Book Reviews

Endangered Primates

Primate Conservation. H.S.H. PRINCE RAINIER III OF MONACO and GEOFFREY H. BOURNE, Eds. Academic Press, New York, 1977. xviii, 658 pp., illus. $39.50.

This book comes at a particularly critical time in the history of mankind's mismanagement of natural resources. The most seriously endangered primate species can survive in the wild only in mature rain forests, the last remnants of which are being irreversibly destroyed at an unprecedented rate. Although hunting for food and skins and trapping for the pet trade and biomedical research (including the losses incurred through capture, holding, and transport, which are often as high as 85 percent) threaten many primate species with extinction, habitat destruction is by far the most serious threat to all primates, including humans. This collection of papers by 22 contributors is concerned with the problems of primate conservation and considers some 57 species as examples.

As several of the authors (for example, Green and Minkowski, Dittus, Alan Goodall and Groves) emphasize, there must be a sound ecological basis to any conservation effort. Besides providing considerable information and proposals directly related to the conservation of primates, most of the contributors have presented substantial quantitative data (many of them unpublished until now) on the behavior, ecology, population dynamics, zoogeography, and taxonomy of the species concerned.

Although three contributions deal with species that are not considered endangered (two bushbabies of South Africa, discussed by Doyle and Bearder, the gray or Hanuman langur of India, discussed by Oppenheimer, and the common baboon, discussed by Kalter), humans continually lurk as a potential threat. For instance, attitudes in India are changing from traditional reverence for the gray langur to harassment owing to the constant surge of human population, which has forced the langur out of its natural forest habitat into increased competition with humans. Kalter gives very little information on the conservation status of the common baboon in the wild but emphasizes the importance of conserving it for purposes of medical research, especially since the traditional laboratory monkey (the rhesus) is currently in short supply.

Three other chapters deal with seriously endangered species but are based on an acknowledged paucity of information: the aye-aye of Madagascar (Petter); the recently rediscovered yellow-tailed woolly monkey of Peru (Mittermeier *et al.*); and the douc langur of war-torn Vietnam (Lippold).

Mittermeier and Coimbra-Filho give a comprehensive survey of the 14 primate genera and 30 species, many of them rare, represented in the Brazilian Amazonia, certainly among the richest arrays of primates in the world. However, the effective size of the only national park in Brazilian Amazonia (excluding reserves for Amerindians) is a mere 3000 hectares as of 1972. The same two authors also describe the disastrous history and fate of the lion tamarins, found only in southeastern Brazil and considered the most endangered primates of the New World. Extinction is predicted for most of the wild relict populations unless more of their forest habitat is protected and the laws are enforced.

Fontaine and Dumond provide a qualitative description of a group of captive red ouakaris in a seminatural environment (Monkey Jungle at Goulds, Florida). Very little is known about this endangered species in the wild. This paper reports on the first behavioral study of the red ouakari, carried out in order to facilitate the development of successful captive breeding programs.

Four chapters discuss the status of macaque species. Dittus presents important socioecological data from a seven-year period of fieldwork on the three subspecies of toque macaque in Sri Lanka. These data provide the critical baseline for a management program designed to conserve these wild populations. Deag summarizes the available information on the status of the barbary macaques in the wild (Algeria, Morocco, Gibraltar) and in captivity. Green and Minkowski provide valuable and original information on the ecology and behavior of one of the least known and rarest monkey species, the lion-tailed macaque, which is found only in a few parts of undisturbed rain forest in the Western Ghats of India. Data from their 19-month intensive study, including broad surveys, suggest that, owing primarily to accelerating habitat destruction and secondarily to hunting, only about 400 of these unique arboreal macaques remain in the wild. Southwick and Siddiqi supply us with yet more of their excellent quantitative studies on the population dynamics of rhesus macaques in India. Traditionally revered and protected, the rhesus are now killed as pests and, until recently, have been trapped for exportation in rapidly expanding agricultural areas. This change in attitude is considered the most basic threat to the survival of these monkeys, which have suffered from extensive exploitation for biomedical programs (over a million exported in the last 20 years). Semiprotected populations, however, increased by 128.5 percent in 14 years while unprotected populations decreased by 77.7 percent. The authors suggest that scientifically controlled exploitation may be possible in the future.

Dunbar presents valuable insight into the problems of conserving wild populations of gelada baboons, found only in the Ethiopian Amhara plateau. The highly specialized ecology of this species prohibits its adaptation to human cultivation, unlike *anubis* or *cynocephalus* baboons. Cultivation and hunting are the major threats.

Oates gives an extensive and critical review of the deleterious effects of humans on the four species of black-and-white colobus, with detailed information on the guereza. The numbers of black-and-white colobus, especially those in West Africa, have declined drastically in the last 100 years owing to habitat destruction and the skin trade, which Oates describes in detail.

Chivers lucidly summarizes the available, but widely scattered, information on the variety of gibbons (the lesser apes), their distribution, evolution, behavior, and ecology. The chapter is illustrated with an exquisite set of drawings by P. Edwards of all nine gibbon species. Chivers predicts a 84 to 96 percent decline of wild gibbon populations during the next 15 to 20 years as a result of forest destruction. In peninsular Malaysia alone, the lowland rain forest is being cleared at the rate of 2500 square kilome-

ters a year. I was disappointed with Chivers's attempt, in an otherwise excellent article, to estimate the total number of gibbons in the wild. Basically, his method involves multiplying the density estimates from detailed studies in a very few, small areas by the amount of existing forest that is considered suitable for gibbons in each country (based on Landsat and aerial photos, some 15 years old). Although Chivers discusses the potential inaccuracies in using this grossly simplified method, he has not considered the dangers. For, as Oates points out in an earlier chapter, once these estimates are in print they become established as fact, to be used and misused by conservationists and exploiters alike. Relevant to this, I found some of the entries in Chivers's tables V to VII to be incorrect or in need of explanation. For example, in table V the entry for *muelleri* at Ulu location with 28 gibbons in 5 square kilometers should give a density of 5.6 per square kilometer, rather than 10.5. Likewise the figure at Kutai for the same species should be 14.8 per square kilometer, not 11.7. In this same table, footnote c is not clear: how is encounter frequency converted to a density estimate? In table VI, for *muelleri* in eastern Malaysia, the total area of its distribution (547,700 square kilometers) apparently exceeds the total area available (198,000 square kilometers). Tables VI and VII are not consistent in the estimates of densities for *muelleri*.

Goodall and Groves review in detail the taxonomic, geographical, ecological, behavioral, and population dynamics data for the eastern gorillas, emphasizing the variety and plasticity of ecology and behavior found in differing habitats, a factor that must be considered in any conservation effort. The gorillas are hunted for meat, witchcraft purposes, and curios; they are disturbed by cattle and human intruders, including tourists; but the most serious threat, as with most of the species described in this book, is habitat destruction.

Most of the contributors offer valuable and detailed recommendations for the conservation of the species described. Although the editors suggest captive breeding programs as the principal means of saving endangered species, most of the authors maintain hope that measures will be taken by the countries involved to protect the animals in their natural habitats and emphasize the necessity for such measures. Primate conservation involves not only the propagation of a species but also its maintenance as a vital component of a viable ecosystem. This is feasible only through conserving the species concerned in large numbers in the full range of its habitats, which also helps maintain maximum genetic diversity. Moreover, since the majority of threatened primate species live in tropical rain forests that are themselves threatened with extinction, most of primate conservation is essentially the conservation of tropical rain forests. These complex and fragile ecosystems not only are essential for nonhuman primates but are also vital elements of our own life-support system. For example, extensive deforestation in the tropics has a significant deleterious effect on rainfall there, as well as in the temperate regions, where the impact may even be greater (as has been documented elsewhere by Potter *et al.*). Green and Minkowski and other authors in this volume clearly outline other vital services to humans that undisturbed rain forests provide.

The establishment of large national parks and nature reserves with diverse and representative ecosystems is strongly recommended by the contributing authors, as well as enforcement of already existing laws protecting these natural resources. They also stress the necessity of educating the indigenous people to the value of conservation, not only to themselves but to future generations. Without their support in upholding the laws (and holding down the human population) conservation efforts by the concerned few will be meaningless.

This volume has provided us with a valuable collection of information and has clearly shown the problems and possible solutions in this aspect of natural resource management. It remains to be seen if the warnings will be heeded and the lessons implemented.

THOMAS T. STRUHSAKER
New York Zoological Society and
Rockefeller University,
New York 10021

Perceptual Modes

Modes of Perceiving and Processing Information. Papers from two workshops, 1974 and 1975. HERBERT L. PICK, JR., and ELLIOT SALTZMAN, Eds. Erlbaum, Hillsdale, N.J., 1978 (distributor, Halsted [Wiley], New York). viii, 232 pp., illus. $14.95.

This volume presents a diverse collection of papers on the topics of perception and information processing. The chapters range from discussions of basic perceptual mechanisms to a functional analysis of the child's expression of meaning and from original experimental contributions to speculations on general issues in perception. The theme unifying these varied selections is the concept of "perceptual mode," which is explicitly discussed in the introductory chapter by Pick and Saltzman. According to these authors, perception is adaptive in that special-purpose systems have evolved for processing alternative forms of information and engaging in alternative patterns of action. Different systems, or perceptual modes, are evident when different types of information are extracted from the same pattern of stimulation. A given perceptual mode is general in that the same type of information will be extracted from quite different patterns of stimulation. Different perceptual modes may involve very different ways of processing extracted information. Indeed, Pick and Saltzman suggest that the processing mechanisms underlying alternative perceptual modes should be distinguishable at the neural level.

Examples of modal distinctions in perception that Pick and Saltzman propose include processing acoustic signals for speech-relevant versus non–speech-relevant information, visual processing of general information about orientation in space versus processing of detailed information specifying object identity, and extracting information with respect to a body-spatial or subjective frame of reference versus an environmental or objective reference system. In the nine chapters that follow, the various contributors to the volume attempt to apply the concept of perceptual mode to their own research or discussion. In the case of some of the papers, this effort seems strained. In other papers, though, an analysis in terms of perceptual modes works quite well. For example, Posner, Nissen, and Ogden distinguish between automatic and attended modes of processing, and they use this distinction as a framework for discussing their experiments on the role of set in detecting the location of input signals. One of the most provocative findings they report is that prior knowledge of the modality of an upcoming signal results in greater processing benefits than knowledge of its spatial position. In another chapter, Mack distinguishes between proximal perception, which is determined by local information in the retinal image, and constancy perception, which is true to some aspect of an external object despite changes in the retinal image. She further divides constancy perception into the subject-relative mode