



Modelling Natural Action Selection edited by Anil K. Seth, Tony J. Prescott, and Joanna J. Bryson

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Review by: Marc Mangel

The Quarterly Review of Biology, Vol. 87, No. 4 (December 2012), pp. 373–374

Published by: [The University of Chicago Press](#)

Stable URL: <http://www.jstor.org/stable/10.1086/668192>

Accessed: 18/01/2013 14:53

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First, the publication has a unique organization of chapters. The first three chapters introduce several common statistical analyses but without touching on probability theory or hypothesis testing. Hypothesis testing (Chapters 4–7) and probability theory (Chapter 9) are gradually covered in later chapters. The last two chapters provide generalizations on linear models with normal and binomial distributions. This unique organization allows readers with no statistical or modeling background to move smoothly from basic algebra to the advanced modeling part of statistical analysis. A drawback of the organization is that readers may have to go back and forth among chapters if they want to better understand some common statistical analyses.

Second, the book puts much emphasis on statistical modeling and parameter estimations. However, it does not cover nonparametric methods, which is also an essential part of statistical analyses for life sciences, given the complexity of life. Therefore, other supplementary textbooks on nonparametric methods are needed for graduate course on introductory statistics.

Third, the volume focuses on the application of statistics for the life sciences by providing plenty of examples and exercises related to biology. Each chapter also has a section that includes R (free statistical programming software) commands and related outputs for some examples in the chapter. This will allow readers to pick up the necessary skills to undertake or program more sophisticated analyses by themselves.

Overall, this work achieves its aim of being a textbook that has “the right combination of data examples, statistical theory, and computing” (p. ix). It would be a good choice for courses on introductory statistics.

XIA HUA, *Ecology & Evolution, Stony Brook University, Stony Brook, New York*

FIELD NOTES ON SCIENCE & NATURE.

Edited by Michael R. Canfield; Foreword by E. O. Wilson. Cambridge (Massachusetts): Harvard University Press. \$27.95. xv + 297 p.; ill.; index. ISBN: 978-0-674-05757-9. 2011.

The 15 well-known researchers who contributed to this edited collection explain why field notes should be permanent. As someone who long ago threw away almost all of my original “notebooks,” it is too late for me to take their advice, but younger persons will find this book instructive, particularly if they are teaching students how to do ecological or behavioral field work.

A useful feature of the volume is that no one method of notetaking is given priority over others;

instead, readers are given several options to consider. Some contributors urge us to make formal, highly structured data entries in our field books, following a particular set of rules. Others favor informal collections of miscellaneous thoughts, questions, and sketches along with any numerical entries that we may make. The authors also differ greatly on the instruments they recommend for notebook users; some prefer paper and pencil, others ballpoint pens or paints, while still others urge researchers to bring cameras or even computers into the field.

Whatever the procedures recommended, the authors argue that notebooks are a continuing source of inspiration for the notebook owner, a reminder of what was done when and, for artistic scientists, an aesthetic document. Moreover, field notes may be valuable not just for the notetaker, but for future researchers who wish to compare the present with the past. We are reminded of Darwin’s field notes and introduced to other examples in which old field notes have been put to new uses.

I am skeptical that my now-destroyed field notes would have had value for researchers down the road. My ephemeral notes served their purpose, which was to help me write more permanent scientific articles. But this well-written volume makes a strong case for producing a lasting record of what we see and think about in the field and the contributors provide plenty of diverse advice about how to do the job right. Young researchers take note!

JOHN ALCOCK, *School of Life Sciences, Arizona State University, Tempe, Arizona*

MODELLING NATURAL ACTION SELECTION.

Edited by Anil K. Seth, Tony J. Prescott, and Joanna J. Bryson. Cambridge and New York: Cambridge University Press. \$140.00. xv + 544 p. + 8 pl.; ill.; index. ISBN: 978-1-107-00049-0. 2012.

Natural action selection is the task of deciding what to do next and all organisms are faced with this challenge. The current volume is an expanded version of an issue of the *Philosophical Transactions of the Royal Society B: Biological Sciences* (Volume 362, Issue 1485) published in 2007. There are three parts: behavioral ecology, neuroscience, and agent-based modeling. Each of these parts is pretty accessible to a respective expert, but is likely to be difficult for newcomers. Thus, the volume could make the basis for a terrific interdisciplinary graduate seminar, or serve as a means for postdoctoral researchers to get into a related field, but it would serve poorly as an introductory textbook.

As with all edited volumes, it has an unevenness of technical level and writing. For example, sometimes the mathematical notation is needlessly complicated (as in $d^p = \arg \max_a \{\text{cost}(\text{outcome}(a), a)\}$ where a and d^p are defined, but $\arg \max$ is not) and it appears that each author thought that someone else was going to explain Bayesian analysis. That said, the book is worth looking at just to learn about the Leaky Competing Accumulator (LCA) model of biological decision-making. This model conceives that organisms accumulate noisy evidence about the world along a number of different channels, which may be mutually inhibiting, and then makes a decision to do one action or the other either when one of the accumulators exceeds a threshold, presumably under natural selection (the free-response paradigm), or whichever accumulator is larger at an interrogation time (the interrogation paradigm). These models are based, in the simplest case, on the Ornstein-Uhlenbeck stochastic process and it is a pleasure to see another innovative application of this really fundamental process, which everyone should understand. I would not rush out to buy this book, but encourage readers to first look at the *Philosophical Transactions* issue. If the material there excites you, then this volume is certainly worth your time, and possibly your money.

MARC MANGEL, *Center for Stock Assessment Research, University of California, Santa Cruz, California*



PALEONTOLOGY

LIVING DINOSAURS: THE EVOLUTIONARY HISTORY OF MODERN BIRDS.

Edited by Gareth Dyke and Gary Kaiser. Hoboken (New Jersey): Wiley-Blackwell. \$129.95. xv + 422 p. + 8 pl.; ill.; index. ISBN: 978-0-4706-5666-2. 2011.

One of the great discoveries of the four decades in paleontology is the documentation that birds (Aves) evolved from small feathered dinosaurs. At present, we have a significant record of the evolutionary history from the earliest dinosaurs to the base of the bird family tree (including the well-known Late Jurassic *Archaeopteryx*). There are a fairly substantial number of technical and popular-audience books on the origins of birds (and their feathers and flight) among the dinosaurs, but there are far fewer on the paleontology of birds themselves. *Living Dinosaurs* addresses this deficiency, focusing on the 145-million-year history of birds after they diverged from other dinosaurs. It is a collection of 16 original chapters that focus on: the deep history of modern birds (three chapters);

the paleontological history of major groups of Cenozoic birds (six chapters); the evolution of modern avian traits (six chapters); and a single chapter summary of the current and near-future state of avian diversity.

The small size and delicate skeleton of birds makes their fossilization potential much less than their larger-bodied relatives. Consequently, detailed phylogenetic studies are presented for only a few groups of robustly built bird clades: penguins (Ksepka and Ando), the large extinct flightless predatory South American phorusrhacid "terror birds" (Alvarenga et al.), and the large extinct pseudo-toothed odontopterygiformes (Bourdon). These analyses, together with an extremely extensive phylogenetic analysis of the great diversity of Mesozoic birds by O'Connor et al., contain data matrices that will stand as the foundations for further exploration of these groups. Unfortunately, there are no downloadable digital copies of the data matrices, while such are typically available as supplementary online files of comparable studies in journals.

Beyond the issue of bird evolutionary interrelationships, the chapters in *Living Dinosaurs* provide important reviews of new discoveries with regard to such issues as the development of flapping flight, the transformations of avian neurology and respiration, and even the shrinking of the avian genome.

This is intended not as a general textbook on paleornithology, nor (given the technical nature of some chapters) is it intended for the casual reader. Rather, it is a state-of-the-science report on our current understanding of the evolutionary history of one of the most successful groups of animals of the modern world. No student in the field of bird history should be without this work. Additionally, this volume will inform those seriously interested in vertebrate evolution.

THOMAS R. HOLTZ, JR., *Geology, University of Maryland, College Park, Maryland*

TRANSYLVANIAN DINOSAURS.

By David B. Weishampel and Coralia-Maria Jianu. Baltimore (Maryland): Johns Hopkins University Press. \$60.00. xv + 301 p. + 8 pl.; ill.; index. ISBN: 978-1-4214-0027-3. 2011.

When discussing the dinosaurs and other Mesozoic creatures known from Europe, Eastern Europe typically receives short shrift. However, hidden away in rural northwest Romania (a.k.a. Transylvania) is a treasure trove of vertebrate fossils that offers a tantalizing glimpse of life from the Late Cretaceous. At this time, Transylvania was a semitropical island intermittently connected to the others. Such a dynamic environment proved to be a fertile evolutionary laboratory. The authors, along with numerous colleagues, have studied this unique fossil assemblage for nearly 20 years, and