

Mammalogy is for everyone

Current Mammalogy. vol. 2. Hugh H. Genoways, ed. Plenum Press, New York, 1990. 577 pp., illus. \$85.00 (ISBN 0-306-43304-4 cloth).

While attending the Fifth International Theoretical Congress in Rome in 1989, I was struck by the large number of people with whom I talked who did not consider themselves mammalogists, even though theriology is the study of mammals. They chose a mammal for research because of special features the particular species possessed, not because the investigator was interested in mammals as such. It seems that only biologists interested in the systematics, distribution, and biology of mammals, rather than in kin selection, optimal foraging, or population regulation consider themselves mammalogists. Perhaps the distinction being expressed was that a mammalogist is a person for whom the mammal is the end rather than a means to an end.

The first of the 12 chapters in *Current Mammalogy*, a review of the origins and applications of North American mammalogy by D. Wilson and J. Eisenberg, reinforces this view. But authors make clear how pervasive in everyday life mammals are: pets, pests, predators, and transmitters of disease, but also the major source of model organisms for biomedical research.

Mammals can serve as biomonitors for in situ detection of pollutants, as discussed by K. McBee and J. Bickham. An extensive table lists metal concentrations found in the tissues of wild mammals. Any environmentalist concerned with potential metal toxicity in our environment will find that chapter valuable and rewarding.

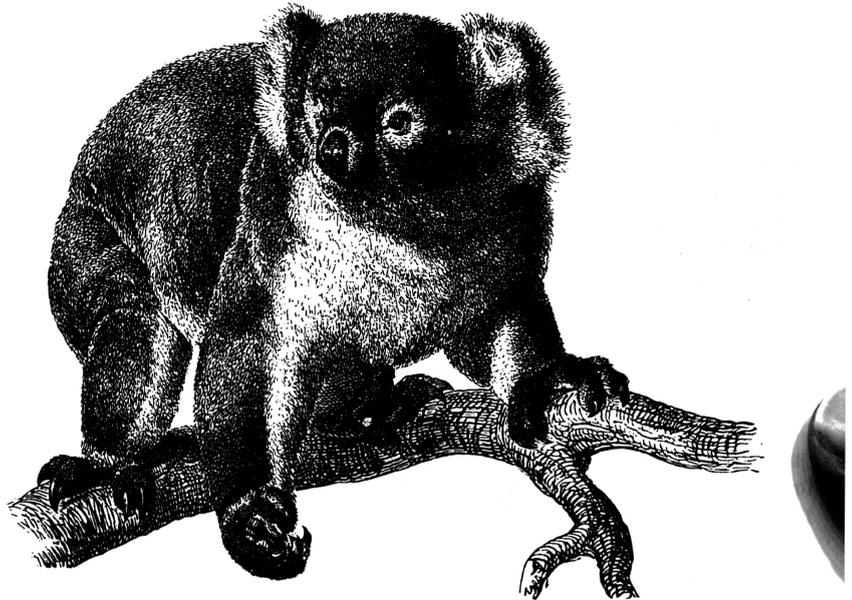
The chapter on rodent control in coconut plantations (P. Milan) seems too specialized at first glance, but it is valuable because of its extensive treatment of methods, discussion of

field experiments, and development of an integrated approach to rodent control that uses cultural, physical, chemical, and biological methods. The chapter should be read by anyone concerned with pest control, if only because the value of integrated pest management rather than reliance on chemicals is once again demonstrated.

That individuals who work with mammals often do not consider themselves mammalogists is well exemplified by endocrinologists who base most of their theory of mammalian endocrine function on a few laboratory species. This reliance on typical mammals can retard progress, as is evident from the review by E. Anthony of work on the pituitary gland and hypothalamus. Although her chapter is written to provide for mammalogists a broader synthesis of the hypothalamic-pituitary axis as an integrated unit, endocrinologists can profit from her well-reasoned argument that the currently accepted model of hypothalamic-pituitary interactions "may not be truly representative of mammals" (p. 328).

Comparative studies are needed to distinguish those features that are universally mammalian from those unique to particular species.

I particularly liked the three ecological chapters. Demographic data from different snowshoe hare populations are reanalyzed and standardized by L. Keith. Aspects of natural history and physiology are outlined. Some hare populations are noncyclic, whereas other populations have fluctuated irregularly, but the cyclic populations receive most of the attention. Predation is the usual proximate cause of death, and, contrary to considerable theory and evidence for small mammals, spacing behavior has no role in cyclic declines (nor does infectious disease or endocrine-stress response). The cycle is generated intrinsically by a hare-winter food interaction. This model and evidence to support it are compelling, but much is yet to be learned; Keith discusses 13 questions demanding answers. I would add another question: What is the relevance of the unusually high metabolic rate of this species? Any mammalian ecologist looking for a good research



problem can find it here and build on the extensive database accumulated during this century and especially the last 30 years.

Mammals face three major tasks, according to F. Bunnell and A. Harstad: acquiring energy, facilitating reproduction, and avoiding predation. Body mass, diet and digestive system, and mode of locomotion impose constraints on activity budgets, but their importance varies and often are only weakly expressed, i.e., have little effect on activity budgets. This broad analysis leads to the conclusion that mammals are remarkably sloppy in their allocation of time, a conclusion in the spirit of J. Herbers, whose publication on time and laziness in animals is not cited. The authors suggest that mammals should be viewed as satisficing rather than optimizing their use of time, but their citation of a paper arguing against optimal foraging strategy will not gain a sympathetic audience. If the authors wanted to discredit optimal foraging, they should have developed arguments based on their analysis, which is only as good as the published data they used. Their sources are too diverse for a single reviewer to evaluate, but the source for the yellow-bellied marmot is not representative. My critical comments should not be taken as an overall negative reaction to this review; it is comprehensive, thought-provoking, and filled with interesting information and interpretations.

Living in a burrow presents special problems for endotherms, e.g., heat dissipation and ambient concentrations of oxygen and carbon dioxide. O. Reichman and S. Smith review the broad characteristics associated with burrowing by both fossorial and semifossorial species. Burrows and burrowing are discussed as benefits and costs. Physiological characteristics are well summarized, but none of the problems of causal relationships are resolved; for example, is small size a consequence of low energy availability or an adaptation to reduced heat stress? Part of the problem is that reduced metabolism or reduced body size has multiple effects such that a reduced body size both reduces total heat production and energy needs. It seems likely that these are coevolved traits. As the authors conclude, generalizations are trivial;

specific topics are rich in diversity and in behavioral, physiological, and anatomical convergences. This chapter should stand as the basic source on the biology of burrowing mammals for some time to come.

Play remains a problem area in mammalian behavior. Most explanatory theories emphasize some functional component whose adaptive value is expressed in adulthood. R. Coppinger and C. Smith take a strikingly different approach. They consider play an artificial construct that can impede understanding. A model of the ontogeny of mammalian behavior considers play/learning to be the "consequence of ontogenetic metamorphosis: a waning of neonate-stereotyped feeding and hazard-avoiding behaviors together with a waxing of adult-stereotyped feeding, hazard-avoiding, and reproductive behaviors" (p. 367). In essence, play and learning occur during metamorphosis of neonate into adult and use both remaining neonatal behaviors and newly arising adult behaviors. Play is not a unitary drive nor practice for adulthood; it is the consequence of metamorphosis. I found unconvincing their reasoning, which explains away contrary hypotheses and accounts for similarities among species. Perhaps the major shortcoming of this chapter is that clear predictions that can distinguish among competing hypotheses are not developed.

The three chapters on phylogenetic and cladistic relationships and the chapter on land mammal diversity in the Cenozoic of North America were of little interest to me, but certainly will appeal to mammalogists interested in those topics. The chapters are well written, timely, modern in their approach, and thorough.

Many chapters will serve as key sources of information for updating lectures or as bases for graduate seminars. The extensive list of references with each chapter provides a rapid entree to the literature for those wanting to explore particular lines of inquiry. Anyone working with mammals or with systems of which mammals are a part will surely find this volume informative and useful.

KENNETH B. ARMITAGE
Department of Systematics and Ecology
University of Kansas
Lawrence, KS 66045-2106

THE TOTAL CLADIST

Paleontology of Vertebrates. Jean Chalain. Translated by David le Vay. Springer-Verlag, New York, 1990. 186 pp., illus. \$29.50 (ISBN 0-387-51755-3 paper).

This little book attempts to summarize the fossil record of vertebrates along the lines of cladistics. The author is a distinguished paleontologist best known for his studies of the fossil record of rodents, particularly muroids. The intended readership is probably students facing a general examination of the essay variety, who are expected to demonstrate some familiarity with current topics in evolutionary and geological research, but not expected to demonstrate any detailed understanding of the complexities of the problems that cause specialists' interpretations to differ.

The book can be read in one sitting, but this brevity comes at a cost: for much of the fossil record of vertebrates, little is presented except a name for a clade, without discussion of the anatomical derived characters thought to identify the clade. Obviously, any attempt to introduce paleontological anatomy would lead to a much thicker book and defeat its likely purpose, but it is irritating that often the names in this English translation of a French book are wrong and misleading. For example, the name *teleosts* (properly, the highly derived and most speciose clade of actinopterygian fish) is used when *teleostomes* (acanthodians, bony fish, and tetrapods) is meant.

The chief novelty of this book is the attempt to summarize the evolution of vertebrates in cladistic terms, that is, in terms of the sequence of splitting and phyletic lines. Previous introductions of the fossil history of vertebrates, such as those of A. S. Romer and of E. H. Colbert, have been in terms of (supposedly major) adaptations, such as the acquisition of jaws in gnathostomes, loss of fin rays and gain of digits on the paired appendages in Tetrapoda, and development of wings and feathers for flight in birds. With varying degrees of assurance, lineages marked by these conspicuous adaptations can be traced farther back, among the animals