

The presentation of the "old" and "new" sociobiology and the examination of their significance for ethics are clear and stimulating.

Jerram Brown discusses cooperation and competition as the paradoxical goals of cells and organisms. Much of the discussion is interesting, but the view that cooperation and competition are the sources of morals and ethics is questionable and the focus on the major histocompatibility complex and its potential role in mate selection is confusing and seems wildly speculative.

Colin Beer provides a fascinating exploration of intentionality but skirts the ethical issues that this topic raises and that are mentioned in his introduction and conclusion—that is, the issue of animal rights and the relationship between sentience and humane treatment of animals. A discussion of these issues might well have been included in a monograph on ethical concerns of particular relevance to neuroscience.

The final chapter, by Pfaff, broaches the topic of a neurobiologically determined and therefore universal ethical principle but concludes with an oversimplified analysis of the components of ethical behavior determined by such an ethical principle. Yet the idea that human values have neurobiological origins and the idea, suggested by Caplan, that there may be biologically determined limits that could realistically constrain ethical ideals, should be investigated further.

This volume only partly fulfills the goal set forth in the introductory chapter, "to include informed discussions of the most difficult theoretical problems and statements of the theoretical opportunities encountered at the interface between ethics and modern neurobiology." Some of the thorniest and most compelling topics that occur to a neuroscientist reflecting on potential ethical ramifications of the work in this field are not mentioned in the book. Such issues include not only the use of animals in pain research but also the role that social values and assumptions play in determining the direction of research and in influencing the perception and interpretation of data, and the potential for producing false expectations and spurious treatments for mental illness and social ills that emphasis on neurobiological factors to the exclusion of psychological and social ones can create.

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Adaptive Strategies

Behavioral Energetics. The Cost of Survival in Vertebrates. Papers from a colloquium, Columbus, Ohio, Oct. 1980. WAYNE P. ASPEY and SHELDON I. LUSTICK, Eds. Ohio State University Press, Columbus, 1983. xii, 300 pp., illus. \$27.50. Ohio State University Biosciences Colloquia.

This book is a collection of nine papers derived from a colloquium. It is dedicated to the memory of William Keeton, whose death in August 1980 prevented his participation in the colloquium. The contributions reflect the goals of the editors to synthesize information from ethology, ecology, and physiology as it relates to energetics and adaptations of vertebrates. The various chapters are organized about three survival strategy themes: "making your way," "reproduction and aggression," and "cost-benefits of temperature regulation and foraging."

The book is a readable synthesis of literature that will interest both specialists and students. It includes information touching on many of the topics suggested by the title: energy budgets for growth and metabolism, reproductive strategies, territoriality, costs of aggression, energetic consequences of ectothermy and endothermy, activity and foraging energetics, optimal foraging, feeding behavior, heat balance and thermoregulation. There is in it a reasonably satisfying blend of theory, mathematical models, and empirical data, but the blending and the level of analysis vary greatly from paper to paper. Some of the papers are reviews and others are case studies, and two of the contributions do not directly address the subject of energetics. Thus Melvin Kreithen's paper is strictly a descriptive review of orientation and navigation mechanisms in birds, and Cathleen Cox analyzes costs of breeding attempts by elephant seals solely on the basis of behavioral data.

Two ideas are held to be centrally important by the editors and are reflected in various of the contributions. One is the value of integration of disciplines such as ecology, ethology, and physiology for understanding the survival strategies of animals. In this regard Harvey Pough's chapter is perhaps the strongest and most eloquent contribution. He discusses how ectothermy and the metabolic organization of amphibians and reptiles account for ways in which their behavioral ecology differs from that of endothermic birds and mammals. Amphibians and reptiles are generally adapted to low energy flux but high efficiency of biomass production. Pough's discus-

sion of this subject is a masterly synthesis of mechanistic physiology (which is scant among the other chapters), descriptive life history, ecology, and behavior throughout which the focus remains clearly on energetics.

The second idea is that animals that obtain food, avoid predators, and reproduce at the least cost of energy can be considered the most fit. Many of the authors appear to accept this hypothesis, yet the papers provide little conclusive evidence that economy of energy expenditure does maximize fitness. Some have a good handle on measures of fitness but no correlative data on energetics, and others present comparisons of energy costs but lack correlative measures of fitness. In either case, there is little or no discussion of whether or not a population or species is actually energy-limited. Natural selection, of course, favors whatever works. An energetically costly mode ought to "work" if the necessary energy is freely available, and the availability of energy would therefore seem to be as important a consideration as are the energy costs that are emphasized in this book.

The measurements and estimates of energy costs (or gains) discussed throughout the book include some interesting and sometimes new information. John Brett's analysis of salmon energetics presents energy budgets for each stage of the life cycle. This level of detail is evidently attempted here for the first time. In broadest overview, however, much of the information in this book is already available or familiar. It is disappointing that the book includes no contribution from anyone using radioisotopes to measure field metabolic rates, for the use of this technique is fostering a substantial growth of meaningful energetics analyses for animals in natural settings.

The book is attractively printed, has an index, and contains only a few typographical errors. The small number of editorial deficiencies include the presence of jargon ("lab" for laboratory), tense switching within paragraphs, a few ponderous statements, and incorrect equations (equating units of temperature with units of heat flux).

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Books Received

Assessing the Impacts of Information Technology. Hope to Escape the Negative Effects of an Information Society by Research. Norbert Szyperski et al., Eds. Vieweg, Braunschweig, Germany, 1983 (U.S. (Continued on page 631))