

Book Reviews

Rain Forest Primates

The Red Colobus Monkey. THOMAS T. STRUHSAKER. University of Chicago Press, Chicago, 1976. xiv, 312 pp., illus. + plates. \$25. *Wildlife Behavior and Ecology*.

Socioecological field studies of mammals have dealt almost exclusively with species that live in savannah or open woodland, habitats that offer little or no visual obstruction to the observer. Such studies tell us little of the social and ecological adaptations of mammals inhabiting very different environments, like rain forests. In his book, Thomas Struhsaker fills a long-standing need by providing the first comprehensive and systematic account of the social organization, behavior, and ecology of a monkey inhabiting the tropical rain forest. The 27 months of field research focused on one group of red colobus monkeys (*Colobus badius tephrosceles*) in the Kibale Forest of Uganda; but a broader perspective is attained as the extensive and detailed data from this group are compared with less extensive data from other groups and other subspecies that live in various habitats in Senegal, the Ivory Coast, Cameroun, and Kenya.

The red colobus belongs to the subfamily of leaf-eating monkeys, Colobinae, and the book was written with the intention of contributing not only to a better understanding of the African Colobinae but also to the development of more realistic theories of the evolution of social systems and their relation to ecology. However, the book does not present a synthesis of primate evolution. "Rather, it presents a detailed study, which, when compared with future studies of similar depth, will enhance such a synthesis."

The impact of the new data is immediately apparent. For example, they indicate the necessity of revising the old hypothesis that correlated a trend toward small, one-male troops with the arboreal and folivorous habits and a trend toward large, multimale troops with open-country terrestrial and omnivorous habits. Indeed, the almost entirely arboreal and forest-dwelling red colobus live in large ($\bar{x} = 45$, range 12 to 80), multimale troops. These troops

are similar to those of gray langurs (*Presbytis entellus*) that are semiterrestrial and that inhabit open woodlands in India and Sri Lanka (Ceylon).

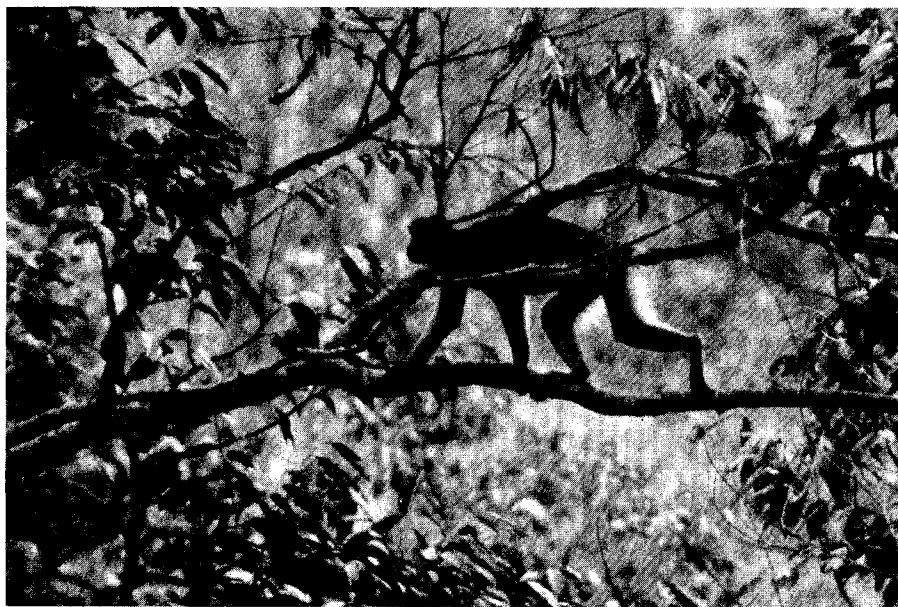
The red colobus may be unique among primates and possibly mammals studied to date in that adult males have been observed to suckle from adult females. They are also the only colobine species where females are known to possess perineal swellings during estrus, a trait more typical of the Cercopithecinae (baboons, macaques, and the like). Nor are the red colobus territorial; home ranges overlap extensively, no area is dominated by one group exclusively, and the outcome of intertroop encounters is based on dominance relations between troops—again a trait common among the Cercopithecinae. Also, newborn infants are not handled or carried by other members of the group as is common among other Colobinae. Struhsaker and his co-worker, John Oates, related infant handling to territoriality, proposing that social groups that defend territories against neighboring conspecific groups may have a greater need for closer social bonds. These are achieved through extensive attention given newborn infants by

other group members. Struhsaker goes on to suggest that the less attention infants receive from other group members the less strong the ties to the group during the juvenile stages of life, and that this may explain why juveniles are the most mobile elements in the red colobus society, often changing their group membership. A wealth of such interesting data and ideas, sometimes controversial, is found in the book.

Gestures of communication are fully described and their functions are deduced through careful quantitative appraisal of the social contexts in which they occur. Red colobus monkeys lack several gestures that are present in other Colobinae.

An entire chapter (40 pages) is devoted to a very thorough analysis of vocalizations. We learn, for example, that the red colobus are extremely vocal, some calls are given mostly by adult males, one call serves as a specific warning against raptors, and there are peaks in the frequency of delivery of certain vocalizations. These peaks correlate with the time of day or with the onset of troop movement. Red colobus lack the loud territorial roars of the black-and-white colobus, but, contrary to previous suggestion, they do possess intergroup spacing calls, albeit of low volume. In addition, the vocal repertoire of the red colobus is richer than that of the black-and-white colobus, and reflects the more complex intragroup social organization and larger group sizes of the red colobus.

Struhsaker is concerned with the importance of establishing phylogenetic histories in the interpretation of social and ecological patterns and in the development of socioecological theories. This is most ap-



Adult female red colobus monkey, *Colobus badius tephrosceles*, employing the slow crossed-alternating walk. [From *The Red Colobus Monkey*]

parent in his comparisons of vocalizations between subspecies. "Greatest attention is given to those vocalizations concerned with intragroup cohesion, because they are the most likely to be involved with maintaining interspecific segregation and thus to be evolutionarily more conservative than other call types." The taxonomy of the red colobus is in a confused state by comparison with that of the other colobus monkeys, and the similarities and differences in the vocalizations between five subspecies are used to clarify their taxonomic status.

Throughout the book, field methods and analytical procedures are fully explained. Their value will be appreciated by anyone who has ever attempted (or who plans to attempt) a systematic quantification and definition of the complex relationships between a species and its forest biome. Approximately half the book is devoted to the elucidation of such ecological relationships. They are dealt with in detail under such headings as food habits, ranging patterns, temporal distribution of activities, censuses of anthropoid primates, interspecific relations, and mortality.

The book is clearly written and well illustrated. At the end of most chapter sections the results from the red colobus are compared with those of studies of other Colobinae. In keeping with the author's reluctance to speculate in the absence of adequate data, a general synthesis relating these data to current theories of sociobiology and ecology is withheld until the final chapter. Here, comparisons are drawn primarily between parallel studies of other primates in the Kibale Forest that were carried out by Struhsaker and his co-workers according to common goals and research techniques. This is the most interesting chapter of the book, as we gain not only an overview of the place of the red colobus in its forest community, but also new insights concerning such topics as ecological niche separation among sympatric rain-forest monkeys, ecological parameters affecting grouping tendencies among different species, the influence of the dispersion pattern of a monkey species' food on its social organization, and the relation of similarities and differences in social organization between various species to their presumed evolutionary histories.

The heuristic importance of the undisturbed rain forest is exemplified by this book, and the need for rain forest conservation is underscored as we learn that the density and diversity of primate species in undisturbed rain forest are much greater than in secondary forest of the same area.

Struhsaker's book undoubtedly will be an indispensable source of information for

all concerned with sociobiology, ecology, and conservation. In addition it may serve as a model to those intending to undertake similar research, particularly on rain forest species.

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Interpreting Burial Customs

Death and the Afterlife in Pre-Columbian America. Papers from a conference, Washington, D.C., Oct. 1973. ELIZABETH P. BENSON, Ed. Dumbarton Oaks Research Library and Collections, Washington, D.C., 1975. x, 196 pp., illus. \$10.

There are two recurrent themes in this loosely organized group of papers by archeologists and ethnographers—the sociology of burials and the mythology of the afterworld.

The sociological approach developed from Hertz's (1) studies of death and burial as a *rite de passage*, through Brown's (2) collection of studies of burial remains as a source of information on the differential distribution of social roles. Its basic assumption is that the position of an individual in various socioeconomic status hierarchies is recorded in his form of burial and burial accouterments. Equating access to exotic resources with access to other scarce commodities, including intangibles such as authority as well as basic economic resources, this view assumes that the greater the differential distribution of status goods associated with burials, the more stratified the society. Using this reasoning, James Brown examines the "Southern Cult" at Spiro in the book under review and Edward and Jane Dwyer discuss Paracas burial textiles. Both articles attempt generally to elaborate on the degree of stratification within status hierarchies by examining the distribution of goods within sets of burials.

The mythological approach views burial artifacts as representing "worlds beyond the grave and *not* worlds with which we are familiar" (p. 192). Thus, the interpretation of burial artifacts concerns itself with the "esoteric or occult matters which to the Indians were probably far more important than economic or social conditions" (p. 193). Several authors proceed to take what had been considered genre burial art and give it new meanings as representations of the "nether" world. For example, Peter Furst uses ethnographic analogy to suggest that West Mexican Nayarit tomb art illus-

trates not merely a populist view of life but an ancient world view which saw the living and the dead coexisting in one arena with only a few critical and fragile barriers between them. Thus, the so-called "two-story houses" (see illustration) become representations of a house of the living above ground and a counterpart dwelling of the "dead" below. Under Michael Coe's deft hand, Maya pictorial burial pots, which many believe to be records of actual events in Maya court life, are found usually to illustrate the adventures of the "hero twins" in the Maya underworld—functioning as a sort of "Book of the Dead" for the Maya elite.

These sociological and mythological approaches need not be contradictory. If Coe is right about the "hero twins" myth, Maya pots can no longer be taken as directly representing historical scenes. However, this does not mean that access to exotic burial goods was not differential or that their presence does not relate to the economic and social role of the deceased. In turn, concern with the economics of their manufacture and distribution does not preclude the study of them as mythological. And as Coe and Furst point out, both the world of the living and that of the dead are depicted through familiar forms. Although the Maya pictorial palaces may not be the "Maler Palace" at Tikal, they do give some idea of what palace interiors must have looked like and how people in them behaved toward one another.

The importance of the relation between the sociology and the mythology of death can be seen in the crucial, but usually implicit, assumption made by the sociological authors that a deceased's relative position within status hierarchies is directly recorded in the goods placed in his grave at death. A study of a modern mortuary in Tucson, Arizona, by J. Moosman (3) has suggested that this may be an unwarranted assumption. Moosman found that among low-income Mexican-Americans there were a wide variety of expenditures that did not seem to relate to socioeconomic status. Often the cause of death dominated significantly, through shared concepts about death and the afterlife, over socioeconomic status in affecting the level of expenditures on funerals. A person who had died of a drug overdose, no matter what his family background, was rarely given more than the bare essentials of a funeral, whereas young women who died of breast cancer, even those from the poorest families, were the subject of the greatest expenditures, many made possible by contributions from a wide network of distant kinsmen. This example obviously does not disprove any of the interpretations in the book, but it

Primates help to maintain biological diversity by serving as pollinators and seed dispersers within the tropical rainforest. A single spider monkey can disperse over 195,000 seeds over the course of one year, greatly helping the regeneration of the rainforest. [2] Of the 199 taxa of primates in the Neotropics, however, 35% are listed as threatened by the IUCN. Sources: Costa, LP et al (2005) Mammal Conservation in Brazil. Conservation Biology, 19 (3), 672-679. Primates evolved from forest-dwelling ancestors and have adaptations for an arboreal (tree-dwelling) existence, including flexible shoulders and dextrous hands. Members of the order Primates range in size from the tiny Madame Berthe's mouse lemur (*Microcebus berthae*), which weighs 1 oz (30 g), to the eastern gorilla (*Gorilla beringei*), which weighs in at over 440 lb (200 kg). The eastern gorilla is the world's biggest primate. Primates (pictures | news) are characteristic of every continental rainforest realm, except for the Australasian realm, and are made up of nearly 200 living species in more than 50 genera. Primates are thought to have originated from their insectivore-like ancestors between 100 million and 65 million years ago. The ancient primates most resembled lemurs and the tarsier of today, and upper primates did not appear until 37 to 23 million years ago. Common Chimpanzee - These primates are found in the rainforests of western Africa. They are highly intelligent and one of the most recognizable of the primate family. Jaguar - Jaguars are the largest cats in the Western Hemisphere. They are found in South America, and can hunt large rodents and even caiman. Lar Gibbon - The lar gibbon is the most well known species in the gibbon family. They are found in Southeast Asia in countries such as Malaysia and Indonesia. A primate (/ˈpraɪmeɪt/ (listen) PRY-mayt) (from Latin *primate*, from *primus* 'prime, first rank') is a eutherian mammal constituting the taxonomic order Primates (/praɪˈmeɪti/). Primates arose 85–55 million years ago first from small terrestrial mammals, which adapted to living in the trees of tropical forests: many primate characteristics represent adaptations to life in this challenging environment, including large brains, visual acuity, color vision, a shoulder girdle allowing a large degree of