Book Reviews

Social Behavior and Habitat

Primate Societies. Group Techniques of Ecological Adaptation. HANS KUMMER. Aldine-Atherton, Chicago, 1971. 160 pp., illus. Cloth, $7.50; paper, $2.95. Worlds of Man series.

The Worlds of Man series consists of brief ethnographies designed as supplementary texts for undergraduate courses in cultural ecology. To provide contextual material for ecological studies of human societies, the series editor has included the present book concerning the forms and techniques of ecological adaptation among nonhuman primates. Hans Kummer was a fortunate choice for the authorship of such a volume.

The initial chapter of *Primate Societies* presents the author's definitions and conceptual framework. Kummer's writing throughout the book is so clear and logical that even the student with little or no biological training should have no difficulty with the ideas presented. Kummer sets out to investigate the structure of primate societies, the ways society functions in the exploitation of the physical environment, causal factors that have shaped social structure and behavior, and means of change (that is, forms of adaptation) of behavior and society.

As is implied by the book's subtitle, the main theme is that nonhuman primates show ecological adaptations primarily as groups rather than as individuals. Primates lack the anatomical and behavioral specializations necessary for effective exploitation of their environment as individuals. The group operates to pool the talents, capabilities, and experience (very important among animals such as primates which have long life-spans) of a number of animals and thus compensates for the lack of specializations.

Primate societies are of three basic types: heterosexual groups with several adult males; heterosexual groups headed by a single adult male; and monogamous pairs. (The third type is quite rare, and is given only minor treatment in the book.) A primate group functions to provide its members with the necessities of life, which ecologically speaking are food, water, sleeping sites, and some means of avoiding predation.

Kummer shows that the relationship between social structure and behavior and environment is one of mutual modification. Animal populations exploit their environments certainly, but equally certainly environment sets limits on forms of behavior and society (as does phylogenetic inheritance). An example will clarify this relationship. As noted above, one of the most important functions of the primate group is the location of food sources. In a barren environment, it would seem that the more monkeys available to hunt for food the better, owing to increased chances of finding widely scattered food items. In actuality, however, the size of the available food units and the intolerance of conspecifics among feeding primates appear to limit group size to the maximum number of animals that can simultaneously feed on the most crucial type of food unit. Among hamadryas baboons of the Danakil desert in Ethiopia, small acacia trees are the main food unit, and a one-male group (about five animals) appears as the "single-tree-foraging-unit."

In habitats that offer needed resources in units of varying size, a flexible social organization is advantageous. Hamadryas baboons forage as one-male groups during the day, owing to the wide scatter of food items. At night numerous one-male groups congregate at sleeping cliffs (the number of which is relatively small) to produce a troop of up to several hundred baboons.

Group life may be ecologically adaptive in many habitat types, but it forces the individual to exist in an extremely complex social environment. Kummer proposes several mechanisms, varyingly characteristic of different primate species, which make group life possible: synchronization of activities by social facilitation; social inhibition (the most extreme form of which is dominance); the differentiation of roles (such as group "leader" or "watchdog"); sexual dimorphism; and spatial arrangements within the group.

Social and behavioral modifications fall into two general categories: phylogenetic adaptation (adaptation of the evolving genotype) and adaptive modification (adaptation by the individual during ontogeny). Kummer hypothesizes that the development of the one-male group structure of hamadryas baboons is a phylogenetic adaptation from a form of social organization similar to that typical of modern savannah baboons. Adaptive modification, in turn, is divisible into modification stemming from the physical environment (ecological modification) and modification stemming from the behavior of conspecifics (social modification). If a social modification creates individuals who in turn similarly modify the behavior of other conspecifics, the trait is labeled a tradition. This is the nonhuman primates' closest approach to human culture. A well-known example of a primate tradition is the sweet potato washing of the Japanese macaques of Koshima Island.

The flexibility of behavioral traits and forms of society is considered in the latter portion of the book. Studies of baboon groups along a hamadryas/anubis baboon transition zone (which coincided with a habitat transition zone) reveal that certain traits are habitat-specific whereas others are typical of a species regardless of habitat. The latter traits are hypothesized to be the result of phylogenetic adaptation.

In the final chapter, Kummer draws some interesting comparisons between nonhuman primates and man, while resisting the temptation (to which many less knowledgeable persons have succumbed) to extrapolate directly from one to the other.

In all, Kummer has presented a skillful description of the intricacies of behavior and society and their relationships with habitat. The book offers profitable reading no matter what one's level of sophistication regarding primate behavior.

JAMES LOY

1214 12th Loop,
Kirtland AFB, New Mexico