

## BOOK REVIEWS

**Perturbing the Organism: The Biology of Stressful Experience.** Herbert Weiner. 1992. The University of Chicago Press, Chicago, IL. 372 p. \$35.00 cloth.

This book on stress, or on "stressful experience," as the author seems to prefer, is an ambitious attempt to delineate the processes involved in the organism responses to stress and the consequences of such responses on development of ill health and disease. The author's struggle to get rid of Selye's ghost is present throughout the book and generates the need for an "integrated" and dynamic definition of stress, including behavioral responses and their inherent variability. Thus, the general term "stress" will be replaced by "stressful experience." The urge of rigorously redefining stress takes the reader through a short history of the stress concepts, their attached methodologies, and the ideas that they have generated. Cannon, Mason, and even Darwin confront Selye's arguments in their attempt to determine beneficial and detrimental aspects of the stress responses.

Following a tentative classification of the stressful experiences, the author dissects out the possible sources of variability into some inherent to the nature of the stressful experience, and others associated with the physiological and psychological state of the individual subjected to the stressor. Intermittent illness, shifting times of work, changing social environment and relationships, loss of a significant family member are factors that will contribute to challenge an individual, whether intermittently or chronically. The outcome of the responses to these environmental changes will depend upon the ability to cope with the stressors, a fact that has long been known by physiologists and psychiatrists. A very interesting discussion of the psychological, social, and personal aspects of experiences ensues, and leads to a closer examination of a number of pathological conditions including the hyperventilation syndrome, the irritable bowel syndrome, and fibromyositis. At a time when interactions between immune and neuroendocrine functions controlling responses to stress, reproduction, and metabolism are a main focus of basic research, the analysis of the role of stress in development of diseases is appropriate. Rheumatoid arthritis, duodenal ulcers, hypertension, and diabetes serve as models to investigate multifactorial sources of variability. The reader is prompted to reflect on the wonders of "diversity," although the multiplicity of open "black boxes" sometimes invalidates the use of a somewhat "uniform" treatment of the disease.

This issue feeds naturally into experimental studies on animal models and the correlates of prenatal stress, maternal separation, hierarchy rank, establishment and maintenance of dominance on behavior, and physiology. At this point, we are intuitively still very close to many of the situations described for the human. Again the reader will oscillate between wonder and despair. Wonder at the mechanisms underlying complexity and the multiplicity of the compensatory mechanisms preventing failure. Despair because of this same individual variability escaping every common

definition. If there must be a rule, it will ultimately be one of individual variability.

Unfortunately, the interest of the book declines as the intended presentation of an integrated neurobehavioral and metabolic system suffers from tedious description of endocrine axes, neurotransmitter release, and signaling strategies. Most of the figures presented to describe systems are poorly designed and their legend is hardly readable. They do not stimulate interest. At this point in the book, it is not obvious to which public this book is intended. While the general public may find its peanut butter and jelly in the first part of the book, it loses it through the cracks during the second part and it is unfortunate. All together, it is worth saluting the effort in trying to encompass and delineate such a vast integrative mechanism represented by "the stressful experience." The author has certainly succeeded in some aspects of his discussion, however, the reader gets progressively disappointed because of the lack of insightful integration. We were led to expect a symphony and we only could attend the rehearsal.

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**Mammals of the Neotropics. Vol. 2., The Southern Cone: Chile, Argentina, Uruguay, Paraguay.** Kent H. Redford and John F. Eisenberg. 1992. University of Chicago Press, Chicago, IL. 430 p. + plates in color and black-and-white by Fiona Reid. \$95.00 cloth, \$39.50 paper.

This second in a planned series of three volumes on neotropical mammals (for a review of Vol. 1, *The Northern Neotropics*, see Ohio J. Sci. 90: 184-185) describes a fauna of unique interest to biogeographers and evolutionary biologists (see, for example, Simpson 1980), and as threatened by humans as it is poorly understood. The region covered here, the "southern cone" of South America, is formed by Chile, Argentina, Uruguay, and Paraguay, and includes areas (e.g., Chile and Argentina) for which mammals have been described previously (Cabrera 1957, 1960; Mann 1978), as well as those for which existing information is more obscure. Bounded by the Andes and the Rio Paraguay to the north, it includes sites visited and species first described by Charles Darwin (1839).

This volume, like the first (Eisenberg 1989), employs a survey format, with separate chapters on each mammalian order augmented with unifying chapters on special topics, including biogeography and community ecology. Volume 2 should stand well on its own, and should not require reference to Volume 1; it has less historical emphasis, however, than the first book. The Introduction includes a brief historical perspective on mammalogy of the region and a section on paleontology. Species introductions by humans (covered more cursorily in the Intro to Volume 1) are covered in an expanded chapter on human impacts. A political map (with major

cities) included in the Introduction comes in handy for “gringos” who need to place familiar, but as yet unvisited, countries on the biome map which appears later. A map of all of South America, highlighting areas included in the southern cone, would have been even more useful to me.

The mammalian fauna of southern South America, like that of the northern Neotropics, is rich and complex, including over 350 indigenous species. The diversity of some groups markedly exceeds that in the north: these include armadillos, felids, cetaceans, camelids, lagomorphs, and cervids. The southern cone is also characterized by a diverse marsupial fauna, primarily members of the opossum family Didelphidae. Rodents, rather than bats, are the dominant taxon. The chapter for each order includes reviews of available data on behavior and natural history, as well as morphology and distribution. Line drawings of skulls and teeth are shown for many species. Fiona Reid's plates are, once again, wonderful.

The community ecology chapter includes a synopsis of types of mammal communities in the region, and a rather detailed analysis of the role of predators, particularly canids, in each. The authors offer general comparisons of the climatic components of this region to North America and northern South America, and I found these helpful. Since references appeared at the end of each chapter, the addition of an author index would have been welcome.

While the shift in first authorship from John Eisenberg to Kent Redford has been accomplished with little change in tone, the authors' enthusiasm and concern for conservation is more salient in this than in the first volume. The publication of this series, while clearly intended as a “progress report” rather than a definitive synthesis, is timely, given the urgency of conservation efforts in South America. Its “state-of-the-science” approach to the available and sometimes sparse data on this fauna should serve to direct future research efforts. This volume, like its counterpart, is a unique and long awaited work, and will be indispensable to all serious students of South American and tropical mammalogy.

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**Behavioral Endocrinology. Edited by Jill B. Becker, S. Marc Breedlove, and David Crews. 1992. The MIT Press, Cambridge, MA. 574 p. \$34.95 paper.**

This book was designed to serve as a textbook in a behavioral endocrinology course for undergraduates who have little previous exposure to physiology. In particular, the editors aimed it at students who had taken an introductory survey course in biology or physiological psychology. This is an unusual volume to serve as an undergraduate text since it consists of chapters contributed by 19 different researchers. The contributing authors cite over 1,100 papers in their chapters, although the frequency of citations is highly variable from chapter to chapter. For the purposes of an undergraduate course in behavioral ecology, such variability is probably not a serious detraction.

Because *Behavioral Endocrinology* is for students with little background in physiology, it begins with two relatively long introductory chapters. The first chapter describes research methodology in behavioral endocrinology and then reviews basic concepts in cell biology, neurobiology, and neuroendocrinology. This includes an introduction to what hormones are, how they affect cells, and how those effects can influence the behavior of animals. Chapter 2 introduces models of sexual differentiation of the brain and behavior. The remaining chapters present a more detailed perspective on hormonal influences on sexual behavior, nonsexual behavior, and the reciprocal regulation of hormones and behavior. The specific topics included under these categories include the endocrine factors involved in courtship and reproductive behavior, parental behavior, aggression, the stress-response, ingestive behavior, and biological rhythms. In addition, in many chapters there is discussion of how environmental stimuli influence endocrine activity and behavior. In a few of the chapters there is a good treatment of the historical development of our understanding of the role played by different hormones (e.g., in sexual differentiation). Although undergraduates do not often appreciate such an historical treatment, it could be used to good advantage in demonstrating to students the strengths and weaknesses of various methodologies.

An interesting feature of this book is that it addresses some controversial aspects of human social behavior, such as sex differences in cognitive functions and sexual orientation. The editors and authors should be congratulated on addressing these important and interesting issues. Unfortunately, discussions of the relationship between hormones and human behavior are limited by a lack of relevant data. This was the case, for example, in the discussion of human sexual behavior. On the other hand, Hampson and Kimura prepared an extremely detailed and well-written chapter on sex differences and hormonal influences on cognitive functions in humans.

The editors stressed in the Preface that they wanted to produce a text that dealt with more than just rats, mice, and humans, despite the fact that the vast majority of studies has been done on those species. Although the emphasis of the book is on those three species, there also is information about amphibians, reptiles, and other vertebrates, as well as a chapter on hormonal regulation of invertebrate behavior that focuses on insects. David

Crews presented a very interesting chapter on diversity of hormone-behavior relations in reproductive behavior. He was one of the few authors who emphasized an evolutionary perspective and the importance in comparative studies of considering the functional outcomes of behavior rather than just the formal characteristics of behavior. Crews makes the excellent point that "Those scientists interested in the immediate causes of behavior tend to be unaware of the great advances that have been made in evolutionary biology. Similarly, most scientists interested in ecological and evolutionary questions ignore advances made in neuroendocrinology and molecular biology." This book offers examples of both the reductionist and holistic perspective on hormones and behavior.

Overall, *Behavioral Endocrinology* is informative and well-written. It will serve as a useful text in an undergraduate behavioral endocrinology course. In addition, it will serve as a useful resource for graduate students who study behavior, but not specifically behavioral endocrinology.

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**Environmental Physiology of the Amphibians. Edited by Martin E. Feder and Warren W. Burggren. 1992. The University of Chicago Press, Chicago, IL. 646 p. \$135.00 cloth, \$47.50 paper.**

In the Preface of this outstanding review, the editors emphasize that the book was designed "... so that it can be read from cover to cover to yield an overview of the environmental physiology of amphibians and a prospectus for further research." That design, a highly appropriate one, is obvious to the reader, as are the excellent editing of the book by Feder and Burggren and the fine production of it by the University of Chicago Press.

Authors' individual styles do vary; however, each chapter presents facts of amphibian environmental physiology and analyses of many of those facts. In addition, contributors have underlined important gaps in our understanding of amphibian functional biology, and have suggested types of investigations required to fill them. Also, authors defined most terms precisely, then used the terms as defined.

Chapter 1, "A Perspective on Environmental Physiology of the Amphibians," by the senior editor, is excellent. It prepares readers for the long and fascinating tour ahead in Chapters 2 through 16. Merely reading through Contents impresses one with the coverage of the tour. The chapters have been organized in four parts, viz., Part 1: *Control Systems*, which includes Chapters 2, "The Nervous System," and 3, "Endocrinology." Part 2: *Exchanges of Gases, Osmolytes, Water and Heat* includes Chapters 4 through 10, "Biophysics of Heat and Mass Transfer," "Exchange of Respiratory Gases, Ions, and Water in Amphibious and Aquatic Amphibians," "Exchange of Water, Ions, and Respiratory Gases in Terrestrial Amphibians," "Sensory

Mechanisms Regulating the Cardiovascular and Respiratory Systems," "The Influence of Temperature and Thermal Acclimation on Physiology Function," "Thermoregulation," and "Estivation and Hibernation." Part 3: *Energetics and Locomotion* consists of Chapters 11 through 14, "Striated Muscle: Physiology and Functional Morphology," "Energetics at Rest and During Locomotion," "Feeding and Digestion," and "Behavioral Energetics." The last two chapters, certainly among the best and most analytical of the book, "Growth and Reproduction" and "Developmental Changes in Physiological Systems," constitute Part 4: *Development and Reproduction*.

The editors have provided a short introduction to each part. Readers will find those preliminaries valuable in focusing the materials that follow. Similarly, readers will appreciate the introductions to chapters, in most of which the authors have succeeded in outlining major points, emphasizing important limitations, and citing earlier reviews.

Cross-references to chapters within the book and references to works in the Bibliography are extensive. The Bibliography includes more than 4,000 entries that span 202 years, i.e., from Galvani's 1791 paper to at least two papers dated 1993. A Table of Contents, a Systematic Index, a Subject Index, as well as a list of contributors and their addresses are included in the publication.

The authors' names will be known to most zoologists, and to comparative and environmental physiologists, for each has contributed to our knowledge of the amphibians, and many are experts in the specific fields they were invited to discuss. The important and valuable similarities of those discussions have been cited earlier in this review. Differences are also apparent. In addition to stylistic ones, they include depths of analyses, uses of a comparative approach, and correlations of physiology with anatomy and morphology. Several contributors relied heavily upon tabular data, and all included figures in their chapters. The tables are generally effective; most figures are likewise.

Unfortunately, and surprisingly, this collection of reviews suffers a few common faults that detract from the general excellence of the volume. There are teleological statements. Several authors use the phrase "due to" often and incorrectly. Others imply or state that specific measurements and/or experiments "should" yield particular data or results. Many of the figures that have been reprinted from earlier publications are not clear or contain smudged lines and points.

These problems can be remedied easily in the future. Now, this reviewer urges all college and university librarians to add *Environmental Physiology of Amphibians* to their collections. All animal biologists, no matter what their specialties are, will want to own their individual copies to read, as the editors suggest, "from cover to cover."

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