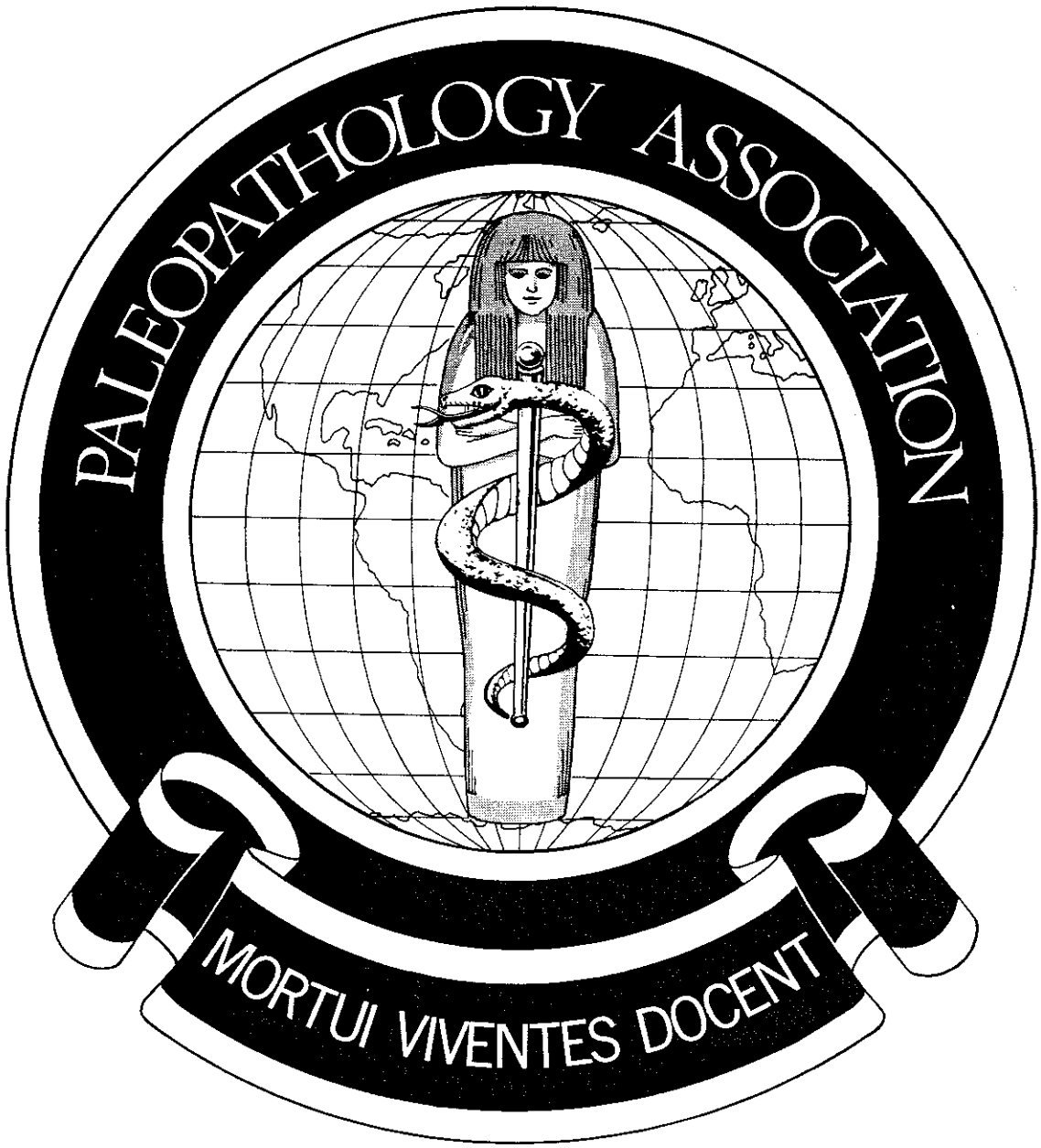
PAPERS ON PALEOPATHOLOGY

presented at the

Tenth Annual Meeting



6 April 1983

Indianapolis, Indiana

SECTION 1: PALEOPATHOLOGY IN NORTH AMERICA: A REGIONAL SURVEY

Convener: Charles F. Merbs

INTRODUCTORY STATEMENT

Charles F. Merbs, Arizona State University

Paleopathologists approach their subject from a variety of different backgrounds and perspectives. Some concentrate on particular areas of pathology, some on unusual kinds of evidence, and some on special techniques. Most tend to limit their studies to one geographical region, trying to understand the significance of its particular environmental variables, cultural as well as physical, to the patterns of pathology they observe. The record of pathology in a particular group depends upon factors as diverse as the presence of disease agents in the environment, the absence of nutrients in the diet, and culturally-determined responses to disease, and they are likely to vary greatly from one area to another. Each region has experienced a somewhat different history of research with distinct approaches to paleopathology sometimes developing, shared to some extent by others working in the same geographic area, but relatively unknown or poorly understood outside that region. Reports on groups from different geographical areas are presented at national meetings, but seldom is there any real attempt to compare results from two distinct regions to try to establish the reality of the differences reported and their possible significance. Significance is relative, and it is often difficult to evaluate the significance of one's own findings, except in relation to the findings of others. Are Eskimos particularly prone to osteoarthritis, Midwestern Indians to treponemal disease, and Southwestern Indians to porotic hyperostosis, or are these merely erroneous impressions that have developed as a result of research provincialism?

This symposium was organized as a first step toward breaking down the barriers of research provincialism, to get people to look at environmental (including cultural) factors of pathology in broader perspective, to share philosophical and methodological approaches to the subject, and to suggest problems for potentially productive future research. With this goal in mind, the continent was divided into eight major regions (the Northeast being unfortunately omitted), one individual representing each region. Each participant was requested to review the history of paleopathology in his or her region, to discuss some of the important findings and current issues in that region, and to suggest areas of potentially significant future research. Given the 20 minute time limit for individual presentations, this was a very difficult if not impossible task. However, the participants have put a real effort into it, and, in so doing, have contributed significantly toward a broader geographical appreciation of paleopathology in North America.

PREHISTORIC ALASKA

Michael R. Zimmerman, Jeanes Hospital, Philadelphia

Several mummified bodies from Alaska have been examined over the past decade, the oldest being a mammoth and some smaller mammals from the collection of the American Museum of Natural History. These frozen remains have been radiocarbon dated at over 21,000 years B.P. and show remarkable preservation of microscopic anatomy. Human mummies have been studied from the Aleutian and St. Lawrence Islands, and have demonstrated the antiquity of pneumonia, trauma, and atherosclerosis.

The frozen family of Barrow is a unique find in terms of the intact archaeologic provenance. Five individuals were identified, crushed and frozen in their house. This talk focuses on the anatomic findings of the bodies, two of which were almost perfectly preserved. Standard autopsy procedures were used on the Northern Body and the Southern Body, both females who died of crushing injuries. Northern Body was a young, relatively healthy adult. Southern Body was middle-aged and showed atherosclerosis. She had probably suffered a complicated pneumonia earlier in her life, and may have been lactating at the time of her death. She may also have had trichinosis. The three other individuals were poorly-preserved skeletonized sub-adults.

THE NORTHWEST

Jerome S. Cybulski, National Museum of Man, Ottawa

The early history of paleopathology in the Northwest can be said to have started with Boas' late nineteenth century descriptions of artificial cranial deformation and his reference to a syphilitic skull, followed by putative examples of skull trephination, arthritis, osteomyelitis and reports on dental health, but it was not until the 1970s that any serious attempt was made to deal with skeletal pathology.

During the past six years, surveys have included sites from both the prehistoric and early historic periods (prehistoric remains clustered between 1,000 B.C. and A.D. 500, historic contact occurring during the latter half of the eighteenth century). Evidence has been found of cribra orbitalia and ankylosing spondylitis in both periods. We have found possible rheumatoid arthritis, Scheuermann's disease, and spondylolysis (the latter more common in the prehistoric than in early historic). Osteoarthritis is common, and there is a possible case of Paget's disease, but the predominant pathology among prehistoric males is major trauma. In early historic skeletons, there is evidence of malignant tumors, tuberculosis, syphilis, chronic sinus infection and dental abscesses. There is also a recent discovery of a burial with signs of the periosteal bone inflammation normally associated with syphilis.

THE PLAINS

Bruce Bradtmiller, University of Tennessee

The history of Plains paleopathology is divided into three broad periods. The first, through about 1950, is characterized by descriptions of pathological conditions in museum specimens. T. Dale Stewart and Aleš Hrdlička were the most active during this period. They generally included *pathological remarks as a part of a complete skeletal analysis.* The second period, from about 1950 to about 1970 exhibited a shift in focus to the larger skeletal collections then becoming available. Pathological descriptions were usually reported as appendices to archeological site reports. The third period, beginning about 1970, is continuing. In this era, large studies with paleopathology as the main focus have begun to appear. John B. Gregg was a pioneer in this field, and his work continues in South Dakota; my work in Tennessee complements his in many ways. These later studies, and those appearing now, share the population as the unit of research.

The work under way at Tennessee explores the biological effects associated with European contact of the Arikara, between 1650 and 1830 A.D. Although a comprehensive data set is being collected, to date I have focused on small parts of the total health question. Nevertheless, combining pathology data with demography, Harris lines, long bone metrics and ethnohistorical data will ultimately allow a considerable understanding of the total health of the Arikara during this period.

Several problems should be addressed in the paleopathology of the Plains. Among the most pressing is the relationship between health and disease among the protohistoric Arikara, and the health and disease of native Americans currently living in South Dakota. The move to effect reburials of prehistoric skeletal remains in the Plains could seriously hamper our ability to explore the natural history of health and disease in this region.

THE MIDWEST

Della Collins Cook, University of Indiana

Paleopathologists in the Midwest enjoy generally good skeletal preservation and prehistoric mortuary practices that result in large, easily recovered series. Archaeologists and other specialists provide us with a wealth of data on subsistence and other relevant conditions of prehistoric life. Among the interesting issues in our region are the relationship of social status to health, high frequencies of an endemic syphilis or yaws-like disease in post-Archaic times, the appearance of a tuberculosis-like disease with the advent of large population aggregates in Mississippian times, and changes in health and trace element content consequent on the adoption of maize as an important part of the diet.

THE SOUTHEAST

Kenneth R. Turner, University of Alabama

Through the 1870s, Southeastern paleopathology was merely an occasional domain for local amateur antiquarians. Subsequently, until 1933, full-time workers appeared, whose research and collecting were generally systematic, usually focused on theoretical issues, and affiliated with major national museums. Later (1933 - 1942), the prolific CWA-WPA Southeast archaeological excavations fostered much descriptive research. During this decade, major collections grew, some professionals received extensive training, and local institutional facilities emerged. A period of quiescence followed (1942 - ca 1960), during which a constant trickle of reports described materials recovered by CWA-WPA projects. Beginning around 1960, most Southeastern graduate anthropology departments developed, with peripheral growth in paleopathological research. Late 19th century researchers in the Southeast were interested in disease as a factor in culture change, initiated debate on the geographical origin of syphilis, and speculated on pre-Columbian cannibalism. Most work during the 1900s has been descriptive, with some during the 1930s mentioning putative effects of civilization on health. Research since 1960 has tended to approach a similar theme with greater sophistication, being often concerned with pathology as indicative of cultural and biological stress, but notions concerning prehistoric cultures have tended toward oversimplification. Presently, however, the most urgent issues involve protection and management of research collections.

PREHISTORIC CALIFORNIA INDIANS

Phillip L. Walker, University of California, Santa Barbara

Paleopathological studies of California Indians are limited by the practice of cremation among many of the prehistoric inhabitants of the state. The Central Valley and the Santa Barbara Channel areas are two regions where cremation was practiced only to a limited extent, and comparatively large collections of human skeletal remains have been examined for the presence of a variety of different pathological conditions.

In the Central Valley, the frequency of Harris lines appears to decrease through time. This may reflect changes in subsistence strategies that decreased the probability of starvation during the late winter, when California Indians sometimes experienced food shortages. In the Santa Barbara Channel area, a different pattern is apparent, with some Late Period collections exhibiting high frequencies of Harris lines in comparison with collections from earlier sites.

The two areas differ in a number of other respects. In the Central Valley, dental caries rates exhibit relatively little temporal variation. In the Santa Barbara area, caries rates decrease significantly through

time, perhaps because of a change in diet from one of plant foods with a high carbohydrate content to one containing substantial quantities of fish with a high fluoride content. There is also a difference in the incidence of linear dental hypoplasia in the two regions. These lesions are quite common in remains from the Sacramento area, but uncommon in material from the Santa Barbara area.

THE SOUTHWEST

Charles F. Merbs, Arizona State University

The study of paleopathology in the American Southwest begins with Ernest Hooten's work on skeletons recovered from Pecos Pueblo, New Mexico, the first time that the subject was applied to an entire population. More recent work has been concerned with the history of various diseases in the Southwest such as tuberculosis, syphilis, and coccidioidomycosis. Evidence for the presence of tuberculosis now appears well established at sites such as Nuvakwewtaqa and Point of Pines, Arizona, and Tocito, New Mexico, with the oldest evidence (A.D. 875 - 975) coming from a small Kayenta Anasazi site in northeastern Arizona. Evidence for the presence of other infectious diseases in the Southwest is much more equivocal.

Fractures of various kinds are common, along with evidence of occasional violence, scalping, and possible cannibalism. Porotic hyperostosis and cribra orbitalia, common in many Southwestern skeletal series, have been associated with iron deficiency anemia related to heavy dependence upon maize. However, some infants and children from Nuvakwewtaqa, Sundown, and Elden Pueblo, all in Arizona, show involvement of the skull interior and the postcranial skeleton suggestive of more severe nutritional deficiency. Interesting examples of congenital or developmental conditions include a possible case of acromegaly from Pottery Mound Pueblo, New Mexico, and one of atlanto-occipital C2-3 fusion with possible traumatic consequences from the Bright Angel Ruin, Grand Canyon, Arizona.

MEXICO AND CENTRAL AMERICA

Frank P. Saul and Julie Mather Saul, Medical College of Ohio

The development of paleopathologic research in this region was briefly reviewed in terms of several important Mexican teachers and investigators of the recent past (the anthropologist Juan Comas and the physician and anthropologist Eusebio Dávalos) and the training and activities of current Mexican (and a very few other) scholars.

The very complex geographic-ecologic setting of this very large and

varied region was discussed in relation to its differential effect upon cultures and their mortal remains. Also emphasized was the unusual biologic and cultural continuity over time in the Maya and similar areas.

The major portion of the presentation was devoted to a review of basic questions for this area (and many others) that relate to health over time. Selected indicators (age at death, stature, dental attrition and caries, linear enamel hypoplasia, radiographic lines and bands of increased density, spongy or porotic hyperostosis, ossified periosteal hemorrhages, and new laboratory techniques [trace element analysis, e.g. Schoeninger] were reviewed in relation to a chronologic orientation (hunting and gathering vs incipient and later agriculture with population expansion vs time of contact ['The Columbian Exchange'] vs colonial vs modern) together with comment regarding questions unique to this area (e.g. the pre-Columbian Maya collapse).

Although a great deal of information was presented concerning health over time and the pre-Columbian presence or apparent absence of certain diseases, it is obvious that this major region requires a more complete synthesis and more field and laboratory research.

Acknowledgements

We thank Professors Lourdes Márquez and Carlos Serrano for their help with this particular presentation, not forgetting the many Mexican physical anthropologists and physicians who have helped us in the past.

SECTION 2: INBORN, CONGENITAL, AND DEVELOPMENTAL ABNORMALITIES IN PALEOPATHOLOGY

Convener: John B. Gregg

INTRODUCTORY STATEMENT

John B. Gregg, University of South Dakota

Paleopathologists have reported few investigations of inborn and developmental anomalies in ancient human remnants. A symposium on congenital defects scheduled by the Paleopathology Association in 1979 was cancelled for lack of support. The best explanation for this absence of enthusiasm is the dearth of specimens having exemplary congenital anomalies for discussion. Cancellation of this session was most unfortunate, because the very fact that obvious, overt, inborn anomalies are rare in ancient human remnants but very prevalent today should have stimulated enquiry to explain this dichotomy. Did inborn anomalies exist in the past? Does the paucity of overt or disabling congenital anomalies in ancient people reflect 'survival of the fittest?' Are the anomalies prevalent in the culturally sophisticated twentieth century world something new? If overt anomalies existed in the past, why are there few remains of affected individuals among ancient human skeletons and mummies?

Factors implicated as mutagens, capable of causing congenital anomalies, are endogenous (aberrations in genetic transmission), and exogenous (affectation of the fetus at some point in embryogenesis, when it is susceptible). Many chemicals, drugs, and other agents are suspect as cause for inborn anomalies and influential in mutations. Compared to the present, in the distant past there were few established mutagenic factors available to the pregnant female. Maternal nutrition has been evaluated thoroughly for its effect on pregnancy and on the fetus. Minckler et al (1971:123) reported that spontaneous abortions occur in 20% of pregnancies, and cited Inhorn (1967), who showed that chromosomal abnormalities accompanied 25% of these. If the frequency of prematurity and spontaneous abortion were known for the previous inhabitants of a certain region, it could be used as an index of possible abnormal pregnancies.

Certain conditions catalyze the appearance of congenital anomalies. Isolation (geographic, cultural, linguistic, economic, or religious) is a potent factor perpetuating genetic anomalies in a population. Consanguinity and incest promote perpetuation of gene-mediated abnormalities. Unfortunately, little paleopathological evidence exists relating to pregnancies and inborn defects in the societies that condoned consanguinity and incest.

Different congenital and developmental anomalies that occurred in

antiquity, some new information relating to the frequency of prematurity and spontaneous abortion in ancient North America, and information relating to a means of evaluating the bones of premature and newborn infants for evidence of nutritional and metabolic stress during pregnancy will be presented in this discussion. A select panel will ponder the data presented, compare the evidence submitted with their own experiences and with the information available from other sources, then advise regarding future investigations in the realm of congenital and developmental abnormalities in antiquity.

Reference

Minckler,J., Anstall,H.B. and T.M.Minckler. 1971. Pathobiology, An Introduction. C.V.Mosby Co. St. Louis

HEREDITARY MULTIPLE EXOSTOSES IN AN INDIVIDUAL FROM A SOUTHERN ONTARIO IROQUOIS POPULATION

M. Anne Katzenberg, University of Toronto, Marc A. Kelley, University of Rhode Island and Susan Pfeiffer, University of Guelph

Skeletal lesions characteristic of hereditary multiple exostoses were discovered in a bundle burial from a protohistoric Iroquois ossuary. The disease, inherited as an autosomal dominant, is not uncommon today, yet there are few reported cases from earlier human populations. The bundle burial was distinct from the highly mixed remains of approximately 457 individuals. No other bones exhibiting exostoses were found in the ossuary.

CONGENITAL DISTURBANCES IN ENDOCHONDRAL BONE DEVELOPMENT IN TWO ARCHEOLOGICAL HUMAN SKELETONS FROM NORTH AMERICA

Donald J. Ortner and Stephen Hunter, Smithsonian Institution

Achondroplasia (chondrodystrophy) is an inherited and congenital disturbance of growth in which endochondral bone formation is diminished but intramembraneous bone formation is normal or nearly so. In achondroplasia, centers of endochondral ossification, in addition to having abnormally slow growth, tend to fuse earlier than normal, accentuating the effect of slow growth. Inheritance is through a simple dominant mode, but the degree of expression (penetrance) of the condition varies and tends to be weak. In domestic animals selective breeding has led to several syndromes in which different parts of the skeleton are differentially affected (e.g. the bulldog, dachshund, boxer, Pekinese, and Boston terrier). In humans the disease tends to be generalized with all centers of endochondral ossification affected.

In archeological human skeletal samples the disease is well documented

in both the Old and the New World, although the number of cases is small (around ten). Two previously unreported cases are presented. One, that of a young child (NMNH 382291), is from the Belle Glade Mound in Florida and exhibits the classic features of achondroplasia -- short, thick long bones with disproportionately enlarged epiphyseal ends. The other case (NMNH 271813) is unusual in that the major growth disturbance affects primarily the humeri and the pelvis. Length growth in the other bones is normal or near normal, although there is evidence of bowing and other features indicative of defective endochondral bone formation. The latter case is from a Pueblo site in the American southwest. The two cases illustrate the variety in the expression of cartilage growth disturbances.

DEVELOPMENTAL DEFECTS OF VERTEBRAL BODIES IN A CANADIAN ESKIMO ISOLATE

Charles F. Merbs, Arizona State University

The Sadlermiut, an isolated Eskimo (Inuit) group that lived on Southampton Island north of Hudson Bay in the Canadian Arctic, succumbed to an epidemic during the winter of 1902 - 03. Seven of the Sadlermiut skeletons, from a series numbering slightly less than 100 individuals, exhibit a developmental defect involving thoracic and lumbar vertebrae. The defect ranges from a small cleft or hole in the vertebral body to a failure of a significant portion of the body to develop. In its most severe form, the defect, best known clinically as 'sagittal cleft vertebra,' divides the body into two parts, resulting in anterior exposure of the neural canal, and presenting a 'butterfly' appearence in anteroposterior radiographs. The affected individuals, ranging in estimated age from 6 to 40 years, have a total of 13 vertebrae affected. Two mild examples of the condition were also discovered among 400 skeletons of neighboring Thule culture Eskimo groups.

This paper also discusses other congenital and developmental conditions found in the Sadlermiut series, including spina bifida, Scheuermann's disease, and third metacarpals with missing styloid processes. The predisposition of individuals with these conditions to early degenerative or traumatic changes in the skeletal system is also considered.

TRANSVERSE LINE FORMATION IN PROTEIN-DEPRIVED NEWBORN RHESUS MONKEYS

Mark A. Murchison, Douglas W. Owsley and Arthur J. Riopelle, Louisiana State University

Radiographs of 85 newborn rhesus monkeys, Macaca mulatta, were examined for evidence of transverse lines in the proximal and distal ends of the left radius. Transverse lines (Harris lines) in long bones

are density anomalies thought to be associated with intervals of stress during growth. This research documents the frequency of postnatal transverse-line formation (i.e. formation of birth lines) and seeks to determine whether the amount of dietary protein available to the animal affects the frequency of line formation.

Newborn rhesus monkeys (n=30) were placed on a protein-restricted diet. Data for the experimental animals were compared with a control group (n=55) that was maintained on a diet adequate in protein. A higher mean number and a higher percentage of transverse lines occur in the control animals than in protein-restricted infants.

Given the use of transverse lines as natural markers in growth studies and as indicators of morbidity and malnutrition in bioarchaeology comparisons, it is useful to clarify the types of factors that lead to line formation. Archeological implications are discussed.

CONGENITAL ANOMALIES OF THE LOWER SPINE IN TWO ARIKARA SKELETAL SERIES

Bruce Bradtmiller, University of Tennessee

Skeletal collections from the Sully (39SL4) and Larson (39WW2) sites in South Dakota are compared with respect to congenital anomalies of the lumbosacral region of the vertebral column. Spina bifida occulta and separate neural arches are specifically considered. Spina bifida occulta, the partial or complete lack of fusion of the sacral neural laminae into spinous tubercles is a completely genetic trait. Separate neural arches, or spondylolysis, occur as a separation at one or both pars interarticularis. It apparently has some genetic and some behavioral component. The Sully site dates from 1650 - 1700 A.D., and the Larson site from 1679 - 1733 A.D. They are located near each other in the Missouri River Basin.

The overall incidence of these anomalies in the two groups is quite different. The Larson series contains over twice the frequency of separate neural arches as the Sully series; spina bifida occulta occurs over four times as frequently in the Larson site. Patterns of age and sex distribution of these traits are documented, and contrasted between the two sites. In the case of spina bifida occulta, these data suggest that the groups are genetically distinct. The large difference of separate neural arches between the sites could be due to a genetic difference or to a behavioral difference. The suggestion is made, based on these as well as other data, that both genetic and behavioral factors are responsible for the high incidence of this trait.

ANCIENT INBORN FACIAL CLEFTS AND NON-ODONTOGENIC FISSURAL CLEFTS

John B. Gregg, University of South Dakota, Marvin J. Allison, Medical College of Virginia, Sylvester Clifford, University of South Dakota, Enrique Gerszten, Medical College of Virginia and Walter E. Klippel, University of Tennessee

Unusual, apparent congenital facial fusion defects in six ancient skulls from the Upper Missouri River Basin and southeastern U.S.A. are presented and discussed. The similarity between non-odontogenic fissural defects and overt and occult lip and palate clefting is explored. Some specimens in other collections now labeled 'dental abscess' or 'dental tumor' may represent these anomalies. Because of the similarity in embryology and anatomy, non-odontogenic fissural cysts must be considered as an abortive form of facial clefting. By determining the frequency with which these occult anomalies occur, it may be possible to estimate the frequency with which these occult anomalies occur it may be possible to estimate the frequency of overt facial clifting in the past, despite the fact that skeletons with overt facial clefting are found only infrequently.

MATERNAL MORTALITY IN ARIKARA INDIAN VILLAGES OF THE POST-CONTACT PERIOD

Douglas W. Owsley, Louisiana State University and Bruce Bradtmiller, University of Tennessee

High infant mortality and high mortality for late adolescent and young adult females suggest that obstetrical hazards may be one explanation for differences in male and female mortality curves. This possibility is investigated in Arikara skeletal series by determining the frequency of females who died with fetal remains in utero. Two females (0.9%) were so identified. Examination of the females and the fetal remains do not provide evidence that stress of childbearing was the cause of death in these cases.

PANEL DISCUSSION

Moderator: John B. Gregg
Panelists: David A. Birkett (Middlesbrough, England), Frank P. Saul Medical College of Ohio, Theodore A. Reyman, Mount Carmel Mercy Hospital (Detroit) and Michael R. Zimmerman, Jeanes Hospital (Philadelphia)

The discussion was opened by Dr. Gregg, who read two conflicting opinions from the nineteenth century. One writer, in 1839, said that it was a common Indian custom to destroy deformed babies (an explanation frequently put forward to explain the paucity of remains showing

congenital anomalies). On the other hand, in 1861 George Catlin wrote that infants with deformities were looked after most tenderly, 'protected and guarded with superstitious care.' Dr. Zimmerman took issue with Catlin's reliability as an observer, pointing out that he was an artist who cherished his relationships with the Indians and would always defend them against what might be considered calumny.

Dr. Reyman, after congratulating the authors on a fine array of papers, went on to say that it would be a misapprehension to continue believing that congenital anomalies in ancient remains are rare. Many anomalies go unnoticed or unreported, simply because they are relatively minor and would have caused no significant clinical difficulty during life. Some might have only soft tissue expression and would therefore be missed in skeletal remains. Others might masquerade as acquired defects, and some will be missed because other disorders so distort the remains that classical features are not recognized. Some anomalies can be seen only in the total skeleton, thus not being spotted in partial remains. At the same time, certain congenital anomalies were probably not present in the past, e.g. fetal alcohol syndrome, drug associated anomalies and those related to toxic chemicals or irradiation, which would not have been present before the Industrial Revolution and the marked increase in population density.

He felt that we should begin to describe and catalog any and all changes observed, so that as our knowledge advances in other areas (e.g. demographic studies involving HLA typing), we may begin to appreciate the association between certain populations and certain anomalies. We should try to answer questions about consanguinity and the development of patterns of anomalies in a population, or questions concerning cultural patterns or environmental factors and their association with anomalies.

He also stressed the fact that we do have evidence from the past for the existence of congenital anomalies. The ancient Egyptians knew about genetic dwarfs (African pygmies), achondroplastic dwarfs, and possibly also pituitary dwarfs. Evidence from paintings, sculptures and written sources should be compared with the evidence from human remains, both mummified and skeletal, thus providing a clearer picture of the type and amount of such congenital disorders, particularly if the human remains are equivocal; in such cases, the addition of historical accounts could lead to a firm diagnosis. He felt that we now have the interest, the ability, and the techniques to accomplish this, and could produce a major addition to human history.

Dr. Saul also felt that it was incorrect to state that congenital abnormalities are not seen in ancient human remains. They <u>are</u> seen, but only in art forms, such as the Olmec 'child-man' sculptures, which may indicate Downs Syndrome, or the Atlantean figures that indicate dwarfism. Dwarfs were also described by Spanish explorers. The lack of skeletal remains might be due to ceremonial disposal of bodies, which (according to Durán and Mendieta) involved burning.

We also see dental abnormalities: e.g. odontomes (benign dental tumors), enamelomas (dental pearls), gemmated (twinned) teeth.

All of these are present in the Maya area, and probably elsewhere, but their presence is not emphasized because they are of little functional significance.

Sometimes the abnormalities may have been misdiagnosed. He was able to rediagnose congenital dysraphism at bregma in an adult male from Chichén Itzá (900 - 1200 A.D.), which had been previously listed, in 1940, as an 'old, healed, depressed fracture.'

Regarding the condition of remains, Dr. Saul warned that caution is necessary because postmortem root and other damage can mimic cysts, etc., especially in fragmentary material. Vertebral material is often lacking or badly damaged, but Genovés found sacralized L5s in 6 out of 11 sacra at Oaxaca (time of contact), and the Sauls found 2 fused C2 - 3s, possibly Klippel-Feil Syndrome, at Tancah (also time of contact).

Definition is also a problem. Is spondylolysis congenital, as once believed, or is it traumatic, as is the current belief, or is it perhaps a combination of both? The fragmentary nature of the materials has limited them to one case in their own work, a 400 B.C. specimen from Cuello, indicated by a fragment of the upper right articular process.

It is very important to go on looking for congenital anomalies. Not only are some of them important from a functional point of view, but those that are hereditary in nature provide definite clues to population gene flow, especially endogamy (in-breeding).

Dr. Saul illustrated his comments with slides, both from art and from his own investigations of human remains.

Dr. Birkett was asked to compare what he had heard today with findings from European paleopathology. He said that his immediate response was to note the similarity, although it was his impression that there might be a higher incidence of certain anomalies.

(Ed. note: At this point, because of technical difficulties with the taping, Dr. Birkett's remarks became unintelligible. We regret the inconvenience to our subscribers)

SECTION 3: CONTRIBUTED PAPERS

CUTANEOUS PATHOLOGY IN A SOUTH AMERICAN MUMMY

Harvey Sasken, Brown University, Marvin Allison and Enrique Gerszten, Medical College of Virginia

During the examination of a South American mummy, a female aged about forty, from northern Chile, cutaneous alterations were discerned. On pathologic examination, the skin is medium to dark brown in color with a sweet, slightly pungent aroma. Hairs are present, as are dermal ridges. Numerous 0.1 cm smooth surfaced popular elevations punctuate the external surface.

Specimens for light microscopy are prepared by rehydration in modified Ruffer's solution, followed by routine dehydration and paraffin and glycol methacrylate embedding. Electron microscopic samples are prepared by simultaneous rehydration and fixation in 5% glutaraldehyde and 0.075 M PIPES buffer at 4°C. The tissues are post fixed in $0_5 0_4$ and embedded in Spurr's low viscosity resin.

The epidermis is absent, no nuclei are evident. Hairs with abundant brown pigment situated within well-preserved follicular structures are recognized. Smooth muscle and collagen bundles are easily discerned. Numerous discrete and quite subtle dissolution and destructive processes are recognized throughout the dermis. Some of these areas are related to surface elevations. There is further indication that some of these lesions can be related to vessels. We concluded that there is evidence of a vascular related necrotizing process. Of the several categories of disease possible, we feel that there is compelling evidence for a systemic infection. Other tissues are currently being examined.

TREPANNING PRACTICE IN PREHISTORIC DENMARK

Pia Bennike, University of Copenhagen

As part of a paleopathology study, including computer registration of all human remains from prehistoric Denmark, a total of 19 trepanned skulls was found, which represented 3% of all well preserved prehistoric skulls.

New C^{14} datings showed that skull surgery could be dated back to 3,500 years B.C. A very uniform location of the trepanations may also indicate that the skull surgery was performed for the same cause, primarily after man-induced injury.

This research was supported by the Danish Medical Council, the Danish Council of the Humanities, and Queen Margrethe II's Archaeological Foundation.

OSTEOARTHROSIS: A CHANGING PATTERN

D.A.Birkett, Middlesbrough, England

The paucity of evidence for rheumatoid arthritis in ancient skeletal remains is in sharp contrast to the obvious signs of osteoarthrosis or degenerative joint disease, which was common throughout prehistoric and historic periods, as it is today in medical practice. However, it has been suggested that the pattern of joint involvement of this disease has changed, possibly because of a different lifestyle and changed occupations. An attempt has been made to draw together figures of the incidence of osteoarthrosis in the larger joints of the skeleton in a number of different populations from different living sites and periods in Great Britain, in order to show changes over the centuries.

NAPOLEON BONAPARTE: WHAT IS THE REAL EVIDENCE OF ARSENIC POISONING?

Peter K. Lewin, Hospital for Sick Children, Toronto

Evidence is presented that a hair specimen obtained from Napoleon at the time of his death contained normal levels of arsenic (1.4 parts per million) and elevated levels of antimony (5.6 ppm). It is therefore concluded that Napoleon did not die of chronic arsenic poisoning. The provenance of the hair is clear.

SECTION 4: A.A.P.A. SESSIONS ON PALEOPATHOLOGY

A. SKELETAL ANALYSIS AND THE EFFECTS OF SOCIOECONOMIC STATUS ON HEALTH

A biological perspective on prehistoric social status (A.M.Palkovich)

Childhood stress, age at death and social status at Dickson Mound, A.D. 590 - 1300 (A.H.Goodman, N.A.Rothschild and G.J.Armelagos)

Social status and health: a comparison of Middle Woodland and Mississippian populations from westcentral Illinois (D.C.Cook)

The cultural determinants of Mississippian community health: an examination of populations from two areas of western Illinois (G.R.Milner)

Subsistence role behavior and the infectious disease experience on the prehistoric Georgia coast (C.S.Larsen)

Status and health in Colonial South Carolina: Belleview Plantation 1738 - 1756 (T.A.Rathbun and J.D.Scurry)

The biological effects of European contact among the Arikara (B. Bradtmiller)

An examination of differential status and health for the prehistoric Anasazi from Black Mesa, Arizona (C.Piacentini and D.L.Martin)

Comments by J.E.Buikstra, Northwestern University

Some of the most important products of this session were the cautions: to be critical concerning the possible biases in the sample, however large (Cook), which can indeed affect health status estimates. Another cogent comment was the observation that we cannot equate community health directly with our osteological indicators without qualification - e.g. how do hypoplasias or periostitis translate into population health? Some of the more provocative results emerged from studies of southwestern remains (Piacentini and Martin, Palkovich). Both pointed to the importance of explicit definition of status markers as seen in the archaeological record and as corroborated by ethnographic evidence, as models against which community health may be evaluated. The fact that Piacentini and Martin found grave construction rather than grave goods more consistent with expectations is significant, and should surprise no-one who has carefully considered the relationship between the social dimensions of mortuary behavior, status, and health. Milner illustrated the need for careful considerations of regional variation in health before we generalize about health status in Mississippian populations. He also presented a provocative hypothesis implicating bean preparation techniques in the health status of Dickson Mounds Mississippian populations, when compared to the inhabitants of the Cahokia area. Goodman and Cook both illustrated the importance of developing models that carefully evaluate temporal change and status differences. Goodman suggested

that status differences, as seen in grave goods, may reflect advantaged health status in Mississippian Dickson Mounds. However, Cook finds no such association in the lower Illinois Valley Mississippian series that she has studied. The biological costs and benefits of an agricultural existence are also considered by Larsen, who argues that females were more disadvantaged in the Georgia Coast region during the shift to agriculture. Bradtmiller documented the costs of European contact to native Americans, and Rathbun noted the fact that elites from the colonial period were not necessarily more healthy than lower status counterparts. In general, the conclusions would seem to support the notion that high status and advantaged health status do not necessarily correlate, and that human beings have not always made 'healthful' choices in their attempts to distinguish themselves from peers.

B. PALEOEPIDEMIOLOGY

Skeletal and dental pathologies in a Cercocebus albigena sample (D.Clauser)

Patterns of human-induced injuries of the prehistoric skeletons from Denmark (P.L.Bennike)

Paleoepidemiology of a native Californian skeletal population (R.D.Jurmain)

Degenerative joint disease in the skeletal remains from Kulubnarti, Republic of Sudan (L.Kilgore)

Rib lesions in chronic pulmonary tuberculosis (M.A.Kelley and M.S.Micozzi)

Evidence for the antiquity of tuberculosis in the New World: skeletal pathology in the sacroiliac region (M.S.Micozzi and M.A.Kelley)

Health status of colonial iron-worker slaves (J.L.Angel and J.O.Kelley)

Caries in permanent dentitions of protohistoric Easter Islanders (A.M.Mires, D.W.Owsley and G.W.Gill)

Comments by J.L.Angel, Smithsonian Institution

This was a chance synthesis of papers, not a symposium. There was no common thread tying them together, but it was an interesting session with good discussion. Clauser's major findings regarding fractures disagrees with Schultz' previous linking of fractures with arboreality. Bennike stresses arrow wounds and trephinations in prehistoric times, with decapitation occurring in the Viking period. Jurmain noted early extreme dental wear and frequent vertebral osteophytosis. Kilgore finds females more stressed than males in her study of medieval Nubia. Kelley and Micozzi note the uncertainty of opinions about the origin of prehistoric tuberculosis and subtlety required for diagnosis. Kelley and Angel, in their study of 31 black iron-working slaves, found them to be fairly healthy, except for evidence of inadequate childhood diet and signs of occupational stress. Mires, Owsley and Gill noted a higher adult frequency of caries than in other Pacific groups, probably related to a sweet, starchy diet.

Committee for the Tenth Annual Meeting

Charles F. Merbs: Scientific Chairman

John B. Gregg: Chairman, Congenital Anomalies Symposium

Della Collins Cook: Local Arrangements Chairman

Eve Cockburn: Meeting Report Editor

RESOURCES IN PALEOPATHOLOGY

The Paleopathology Association is compiling a listing of individuals who are willing and able to perform the specialized studies essential to our interdisciplinary field. Members who would be interested in collaborating on studies of skeletal or mummified remains are urged to complete the form below and send it to:

Michael R. Zimmerman, M.D., Ph.D.
Chief of Anatomic Pathology
Jeanes Hospital
7600 Central Avenue
Philadelphia, PA 19111

Name: _____

(title) (surname) (first name)

Address: _____

_____

(city, state, zip) (country)

Telephone number: Office ( ) - _____

Home ( ) - _____

Check off any category in which you have special interest or expertise:

___ Skeletal biology
___ Gross pathology (bone ___; soft tissue ___)
___ Histopathology (bone ___; soft tissue ___)
___ Radiology
___ Age determination (adult ___; subadult ___)
___ Dating (radiocarbon ___; other ___)
___ Chemical analysis
___ Microbiology
___ Congenital disease
___ Arthritis
___ Trauma
___ Infectious disease
___ Neoplasia
___ Parasitology
___ Other