Book Reviews

Meat Eating in Primates

The Predatory Behavior of Wild Chimpanzees. GEZA TELEKI. Bucknell University Press, Lewisburg, Pa., 1973. 232 pp., illus. $15. The Primates.

As the only cultural artifacts that commonly survive for our inspection, tools have long been a focus of theorizing about the behavior of early man. Another focus has been the transition from a mainly vegetarian diet to meat eating, thought to have been inaugurated among higher primates by *Australopithecus*. In a classical demonstration of the comparative ethological approach, studies of another surviving anthropoid, the chimpanzee, now necessitate reappraisal of both issues. Although chimpanzee tools need only slight preparation and are soon discarded, their use undermines the unique status of man as the only primate tool user. The chimpanzees of the Gombe National Park in Tanzania, under continuous study since 1960 by Jane van Lawick-Goodall and her colleagues, have yielded key information not only on this point but also on the habit of eating meat. As we learn in more detail in this book deriving from fieldwork at Gombe by the author in 1968 and 1969, they are also skilled hunters. The point is significant, for although meat eating had already been described by DeVore and Washburn and others in baboons, most of the prey seemed to be stumbled upon rather than hunted. The tendency was to relabel baboons as not predators but omnivores. While chimpanzees eat only a little meat—at Gombe it probably makes up less than 1 percent of their diet—and while they do not hunt often—averaging about 10 hunts per year—the Gombe studies leave no doubt that this is no casual activity but a pattern of behavior deeply rooted in the collective life of this highly social primate.

Of the 132 incidents of meat eating known to have occurred in a decade of studies on this community of about 50 chimpanzees, 49 are known from fecal analysis and the discovery of carcasses. Of the 83 directly observed incidents, prey were killed in 46. The 56 prey identified included all six mammals common in the area that might be potential prey, most common by far being young baboons. As is well illustrated by photographs and samples of field protocols, all three phases, pursuit, capture, and consumption, are definitely group activities. In the pursuit phase, always by males in the incidents described, one may see some animals quietly taking stations along possible escape routes, watching intently as a companion maneuvers for a direct leap at the prey. In contrast with the silent concentration of the first phase, the capture is followed by wild excitement, with vocal chorusing audible at great distances, often bringing other animals to the site of the feast.

There are many points of interest in the process of food sharing and consumption. The eating is unhurried, and several hours may pass before the last morsel is consumed. The chimpanzees show every sign of savoring the meat. Brains are a special delicacy, often mixed with a "wodge" of leaves from which the juice is sucked at leisure. Such wodges as well as pieces of meat and fragments of bone may pass through several hands after initial division of the carcass by several males, each then becoming the focus of a cluster of companions waiting for a chance to take a portion or begging for it with special gestures and vocalizations. The carcass may eventually be shared by as many as 15 chimpanzees. The sharing is singularly unaggressive, and there is an unusual suspension of the rules that usually govern the priority of access to food during competition according to rank in the dominance hierarchy. Meat sharing is the unique circumstance in which the alpha male may be seen begging for food from a subordinate who would flee in terror on his approach in other feeding situations.

There can be no doubt that predatory behavior is deeply rooted in the social life of the chimpanzee. The meat eating of nonhuman primates can no longer be dismissed as casual omnivory. The opened baboon skulls from which brains are eagerly removed are remarkably like those found by Raymond Dart with australopithecine remains. This much chimpanzees can accomplish without the aid of hunting tools. This discovery does not, however, undermine the hypothesis of Dart and others that significant changes in the hunting behavior of *Australopithecus* occurred with the onset of tool using. Whereas studies of group hunting in social carnivores such as lions and hyenas demonstrate that a key advantage is the collective ability to take prey larger than themselves, the prey known to be taken by chimpanzees are much smaller than they are. Tools may well have been necessary for the emergence of this next step in the evolution of human carnivory. However, this other predatory anthropoid, excitable and ebullient it is true, is hardly the picture of vicious cruelty that some of the more colorful reconstructions of australopithecine personality have led us to expect.

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Noneutherian Mammals

Life of Marsupials. HUGH TYNDALE-BISCOE. Elsevier, New York, 1973. viii, 254 pp., illus. $15. Contemporary Biology.

The publication of this book marks a special point in the development of zoology in Australia. *Life of Marsupials* is the first text to comprehensively review the general biology of this intriguing group of mammals. The author clearly describes the many physiological adaptations which fit a variety of marsupial species into their environments. In doing so, he offers emphatic refutation of the hoary idea that marsupial organization is in some way inferior to that of eutherian mammals.

The first part of the book describes the relationships and origins of marsupials. Tyndale-Biscoe presents a new hypothesis to account for the present distribution of marsupials in Australia and South America. He suggests that, in the early Cretaceous, primitive forms of multituberculates, eutherians, and marsupials were equally distributed throughout the world. When the angiosperms radiated in the early Tertiary, the first mammal group to evolve adaptations to exploit these new food sources gained an advantage. Thus, Tyndale-Biscoe suggests that on each continent

a different form of mammalian organization prevailed—eutherians in Europe and Asia, marsupials in Australia, and both eutherians and marsupials in South America. This interesting hypothesis requires considerably fewer assumptions than the two other current theories of land bridge filters from Asia or from Antarctica.

There is a large section in the book on marsupial reproduction, in which the author sets out to answer a series of questions dealing with such matters as the achievement of synchrony of male and female gametogenesis and subsequent conception, uterine maintenance of the embryo, succoring of young in the pouch, and the achievement of homeostasis by the young. To many zoologists this will be the most rewarding section of the book. The author's major contributions to this field have given him the insight to write a succinct and clear review of the subject. The large amount of material covered cannot be effectively reviewed here, but two aspects of the treatment deserve mention. The first is the interesting comparisons made of the uterine development of marsupials and of monotremes and the second is the review of the physiology of marsupial lactation. It is disconcerting to learn that at one point in the reproduction of the red kangaroo the mother can be suckling from adjacent teats a newborn young and a young about to be weaned. To the consternation of endocrinologists the two milks are entirely different in lipid and protein content and composition.

Most of the remainder of the book considers the ecological adaptations of a number of different species of marsupials. For economic reasons most work has been done on the larger kangaroos, and the author describes their ruminant physiology and temperature-water relations. There is a very interesting chapter on some of the smaller pygmy possums and gliders and on the insectivorous/carnivorous dasyurids. Of special interest to North American readers is the comprehensive review of the biology of the opossum, *Didelphis*. The book closes with a discussion of the effect of Paleolithic and modern man on the status of marsupials in Australia today.

This reviewer noted no major typographic mistakes in the text, but the double inclusion of sheep in fig. 3.10 is unexplained. In a few parts the book suffers from a lack of synthesis of material, but generally the author writes well and clearly. A major feature is the excellent illustrations including clear and uncluttered graphs and drawings. The deficiencies in present knowledge of marsupials also become apparent during the reading of this book. Apparently little is known of the bandicoots, although some species are relatively common in Australia. There is little mention of the biology of such appreciated species as the wombat, koala, cuscus, Tasmanian devil, or the tree kangaroos. Least of all is known about the South American marsupials.

An absence of information is not, however, the fault of the author of this book. Tyndale-Biscoe has succeeded in producing an excellent text, which, although it must inevitably become dated, is at present outstanding as the only competent major comprehensive work on marsupial biology.

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Adaptations of Early Man

Ice-Age Hunters of the Ukraine. RICHARD G. KLEIN. University of Chicago Press, Chicago, 1973. xviii, 140 pp., illus. Cloth, $6.50; paper, $2.95. Prehistoric Archeology and Ecology.

As Karl W. Butzer and Leslie G. Freeman, the editors of the new University of Chicago Press series Prehistoric Archeology and Ecology, point out, the tremendous amount of information about early man that has accumulated in the past decade has not been accompanied by a corresponding increase in publication outlets. Few of the existing ones are oriented to the current interdisciplinary approach, and those that are carry only short articles. Although some of the most important work on early man is being done by North Americans, there are no media here for more substantial reports, which not infrequently must await publication abroad in a costly format and even in a foreign language. With this new series the editors aim to provide a medium for rapid and inexpensive diffusion of medium-length summaries of work of major interest to scholars and students in English-speaking countries. They are particularly interested in encouraging the fusion of Old World data and technique with New World method and theory.

Their first offering, *Ice-Age Hunters of the Ukraine*, is of far broader interest than its title might suggest, and well exemplifies their aims. Though written for the undergraduate or the layman (it presupposes no knowledge of the subject), it will serve as a useful reference for the scholar, providing as it does a critical synthesis of a large body of scattered Russian sources.

One of the more interesting chapters of man's development was the remarkable adaptation to a rigorous periglacial environment achieved in many areas during the late Pleistocene, which through the exploitation of a rich resource of large game animals permitted not just bare survival but surprising local population densities. Some of the best evidence for this comes from the Ukraine with its abundant and spectacular sites containing remains of dwellings and art objects. These are long-term or frequently revisited campsites—they may well be winter camps—and not the mere kill sites or temporary camps on which studies of the New World early hunters are forced to rely. The time span covered embraces the Mousterian (associated with Neanderthal man) and the ensuing Upper Paleolithic, representing men of modern type. This impressive body of evidence has been little known and appreciated in the west owing to the language barrier and a general unfamiliarity with Russian sources.

In presenting his excellent summary of this material the author emphasizes man-environment relationships and stresses the interdisciplinary approach. He hopes to demonstrate its importance to the student reader as well as to convey the necessity of acquiring interdisciplinary training. After a brief opening statement on the aims and limits of paleoanthropological research, the book proceeds to sketch the geology and geological dating of the Ukraine sites and then to portray the environment at different periods of human presence, in terms both of landscape and of the fauna with which man coexisted and off of which he lived. The longest chapter deals with the cultural remains, again by periods: the tools and what information may be deduced from them, the art objects and the dwelling remains—the latter being discussed in some detail. A final chapter endeavors to compare the life of Mousterian and Upper Paleolithic times and to grapple with the problem of the transition between the two (or the re-