

sible projects and many fascinating tidbits of new information. The more senior of us were left wanting more of an organized research agenda, feeling that the authors pointed out some of the difficulties with, say, determining the emergent properties of sexual conflict not represented by the traditional study of sexual selection, but then left the situation unresolved. What are the common consequences of sexual conflict among taxa for individual lifetime reproductive success? The rather encyclopedic approach also made it difficult to see the repeated patterns of both mechanisms and consequences of sexual conflict among different taxa. The authors present empirical evidence to support the notion that female choice is inherently a form of resistance to male efforts at mating, and this provided the fodder for much debate on the topic. Ideas such as this or the discussion of sexual conflict within hermaphrodites or plants would be excellent jumping-off points for a graduate or advanced undergraduate seminar.

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HORMONES AND ANIMAL SOCIAL BEHAVIOR. *Monographs in Behavior and Ecology.*

By Elizabeth Adkins-Regan. Princeton (New Jersey): Princeton University Press. \$79.50 (hardcover); \$45.00 (paper). xvii + 411 p; ill.; index. ISBN: 0-691-09246-X (hc); 0-691-09247-8 (pb). 2005.

Over 40 years ago, Nobel Prize laureate Nikolaas Tinbergen laid the cornerstones for the study of modern ethology (science of animal behavior) when he proposed that an animal's behavior could be understood by asking four basic questions about that behavior: *Function*, how does it impact on the animal's chances of survival and reproduction? *Causation*, what stimuli elicit the behavior? *Development*, how does it change over the animal's life? *Evolution*, what are its origins and how does it compare with similar behaviors in related species? During this same period, the field of behavioral neuroendocrinology was well on its way to understanding how hormones can dramatically influence animal behaviors such as courtship, mating, and parenting. What is particularly surprising about these two areas of behavioral study is how they managed to remain somewhat disconnected for so many years. Recently, studies have begun to emerge that integrate the basic principles of these two fields. In her new volume, Adkins-Regan has successfully synthesized the present body of literature relating to hormones and behavior into a clear

and concise guide to how these hormonal processes influence animal behavior as a whole.

The book is organized into seven chapters that follow an ascending path, starting with the molecular mechanism underlying hormone action to the behaviors influenced by these molecular events to ultimately how hormones may have influenced phylogenetic histories. These discussions are not limited to just vertebrates, but are inclusive to both invertebrates and vertebrates. Chapter 1 provides a well-organized, up-to-date discussion of the cellular and molecular mechanisms underlying hormone action, which will prepare readers for an examination of hormonally influenced behaviors in Chapter 2. Adkins-Regan continues to build on this theme in Chapters 3 and 4, where she adds a new layer of complexity with the introduction of social organization and sexual differentiation, respectively. Here, she presents a convincing argument that hormones have a clear influence over behavioral ecology. The final three chapters address the relationship between hormones and social behavior in the larger context of life stages and evolutionary changes over short and long periods. These discussions are insightful and will most certainly inspire new ways of thinking about what roles hormones have played and will play on animal behavior.

Adkins-Regan's writing is engaging and thought provoking. She presents her arguments in the form of testable hypotheses and has a keen sense for identifying important but yet unanswered questions. Although the book is intended for graduate students and researchers, anyone interested in the hormonal modulation of behavior will find this volume of interest. In the preface, the author states that the goal of the book is to provide a common dialogue between behavioral ecology and behavioral endocrinology. She has succeeded.

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NEURAL NETWORKS AND ANIMAL BEHAVIOR. *Monographs in Behavior and Ecology.*

By Magnus Enquist and Stefano Ghirlanda. Princeton (New Jersey): Princeton University Press. \$89.50 (hardcover); \$39.95 (paper). xi + 253 p; ill.; index. ISBN: 0-691-09632-5 (hc); 0-691-09633-3 (pb). 2005.

Mathematicians (and modelers) have a unique way of looking at the world. Hence, the authors of any book that attempts to encourage biologists to adopt a mathematical modeling approach to their work have set themselves quite a challenge. In *Neural Networks and Animal Behavior*, Enquist and

Ghirlanda have fully accepted this challenge. The volume consists of a preface, six chapters, a comprehensive reference list, and an index. The first chapter sets the stage by considering how animal behavior can be understood. The second introduces the terms and methods of neural networks. Chapters 3 through 5 suggest how neural networks might be used to help researchers understand the mechanisms of behavior, learning and ontogeny, and evolution. The final chapter provides a thoughtful concluding statement.

Will this book be useful to anyone interested in animal behavior? Certainly not to those whose eyes glaze over when faced with an expression such as $z_i = f(y_i)$. But for more adventurous (or younger) researchers, this volume has a great deal to offer. The authors have an exceptionally understandable and straightforward writing style. Furthermore, they have obviously gone to great effort to make their descriptions of neural networks as clear as possible, liberally sprinkling the book with road signs that help guide readers along the path to understanding. They also provide plenty of references to articles or other volumes that cover topics in greater detail. Perhaps just as important, the authors show an excellent grasp of a wide range of topics in animal behavior, from the physiological mechanisms of rhythmic movement generation to the evolution of behavior, something that allows them to speak credibly about how neural network methods might be applied to various lines of research.

Neural network studies in neurobiology and psychology have led to important insights into neurobiological processes. Enquist and Ghirlanda express the hope that using neural networks to conduct rigorous tests of ideas in animal behavior will have the same effect in that field. Certainly in this volume they have done everything possible to entice researchers into trying neural network methodologies to increase their understanding of animal behavior.

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HUMAN BIOLOGY & HEALTH

MONKEYLUV: AND OTHER ESSAYS ON OUR LIVES AS ANIMALS.

By Robert M Sapolsky. Scribner. New York: Simon & Schuster. \$24.00. xi + 209 p; no index. ISBN: 0-7432-6015-5. 2005.

This volume is a very readable and entertaining set of 18 short essays reprinted from a variety of magazines such as *Discover*, *The New Yorker*, and *Scientific*

American. Sapolsky, professor of biology and neurology at Stanford, covers a wide area of loosely related topics, ranging from Sudden Infant Death Syndrome through the consequences of genetic imprinting to sexual attraction among monkeys. A helpful set of notes and recommendations for further reading follow each essay. The author has a light and humorous touch and although the material is written for nonbiologists, the information is scientifically accurate. Mercifully, there is only a little of the tiresome sermonizing about the evils of genetic determinism that mars so many books on biology and behavior that are written for educated general readers.

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BIOMEDICAL SCIENCES

TICK-BORNE DISEASES OF HUMANS.

Edited by Jesse L Goodman, David T Dennis, and Daniel E Sonenshine. Washington (DC): ASM Press. \$119.95. xv + 401 p + 28 pl; ill.; index. ISBN: 1-55581-238-4. 2005.

No longer are ticks and tick-borne diseases confined to small sections tucked away in general medical entomology books. Gradually they are moving toward center stage among vector-borne diseases, as befits their global distribution, high prevalence, significant medical and veterinary impact, and the intellectual challenge they pose for explaining and predicting their (changing) epidemiology. For the majority of biologists who know little about ticks, this volume will provide a valuable reference on the infectious agents they transmit to humans.

A promising introductory chapter conveys the enthusiasm that most acarologists feel for their subject. The first section (seven chapters), on the biology of ticks and tick-human-pathogen interactions, describes many of the features that permit ticks—so well equipped as bloodsuckers, but fettered as vectors by their habit of taking only one blood meal per life stage—to be such effective and ubiquitous conveyors of viruses, bacteria, rickettsia, and protozoan parasites. The highlight for me is the elegantly written chapter (Munderloh et al.) on ticks as hosts to these exploitative, and other symbiotic, microbes. Evidence of the wide spectrum of transmitted pathogens is then laid out: a chapter on each of 13 major disease systems that threaten humans, predominantly those of north-