crementalism works in the history of science, with
the introduction of new tools and new insights,
and with fusions of fields leading to a greater un-
derstanding of how a science evolves?

Elof Axel Carlson, *Biochemistry & Cell Biology,
Stony Brook University, Stony Brook, New York and In-
stitute for Advanced Study*.

The author received her doctorate in 2011 at the
University of Cambridge in history and philosophy
of science studying 18th-century natural history. In
this book she looks into the distinction between
the then three kingdoms of matter: animal, vegetable,
and mineral. Her volume shows how what once
seemed obvious as a classification of three distinct
kingdoms crumbled from both philosophic and
scientific outlooks. This is a short book intended as
a popular work but with a scholar’s analysis and in-
sights in the tradition of Schrödinger’s *What is Life?*
and the debates over the connections between plants
and animals or of the living cellular and noncellu-
lar (viral) worlds.

Gibson reminds us that scientists differ in cul-
tural experience, religious (or nonreligious) out-
sights, social class, and from their past and future
generations. Although vitalism or holism might re-
treat from the organism to the cell or from the cell
to some vague protoplasmic dynamism, we have to
remind ourselves that life is more complex than
our present knowledge of how to interpret it at its
most basic level and that we tend to believe we have
a more complete picture of life than we actually
have. This is a book well worth reading and it will
enliven many a classroom lecture.

Elof Axel Carlson, *Biochemistry & Cell Biology,
Stony Brook University, Stony Brook, New York and In-
stitute for Advanced Study*.

GENERAL BIOLOGY

Bayesian Models: A Statistical Primer for
Ecologists.

By N. Thompson Hobbs and Mevin B. Hooten. Princeton
(New Jersey): Princeton University Press. $49.50. xiv +

This book goes against the current fashion in eco-
logical statistics volumes in at least two ways. For
one, the authors refrained from writing a recipe
book littered with helpful but necessarily specific
code. Second, the scientific method, and along
with it, theory, are put into the center of statisti-
cal endeavors. After a decade of wading through
hugely helpful R code-dominated, how-to volumes,
reading *Bayesian Methods* refocuses readers on the
“why,” rather than the “how.” In an old-fashioned and
authoritative style, the book aims to make readers
understand how to embed ecological theory in a
formal mathematical Bayesian framework. It con-
tains few examples, quite a few equations, and no
modicum of abstract statistical reasoning—all to
the service of comprehension, rather than applica-
tion, of the Bayesian toolkit in ecology.

This is an addition to a well-stocked, shellload of
Bayesian-statistics-meets-ecological-theory books—
Mangel’s *The Theoretical Biologist’s Toolbox: Quan-
titative Methods for Ecology and Evolutionary Biology* (2006,

Although I sympathize with the authors’ intentions, this approach also has its downsides. In real life, there is an implementation gap between a mathematically formulated model and a fitted Bayesian model, and learning how reinforces the why. When learning Bayes, some problems and details remain obscure until one “does it,” goes back, rereads, and thereby iteratively grasps both theory and computation. And it is, in my experience, implementation ambiguity that leads to suboptimal Bayesian analyses: simulation from the model and Bayesian p-values; nonlinear correlation between parameters that make marginal distributions suggest suboptimal estimates; convergence statistics that are dependent on initialization; computation of Bayes factors; dominance of the observation model for small data sets; and improper Jeffreys prior for hyperparameters; all of them being dealt with at best cursorily here.

The volume is a refreshing and solid read for anyone confused or distracted by Bayesian recipe books. Ideally, ecologists should have substantial experience with probability theory or have some experience with doing Bayesian analysis. Following the maths before knowing what you will do with it is very abstract; finally understanding why all the how-to guides suggest one approach or another is more rewarding. The Fundamentals section of the book takes up over half of the pages, while Implementation receives less coverage with around one-third. The final part of the volume, Practice in Model Building, eventually also offers an abstract recipe, which is then detailed in five “problems.” The authors’ fluent and clear writing style make the book substantially more coherent and balanced than the recently published journal paper “abstract” of this volume (with accompanying R code). Theoretical ecologists will find the statistical background to match models and data in a Bayesian framework.

Carsten F. Dormann, Environment & Natural Resources, University of Freiburg, Freiburg, Germany

**NEW BIOLOGICAL BOOKS**

**PALEONTOLOGY**


It is refreshing when a dedicated volume such as this comes along that so wonderfully illustrates the proliferation of data-driven comparative methods over a previous reliance on qualitative analogs. The development of new methods as well as the application of carefully designed comparative approaches are satisfying to behold here and marks this as an important contribution in paleobiological research. This edited volume consists of 17 chapters organized into three parts: functional morphology, taphonomy and environment, and organism-substrate interaction. A substantial breadth of research covering disparate taxonomic groups, study environments, and novel methodologies is captured, including vertebrate and invertebrate biomechanics, comparative taphonomy of marine near-shore environments, and descriptive neoichnology of vertebrate and invertebrate burrows. Taxa covered include crinoids, bivalves, eurypterids, whales, microbialites, mollusks, worms, urchins, plants, scorpions, fish, salamanders, lizards, elephants, and lemmings. Many chapters are wonderfully illustrated with full color, high-resolution images, figures, and tables. As with many edited volumes, this one occasionally suffers from consistency issues. Some chapters seem like a rehashing of an author’s previous work with little by way of new results. Many chapters do contain innovative methods and analytical techniques sure to capture attention and perhaps even inspire further work. Excellent examples include those chapters on fossil cetacean feeding ecology by Cooper et al. (Chapter 5) and multiple neoichnology studies coming from the Hembree laboratory.

Many paleobiologists (and neontologists for that matter) are likely to find something of immediate interest or use in these pages, although certain contributions may be too specific to be directly applicable to their own research. This volume will be of particular use for graduate students and those teaching graduate-level methods courses, where one can examine and compare numerous experimental designs and analytical techniques. Although a few chapters include an appendix of data tables,