

methods to measure and categorize alveolar bone resorption, making it difficult to compare results. The purpose of this study was two-fold. First, to devise a methodology which would maximize sample size while still addressing the problems of reliability and comparability. Second, to use this method to examine patterns of alveolar bone loss in 53 adults from the Highland Park skeletal collection; a 19th century New York state almshouse population.

Alveolar bone resorption was measured using the distance from the cemento-enamel junction to the alveolar crest on both the buccal and lingual surfaces of M1, M2, PM1, PM2, I1, and I2. Analysis revealed that, within this sample, periodontal bone loss was symmetrical for the right and left quadrants. These results allowed the maximization of sample size in that teeth from the right and left quadrants were used interchangeably in the analysis of differences in bone loss patterns between the maxilla and mandible. Preliminary results revealed significantly greater alveolar bone loss on the lingual surfaces of mandibular I1 and I2, and maxillary M1 and M2; and on the buccal surfaces of mandibular PM1 and I1 when compared to their maxillary and mandibular counterparts.

Changing Urban-Rural Differences in Growth and Maturation. P.B. EVELETH, National Institutes of Health, Bethesda, MD 20892

An overview of urban-rural differences in growth and maturation reveals changes in these differences as the world becomes more urbanized. A large percentage of people in the industrialized world live in urban or peri-urban environments; an increasingly greater number of people in the Third World also do. Mainly because of centralization of services, life in cities is considered to be beneficial to health. On the other hand, high population density may have disadvantages, such as increased psychological stress, infectious disease, and accidents.

Growth and maturation are excellent indicators of adaptations to urban life, although they do not give evidence of specific mechanisms. In European and North American countries children in the cities generally are taller and heavier and mature earlier than their peers in rural areas; this was not the situation at the turn of the century. This is also not the situation today in many Third World countries where urban populations are growing rapidly, being fed by migration from rural zones to poor urban and peri-urban slum areas that do not necessarily have the benefits of 20th century European cities. In such areas, children are frequently, but not necessarily, larger than they are in rural areas. Additional factors that confound the results are selective migration, socioeconomic level, and ethnic group. Body shape, rate of growth, and skinfolds are additional parameters to be examined for adaptation to urban environments.

The "radiator" theory of brain evolution in Homo. D. FALK, Department of Anthropology, State University of New York, Albany, New York 12222.

The fossil record indicates that brain size began to increase rapidly in the genus Homo over a million years after bipedalism had been selected for in basal australopithecines. Because of gravitational pressures, vascular systems of early hominids became reoriented with the shift to bipedalism. In the case of robust australopithecines and the Hadar early hominids, blood drained from the cranium partly through an enlarged occipital/marginal venous sinus system. Brain size remained conservative in these hominids. On the other hand, hominids in the gracile australopithecine through Homo lineage developed another more widely dispersed network of veins to drain blood from the cranium. Mastoid and parietal emissary veins are representatives of this network, and they have been shown to cool the heat sensitive brain under conditions of hyperthermia in extant humans. The frequencies of parietal and mastoid emissary foramina increased along with brain size in Homo. This suggests that the network of emissary and other cranial veins in the lineage leading to Homo acted as a radiator that released a thermal constraint on brain size. The radiator theory is consistent with the belief that basal gracile and basal robust australopithecines occupied distinct niches, with the former living in savanna mosaic habitats that were subject to hot temperatures and intense solar radiation during the day.

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Anthropometry of Amerindians: An Examination of Scaling Phenomena. A.B. FALSETTI, U.S. Army Natick, RDE Center, Natick, MA 01760-5020; and R.L. JANIZ, University of Tennessee, Knoxville, TN 37996-0720.

This study presents a broad picture of Amerindian biological relationships based on anthropometric and climatic data. It employed a sample of 2946 individuals representing 82 tribes from the Northwest Coast, Arctic, Subarctic, Great Basin, and California. These data were analyzed within a cultural/spatial framework using multivariate scaling techniques designed to elucidate among group differences due to size-and-shape versus shape variation alone.

Results indicate that size inclusive shape patterns follow a south-north gradient drawn primarily by variation in body proportions and head and nose size. These patterns generally conform to Bergmann's and Allen's rules governing the geographical distribution of phenotypes. A comparison of size-and-shape versus data showed that 75% of among-group variability was due to shape. The examination of size-adjusted shape variation revealed that a higher degree of homogeneity existed among Northwest Coast males than among females from all five areas; suggesting that gene flow, migration, and local adaptation played a significant role in this distribution.

Canonical correlations between anthropometric and climatic data isolated three morphological complexes that were related to climate; the nasal-index, cranial-index, and nasal breadth. Large wide noses correlated with cool/wet conditions, while smaller, narrow noses were associated with warm/dry areas. The cranial-index followed a pattern whereby more rounded heads were found in cool/dry areas. Breadth of the nose varied from narrow to wide with levels of humidity and rainfall. Narrow noses were found in areas

predominantly cool/dry, whereas relatively wider noses correlated with wet/warm conditions.

In sum, anthropometric size and shape patterns provide two avenues for the examination of morphometric variability. Each presents subtle variations from the other, which in turn allow insight into exploring the underlying biological mechanisms. Correlations between morphology and climate provide clues into the potential for explanations along environmental boundaries.

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The evolutionary response of correlated characters: Selection on birth weight and gestational length. S. FIELDS, University of Michigan, Ann Arbor, Michigan 48109.

Using a sample of U.S. Blacks and Whites, the responses to selection on 2 correlated characters, birth weight and gestational length, are studied using the quadratic multiple regression model of Lande and Arnold (1983). The Lande-Arnold model is powerful because it takes into account the effects of selection on correlated characters and provides an estimate for the selection on both variance and covariance after correcting for directional selection.

The directional and stabilizing components of selection for the 2 traits are estimated from the observed changes in the mean and variance, respectively. These estimates are compared with those generated by the Lande-Arnold model. In both the Black and White samples, the model shows greater increases in the means of the respective traits than are observed when each is considered separately. This is due to the action of indirect selection acting through the covariance of the correlated characters. On the other hand, the stabilizing selection differentials of both traits are less than those observed because the model portions a large percentage of the change in variance to the effects of directional selection.

Estimates of genetic change resulting from selection also differ when using the Lande-Arnold model. A greater loss in additive genetic variance is observed in the Black sample although the percent change in the mean attributed to genetic variation is greater in the White sample.

Changing sex ratio of mortality in the Semai Senoi, 1969-1987. A.G. FIX, University of California, Riverside, CA 92507.

An excess of male deaths compared to females is characteristic of modern national populations; whereas in some high mortality societies, female mortality exceeds that of

males. Many potential causes for these sex differentials in mortality have been suggested including both biological (e.g., genetic differences in disease resistance) and social (discrimination in care).

In the decades prior to 1969, Semai women experienced higher mortality than males. By 1987, this sex specific differential mortality had disappeared. Life tables show markedly higher mortality for the 1969 post-15 year old female population than for males. This differential is not apparent in the childhood (0-14) age classes. The 1987 life tables show nearly identical mortality schedules for both sexes. Specifically, compared to an expectation of further life at age 15 (e_{15}) in 1969 of 35 years for males and 30 for females, in 1987 female e_{15} =40.2 and male e_{15} =39.6; there is a sharp shift in the sex ratios of mortality for the post-15 year age classes (geometric mean of age classes 15-44 was 0.768 in 1969 vs. 0.997 in 1987).

In contrast to some well known cases of high female mortality (e.g., South Asia), biased childhood sex ratios caused by differential care seem not to have occurred in the traditionally sexually egalitarian Semai. The analysis of causes of death suggest that maternal mortality played the major role increasing female deaths. Since the mid 1960's, many Semai women have been giving birth in hospital and the reduction in female deaths seems largely due to better maternal health care. Interestingly, the reduction in female mortality has taken place at the same time as fertility has increased and overall mortality has continued at relatively high levels ($\theta_0 < 36$). A single factor, better maternal care, seems sufficient to account for the declining sex differential.

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New platyrrhines from the early Miocene of southernmost Argentina. J.G. FLEAGLE, Department of Anatomical Sciences, State University of New York, Stony Brook, New York 11794.

Ongoing paleontological expeditions conducted by the State University of New York (Stony Brook) and the Museo Argentino de Ciencias Naturales in Buenos Aires have recovered thousands of fossil mammals from presumed early Miocene (Santacrucian Land Mammal Age) deposits of the Pinturas Formation in the western part of Santa Cruz Province, Argentina and the Santa Cruz Formation from the coast of the same province. The mammalian faunas of the two formations are grossly similar, but show a number of compositional differences suggesting both geographical and some temporal distinctions.

The primates from the Pinturas Formation include Soriacebus amechinorum, a saki-sized monkey