

searchers in the areas about which they write. If this guide were read from beginning to end, the breadth of a reader's understanding about the history of our knowledge of evolution (the fact and the theory), and the current state of knowledge and theorizing would be staggering. Most, of course, will use this as it was intended, namely as a guide; reading an entry as the need arises to understand a topic. I tried to think of topics that were worthy of entry but were absent. I could not think of any. I am sure some reader will find a topic dear to her/his heart missing, but that is going to be rare. I found that I learned something from every entry, even from those on topics about which I keep on top of the current literature. This is an exceptionally valuable resource for undergraduates (it is written to be intelligible to that audience), graduate students, and researchers. It should be on the shelf of every student and researcher in biology, as well as anyone interested in evolution. It is an invaluable resource.

R. PAUL THOMPSON, *Institute of History & Philosophy of Science & Technology and Ecology & Evolutionary Biology, University of Toronto, Toronto, Ontario, Canada*

ESSENTIAL READINGS IN EVOLUTIONARY BIOLOGY.

Edited by Francisco J. Ayala and John C. Avise. Baltimore (Maryland): Johns Hopkins University Press. \$49.95. xv + 547 p. + 8 pl.; ill.; author index. ISBN: 978-1-4214-1305-1. 2014.

This volume presents 48 beautiful reprints of seminal papers from the history of evolutionary biology. The editors, Francisco Ayala and John Avise, two leading figures in the field, introduce each reprint with a short commentary and provide a general timeline of the history of evolutionary thought. In the introduction and in the epilogue, Ayala and Avise make clear the main goals of the volume: first to enlighten readers about "the vibrant dynamic nature of scientific investigation in the evolutionary sciences" (p. 544); and, second, to convey "the many wonders of the evolutionary sciences to a broader audience" (p. ix). *Essential Readings in Evolutionary Biology* is the first comprehensive collection of works from the history of evolutionary thought in English and represents an important editorial event in its own right. Yet, the volume only partially achieves its two main goals.

The book presents the history of evolutionary biology as a linear progression of syntheses that started with Darwin, ascended to the Modern Synthesis, and got further articulated by integrating findings from different disciplines, such as ecology and developmental biology, until today when, according to the editors: "Technological advances allow molecular genetics and genomics to be

added to the evolutionary synthesis" (p. xiii). Important works that challenged the prevailing picture are left out from this narrative. Names such as Ernst Haeckel, Richard Goldschmidt, William Bateson, and Vero Copner Wynne-Edwards, among others, are either not mentioned or treated as scientific failures. Also, the selection of the articles is strongly biased toward Anglo-American science and leaves out important achievements and ideas from other national traditions. Rather than with a vibrant history, these choices present readers with one main trajectory, which does not always recognize the inner dialectics characterizing the historical development of evolutionary biology.

The second goal of the volume is a pressing one: ameliorating the way evolutionary biologists communicate to a broader public. Yet, it is unclear how such a collection should achieve this goal. The short introductory commentaries to the reprints give clear descriptions of the content of the papers, but nonexperts would likely still wonder about the context in which they came about (e.g., How did Darwin's idea emerge in the context of Victorian England?), what debates followed them (e.g., How were Darwin's ideas received in different scientific communities and societies of the time?), or how did their authors find and organize evidence in the favor of their claims (e.g., What kind of evidential support did Darwin provide for his theory of evolution by means of natural selection?). Paying more attention to the human and social dimensions of science would have helped to make the hard science more palatable to a general audience or to scholars interested in evolutionary ideas and their development.

So as to fully accomplish its two main goals, *Essential Readings in Evolutionary Biology* would have benefited from a close collaboration among scientists, historians, and writers who know how to communicate science to the public. This teaches us an important lesson: if evolutionary biology wants to reach out to a broader audience and conserve a perception of its past that gives meaning to its present, these collaborations should be encouraged as part of the daily operation of the field.

GUIDO CANIGLIA, *Center for Biology & Society, Arizona State University, Tempe, Arizona*

UNDERSTANDING EVOLUTION.

By Kostas Kampourakis. Cambridge and New York: Cambridge University Press. \$34.99 (paper). xix + 253 p.; ill.; index. ISBN: 978-1-107-61020-0. 2014.

The author has written an excellent introduction to the basic concepts of evolutionary theory, and one that also has an unusual (and welcome) philosophical angle. The clear and accessible discussions of biological examples, augmented by a large

number of helpful diagrams and a well-constructed glossary of technical terms, would make this book a good choice for introductory courses on evolution.

Everyone has seen poll results indicating that rates of acceptance of evolutionary ideas are quite low, especially in the United States. Conventional wisdom has it that religion is the main source of resistance to evolutionary thinking. In the course of introducing evolutionary theory, Kampourakis develops a challenge to this received wisdom. He argues in Chapter 3 that evolutionary thinking is deeply counterintuitive. He supports this claim with a fairly detailed survey of some relevant empirical studies of conceptual development in young children. The research suggests that certain modes of teleological and essentialist thinking come naturally to us. Unfortunately, these deeply rooted cognitive tendencies can also get in the way of our digesting evolution. To give just one example, the empirical research seems to suggest that young children tend to think of organisms as having fixed, unchangeable essences, although they are less likely to take this view of artifacts (p. 88). According to the author's way of looking at things, some traditional religious thought, such as natural theology, is a manifestation of these underlying cognitive tendencies. But religion is not itself the source of the resistance. In one simple move, Kampourakis lowers the temperature of the discussion of evolution and intelligent design theory while also placing Darwin's achievement in a larger context of cases (such as the Copernican Revolution, discussed on pp. 62–72) in which science proved deeply counterintuitive.

Chapter 1 introduces evolutionary thinking with the help of some examples: the domestication of dogs and the explanation of how HIV attacks the human body. The opening chapter also includes a lovely discussion of how the discovery of fossils such as *Tiktaalik*, an intermediate form between fish and tetrapods, counts as a predictive success for evolutionary theory. Chapter 2 explores religious resistance to evolution, with a focus on the views of three scientists: Richard Dawkins, Stephen Jay Gould, and Simon Conway Morris. If the book has any weakness at all, it is the fact that Kampourakis belabors the distinction between knowledge and belief (pp. 52–60). After discussing the conceptual obstacles to understanding evolution (in Chapter 3), the author includes a historical chapter that focuses on how Darwin himself overcame those obstacles (Chapter 4). Chapters 5 and 6 bring us into contemporary evolutionary theory. Chapter 5 deals with phylogenetic reconstruction, and concludes with a discussion of “evo-devo.” Chapter 6 explores questions about natural selec-

tion, drift, speciation, and the relationship between micro- and macroevolution. The book concludes with a helpful discussion of the virtues and limits of evolutionary theory.

Understanding Evolution is both useful and innovative: an introductory volume that also explores what happens when science clashes with intuition.

DEREK D. TURNER, *Philosophy and Goodwin-Niering Center for the Environment, Connecticut College, New London, Connecticut*

EVOLUTION: COMPONENTS AND MECHANISMS.

By David Zeigler. Academic Press. Amsterdam and Boston (Massachusetts): Elsevier. \$49.95 (paper). xv + 193 p.; ill.; index. ISBN: 978-0-12-800348-0. 2014.

My routine for airline travel is to read a book of sufficient length to occupy my attention for the duration of the flight. It is not so much that I fear flying, rather it is apprehension because I know enough about the complexity of aircraft and airline travel to realize the possibilities for things to go wrong. Sort of like my thoughts about another book on evolution. I know enough about the complexity of the subject to realize that things might go wrong. Teaching evolution is the most important responsibility of any biologist and it must be taken seriously.

My initial thoughts when I received this book for review were Darwin and Wallace. Would I recommend this to a young Charles Darwin, a first-year medical student at the University of Edinburgh? When I finished reading the volume and came back to Earth I concluded—I would not recommend it to Darwin because of serious concerns. What would Alfred Russel Wallace, as an older individual, think about this book? He would probably be annoyed that his name was spelled incorrectly (p. 9), and that he has no quotes in this volume.

This could have been a useful book for any first-year medical student, or any aspiring journalism student, or a student in need of a condensed overview of recent genetic technology as preparation for a qualifying doctoral examination. It is an easy read, but not a simple one. Zeigler gives a competent, informed overview of recent developments in the study of the mechanisms of evolutionary change. He rightly emphasizes the neglected importance of parasites, and does a nice job of explaining community ecology, conservation biology, and the place of humans in the broader scheme of things. His four values for science are simple and essential. All of these things are important and not easy to explain as clearly as Zeigler has done in a relatively compact book. Other than the egregious error in spelling Wallace's name,