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groups were completely separate with occasional mixing of members. During the intervening two years there were periods when the groups merged rarely. Interaction networks are analysed as they change over time. Hypotheses concerning the social bonds that integrate the groups are offered. Supported by Contract NIH DRR 71-2003 from the National Institutes of Health, HEW and Grants GS-35744X and GS-35744Y from NSF.

Patterns of growth of body height. Q. D. WILSON, B. S. SAVARA, and D. R. THOMAS, *University of Oregon Dental School*.

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Observations and measurements on individual skulls of monkeys, apes and man. Donald A. WILSON, Student, *University of Wisconsin-Madison*.

Observations and recently devised measurements on individual vertebrae of long series of African monkey species, *Cercopithecus asotus*, *Cercopithecus aethiops*, and *Cercocebus torquatus*, give results which carry studies of vertebral function beyond analyses confined largely to measurements of segments of the trunk. Research implications for analyses of locomotor patterns are discussed with special reference to hominoid apes and man.

Functional analysis of the hand measurements of primate asymmetries. A. COBLENTZ, G. W. WILSON and M. AMPHOUX, *Paris*.

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Autopsy of Egyptian Mummy PUM-II. Aidan WILSON, *Smithsonian Institution*.

Autopsy was performed in Detroit on February 1st 1973 by a team of ten specialists. X-rays of the brain to have been replaced by resin, and packages to be in the abdominal and pelvic regions, and periostitis of the right fibula. Removal of the wrappings was difficult because the mummy had been poured liberally at all stages. The mummy was in superb condition. The abdomen was opened and packages removed. These were covered with insect pupae preserved by hot resin poured into the abdomen. Five species of insect pupae were identified. The skull was opened and the mandibles removed. Resin poured in the left ear has penetrated into the left ear and down the vertebral canal. The left leg was swollen and the head of fibula was removed for study. Many sections of tissue were collected for histologic preparation. The mummy was dated tentatively as 1700 B.C., but later finds indicated early date as being more probable. Pathological conditions are discussed by other members of the group.

*Atta villosa* in Guatemala: A preliminary report of the socio-bioenergetics of howler monkey. Anthony M. COELHO, Jr., Claud A. BRAMBLETT and Larry B. QUICK, *The University of Texas at Austin*.

Field reports on a summer field study of howler monkeys in Guatemala. Seven researchers working in teams obtained approximately 1200 hours, representing 2400 field hours in

the Mayan archaeological site of Tikal Guatemala. Detailed durational observations of individual and multiple groups were possible because of the team method of observation and finely detailed archaeological maps of the area. The nutritional composition of some foods eaten by howlers are presented. Minimal productivity values for the habitat are estimated. The paper focuses on two basic questions of ecology: (1) How much food does an animal require to meet the costs associated with its lifeways? and (2) To what degree can an animal's energy and nutritional requirements be met by resources available in a particular habitat? Data presented in this paper suggest that small group size and low population density are not necessarily the result of a nutritionally poor environment. Tikal is capable of supporting 1700 howlers/km<sup>2</sup>. Unless food scarcity can be quantitatively demonstrated it should not automatically be assumed to be the cause of a particular population size or structure. Food resource limitation may largely be a myth among primatologists.

Population differences in dental morphology viewed in terms of high and low heritability. Janice A. COHEN, Student, *University of Massachusetts, Amherst*.

A model for viewing biological differences based on dental morphology is utilized on two archaeological American Indian populations. The phenotypic differences between the Middle Mississippian (1250-1300 A.D.) populations of Cahokia and Dickson Mounds are determined using dental traits and measurements characterized as having relatively high or low heritability. Also, an analysis of differences in dental morphology between the three cultural periods within Dickson Mounds (Late Woodland - 1050-1150 A.D.; Transitional - 1150-1250 A.D.; Middle Mississippian - 1250-1300 A.D.) are performed.

Relative heritability is based on family studies by various authors determining the pattern of inheritance of each trait and each measurement. Statistical differences between the populations may then be more clearly defined as actual genetic differences or merely responses to environmental differences or stresses. This analysis can produce more absolute information than other measurements of relative biological distance, such as Mahalanobis D<sup>2</sup> or Sanghvi's  $\chi^2$ .

Mortuary practice: an assessment of sources of error in paleodemography. Della C. COOK, *Indiana University*.

Recent publications by Weiss ('73) and by Ácsádi and Nemeskéri ('70) have developed models for demographic analysis of prehistoric skeletal material. A necessary assumption in the application of these models is that mortuary practice does not bias the cemetery sample as it reflects the mortality experience of the population. The effects of violating this assumption are investigated using data on Woodland period mounded cemeteries from the Lower Illinois Valley region. There is no systematic exclusion of particular age or sex categories from recoverable aspects of the mortuary program. However,

age, sex and status do determine access to a given mound within a mound group and to structural and processual elements within mounds. Partial excavation of these cemeteries is simulated by sub-sampling in a variety of ways. Demographic models are applied to these subsamples. The resultant demographic characterizations of the parent population are compared. Errors of up to fifteen years in relatively insensitive variables such as life expectancy at age fifteen result. Methods for identifying and correcting for these effects are explored.

Dental observations from the Robert J. Terry Collection. Carol R. COTTOM, *Indiana University*.

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On population pressure as a non-explanation. George L. COWGILL, *Brandeis University*.

Population growth as an autonomous "prime mover" in cultural change is questioned. Empirical data and quantitative considerations are cited to show that chronic difficulties in controlling population growth can not be assumed. Moreover, even when population problems exist, it is drastically oversimple to suppose that they will generally be an effective stimulus for developmental innovations. Development is more apt to be stimulated by more effective economic demand, while stresses due to resource shortages may actually reduce demand. Finally, over-reliance on population growth as an autonomous variable encourages neglect of other factors which are highly relevant for understanding developmental episodes.

The breakdown of a genetic isolate: Acceglio, Italy. Michael H. CRAWFORD, *University of Kansas*.

Contrary to the opinions of Morton ('65), and Yasuda and Morton ('67), the concept of the genetic isolate is of importance in evolutionary studies of human populations. The work of D. F. Roberts, and his associates, on the population of Tristan da Cunha demonstrates that intensive ethnohistorical and demographic information can minimize the genetic "static" due to small effective population sizes and provide insight into the interaction between social and biological change.

This presentation focuses upon the demographic structure of an Italian, Alpine, genetic isolate (Acceglio) and traces the role of various historical and economic factors in the recent breakdown of social isolation. Changes in migration and mate selection patterns, rates of isonymy, are used as measures of the reduction of social isolation.

Albumin and transferrin evolution among the Lemuriformes. John E. CRONIN and Vincent M. SARICH, *University of California, Berkeley*. Yves RUMPLER, *Ecole Nationale de Medecine, Université de Madagascar*.

Antisera have been prepared against the albumins and transferrins of *Lemur fulvus*, *Lepilemur septentrionalis*, and *Avahi laniger* as well as to those of numerous other prosimian and

anthropoid species. These were used to obtain immunological distances among the available lemuriform species and to measure rates of evolution along the various molecular lineages involved. The resulting lemuriform phylogeny shows appreciable discordance with current classifications of the group. Neither the association of Cheirogalinae and Lemurinae as Lemuridae nor of *Lemur* and *Lepilemur* as Lemurinae is supported by the molecular data. These data suggest that the Cheirogalinae represent an early lemuriform divergence and that the adaptive radiation among the more advanced Lemurinae and Indriidae began at some later time. Details of this latter radiation are presented and discussed.

Types of populations and the utility of discontinuous skeletal variants in affinity inferences. Jerome S. CYBULSKI, *National Museum of Man, Ottawa*.

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Spatial-sequential analysis of captive night monkeys (*Aotus trivirgatus* Illiger, 1811). J. F. DAHL, Student, *Washington University*.

A technique for investigating the pattern of spacing and distribution of individuals of the night monkey (*Aotus trivirgatus* Illiger, 1811) in captivity is described. Results obtained using this technique are discussed.

Specific types of behavior were found to be synchronized; the animals always rested at the same time and were active at the same time. During active phases, particular patterns of movement were seen to be associated with specific sequences of behavior; the animals always displaced each other when active except when specific sequences of greeting behavior were displayed by an approaching animal. Ritualized signals were used to reduce the distance and to maintain proximity between the animals. A greeting sequence not previously noted for *Aotus* is described.

Particular sequences of behavior were instrumental in co-ordinating the animals' movements. Questions are raised concerning the function of communicatory behaviors associated with displacement and the spatial distribution of animals in relation to the distribution of environmental resources.

Dental and cephalometric studies of Wainwright Eskimos. Albert A. DAHLBERG, *University of Chicago*.

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The Sowell Mound population, Bay County, Florida. R. C. DAILEY, *Florida State University*.

This paper summarizes the excavation and analysis of some 20,000 fragments of human bone recovered from the Sowell Mound, a Weeden Island necropolis situated near Panama City, Bay County, Florida. The mound has been excavated several times, first by Clarence Moore and then a number of parties, both professional and amateur. During the summer seasons of 1969 and 1970, the Florida State University excavated most of what was left. Though a great deal of human bone remained, representing in

excess of 100 adults, it was all fractured and disarticulated. The condition of the bone and the excavation of disturbed sites such as this raise a number of archaeological and osteological problems. These and the results of the project are described.

Molecular systematics and clinal variation in Macaques. L. DARGA, M. GOODMAN, M. WEISS, G. W. MOORE, W. PRYCHODKO, R. TASHIAN and H. DENE, *Wayne State University and University of Michigan*.

By the use of starch gel electrophoresis, urea gel electrophoresis and immunoelectrophoresis blood samples from 17 populations of known geographic origin representing ten species of macaques were screened for variant forms of five or more informational macromolecules. The gene frequencies for the polymorphic systems were employed to generate dendrograms via several algorithms, including one based on a maximum parsimony model.

As might be expected, *M. radiata* and *M. sinica* appear to be closely related, as are *M. niger* and *M. maura*. The latter two species exhibit variants of both  $\alpha$  and  $\beta$  chains not uncovered elsewhere. *M. fuscata* and *M. cyclopis* cluster with *M. mulatta* while conspecific populations of *M. nemistrina* group together. *M. fascicularis* populations also cluster together. *M. speciosa* appears to be the most divergent species analyzed.

Intra- and inter-specific clinal variation are discussed in terms of Pleistocene and Recent zoogeography and inter-specific hybridization.

The oldest known fossil Cercopithecidae. Eric DELSON, *Lehman College, CUNY*.

The earliest fossils of Old World monkeys are of Early to Middle Miocene age, from the northeast quarter of Africa. Their morphology can best be interpreted by comparison with the dental and cranial characters expected in the ancestors of known monkeys. These characters, derived from analysis of modern and later fossil taxa, include facial and incisor morphology of colobine type, combined with macaque-like cheek teeth. Affinities of the early fossils will thus depend on changes from this ancestral pattern toward the more derived character complexes seen in modern subgroups.

The Early Miocene "cercopithecine" molar and "colobine" frontal from Napak were to be expected in an early cercopithecid. *Prohylobates tandyi* is certainly a monkey, and most of its observable characters are of ancestral or perhaps colobine type, but some are possibly *sui generis*; unfortunately, its age is uncertain, though early.

The most interesting material is from Maboko Island and some other sites of mostly Middle Miocene date (17-14 MY). Part of this material was reported by Koenigswald and assigned to two species of *Victoriapithecus*. I have been able to segregate the fossils differently, suggesting the presence of a smaller and possibly more arboreal, colobine-like form and a larger, dentally cercopithecine ("primitive") type at least as terrestrial as *C. aethiops* or some macaques.

It appears that at least some cercopithecids

were becoming terrestrial in the mid-Miocene; the modern subfamilies were probably diverse at this time. The cercopithecines may have maintained an eclectic diet while increasing that of a terrestrial substrate, as colobines raised intake and developed a specialized dentition of the digestive tract, possibly in the forest canopy.

Variability of accessory sex structures in *Macaca mulatta*. C. Jean DeROUSSEAU, *Southwestern University*.

Previous studies have assumed that variation in reproductive morphology demonstrates reproductive isolation and is of taxonomic significance. However, intra-population variability of accessory sex structures in *Macaca mulatta* suggests that linear measurements of macaque reproductive structures are of limited taxonomic value, and shape may be more diagnostic.

Linear measurements of the baculum and penis in 219 male Cayo Santiago rhesus monkeys show a high coefficient of variation, some of which is explained by age and body size. Social status appears to be associated with baculum and glans lengths in adults. A low coefficient of variation in glans length is observed among adult males natal to the same social group.

Maturation, idiosyncratic and environmental factors, and genetic predisposition contribute to variability in lengths of the baculum and penis.

Supported by Contract No. NIH-71-2003.

The existence of pre-Columbian cretinism in Chile. A. DE VASTO, *Ladycliff College*.

Cretinism is endemic in parts of Chile today and is seen to have been so in pre-Columbian times. The highland Andean environment is iodine deficient today and there is no reason to think that there was much more iodine in pre-Columbian times. Lack of dietary iodine is closely correlated with the etiology of endemic goiter and cretinism. The cretin skeleton can be distinguished from the skeleton of achondroplastic dwarfs, Down's syndrome dwarfs, and other types of dwarfism. It is probable that in cretinism, hypothyroidism there is an increase in bone density which is diagnostic. There is evidence that iodine, lima bean, and other dietary goitrogens which are particularly active in the absence of dietary iodine were consumed in quantity in the Andes and contributed to the etiology of cretinism. The pre-Columbian Andean cretinism was likely that the pre-Columbian Andean cretinism knew that sea-weed and other marine products were specific for goiter and cretinism, and there is strong evidence that these were traded along the Pacific coast into the highlands. Descriptions of pre-Columbian Andean skeletal cretinism by Eaton, Hrdlicka and MacCurdy are suggestive of cretin morphology.

A comparison of methods for estimating heritability, utilizing dental variables. E. J. DIETZ, Howard BAILIT, and Donald KOLSKY, *University of Connecticut*.

The heritability of a trait indicates the