

sensory ecology, and signaling theory have been tested and applied in this context. This represents a missed opportunity to explore territory of interest to readers outside the zoo world. In its place are vague and detached discussions of breeding problems and the possible role of the major histocompatibility complex in mate choice.

In tackling a topic so broad as zoo animals, one must skip a stone across the surface, even when devoting more than 600 pages to the subject. Inevitably, the stone will travel unequal distances between touching the surface of the water, so some parts of the lake will be explored more thoroughly than others. Hosey et al. have done an amazing job in crossing the entire lake; I admire the strength of their throwing arm.

Whose bookshelf should contain this publication? I think anyone who is employed by a zoo or conducting research there should own a copy or at least have access to the volume down the hall. Others working in captive settings (e.g., with laboratory animals) will find this book useful. Unfortunately, it does not contain enough material generalizable beyond the zoo fence to be of interest to other students of biology. It is, however, a strong volume that could go by the alternative title, *Almost Everything You Wanted to Know about Zoo Animals*.

RONALD R. SWAISGOOD, *Applied Animal Ecology, Institute for Conservation Research, San Diego Zoological Society, San Diego, California*

THE ETHOLOGY OF DOMESTIC ANIMALS: AN INTRODUCTORY TEXT. *Second Edition*.

*Edited by Per Jensen. Wallingford (United Kingdom) and Cambridge (Massachusetts): CABI Publishing. \$59.95 (paper). xi + 246 p.; ill.; index. ISBN: 978-1-84593-536-8. 2009.*

The purpose of this volume is to introduce readers to the basic concepts underlying the behavior of domestic animals and to describe the most representative behaviors of our most common domesticated species. The first 115 pages consist of eight chapters that cover the Basic Elements of Animal Behavior, including behavior genetics, the process of domestication, physiological processes underlying behavior, motivation and the organization of behavior, learning and cognition, social and reproductive behaviors, abnormal behaviors, animal stress and welfare, and human-animal interrelationships. Although informative, I found the chapters Behaviour and Physiology (by Valros and Hänninen) and Learning and Cognition (Mendl and Nicol) somewhat difficult to read, partly due to the complexity of the topics discussed and partly due to organization and writing style. In addition, I felt the latter chapter put too much emphasis on cognition and not enough on the basic principles of learning for an

introductory textbook. The chapter Social and Reproductive Behaviour (Weary and Fraser) was very readable, but much too short to do justice to this very broad topic of particular relevance to understanding the behavioral patterns of our common domestic animals. The remaining chapters were excellent in all respects.

The second half of the book included chapters on domestic fowl, horses, cattle sheep and goats, pigs, dogs, cats, and laboratory mice and rats. I found all of these chapters very readable and they offer useful background on the basic behaviors of the species covered. The chapters on domestic fowl, pigs, and cats stood out as particularly informative. In addition, I thought the sections in the chapter on laboratory mice and rats that deal with phenotypic development and requirements under laboratory conditions were particularly thought-provoking.

Overall, this volume goes a long way toward fulfilling the editor's objectives, especially considering the text is only 233 pages long. I like the fact that it introduces readers to the basic principles of animal behavior before exposing them to more advanced topics such as the application of behavioral knowledge in the care and management of domesticated animals.

EDWARD PRICE, *Animal Science, University of California, Davis, California*

WILD JUSTICE: THE MORAL LIVES OF ANIMALS.

*By Marc Bekoff and Jessica Pierce. Chicago (Illinois): University of Chicago Press. \$26.00. xv + 188 p.; ill.; index. ISBN: 978-0-226-04161-2. 2009.*

This well-written book makes a compelling case for what the authors term "wild justice," the presence of species-specific moral codes among a diversity of animals. Designed to spawn a new field of inquiry into animal behavior rather than chronicle the conclusive findings of a mature field, this volume ties together a variety of studies and anecdotes to make the case that animal morality should be taken seriously and studied more extensively. Excellent treatment is given to three key concepts: animals cooperate, animals are empathetic, and animals maintain a code of justice. Although much of the content presented has been chronicled by others, the authors manage to sew previously disconnected and disparate concepts into a more coherent whole. In addition to bringing together diverse scientific observations, the book also delves into the philosophical underpinnings of various scientific fields, dissecting assumptions and challenging widely held, but poorly supported, hypotheses about the cognitive and emotional limitations of animals.

*Wild Justice* packs a lot of ideas and content into relatively few pages, but manages to stay accessible;

any reader with moderate scientific literacy will be able to follow the well-crafted flow of the argument. For readers who want to explore more, very comprehensive notes and reference sections provide a valuable bibliographic map that allows the text to remain unencumbered by clunky inline citation or footnoting. Bekoff is a seasoned ethologist whose work explores the role of play in animal sociality, while Pierce is a broad-thinking philosopher grounded in bioethics. Their collaboration has produced a valuable and provocative volume with the potential to promote a deeper understanding of animal morality, including the morality of our own species.

CHRISTOPHER X. JON JENSEN, *Mathematics & Science, Pratt Institute, Brooklyn, New York*

#### GUILTY ROBOTS, HAPPY DOGS: THE QUESTION OF ALIEN MINDS.

By David McFarland. Oxford and New York: Oxford University Press. \$34.95 (hardcover); \$15.95 (paper). x + 252 p.; ill.; index. ISBN: 978-0-19-921930-8. 2009.

This volume is aimed at the general public and contains the author's philosophical musings on animal and robot minds—the backdrop to his distinguished scientific career in animal behavior and robotics. The rhetoric of “alien minds” is used to emphasize that animals and robots are mechanisms designed to operate in different niches from humans. That current “robots . . . can match animals” (p. 200) in every respect—used to argue for animal mentality—is a central conceit. McFarland concludes that fundamentally we do not know anything about robot or animal minds because they are “aliens.”

Poor editing, a limited index, and the lack of an alphabetized bibliography all contribute to making this book less useful than it might have been to academic readers. Even if those defects were remedied, the approach is perhaps too idiosyncratic to serve as a good, general introduction to either the philosophy or the science. McFarland engages primarily with the (still relevant) literature of the 1980s and 1990s (accounting for two-thirds of the references in the endnotes). Symbolic and connectionist approaches to robotics and philosophy of mind are discussed. More recent dynamical systems approaches are omitted.

For the intended audience, the author can be excused a personal tour. Less excusable is the presentation of the philosophical material motivating the book (40% of the indexed authors are philosophers). Key ideas and distinctions are scrambled, and views are attributed to philosophers that they would not recognize. These claims cannot be fully documented in the space allotted but, for example, Robert Cummins is labeled a “teleological functionalist” (p. 165), a view that Cummins has wished would go to a “well-deserved

extinction.” Even the biology is presented in ways liable to confuse readers. For example: “Obviously, an individual that has no offspring during its lifetime will exert no genetic influence upon the population” (p. 27). Kin selection is introduced one page later.

Can we understand “alien” minds? Perhaps yes, perhaps no. But this book does little to reduce the murk surrounding the question.

COLIN ALLEN, *History & Philosophy of Science and Program in Cognitive Science, Indiana University, Bloomington, Indiana*



#### NEUROBIOLOGY

##### EVOLUTIONARY NEUROSCIENCE.

Editor-in-Chief: Jon H. Kaas; Co-Editors: Georg F. Striedter, John L. R. Rubenstein, Theodore H. Bullock, Leah Krubitzer, and Todd Preuss. Amsterdam (The Netherlands) and Boston (Massachusetts): Elsevier (Academic Press). \$149.95. xix + 1017 p.; ill.; index. ISBN: 978-0-12-375080-8. 2009.

The chapters in this edited volume are drawn from a larger, four-volume work entitled *Evolution of Nervous Systems: A Comprehensive Reference* (J. H. Kaas. 2007. Amsterdam (The Netherlands): Elsevier Academic Press), with a few additional chapters drawn from the *Encyclopedia of Neuroscience* (L. R. Squire. 2008. Available online at: <http://www.elsevierdirect.com/brochures/ens/index.html>). The chapters selected together provide an excellent overview of the structural evolution of the vertebrate nervous system. The book is organized into four sections that deal broadly with the history and theory of brain evolution, the evolution of vertebrate brains (excluding mammals), the evolution of mammalian brains and, lastly, the evolution of the primate brain. Kaas has gathered contributions by many of the important researchers in the field into this single volume, making it an invaluable (and more affordable) publication for both students and scientists. The choice of chapters to some extent reflects the enormous contribution that Kaas has made to evolutionary neuroscience, focusing primarily upon the structure of vertebrate brains in a comparative framework.

There is not space to review each chapter separately, but I feel I must mention a few of my favorites. The opening chapter (by Striedter), which discusses the core concepts necessary for studying brain evolution, gives an excellent introduction suitable for students and scientists. Subsequent chapters use the themes discussed in this opening chapter. Two further chapters on mammalian brains (by Krubitzer