POPULATION OF THE CANARY ISLANDS: NEW DATA

Conrado Rodríguez Martín, Museo Arqueológico y Etnográfico de Tenerife

In this paper we review a long-time point of debate in the history of paleopathology in general, and in the paleopathology of the Canary Islands in particular. The
presence of syphilis in the islands. From the first works of Rene Verneau up to the present day, the existence of this disease in the Canaries has been argued, although it has never been treated in a monograph. This paper therefore reviews and revises Canarian paleopathological literature. A number of skulls, in which some authors believed they could see the bony stigmata of 'morbus gallicus' have been investigated, and the conclusion is that syphilis was absent from the Canary Islands in the years before the Spanish Conquest and the arrival of Spanish troops.

A MODERN SUICIDE BY CLAMSHELL: ECHOES FROM THE MAYA PAST (poster)

Frank P. Saul and Julie M. Saul, Medical College of Ohio and Christopher R. Desley, Lucas County Coroner's Office, Toledo

Initial examination of the body of a 31 year old man, who was found dead in the front seat of a car, revealed deep incised wounds of the wrists, right antecubital fossa, and right side of the neck. A large amount of blood was present on the car floor, but no weapons were found. Prominent linear abrasions on the skin around the incised wounds indicated repeated sawing action with a relatively dull instrument. The location of the wounds was typical for suicide. Further search of the car disclosed a large clamshell on the car floor. The death was ruled a suicide due to exsanguination caused by incised wounds of the neck and extremities. Experimental cuts on the skin with the sharpest edge of the clamshell produced wounds similar in character to those identified. The cuts were made with difficulty, requiring repeated sawing action while exerting strong pressure. Once through the skin, however, the shell cut very deeply with ease. (These cuts were done as part of the standard autopsy procedure.) This unusual method of suicide can perhaps be better understood in the context of ancient Maya bloodletting rituals, as depicted in their paintings, carvings, and legends. Although the Maya obviously knew nothing of the endorphin based mechanism involved, they did know that drawing large amounts of blood could trigger hallucinations that would help them communicate with their gods and ancestors. This same mechanism may have enabled the modern suicide victim to complete his otherwise difficult mission.
SECTION 3: WORKSHOP

WHAT'S IN AND/OR ON THE BUMP(S)?

Bruce D. Ragsdale, Arizona State University and Donald J. Ortner, Smithsonian Institution

Depending on the neurovascular conditions created by pathological conditions, bone tissue can be resorbed, proliferate, or exhibit some combination of both responses. A major dimension of current and future research in paleopathology is the need for a better understanding of the surface features and soft tissue contents of productive lesions in skeletal specimens. This year's workshop concentrated on productive lesions of bone as a follow-on to last year's workshop (What's in the Holes?). Just as the fossilized footprint is of interest for what it says about the creature that made it, so the alteration of solid bone substance is the result of the action of soft tissue acting on bone surfaces. Understanding this dynamic interface is the essence of studying mechanisms of disease. Three major categories of orthopaedic disease (trauma, infection, and tumor) were emphasized, but other conditions were reviewed as well.

Work with specimens from prehistory permits comparing opinions, but often there is no final ironclad 'answer'. Maceration of hospital specimens after gross photography and histologic sampling produces specimens that have several advantages. The dynamics of the soft tissue/bone interface can be presented in photomicrographs. The resultant changes in bone configuration can be displayed with sequential radiographs. Medical records establish age, sex, race, heredity factors, occupation, handiness, other sites of skeletal disease, and effects of the disease process on lifestyle and physiology. Coexistent visceral pathology and microbiologic culture results are known. Macerates retain fragile structures, such as delicate periosteal reactions. The precise condition of joint surfaces is photographically recorded prior to maceration.

A mixture of museum specimens and specimens recently collected in a hospital environment were the materials of this workshop. These included: calvarial hyperostosis due to meningioma, old rib fractures with articulating exostosis, metastatic prostatic carcinoma in spine with concurrent 'burned out' rheumatoid arthritis of humerus and femur, metaphyseal ridges on juvenile vertebral body (normal variant), cranial synostosis, hypertrophic pulmonary osteoarthropathy (periostial reactions on chimpanzee long bones due to pulmonary coccidiomycosis, courtesy of Charles F. Merbs), exostosis at ligamentous insertions of third proximal metatarsal, osteochondromatosis, neuropathic knee joints (Navajo neuropathy and rheumatoid neuropathy), osteomyelitis with sequestrum, and congenital syphilis.
Participants were asked to form small groups of three and review 15 cases. Each case included the gross specimen, and, if appropriate, one or more x-ray films. Both paleopathological and modern clinical orthopaedic diseases were included. Following the time period for participant review of the cases, each case was discussed either by Dr. Ragsdale or by Dr. Ortner. Discussion by the participants was encouraged, and an award was given for the group that had the greatest number of correct diagnostic opinions.

Exercises of this type help to sharpen the participants' ability to recognize significant features in pathological bone tissue. What is very clear, however, is that differences of opinion will exist. Equally clear is the fact that abnormal bone tissue poses a very substantial challenge in classification. A careful review of all the information available about the case, including the distinctive morphological features, is an essential preliminary to effective diagnosis.

Specimens acquired from the modern hospital setting will undoubtedly become increasingly important as teaching specimens if the current trend for reburial of native American remains continues. A description of the method for papain digestion of fresh bone specimens was distributed to participants, and is also available to other Association members upon request. (Ed. note: If you do make a request, please send stamped and addressed envelope for reply.)
SECTION 4: ROUND TABLE DISCUSSIONS

BONE REMODELING AFTER TRAUMA

Paul S. Sledzik, National Museum of Health and Medicine, Armed Forces Institute of Pathology and Sean P. Murphy, University of Tennessee-Knoxville

This informal discussion focused on research being conducted at the National Museum of Health and Medicine. Skeletal specimens exhibiting known duration of osseous response following trauma were presented, along with slides and descriptive statistics of the preliminary data. This research uses the well-documented Civil War skeletal collection at the NMHM/AFIP. Preliminary results show that the first macroscopically detectable hard tissue remodeling following trauma occurs at 13 ± 3 days. These changes were observed as clastic and blastic activity near the fracture margin. Results of the study indicate the following: 1) osseous remodeling may not occur until two weeks following injury; 2) the absence of remodeling need not indicate that an individual died within hours or days following injury; and 3) this evidence may force osteopathologists and forensic anthropologists to reconsider the use of the term perimortem, which is commonly applied to events occurring at or around the time of death. Discussion from the participants involved the role of infection in the process of remodeling, and the effect on the osseous response of the location and condition of the periosteum following injury.

ENAMEL MICRODEFECTS AND HYPOPLASIAS

Jerome C. Rose, University of Arkansas

Photographs and plaster casts of various grades of enamel hypoplasias were made available for discussion of the minimum level at which a linear feature on a tooth would be considered a hypoplasia. Micrographs of hypoplasias and Wilson bands (enamel microdefects) were also used for discussion of the criteria necessary for scoring these features while examining thin sections. Dental thin sections and a microscope were available as well for use by participants, and lively discussion of these two enamel indicators ensued.
SECTION 5: SYMPOSIUM

TWO YEARS BEFORE COLUMBUS: THE AMERICAS IN 1490
Conveners: Frank P. Saul and Julie Mather Saul, Medical College of Ohio

RIB LESIONS AND TUBERCULOSIS: THE UXBRIDGE OSSUARY
S. Pfeiffer and W. Eaton, University of Guelph, Canada

Although ossuaries feature a problematical mixing of individuals, they offer an excellent opportunity to explore the impact of infectious disease on populations. This research was designed to explore the disease profile of the Uxbridge ossuary, an Iroquoian population previously reported to show a high frequency of vertebral lesions consistent with tuberculosis. (Uxbridge C14 date 1490 ± 80 A.D., minimum sample size = 457, minimum affected individuals = 26). Assuming that certain rib lesions are indicative of tuberculosis, all rib fragments were examined and classified. Of a total potential sample of 10,968 ribs, a minimum of 265 (2.4%) show characteristic lesions on their internal aspect. Most lesions (84.5%) are mild to moderate periostitis, but puffy periosteal expansion (13.6%) and resorption (1.9%) are also present. A comparison of adult and juvenile frequencies shows no significant age difference (2.1% versus 2.7%). Most lesions are on ribs 3-10. Although consistent in many ways with the observations of Kelley and Micozzi (1984) about the Hamann-Todd collection, this protohistoric sample differs in showing almost balanced involvement of the right and left sides (123:136), and characteristic lesion locations on the rib, head, and neck, as opposed to the central body. The number and pattern of rib lesions in this sample are consistent with an etiology of tuberculosis. Their presence further emphasizes the dramatic impact that this disease must have had on some prehistoric Amerindian populations.

THE DISTRIBUTION AND DISSEMINATION OF TREPONEMATOSIS AT THE TIME OF COLUMBUS
Brenda J. Baker, University of Massachusetts

Discussion of the Columbian exchange of diseases has focused primarily on the impact of European pathogens on Native American populations. The rapid dissemination of syphilis recorded throughout Europe around AD 1500 suggests transmission of a New World pathogen to a population with no prior immunity.
The pre-Columbian osteological evidence for treponematosis reveals its widespread occurrence throughout the Americas and absence in Europe. However, treponemal lesions in post-Columbian remains are found on both sides of the Atlantic Ocean. The distribution of treponematosis in skeletal remains indicates that the Columbian exchange of disease was not unidirectional.

UPPER MIDWESTERN PROTO-UNITED STATES HEALTH PROBLEMS
A CENTURY BEFORE COLUMBUS

John B. Gregg and Lawrence J. Zimmerman, University of South Dakota

In about 1350 A.D., 142 years before Columbus started west, 500+ people died catastrophically on bluffs of what later was called the Missouri River, in mid-South Dakota. Their mortal remains went into a common grave that was untouched until 1978 A.D., when soil erosion uncovered the site. Archaeological, anthropological, and geological investigations yielded important information about the people, their culture, environmental conditions, and circumstances related to their deaths. Analysis of the large skeletal cohort for osteopathology produced pertinent information about health and disease, and physical anomaly patterns that existed in upper midwestern proto-United States shortly before Europeans arrived.

DIPHYLLOBOTHRIASIS IN PRECOLUMBIAN CHILE AND PERU

Karl Reinhard, University of Nebraska-Lincoln and Arthur Aufderheide, University of Minnesota-Duluth

The study of coprolites and mummies from Peru and Chile provides evidence of prehistoric human infection with the fish tapeworm *Diphyllobothrium plicatum*. The normal definitive host for this species is the sea lion *Otaria flavescens*. Humans contract the infection from the consumption of undercooked fish. Previous finds of the eggs of this tapeworm in human coprolites indicated that humans were commonly infected with it. The present analysis of the intestinal contents of 21 mummies from northern Chile confirms that infection was common. The authors view this as an early evolutionary adaptation of an indigenous parasite species to early New World Native American populations. This is the first documented adaptive radiation to human populations in the New World of a parasite indigenous to non-human host.

MYCOTIC INFECTION IN THE AMERICAS BEFORE COLUMBUS

Charles F. Merbs, Arizona State University
Many of the fungi that produce diseases such as candidiasis, cryptococcosis, sporotrichosis, and histoplasmosis capsulati, are presently broadly distributed in both the Old and the New Worlds, but others, such as paracoccidioidomycosis, coccidioidomycosis, and blastomycosis, appear to have been native only to the Americas. The pre-Columbian presence of paracoccidioidomycosis in South America was demonstrated in 1979 by Marvin Allison et al. through discovery of a pulmonary lesion actually containing yeast cells of *Paracoccidoides brasiliensis* in a mummy from northern Chile. Evidence consisting of spherules and endospores of another mycosis producing fungus, *Coccidioides immitis*, have now been found in a pre-Columbian skeleton from Nuvakwewtaqa, Arizona.

THE SUMMING-UP

Frank P. Saul, Medical College of Ohio

The symposium provided a stimulating preview of the Columbian Quincentennial in 1992, though it was unfortunate that D.H. Ubelaker was unable to be present to give us an overview of the November 1989 Smithsonian symposium, *Disease and Demography in the Americas*: we hope that this summary will be published in a future issue.

The Pfeiffer paper was confined to a single site, and a comment was made about the broad dating (1490 ± 80 A.D = 1410 - 1570 A.D.), plus some ideas regarding modern clinical context. The Baker report on treponematoses was well received, but elicited some audience concern regarding 'evidence' that is uneven in terms of both dating and the fact that it has not been personally evaluated by a single investigator. The Gregg presentation was noteworthy for its emphasis on the presence of pre-Columbian violence, which included scalping and 'trophy-taking of corporeal components'. Gregg also pointed to the present world wide effects of the availability of tobacco and cocaine, with their related diseases: before 1492 these were found only in the New World. Concern expressed about the diagnosis of anemia and scurvy in bones from Crow Creek led to a proposal for a workshop on the subject. Questions that followed the Reinhard/Aufderheide paper and the Merbs paper, both of which dealt with often neglected disorders, also indicated interest in developing them as discussion subjects in the future.

A final comment from D. J. Ortner was that 'gradients' of what may seem to be the same lesion should not be assumed to be manifestations of the same disease, especially when one is dealing with partial skeletons or a single bone: this caution should be taken to heart by all paleopathologists.
Committee for the Seventeenth Annual Meeting

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