Book Reviews

Questions about Primate Diet

Food Acquisition and Processing in Primates. DAVID J. CHIVERS, BERNARD A. WOOD, and ALAN BILSBOROUGH, Eds. Plenum, New York, 1984. xiv, 576 pp., illus. $85. From a symposium, Cambridge, England, March 1982.

Pigeonholing primates according to gross dietary categories such as frugivore and folivore oversimplifies reality, obscures significant differences, and does not explain how six or more sympatric "frugivores" or five sympatric "insectivores" can and do coexist. Harding and Teleki (1981) previously noted this futility, and the point is made again by several authors in this volume. In attempting to find more accurate ways to describe primate diets several suggest substitutes for these widely used categories. Winkler suggests using "dietary range." Chivers and Hladik suggest a "dietary index" and a "gut specialization index." In perhaps the most thoughtful discussion of the problem Van Roosmalen suggests using finely tuned subcategories that accurately describe the exact parts of plants eaten and their mechanical properties. But the problem remains.

The book contains 24 papers and a concluding discussion resulting from a five-day symposium and workshop. The symposium united morphologists, fieldworkers, and others in an interdisciplinary discussion of the factors that influence diet and feeding in primates. The stated purpose was "to improve the integration of studies of structure, functional analysis and observed behaviour." The book has three sections, treating ecological diversity (eight papers), food processing (11 papers), and evolutionary perspectives (six papers).

Quality and style vary widely. There are several literature reviews: Martin reviews applications of allometric analyses to the interpretation of feeding and ranging in primates; Waterman thoroughly reviews the distribution of nutrients in plants and plant parts, their relationship to observed patterns of food selection, and the role of secondary compounds; Hiiemae reviews the work on masticatory movements in mammals and raises the intriguing question, What are the patterns of transition from breast feeding to the adult diet in primates?

Ripley integrates behavioral, morphological, and ecological approaches in tackling the question of why primates, among mammals, are the broadest generalists and why their success was ultimately limited in the Old World rainforest habitat. She points out that since specialists (folivores and specialized prosimians) are predicted in the rain forest, it is the generalized frugivores that must be explained. She suggests significantly that one of the pathways (although not the most frequent one in primates) to long-term evolutionary success is through increased social flexibility. The callitrichids, with their polyspecific associations, cooperative polyandry, and communal breeding, are among the primates that have followed this route.

Lucas and Luke, using engineering principles, study the relationship between rate of food breakdown and the amount of food in the mouth in simple, elegantly analyzed experiments (in humans). They conclude that it is more useful to consider tooth shape and movement separately, and therefore terms such as "crush," "grind," and "shear" should be avoided since they tend to represent both shape and movement. Lucas and Luke point out that sharpness of teeth, and especially the maintenance of sharpness, should be studied, since these features are directly related to rate of particle size reduction. This type of analysis may lead to better understanding of the mechanical function of dental features.

Kortlandt, by using Lebrun's (1960) index of floral richness, concludes that food diversity is the most important single factor in determining the ecological limit, foraging range, carnivory, and social organization of chimpanzees.

Coe rightly recognizes that anyone studying food acquisition must realize that primates cannot be studied in isolation from their habitat, but his paper also illustrates what may happen when an ungulate specialist writes about primates. His data on numbers of primate species are much in error, undermining his conclusion that greater speciation has taken place in the Neotropics than elsewhere. Forest refugia have effected speciation but not so frequently as Coe supposes. The most recent Pleistocene refugia in the Neotropics have resulted largely in new primate subspecies rather than in a plethora of new species. When species are counted more accurately, the largest number are found, as expected, where there is the greatest effect of isolation—in the Southeast Asian archipelago.

Several papers deal specifically with the problem of reconstructing the diet of fossil primates. Kay and Covert review the ways in which paleontologists may combine behavioral and anatomical in-

"Female hanuman langur harvesting *Trapa natans*." [From P. Winkler's chapter in *Food Acquisition and Processing in Primates*]

formation from living species to infer the foraging behaviors of extinct species. Janis investigates gross molar wear patterns of three species of *Colobus* and correlates these patterns with differences in diet. She then uses the analysis to predict the diet of three species of Eocene *Pelycodus*, providing probably one of the best examples of such a study. Grine, from a study of microwear of australopithecine molars, concludes that deciduous teeth (as well as adult molars) of robust australopithecines were used more for crushing and grinding activity than were the teeth of *Australopithecus africanus*.

In the third section of the book, there are several scenarios for various aspects of primate evolution. Andrews and Aiello propose a model for the evolution of cercopithecoids in tropical to subtropical savanna. They describe African vegetation types, cladistically develop probable vegetation types for fossil taxa, and suggest that the earliest African monkeys were terrestrial leaf-eaters. Rose, in a very thoughtful paper, discusses the evolution of bipedalism and suggests (*contra* Lovejoy) that it did not take place abruptly; rather, it is seen as a process involving changing positional repertoires, probably associated with changing patterns of food acquisition, and during the transition non-bipedal activities must have formed a part of the positional repertoire, with bipedalism having different purposes at different stages. Rose suggests that the most important changing factor is body size, since increase in body size is generally accompanied by morphological specialization.

A number of papers do not deal directly with diet or feeding. Smith attempts to correlate craniofacial measurements with maximum gape in a large series of primates. Papers by Maier, Janis, and Boyde and Martin deal with dental morphology; papers by Demes *et al.* and Wolff deal with the shape of the mandibular symphysis in hominoids; Demes presents a stress-coat analysis of the human cranial base; and Sakka describes the relation of the temporalis muscle to the sagittal crest in a gorilla.

It is surprising that no one mentions the Rosenberger-Kinzey hypothesis (1976) that critical function, rather than food type most often eaten, selects for dental morphology. This concept was nicely demonstrated, for example, by Terborgh (1983) in his study of five New World primates. Two chapters allude to the possibility, however, in australopithecines. Andrews and Aiello suggest that thick enamel in *Sivapithecus* and *Australopithecus* may relate to foods eaten when fruit (presumably the main food source for these genera) was not available. Grine also suggests that thick enamel, especially in the robust australopithecines, may have been important specifically during the dry season for reducing hard dietary items when most plant foods were comparatively tough. Thus, the premolars and molars of these genera may have evolved in response to this critical function, rather than to food items eaten most frequently throughout the year. This line of inquiry warrants further pursuit.

This is one of several recent books and symposia that have dealt with the diet of primates. Why yet another one? Perhaps it is because we are still groping for a synthesis, for some magic method to predict what a given primate will eat and why. This volume moves a little closer, following a similar volume edited by Rodman and Cant (1984), along an asymptotic approach to that goal. The concluding discussion (chapter 25) attempts to provide a unifying theme relating ecology, diet, foraging, and morphology. In fact, one gains an excellent summary of the book and of the conference that produced it by reading this short final chapter. But, despite the optimism of the participants, full understanding of these relationships is still far in the future.

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Elsie Clews Parsons

A Woman's Quest for Science. Portrait of Anthropologist Elsie Clews Parsons. PETER H. HARE. Prometheus, Buffalo, N.Y., 1985. 192 pp., illus. $22.95.

Peter Hare has a wonderful subject and excellent sources. The subject is Elsie Clews Parsons, and *A Woman's Quest for Science* is a particular kind of portrait. "What I have attempted is a straightforward presentation of Elsie as a personality. Such a presentation requires extensive use of quotations from her correspondence and other writings so that she can speak for herself" (p. 8). Hare's sources were a family legacy, a "treasure trove of personal papers" (*ibid.*) his great aunt Elsie had not deposited with the American Philosophical Society.

The book is a mixed success. Elsie Clews Parsons is fascinating, speaking for herself. As biographer, Hare primarily maintains chronology, with a minimum of interpretation. He does isolate themes—anti-conventionalism, feminism, pacifism, romanticism—but he does not develop the relationship of these to Parsons's anthropology.

Born in 1874 into a wealthy New York banking family, Elsie Clews fought to go to college and went uptown to Barnard. In 1900 (sociology Ph.D. in hand) she married Herbert Parsons, a lawyer and U.S. congressman. She raised four children, while publishing at an incredible rate (p. 139). She died in 1941.

Elsie Clews Parsons is best known for her voluminous compendia of southwestern ethnography and Negro folklore. A series of intellectual convictions shaped these contributions: an anti-conventionalism that became a critical sociology; a qualified feminism and an ironic pacifism; a romantic absorption in "primitive" societies. Throughout, Hare notes, she was a "quiet iconoclast" (p. 20). She couched her attacks on American society in descriptions of "exotic" cultures—"propaganda by the ethnographic method," she said (p. 135)—and published her controversial sociology under a pseudonym. Quotations from letters show she also disguised her personal feelings.

Travel led Parsons into fieldwork. On trips with Herbert Parsons or (before and after Parsons's death in 1925) with other male companions, she collected stories, artifacts, and informants. Hare downplays the significance of her encounter with Franz Boas, father of American anthropology, partly to prove her independence in anthropology and partly to stress other collegial relationships (for example with Pliny Goddard, Alfred L. Kroeber, and Robert Lowie).

On her most significant anthropological contribution, the southwestern fieldwork, Hare lets Parsons "speak for herself." Neither quoted passages nor Hare's commentary, however, reveal the impact the difficulties of working in Pueblo cultures had on Parsons's ethnography. The reader does not learn whether qualms about probing into "secretive" cultures determined her dry, descriptive style. Nor does the reader learn the extent to which Parsons's approach to Pueblo cultures changed over time.

Hare's portrayal of the woman's personality provides a tool for assessing her anthropology. He himself suggests that "personal values" guided her research (p. 141), but the reader must relate the themes raised in earlier chapters to the terms of her ethnographic approach. A