

# Book Reviews

## Quantitative Primate Studies

**Baboon Ecology.** African Field Research. STUART A. ALTMANN and JEANNE ALTMANN. University of Chicago Press, Chicago, 1971. viii, 220 pp., illus. \$12.

Since Washburn's and DeVore's baboon studies of the early 1960's most field studies of primate behavior have been influenced by anthropological interests. The research questions have been based on the hypotheses that social behavior and organization are adaptations to ecological conditions; that therefore they covary with habitats; and that insight into the correlations between primate social systems and habitats will permit inferences from known habitats of early man to his unknown social life. The ecological orientation paralleled a similar new trend in ethology and was accepted by most zoologist monkey watchers.

The proposed aims required that the same primate populations be studied by both an ecologist and a student of behavior. As it has turned out, most field studies have been done by single workers who have been unable to cope with both tasks. The typical field report of the last decade focuses on the social interactions of the resting group. It then describes the habitat in qualitative terms, presents travel maps and a list of food species, and ends with speculations on the assumed local adaptiveness of the social system.

The Altmanns here set a new standard by devoting a full, heavily quantitative monograph to the ecology of a primate population. The monograph reports original fieldwork on the yellow baboons (*Papio cynocephalus*) of the Amboseli Reserve and extensively reviews ecological knowledge on the other baboon species. As quantitative treatment reveals the space-time patterns of feeding, drinking, and sleeping, some commonsense expectations are shaken by surprising facts. For example, the rate of alarm reactions is proportional to the time spent in a home range quadrat, not to the frequency with which the quadrat is entered. This suggests a steady rate of alarms rather

than an alarming effect of a newly entered and therefore risky locality. In the descriptive sections the authors avoid declaring that an obviously adaptive group response is typical. It becomes clear that responses to apparently similar situations vary greatly and often inexplicably. In the same vein, the Altmanns treat migrating males not as a class but by presenting differing individual histories.

The authors' mathematical skills, acquired in their earlier work on communication processes, are here applied to the problems of home range use. Data are analyzed and reanalyzed in search of meaningful parameters and of ways to circumvent that pervading difficulty of fieldwork, biased samples. The reader looking merely for the usual type of descriptions may find that certain subjects are mathematically over-treated. He will soon realize, however, that the authors do more than just study baboons. With this book primate field research begins to test its own methods.

Speculations are set apart in the last 15 pages of the book. The major concept is the "utility" of a given section of the home range, which is composed of its resource value and its risk rate. "The perpetuation of the group depends upon its ability so to allocate the distribution of its activities among the parts of the home range that the net utility of the range to the animals is positive, or at least, non-negative" (p. 199).

Primate field research aims at an ecology of social systems. So far, we have had little more than a primate sociology. The Altmanns have now replaced the description of primate habitats by an analysis of interactions with the habitat. This ecology is "social" in such aspects as the avoidance of predators. As it concerns foraging, it is still predominantly an ecology of the individual. The third and most difficult step, it seems, will have to reveal the social strategies of resource exploitation.

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## Sea Animals

**Explorations in the Life of Fishes.** N. B. MARSHALL. Harvard University Press, Cambridge, Mass., 1971. xiv, 204 pp., illus. \$6.50. Harvard Books in Biology, No. 7.

This book's title is indeed descriptive of its content. Its author is one of the world's outstanding ichthyologists; he says he began the book when he gave a series of lectures at Harvard in the spring of 1963, but what he offers the reader are the experiences of a lifetime of research into the many and varied adaptations of the largest class of vertebrate animals. His fascination is with the animals of the deep sea, those vast reaches of the oceans "where sunlight is perpetually faint or lacking," where the pressure is high and food is scarce. The largest part of the book (chapters 3 and 4) deals with the ways in which fishes cope with these contingencies.

We are led into the problems of the deep sea, though, through a broad overview of the success of teleostean fishes that deals lightly with feeding adaptations and reproduction and then proceeds to considerations of hydrodynamic design including neuroanatomical and physiological specializations for cruising and high-speed swimming.

While deep sea fishes and their peculiar adaptations occupy about a third of the book, its nearly equally large final portion deals with convergent evolution. Examples from invertebrate phyla are given here, but fishes still provide the principal illustrative matter to explain how environmental forces shaped form and function, eventually to result in similar features among unrelated groups of animals. Surface feeders, for instance, whether the mosquito-fish *Gambusia* or flying fish, have small, upturned jaws and their pelvic fins originate anterior to the dorsal for reasons of skimming the surface with the snout. Certain fast-swimming sharks and tunas have silhouettes that can practically be superimposed, but more remarkable still, they both have retia mirabilia in their red muscles to enable them to operate several degrees above their ambient temperature. A number of advantages thus accrue to these large elasmobranch and teleost predators alike; to single out only two among many important metabolic reactions, nerve impulse transmission and digestion are speeded up.

At the very end of the book Mar-