PAPERS ON PALEOPATHOLOGY

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A HUMAN SKULL FROM THE MINOAN SITE, KOMMOS, CRETE

P.J. Anderson (U.S.A.)

A partial human skull was uncovered in 1982 during the excavations of a building at the site of Kommos, near Phaistos. LM III sherds were present near the skull, but no related bones were found. The skull lacked mandible, maxilla, and most of the zygoma and facial bones. Two irregular fenestrations were present in the left cranium. X-rays disclosed that approximately 70% of the skull was fossilized, but inner and outer tables of the calvaria were clearly defined. The sutures were fused in the pattern of a young adult. The sella turcica was normal. The frontal sinuses were aerated but extremely small.

The configuration and measurements suggest that the skull was that of a young male. The significance of the calvarial defects is uncertain. X-rays disclosed no osteoblastic 'healing' reaction at the margins of associated 'fracture' lines. The context of the discovery site suggests that the skull dates from 1200 to 1600 B.C. (LM III to MM III), although several other possibilities must be considered and attempts at more precise dating are in progress.

MICROSTRUCTURAL ALTERATIONS IN BURNED BONES FROM A NEOLITHIC TOMB AT SAINT-LEONARD, WALLIS, SWITZERLAND

C.A. Baud, A. Susini and A. Wetz (Switzerland)

This cist, the contents of which are described here, was excavated in a Middle Neolithic site at Saint Leonard, dating to about 3500-2800 B.C. Numerous bone fragments were scattered on the bottom of the cist. It is at once clear that these bone fragments have been burned: the organic components are missing, and the mineral substance recrystallized. The microscopic and microradiographic aspects are unusual: the osteocyte lacunae are enlarged or surrounded by an irregularly mineralized area. Similar aspects have been reported in various pathological conditions, such as fluorosis, vitamin D resistant rickets, renal osteodystrophy, and osteogenesis imperfecta tarda.

However, in the present case, the topographic distribution of the lesions is different, sparing the subsurface layers of the bones or bone fragments. Such a structure is typical of a postmortem bacterial attack. Thus, it is probable that our specimens were at first inhumed and contaminated by soil microorganisms, and shortly afterwards exposed (doubtless accidentally) to a fire that arrested the bacterial resorbing action at the early stages.
DISLOCATION AND/OR CONGENITAL MALFORMATION OF THE SHOULDER JOINT

P. Bennike (Denmark)

The subject presented is a medieval skeleton, of an approximately 16 year old boy, excavated from a Danish cemetery. It reveals several pathologic changes, probably due to congenital malformation, of which the most intriguing is seen at both scapulae, with the changes being bilaterally symmetric. Both the glenoid cavities are placed posterior but at the normal height of the bone. The joints are almost perpendicular to their normal direction. The size of the glenoid cavities is normal, and the shape is rather flat in accordance with the development stage of the skeleton, where the epiphysis of the rim has not yet appeared to form the gently concave fossa normally seen in adults. Both the surface and the borderlines of the glenoid cavities are more irregular than normal at that age.

The position of the joints may be caused by dislocation and/or congenital malformation. Because of the shape of the cavities, the symmetric bilateral symmetry, and the minor congenital malformations, it is believed to be caused primarily by congenital malformation. Probably the young man was not much affected by the malformation of the shoulder joints, as is indicated by the normal form and size of the humeri and the well developed muscle attachments of the bones. The claviculae seem shorter and more twisted than normal, which may be caused by a twisting of the scapulae, so the glenoid cavities may have pointed almost in the normal direction, in spite of the malformation. As far as we know, no similar case has been described in clinical observation or in skeletal finds.

DENTAL PATHOLOGY AND DENTAL WEAR OF THE MIDDLE PLEISTOCENE HOMINIDS FROM ATAPUERCA, SPAIN

J.M. Bermudez de Castro and A. Rosas (Spain)

The Middle Pleistocene hominid fossil sample found in the Sierra de Atapuerca (Sima de los Huesos, Cueva Mayor) in 1976, 1984 and 1985, is composed of 119 cranial, dental, mandibular and postcranial remains belonging to at least ten individuals. A total of 56 teeth, 43 catalogued as isolated specimens and 13 preserved in jaws, constitutes the dental sample from Atapuerca. These teeth, as well as the jaws, were examined for possible pathological evidence (caries, hypoplasia, calculus, parodontal disease, etc.). For example, the teeth were examined with a binocular lens, in a search for hypoplastic defects, as arrested growth due to diseases, malnutrition or other metabolic disorders had been observed as Harris lines in the long bones of one individual. Furthermore, we studied the tooth wear in relation to the problem of the differential wear of the anterior dentition with regard to the postcanine. The tooth wear of the Atapuerca individuals was compared with that of other Pleistocene hominids. The human fossils from Atapuerca, as well as other fossils of the Middle Pleistocene, Riss/Würm Interglacial, and Würm I-II climatic phases,
show a greater wear on the anterior dentition than on the postcanine. An opposite pattern is observed in later and in living populations. The possible explanations of these changes are discussed.

OSTEOCHONDROMA (CARTILAGINOUS EXOSTOSIS)

D.A. Birkett (England)

An examination was made for the presence of osteochondroma in various ancient populations. Six examples were found in approximately 1500 individuals. All were round the knee joint, 4 on the tibia and 2 on the femur (1 of the femoral examples being bilateral). Five were in men and one in a woman. Only one example was thought large enough to have caused symptoms during life. An examination of a thick section from one lesion confirmed the normal trabecular pattern of the bone inside the tumour, with a rim of normal cortex running from the shaft of the long bone round the tumour, thus indicating that the tumour was merely an extension of the normal bone.

STUDY OF A TREPANNED SKULL BELONGING TO THE NEOLITHIC PERIOD, FROM THE SITE OF 'CAN TINTORE' IN GAVA (BARCELONA), SPAIN

D. Campillo (Spain)

The exhumation of this skull from the Neolithic period is of great interest for the study of cranial trepanation in Catalonia, because it is a double trepanation in a young adult male, performed by abrasion. The long survival of this individual and the abundant remains of the postcranial skeleton that still exist demonstrate some aspects of the pathology of this case, and also tell us something about other prehistoric trepanned skulls found in Catalonia.

ANOMALIES OF THE SKULL BASE OF CANARY ABORIGINALS AND OBSERVATION OF VASCULAR IMPRESSIONS ON THE FRONTAL BONE

J.M. Carretero and P.J. Pérez (Spain)

This work has been carried out on numerous cranial remains of aboriginal Canarians housed in the Archaeological Museum of Santa Cruz de Tenerife (Spain). The frequency of the following anomalies on the base of the skull has been studied: labia foraminis magni, processus basialis, condylus tertius, processus paracondyleus, canalis hypoglossis bipartito, double occipital condyle, osseous spine on the anterior part of the foramen magnum, and assimilation of the atlas. In addition, the vascular impressions on the
external face of the frontal bone have been examined. There is no evidence on this bone of scarifications, as has been suggested by some authors regarding the Canary Aboriginals.

SOME VERY RARE CASES OF CRANIAL PATHOLOGY IN THE LATE MIDDLE AGES IN SOUTHWEST FRANCE

E. Crubézy and J. Zammit (France)

Three rare cases of cranial pathology are described in detail. The skeleton of an adult male from the abbey of Valmagne (Hérault) dated to the 14th-16th century has a malformation in the craniovertebral region: condylar and lateral mass dysplasia, processus epitransversarius articulate with the skull base at the outer part of the foramen magnum, spina bifida of the atlas, dysplasia of the odontoid process, and concavity of the articular facets of the superior part of the axis. The skull of an adult male more than 40 years old from the cemetery (St Hilaire, Aude), dated to the 14th-16th century, has a round lesion two centimeters in diameter, which is interpreted as an hemangioma. The skull of a child (5 to 10 years old) from the Mairac cemetery, dated to the 13th-15th century, is abnormally large and a diagnosis of hydrocephalus is possible.

PSEUDOTREPHINATION OF THE SKULL

T. Dzierżykray-Rogalski (Poland)

Trephination is one of the oldest surgical procedures performed in all parts of the world since Paleolithic times. It should, however, be differentiated from the damage to the skull made in the course of exploration of bones. Skull injuries from early childhood could also suggest trephination. Also, many diseases, such as tuberculosis, syphilis, localized osteomyelitis, mycosis, cysts, and neoplastic metastases, could be confused with trephination. The literature is rich in descriptions of new cases of trephination, as this apparently easy to diagnose injury of the bones of the skull can be seen even by an inexperienced scientist. Cases of pseudotrephination are frequently described, and these should be differentiated on the basis of the very characteristic features of trephination.

VIOLENT INJURY IN AN INDIVIDUAL FROM THE NEOLITHIC PERIOD

F. Etxeberría (Spain)

It is not usual to find evidence of injury, as described here, among the
human remains from the prehistoric ages of Spain. The discovery of an arrowhead of silex lodged in a human coxal bone, from the site of San Juan Ante Portam Latinam (Alava, Spain), whose chronology seems to be centred in the Neolithic period (approximately 2,000 B.C.), constitutes the oldest indication of human violence found to date in the Basque country. It has to be considered as exceptional, and it should be mentioned that the arrowhead remained as a foreign body in the individual, who survived the wound.

A FATAL INJURY OF THE CRANIUM FROM THE LATE HELLADIC III B1 IN THEVES: ETIOLOGY AND RESULTS

M. Foundoulakis (Greece)

Several human skeletal remains were unearthed from the Mycenean palace in Theves. The skull of a young female is of special interest because of a depressed detached fracture in the middle of the cranium vault that was produced by a violent blow. From the morphological examination of the fracture, it is assumed that the injury was caused by a sharp object hitting the skull at the transversal axis, coming from above at the rear and to the right. This deduction is confirmed by the three asteroid lines of the fracture. The trauma is angular in shape, and the exocranium dimensions are 38 mm anteroposterior axis and 39 mm at the transversal axis. In addition, the endocranial surface indicates a detachment measuring 7 mm. Further biomechanical and statistical analyses will be conducted to determine the probable mechanism of the vault fracture.

IMMUNOHISTOCHEMISTRY IN MUMMIFIED TISSUES: A PROBLEM IN PALEOPATHOLOGY

E. Fulcheri and E. Rabino Massa (Italy)

In order to verify the limits and perspectives of immunohistochemistry in paleopathology, we tested various antibodies on different samples of mummified tissue. Conventional histology was performed on 14 unselected 'paleocristiane' Italian mummies, on 7 dynastic and on 7 predynastic unselected Egyptian mummies, in order to verify if there were differences due to different processes of mummification among the samples studied. From each subject, skin, vessels and muscle were examined, plus other selected specimens from the Egyptian mummies. We investigated some cytoskeleton proteins using the Avidin-Biotin-Peroxidase Complex (ABC) technique.

The muscular tissues of Italian mummies were negative to the antisera used; it is probable that the environmental conditions did not permit a fast process of mummification, and consequently the tissues' antigenic properties were destroyed. Muscular tissue of the Egyptian mummies was positive even when it was homogeneous. We therefore think that immunoperoxidase techniques
are more suitable for Egyptian mummies, probably because of the difference in the mummification process. We obtained different results from case to case, and therefore, at the present time, the use of immunoperoxidase methods in paleopathology is not completely reliable.

PATHOLOGY OF THE ATAPUERCA CAVE LATE BRONZE AGE INDIVIDUALS (BURGOS, SPAIN)

M.D. Garralda and V. Galera (Spain)

Pathological changes in the human remains found in the 'Galería del Sílex' (Atapuerca, Burgos), from the Late Bronze Age, were analysed. Among them, a child with cribra orbitalia and various cases of paradontal disease must be noted. The incidence of caries was also studied, showing a frequency (4.3%) similar to that of the Gorafe dolmens population (4.35%) and higher than the Muge series (2.4%), illustrating the increase of this condition during time. The paleodemographic structure of the Atapuerca population (43% infants, 20% juvenile, 32% adults, no middle aged or old individuals) could explain the absence of various kinds of diseases such as arthritis that have a higher frequency among people of more advanced years. Also worthy of note is the small surgical scraping evident in the frontal bone of one of the more immature skulls of this site.

A CASE OF SUPERNUMERARY MASTOID PROCESS IN A MEDIEVAL SKULL FROM SANTILLANA DEL MAR, CANTABRIA (SPAIN)

F. Gómez Bellard, J. Cobo and J.A. Sánchez Sánchez (Spain)

Excavations at Santillana del Mar, Cantabria (Spain) offered osteological material from the late Middle Ages. One skull of this material shows an excrescence in the mastoid process located in the middle line of the squamous portion of the occipital bone, between inion and the right normal mastoid process. We describe this infrequent phenomenon and discuss the possibility of an hereditary origin of the supernumerary mastoid process.

EVIDENCE FOR HEALTH IN THE PAST -- THE PALAEOPATHOLOGICAL CONTRIBUTION: A CASE STUDY FROM WHARRAM PERCY, YORKSHIRE

J. Henderson (England)

Health has been defined as 'a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity' (World Health Organisation). Attempts at the evaluation of health status in archaeological
populations rely heavily for their evidence on human remains, generally bones and teeth. Such limited data can yield only restricted information, as few pathological conditions, whether physical or mental, actually leave identifiable traces on the skeleton. The aim of this paper is to utilise a case study -- that of the deserted mediaeval village of Wharram Percy in the Yorkshire Wolds -- to describe and discuss the palaeopathological contribution to the study of health in the past. The various categories of palaeopathological data are outlined, including congenital, developmental, and acquired conditions. Discussion revolves around the relevance of these data relative to other sources of information (demographic, environmental, and historical). Finally, an overall assessment is made of the extent to which present methods of analysis allow statements to be made about health in the past.

PATHOLOGY FROM A MEDIEVAL CHURCHYARD

P. Holck (Norway)

In Tønsborg, the oldest city in Norway, archaeological excavations have taken place during the last three years. The remnants of the parish church of St. Peter, with its last undisturbed part of the old churchyard, was discovered at that time, and the skeletons of more than 1000 individuals were unearthed. These have given valuable information about the health conditions in medieval Norway.

EFFECTS OF LIFE CONDITIONS ON A SLAVE POPULATION FROM SURINAME

M.R. Khudabux and G.J.R. Maat (Suriname and the Netherlands)

Analysis of skeletal remains of slaves of African ancestry from a burial place on the cotton plantation Waterloo in Suriname (South America) elucidates conditions of life among the slave population. The plantation and its burial place had been in use from 1793/96 to 1861 A.D. Fifty-seven burials were explored and mapped, of which thirty-eight contained almost complete skeletons. Interesting demographic results appeared to be an unequal sex ratio and a peak mortality of adults in the age at death interval of 40-44 years. Gross bone examination revealed a high incidence of an infectious disease with multiple bone lesions: treponematosis. Several individuals demonstrated skull lesions, spongy hyperostosis, due to severe anemia. Growth conditions were generally studied by means of growth arrest lines (Harriss's lines) in the distal part of the tibia. Carious lesions related to diet and occlusal wear channels related to pipe smoking practices also illustrated aspects of local living conditions.
This study concerned three populations of adults from western Switzerland and from different periods: A - Middle Neolithic (3500 - 2800 B.C.), 90-109 subjects; B - early Middle Ages (400 - 700 A.D.), 40-69 subjects; C - Middle Ages (1000 - 1500 A.D.), 110-130 subjects. We have observed osseous and articular changes. The osseous indicated: congenital malformations, stress indicators (cribra orbitalia, Harris lines, enamel hypoplasia), trauma, infections, and tumors. The articular indicated: growth disorders (hip subluxations, vertebral osteochondrosis, Schmorl's nodes), erosive arthropathies suggestive of infectious or rheumatoid origin, ankylosing spondylitis, osteoarthritis with evidence of bone eburnation. In addition, diffuse enthesopathic hyperostosis was observed in the axial and appendicular skeleton. We see a deterioration of the health status from the Neolithic to the Middle Ages, especially for the cribra orbitalia (3% in A, 23% in B, 10% in C), the enamel hypoplasia (4% in A and B, 9% in C), the joint pathology, and hyperostosis. Osteoarthritis in the axial skeleton was twice as common in medieval groups (15-20%) as in the neolithic (9%); in relation to A (26%), the frequency of vertebral osteochondrosis was doubled in group B and tripled in C.

CREMATION OF A DISEASED MATURE FEMALE FROM THE EARLY LATÈNE PERIOD

I. Kühl (Germany)

In this relatively extensive cremation (1195 g) with normal age changes, there are, in all preserved remnants of vertebrae, ribs, scapulae and pelvis, multiple portions of various sizes with pronounced fine-meshy spongy tissue, as well as some rarifications in the vertebral bodies. These changes do not appear in the spongy parts of the skull or the extremities, e.g. caput humeri or femoris. In addition, the surfaces of all vertebrae and pelvic remnants are covered with finest bony structures, which give them a sandlike or coke-like consistency. Surfaces of the rib fragments are smooth, as is normal. These appearances seem to be pathological in nature, but no diagnosis has yet been made. There is no record in the literature of similar findings from a cremation.

MAXILLO-DENTAL PALAEOPATHOLOGY IN NEOLITHIC BRONZE AGE POPULATIONS FROM THE PRESENT TERRITORY OF ARAGON

J.I. Lorenzo Lizalde (Spain)

The population studied consists of about 68 individuals from 19 sites, only
three known before. The most important paleopathological injuries observed were maxillo-dental processes. Caries were already present in earlier populations (Chaves, Huesca), although the frequency was very low, even zero, in the same site. On the other hand, a large number of periodontosis processes was found in most sites. These were related to the formation of bacterial plaque, as is testified by the persistence of fossil tartar deposits. We have three dental pieces from the Campaniform period, from Foz de Escalete (Huesca), which show artificial wear macro-grooves. These grooves seem to be related to gingivitical processes present in the same pieces. They could be related to practices connected with the pathological processes.

**TUBERCULOSIS: AN EVOLUTIONARY MODEL**

Keith Manchester (England)

The two bacteria, *M. bovis* and *M. tuberculosis*, are both causative organisms of tuberculosis in mankind. *M. bovis* infection in cattle is a cattle population density dependent disease. *M. tuberculosis* infection in mankind is a human population density dependent disease. It is proposed that the prevalence of tuberculosis in cattle increased with the advent of herding, and, at this time in history, sedentary human groups first experienced repeated exposure, by ingestion, to tuberculous pathogens. Tuberculosis was thus established as an endemic primary gastrointestinal human disease, with intrapopulation transmission not from man to man, but from cattle to man. It is proposed that the crucial change in human tuberculosis from a mainly primary gastrointestinal disease to primary pulmonary disease occurred with the closer association of cattle and man in joint dwellings. The long-house environment favoured the transmission of *M. bovis* from cattle to man via the pulmonary route by droplet infection. The long-house was the keystone to the development of the population density dependent human pulmonary tuberculosis. The taxonomic relationship of *M. bovis* and *M. tuberculosis* in this respect may reflect an 'opportunist' microevolution.

**THE CONNECTIONS OF TOOTH ANOMALIES IN PALEOANTHROPOLOGICAL MATERIAL**

A. Marcsik and G. Kocsis (Hungary)

Simplification of tooth shape often goes hand in hand with diminution in size. Anomalies in tooth shape and size are often only micromanifestations of a genetically determined reduction in number, and can often be the cause of changes in the position or impaction of teeth. At the same time, part of the structural anomalies can also be connected with changes in tooth shape. The authors report on various tooth anomalies (formal, numerical, positional, structural, etc.) and analyse their connections in paleoanthropological material from different centuries in Hungary.
HUMAN DISEASE IN THE MEDIEVAL PERIOD IN LA RIOJA

J. Martínez Florez and P. Diez Ripolles (Spain)

As Director of the Physical Anthropology Department at the Rioja Museum, I receive human osseous remains from various archaeological excavations made in our autonomous community, and these are now of appreciable significance. In this communication, we present some of the results obtained over the years. Relating these to the literature, we present a catalogue of the osseous anomalies that are quite typical of disease sequelae found in osseous remains. We shall also show some pieces that are difficult to diagnose and, in our judgment, are of great interest. Although medieval remains have not been found in certain areas, we feel that the collection presented here constitutes an acceptable sample of the medieval period in La Rioja and the diseases present there at that time.

PALEOPATHOLOGICAL IDENTIFICATION OF HYPEROSTOTIC DISEASE (FORESTIER'S DISEASE, DISH)

G. Morlock (France)

Hyperostotic disease (H.D.) is a condition first described in 1950 by J. Forestier and J. Rotes-Querol. It is also known as Forestier's disease, ankylosing hyperostosis of the spine, spondylitis hyperostotica, and (more recently) diffuse idiopathic skeletal hyperostosis or DISH. It is a skeletal disorder characterized by excessive bone formation at ligament and tendon attachment sites. The antiquity of H.D. is well documented, but its description as a distinct entity is lacking in major paleopathological texts. It is still misdiagnosed as a severe form of spinal osteoarthritis. A good knowledge of paleopathological aspects of the disease is thus needed to avoid misinterpretation of paleoepidemiological data.

Guidelines for the identification of H.D. in intact skeletons, incomplete skeletons, and disarticulated bone are proposed. The analysis of spinal and peripheral overgrowths or ossifications can thus lead to a diagnosis of definite, probable, or possible H.D. Every study of skeletal changes in ancient populations should take these changes into account before giving an interpretation on the frequency of arthritis.

SKELETAL EVIDENCE OF PRE-COLUMBIAN TREPONEMAL DISEASE IN NORTH AMERICA

D.J. Ortner (U.S.A.)

The history of treponemal diseases in the Old and New Worlds remains a problem having both historical and biological significance. Four syndromes
of treponemal disease affect the skeleton: 1) yaws; 2) treponarid (also known as bejel or endemic syphilis); 3) venereal syphilis; 4) congenital syphilis. The mode of transmission is a major factor in the expression of these syndromes; there is no detectable difference in the organism. This mode is affected by cultural and environmental factors that resulted in the geographical pattern in the world-wide distribution of the syndromes. In the New World there is increasing evidence for the presence of treponemal disease before the arrival of Columbus. In the Smithsonian collections there are four specimens from the United States that provide evidence of the antiquity of this disease and its broad geographical distribution in North America.

From the state of Virginia in the Mid-Atlantic region, there are two specimens. One (NMNH 385788) is an adult male about 25-35 years of age from a site dated by carbon fourteen to 925 A.D. The second (NMNH 379177) is the skeleton of a six year old child, probably dated to the prehistoric period. An incomplete skeleton of an adult female from Arkansas (NMNH 258778) provides probable evidence of treponemal disease in the southern part of the United States. Associated artifacts suggest a date in the late prehistoric period. The last case is an adult female from a site in the American Southwest. Most of the associated cultural materials are prehistoric, but there is an historic component that could be associated with the skull. Although differential diagnosis with other infectious diseases is often troublesome in archaeological specimens, the overall pattern in the four cases seems suggestive of treponemal disease.

PALEOPATHOLOGICAL STUDY OF URSIDS FROM THE PLEISTOCENE-HOLOCENE IN THE IBERIAN PENINSULA

P.J. Pérrez, O.T. González, J.L. Fraile and T.de Torres (Spain)

The study of a large number of Pleistocene-Holocene Iberian Peninsula bears has allowed the selection of a great number of skeletal pieces with pathological changes. In this work, we deal with three species: Ursus deningeri, U. spelaeus, and U. arctos. The following pathological changes have been identified: Periostitis, osteomyelitis, arthrosis, fractures, post-traumatic sequel, luxations, periodontal disease, chronic dental abscess, dental caries, pathological occlusion, and calcified tendinous and ligamentous insertions. Some diseases are also proposed, such as gout, rickets, osteomalacia, achondroplasia, Paget's disease, acromegaly, brucellosis, and tuberculosis. Finally, some paleoepidemiological considerations are made.

CORRELATIONS BETWEEN AGE AT DEATH AND TOOTH DIMENSIONS AS AN INDEX OF DEVELOPMENTAL STRESS IN PREHISTORIC CALIFORNIA INDIANS

A. Pérez-Pérez and P.L. Walker (U.S.A.)

The dental dimensions of 184 individuals from southern California archaeological
sites were analyzed to test the hypothesis that people who die before reaching adulthood should have smaller, more variable teeth than people who die at a later age, due to the disruptive effects of developmental stress. Contrary to our predictions, the average buccolingual tooth dimensions of juveniles from several of the populations we studied were larger than those of the adults. These results are discussed in view of inter-population differences in dental attrition and the prevalence of stress indicators such as dental hypoplasia and porotic hyperostosis.

INJURIES AND THEIR TREATMENT BY THE MATERA MEDICALIS DURING THE MIDDLE AGES

R. Perrot (France)

In the pursuit of knowledge of the techniques used during the Middle Ages for the treatment of injuries by the Matera medicalis, some ancient medical texts from seven surgeons were studied: an Arabian, Abulcasis of Cordova; a Carthaginian, Constantinus the African; two Italians, Roger of Parma and Willians of Saliceto; two French, Henry of Mondeville and Guy of Chauliac. About 200 substances, both animal and vegetable, are listed. Vegetable substances are the most important (80%), and serve chiefly as cutaneous topicals.

PALEOPATHOLOGY AND MODERN MEDICINE

E. Promińska (Poland)

A system of positive feedback occurs among the development of medical sciences, the success of therapy, and the organization of health service. To enable us to approach the prevalence of diseases synthetically, M. Grmek created the notion of pathocenosis, that is, the assemblage of all pathological conditions present in a given population in a definite period. Investigation of the relations between diseases in a given epoch permits us to find their mutual interaction in different environmental conditions. Analysis of the dynamics of pathocenosis may help us to understand the sequence of events such as cycles, trends, etc., and thus enable us to construct models in reference to both the periods of balance in pathocenosis and the times of transition. Using paleopathology as a basis, one can try to search for the possibility of an observed sequence of events in the past and the present recurring in the future. This would seem to be especially useful for the long-term prognosis, based on an analysis of the oscillation of the developmental cycles and of changes in the natural and social environment.
TRAUMA IN PAST BRITISH POPULATIONS AND ITS RELEVANCE TO A WIDER UNDERSTANDING OF ARCHAEOLOGICAL SITES

C.A. Roberts (England)

The types of fractures encountered from a large sample with age and sex distribution and possible causes will be related to probable occupational roles. Discussion of the treatment and healing of fractures will draw on several types of evidence (bone, documentary, archaeology, iconography, ethnography, and modern clinical practice), which will be considered in some detail. An attempt will be made to relate this evidence to a broader spectrum of the archaeological site. Diet, level of hygiene, living conditions, and their effect on the healing of injuries will be discussed. Prospects for future developments in palaeopathology will emphasise this multidisciplinary approach to specific conditions.

PALEOPATHOLOGY OF JOINT DISEASE: A BASIS FOR POSSIBLE CLASSIFICATION

J. Rogers (England)

Arthropathies are among the most common conditions found in skeletons from archaeological sites. Osteoarthritis and osteophytosis are frequently reported, but diffuse idiopathic skeletal hyperostosis has only recently been well recognised. Erosive arthropathies (which include the sero-negative group) are much less common, and have probably been misdiagnosed in the past. We present here a scheme by which the arthropathies can be assigned to their most probable classification, taking into account the morphological and radiological findings. Particular emphasis should be given to the distribution of the lesions, and whether they are proliferative or erosive or both. It is of the greatest importance that the skeleton be considered as a whole, and in the absence of vital elements such as the phalanges of hands and feet, or metacarpals and metatarsals, it may be impossible to assign lesions accurately.

POROTIC HYPEROSTOSIS: THE RELATIONSHIP OF ORBITAL AND VAULT LESIONS

P. Stuart-Macadam (England)

It is now generally accepted in the literature that the term porotic hyperostosis includes lesions occurring both on the orbits (also known as cribra) and the skull vault. However, for many years researchers have argued about the relationship, if any, between lesions found on these two different areas. The present paper discusses this issue with reference to data on
microscopic, macroscopic, radiographic, and demographic studies of both orbital and vault lesions.

POSSIBLE TREPONEMAL BONE LESIONS AMONG EARLY NATIVE CALIFORNIANS

J. Tenney (U.S.A.)

A survey of osteological material at the Lowie Museum of Anthropology revealed a large number of pathological findings. In addition to examples of traumatic lesions, arthritis, and anemias, there were many instances of infectious processes. Most were confined to a single skeletal site, but many appeared to be generalized, involving many bones. Among these were many that had attributes similar to those usually described in association with treponemal disease. These include nasal destruction, palatal perforation, cranial sclerotic new bone formation, and fusiform tibial lesions without cloacae. The purpose of this study is to examine several examples of this latter material, and assess the morphologic findings with respect to granulomatous and treponemal diseases.

IATROGENIC PALAEOPATHOLOGY

T. Waldron and J. Rogers (England)

Human bones that become available for palaeopathological study may show evidence of disease, but they may also show signs of human intervention that was undertaken originally to treat the disease during life or to investigate it after death. We have called the changes that have a human origin 'iatrogenic palaeopathology.' We have studied a number of skeletons that came from individuals who had amputations performed on their lower limbs. The reactions of the cut end of the bone indicate that at least some of these individuals survived the operation. We shall discuss what can be inferred about disease in the past from the age distribution of these cases and the sites of the amputations. We have also examined skeletons from subjects who underwent autopsy, and we propose to discuss these in the light of the history of the autopsy.

SEX DIFFERENCES IN THE DENTAL HEALTH OF PREHISTORIC AND MODERN HUNTER GATHERERS

P.L. Walker (U.S.A.)

Studies of the dental health of prehistoric American Indian hunter gatherers
and modern Pygmies from the Central African Republic reveal significant
differences in dental health. Women in these populations have higher caries
rates and retain fewer teeth in jaws than men of comparable age. These
differences appear in large part to be a result of sex differences in economic
roles and access to cariogenic foods. The data presented suggest that sex
differences in diet are often more pronounced among hunter gatherers than
among agriculturalists, because the men and women in hunting and gathering
societies specialize in the production of, and thus have differential access to,
different kinds of foods. It seems likely that with the decline in the importance of hunting and the increased emphasis on a small number of staple crops
that accompanied the shift to agriculture, opportunities for significant sex
differences in diet diminish.

A POSSIBLE CASE OF HYDROCEPHALUS IN A COLOMBIAN MUMMY

J. Zammit and E. Crubézy (France)

The Colombian mummy of a child (probably a girl) belongs to the Toulouse
Natural History Museum. It comes from a sepulchral cave in Colombia,
and is dated to the 10th - 12th centuries. Macroscopic examination showed
a prominent and enlarged skull. X-ray examination and CT scan (C.G.R.)
show anatomical and palaeopathological characteristics, and try to resolve
the question as to whether this may be a possible case of hydrocephalus.
LONG BONES SYMMETRICAL HYPERTROPHIES: FOUR CASES IN MEDIEVAL NORTHERN FRANCE

J. Blondiaux and M. Houcke (France)

From the paleopathological study of two medieval sites in Cambrésis (Northern France), we identified four cases of hypertrophic symmetrical osteopathies of the appendicular skeleton. Morphologic, radiographic, and microscopic analyses brought three etiologies to mind: Pierre Marie's hypertrophic osteoarthropathy, Camurati-Engelman's progressive diaphyseal dysplasia, and Paget's disease. Microscopic examinations permitted the first description of specific alterations in progressive diaphyseal dysplasia and perhaps one of the first paleopathological diagnoses of Paget's disease.

LASER-RADIOGRAMMETRY: A NEW TECHNOLOGY FOR THE STUDY OF PATHOLOGIC HUMAN BONE, ANCIENT AND LIVING

L. Capasso (Italy)

The transparency, or radio-opacity, of osseous tissue following x-ray examination has been estimated exclusively by empirical visual observation of the radiogram. Frequently, however, small differences in radio-opacity are impossible to estimate by visual observation alone. Moreover, it may be advantageous to have a numerical evaluation of comparative radio-opacities of normal and pathological states from the radiograms (e.g. osteoporosis, osteosclerosis, etc.). The author suggests a new methodology for the quantification of radio-opacity in radiograms. This new technique consists of a graphic display of laser absorption of the radiogram. The apparatus consists of: 1) laser source; 2) radiogram; 3) laser sensor (photo-electric transducer); 4) recording apparatus. With this technique, the variations in the radio-opacity of radiograms are changed into a simple graphic display. The author presents a large series of applications of laser radiogrammetry in various examples of ancient osseous diseases (tumors, trauma, etc.).

COPPER PLATES ON THE ARM IN BURIALS AT THE CHURCH IN VRASENE

P.A. Janssens (Belgium)

This discussion concerns the significance of copper plates found around the humeri in three graves from different periods. The first, dated from Norman to 13th century, probably had been used as an ornament to hide a dressing with ivy leaves. The second (1260-1527?) was fixed around a humerus showing hypertrophied lips of a notch, caused by a cutting weapon. In the third case (1579-1650), there was no sign of a bone lesion. The author discusses the possible relationship of copper usage with the De Re Medica of Celsus, which recommends copper as a disinfecting agent.
THE PALEOPATHOLOGY OF HUMAN METABOLIC AND ENDOCRINE DISEASE
(Invited lecture)

D.J. Ortner (U.S.A.)

Metabolic diseases, including those resulting from a deficiency of vitamins C and D, are poorly known in archeological human skeletal samples. The paucity of cases suggests that these diseases were rare in the populations surveyed. Additionally, inadequate attention may have been given to the skeletal manifestations associated with various metabolic diseases. I have published a case of scurvy in a child's skull (NMNH 342512) from an historic site in Alaska (Ortner 1984, MASCA J., 3:79-81). Principal features were porous reactive bone underlying the temporalis muscle and porosity of the alveolar bone of the upper and lower jaws, including the sockets of the teeth. This case was remarkably similar to a child's skull from Peru (NMNH 266599) published earlier as an example of porotic hyperostosis (Ortner and Putschar 1981, Identification of Pathological Conditions in Human Skeletal Remains, p.258). These porous hypertrophic lesions probably resulted from bleeding due to weakened blood vessels, associated with vitamin C deficiency. The distribution of lesions in both cases is clearly associated with the anatomy of chewing and the insult to both the bone supporting the teeth and the bone underlying the major muscles of chewing.

One case of rickets from the Free African Baptist Church cemetery in Philadelphia, Pennsylvania, U.S.A. is presented to demonstrate that the most severe deformity typically affects the lower limbs and not the upper extremity, because rickets usually occurs after the child has begun to walk. The deformity is from weight-bearing on soft, poorly mineralized bone. The burial site is dated to A.D. 1823-1840, and there is evidence of marginal nutrition in other burials.

Both the gross skeletal changes associated with fluorosis and the virtually pathognomonic zones of poorly mineralized lamellae in osteons in the histology of compact bone are demonstrated in a burial (B South 40, ca 2100 B.C.), excavated in Bahrain. There is extensive ossification of the ligaments and connective tissue around the joints of the spine and in other areas of the postcranial skeleton as well. The few teeth that remain exhibit a slight degree of mottling, as would be expected if excessive fluorine were part of the diet during the development of the permanent dentition.

Endocrine abnormalities found in archeological remains include a possible case of sporadic hypothyroidism from a site dated between A.D. 1250 and 1700 in the American Southwest. Other cases of endocrine disease include a probable case of acromegaly (NMNH 227508) and a likely case of pituitary dwarfism (NMNH 314306) from archeological sites in the United States.

The above cases provide evidence that metabolic and endocrine diseases, though rare, do occur in archeological sites. They provide a point of departure for further research, as paleopathologists attempt to clarify the skeletal manifestations associated with these diseases.
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