

Book Reviews

CLASSIFICATION AND HUMAN EVOLUTION. Edited by Sherwood L. Washburn. viii + 371 pp. Aldine Publishing Company, Chicago, 1963, \$7.50.

A special property of mankind is the ability to give names to things. The way this ability was being used by anthropologists and human palaeontologists in giving scientific names to their living and extinct primate relatives resulted in a nomenclatural chaos. Campbell (pp. 69-70) reports some 107 different species have been proposed for the Hominidae of which 63 are invalid by the rules of the International Code of Zoological Nomenclature, and 38 to 40 of the remaining 44 are unjustified on zoological grounds; the status of two species, *Atlantropus mauritanicus* and *Zinjanthropus boisei* being in question. The ratio of 4 to 6 good zoological species out of 107 is a measure of this chaos.

This book is the hard cover edition of Viking Fund Publications in Anthropology, number 37, giving the 17 papers prepared in advance and revised after discussions held in the summer of 1962 at Burg Wartenstein, the European Conference Center of the Wenner-Gren Foundation for Anthropological Research. The purpose of the conference, organized by Washburn, was to examine the hominoid classificatory problems in the light of many new facts and few new ideas produced in the last two decades, that is, in the time since publication of Simpson, *The Principles of Classification and a Classification of Mammals* in 1945.

Most contemporary biologists agree classification of mammals above the species level is arbitrary; it involves working procedures more akin to the arts than to the exact sciences; and biologists, like art critics, often give personal opinions as to which classifications are better and which are worse.

The Wartenstein conferees report general agreement on a number of broad issues. All agree that the australopithecines, in the wide sense, belong to the Hominidae and not to the Pongidae. The Primate of the conference, and of mammalian taxon-

omy in America, George Gaylord Simpson, reports change of his taxonomic opinion about *Australopithecus* from uncertainty in 1945 to a placement in the Hominidae in 1963, which he believes "in general to be consistent with the mass of more recent information" (p. 30). Most agree that the trend for both primate neontology and palaeontology is toward taxonomic lumping and away from splitting — and most like the trend. Several agree that the chimpanzee and gorilla belong in one genus and that estimates of biological distance between man and the African apes should be decreased while that between man and the Asian apes, especially the gibbons, should be increased. All are delighted that primate taxonomy has become more dynamic.

Two negative comments on the conference in general seem of enough importance to warrant mention. Conference agreement of 18 invited participants may represent a biased sample of the taxonomic judgments of that larger body of students who created new data and new ideas on the subject; it is regrettable that the views of people like W. E. Le Gros Clark, W. Fiedler, G. H. R. von Koenigswald, and J. T. Robinson were not better represented in the conference report. Also it is unfortunate that there is inadequate reporting in this volume of the discussion on the sinking of *Pithecanthropus* as a genus (e.g., p. 43, fn. 10); it is remarkable that so many anthropologists accept the inclusion of *Pithecanthropus* in *Homo* without requiring that someone present a new diagnosis differing from those previously given, for example by Le Gros Clark in 1955.

Given the topics covered, all of the papers are appropriate, authoritative, and informative. It is economical to note the content of the 17 papers under five general headings:

(1) The four papers by Simpson, Harrison and Weiner, Mayr and Dobzhansky are general and basic. Simpson gives an excellent account of the theoretical basis of Primate classification while Mayr presents a taxonomic evaluation of fossil hominids pointing out some differences between the

taxonomy of hominids and non-hominids. Harrison and Weiner outline ten recipes on how to make a human phylogeny. Most of the conference is devoted to the species and higher taxa but Dobzhansky supports the reality of the subspecies (race) in recent and fossil hominids; he shows the notion of racial or higher types perpetuated without change or determined by single genes is flatly contradicted by genetical data and states ". . . a taxon is natural when it corresponds to an observed cluster of genotypes, and unnatural if it does not" (p. 350). These four papers make up the most compact, authoritative set of principles of hominoid taxonomy now available.

(2) The three papers by Leakey, Campbell, and Straus stress the fossil record. The Leakey family recovered a large share of the fossil hominoids known from East Africa. At this conference, Leakey is a splitter among a cluster of lumpers. Finding the fossils has priority over naming them and everyone agrees the Leakeys are good at that. In addition to his useful work on the lexicon of hominoid taxonomy, Campbell shows the D^2 statistic puts Swanscombe intermediate between Skhul V and La Chapelle aux Saints based on 17 measurements of the parietal and occipital bones. The paper by Straus is an admirable report on the morphology of the Pliocene *Oreopithecus*; if it is not made a member of the Hominidae, Straus thinks it should be put in a family of its own because it does not belong to the Pongidae.

(3) The four papers by Schultz, Biegert, Napier and Klingler et al. are morphological. The data produced and summarized by Schultz on the range of sex and age variation of morphological characters in living Primates give the student of fossil Primate taxonomy the best available standards of reference on the range of variation in the skeleton between and within good Primate species. Schultz reads his data to support the general and basic similarity of all recent hominoids. Biegert shows variation in the skull, hands, and feet have different taxonomic and evolutionary significance; he derives the hominids from ". . . a generalized pongid group which may have been similar to *Proconsul* . . ." (p. 143). Napier reviews the locomotion in hominids and suggests use of two functional markers to identify the early *sapiens* line: (a) ability to stride bipedally, and

(b) ability to oppose perfectly the thumb and index finger. Klingler (with Hamerton, Mutton and Lang) shows that the chimpanzee is the closest of living pongids to man in chromosomal morphology, the gorilla is next, the orangutan is more distinct, and the gibbon is completely different, resembling the specialized cercopithecoids rather than the pongids.

(4) The two papers by Goodman and Zuckerkandl present techniques which are relatively new to anthropology. Goodman summarizes information from an extensive, comparative survey of primate serum proteins. He finds evidence for a deceleration of the rate of change of albumin but not in globulin configuration and correlated this deceleration with the increased opportunity for maternal-fetal immune reactions in the hominoid phyletic line. Zuckerkandl gives an excellent discussion of problems in the phylogenetic interpretation of macromolecules, especially, the hemoglobins. The serological and the biochemical data support a close affinity of man and the African pongids.

(5) The four papers on behavior are by Hall, DeVore, Roe and Washburn. (Washburn's paper is almost as much morphological as it is behavioral just as Napier's is the reverse. Both make the point that behavior and structure need to be interpreted together.) The implications for taxonomy of the new field studies of Primate behavior reviewed by Hull and DeVore are not neat and simple; they are therefore fascinating. In some aspects of their social behavior the grassland-feeding monkeys show closer resemblance than do the forest-feeding pongids to the hominids; yet the openness of the pongid social groups is more man-like. If great taxonomic weight were given to the distinctive behavioral traits of man discussed by Roe, *Homo sapiens* might be placed in a separate order, class, or even kingdom.

Washburn's thesis is "that the principal groups of the higher primates are adaptive and that the characters by which they have been recognized are structures which are closely related to the behavior of the groups" (p. 190). Emphasis on behavior may lead to insightful definition of taxonomic characters: if vertebrae are counted by presence or absence of ribs there is no clearcut distinction between the number of lumbar vertebrae in the quadrupedal vertebrates and baboons and the brachiating gib-

bons, but if vertebrae with facets allowing primarily flexion and extension are counted as lumbar there is no overlap in the number of lumbar in that ape and those monkeys.

The papers of this conference show the whole spectrum of evidence — genetic, molecular, immunochemical, karyotypic, morphological, and behavioral — is needed to reach sound conclusions about classification and human evolution. The book is a valuable addition to human biology. We should all thank the authors and the Wenner-Gren Foundation for making it available.

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OLDUVAI GORGE 1951–61. VOLUME I. A PRELIMINARY REPORT ON THE GEOLOGY AND FAUNA. By L. S. B. Leakey (with contributions by P. M. Butler, M. Greenwood, G. Gaylord Simpson, R. Lavocat, R. F. Ewer, G. Petter, R. L. Hay and M. D. Leakey). 120 pp. \$14.50. At the University Press, Cambridge, England, 1965.

In the past several decades most exciting discoveries, very likely the most significant yet in the history of paleoanthropology, have been made in Africa. For some years the focus of research was southern Africa, notably the Transvaal, where Dart, Broom and Robinson, and coworkers in stratigraphic and sedimentary geology and vertebrate paleontology, brought to light the several australopithecine-bearing cave deposits and their fossil contents. Very great advances in knowledge were made, but problems also arose and not a few have remained unsolved.

The extraordinary potential wealth of Olduvai Gorge, in fossil vertebrates and hominid artifacts, was clearly demonstrated to all when L. S. B. Leakey, and coworkers, published *Olduvai Gorge. Evolution of the hand-axe culture in Beds I–IV*. (Cambridge University Press, '51). That same year the first fairly extensive excavations were initiated after the previous twenty-year period of reconnaissance, survey, collecting, and rare limited excavation. Since that time new discoveries have followed rapidly one upon the other, and Olduvai Gorge has surely become the most important single locality for the study of very early hominids, and probably even for Pleistocene vertebrates, anywhere in the Old World.

This book is the first in a projected series, by Leakey and a number of co-investigators, on the results of this work. This volume provides some historical retrospect, a preliminary inventory and (well-illustrated) description of a portion of the abundant and varied vertebrate, especially mammalian fauna, the initial results from absolute age assessment (K/Ar) of volcanic mineral products and study of the stratigraphic succession (reprinted from articles in *Nature* and *Science*, respectively), as well as a very helpful listing of the named sites. Subsequent volumes will treat comprehensively the hominid skeletal remains, stratigraphic geology and sedimentary petrology of the Olduvai deposits, the artifactual materials and their associational contexts, and further aspects of the vertebrate fauna, including very many additional taxa not even mentioned here.

Intensive detailed study always suggests modification of prior conclusions based on preliminary investigations. The work at Olduvai Gorge is a classic example of this fact which might well stand as a lesson for years to come. The great interest aroused by these recent studies suggests to the reviewer that an overall appraisal of such changes, as exemplified in this volume, in regard to stratigraphy, absolute age estimation, and vertebrate fauna, might be helpful to those workers in physical anthropology, and related fields, not themselves actively involved in paleoanthropological studies.

*Stratigraphy and absolute
age assessment*

The broad outline of the stratigraphy exposed at Olduvai Gorge was initially determined by Hans Reck, subsequently in conjunction with L. S. B. Leakey. Two recent seasons of field work by R. L. Hay, resulting in many measured sections and careful tracing of formations, have greatly clarified the previous picture, in part incomplete due to Reck's premature death. The important features of the succession are as follows:

The varied sedimentary deposits, where exposed in the westerly reaches of the Main Gorge, overlie Pre-Cambrian basement (gneissic rocks).

Bed I. This unit is of variable thickness, maximum up to some 40 meters (2nd fault sector). The lowest member, represented west of the fifth fault, is a welded