

commonplace in Darwin's day. Platonists, primarily Continental Platonists, placed much more emphasis on forms than did their meat-and-potatoes English contemporaries. A role for forms in evolutionary theory has been resurrected in recent years.

All of the preceding discussion prepares the stage for a return to a final treatment of complexity and design. Given all the improvements in contemporary evolutionary theory, how does the argument from design hold up? Ruse begins with nontheistic treatments of design: goal-directed system, functional organization, and human intentions. Then, in the last two chapters, he returns to the idea of God the designer. Here he must distinguish between the United States and the rest of the first-world nations. Only in the United States is the general public so opposed to Darwin's theory. By and large, our schools are not doing a good job of explaining evolutionary theory or the nature of science in general. According to the critics, unless one can see something with one's own eyes, it is "only a theory," and theories are the sorts of things that one can accept or reject as one pleases.

How do present-day creationists handle present-day evolutionary theory? In large measure, they don't. Instead, they use recent disputes over the evolutionary process to argue that even scientists reject Darwin's theory. In the main, they simply trot out 19th-century objections to parodies of 19th-century evolutionary theory. A case in point is the phrase "chance variation." When evolutionists say that variations occur by chance, they do not mean that they have no causes at all. The variations that function in the evolutionary process are "chance" only in the sense that they were not introduced for a purpose. They are caused—totally caused—but only by, say, an increase in temperature, not divine fiat. Evolutionary biology is totally naturalistic, as it must be if it is to count as science.

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A LAYPERSON'S GUIDE TO THE SOUTHERN OCEAN

The Complete Guide to Antarctic Wildlife: Birds and Marine Mammals of the Antarctic Continent and the Southern Ocean. Hadoram Shirihai. Illustrated by Brett Jarrett. Princeton University Press, Princeton, NJ, 2002. 512 pp., illus. \$49.50 (ISBN 0691114145 cloth).

Hadoram Shirihai is a conservationist and birdwatcher best known for his works on Western Palearctic birds, and Brett Jarrett, the illustrator, is a wildlife artist. The twofold purpose of this book, *The Complete Guide to Antarctic Wildlife*, is to provide a detailed and accurate popular introduction to the Southern Ocean (broadly defined to include some islands that serve as tourist stops) and to serve as a field identification reference for the birds and marine mammals therein. The book is aimed at the layperson or keen birder with an interest in the Southern Ocean, and the author makes no apologies for not reading much of the scientific literature on the Southern Ocean. In other words, this book is not for researchers looking for a technical book.

The book is divided into three major sections: (1) an overview of the oceanography and ecology of the Southern Ocean and humans' exploration of it, (2) species accounts, and (3) descriptions of the islands and areas of the Antarctic. It closes with a short section on birding and marine mammal touring opportunities in the countries used as arrival and departure points for Antarctic tours.

The first section—the overview—is short; it makes up only about a tenth of the book. In those pages, Shirihai covers everything from geological history to oceanography, sea ice characteristics, oceanic food chains, conservation issues, a checklist of species, and the history of Antarctic exploration. Given that there are whole books devoted to each of these topics, the author tried to do too much

in the allotted space. A problem throughout this section is that some technical terms are defined but others are not. For example, "Ekman transport" is presented without definition, but a few pages later, a full paragraph is devoted to the definition of convergence and divergence. If a layperson is supposed to know what Ekman transport is, I imagine that he or she would know what convergence and divergence are as well. I noted one error in this section: There is no illustration of a food chain on page 25, although one is cited in the text. (I think the author was referring to figure 4 on p. 27.) The readability of this section is impaired by the unfortunate decision to use "ad" for adult and "imm" for immature in the text, resulting in phrases like "but even as ads on foraging trips from the nest...." It is an annoying affectation.

The next section, on species accounts, makes up roughly two-thirds of the book. It is quite detailed. Although there are more species per plate than in other identification books, this section is nicely illustrated with photographs. I also liked the background colors on the plates, which gave a nice contrast to the illustrations. Moreover, the species accounts are nicely written to include information on vocalizations, ecology, and conservation status. The author's description of the current state of flux in albatross taxonomy is also well done, and the albatross section is particularly well illustrated with plates and photos. The marine mammal section is nicely done as well, and there are many handsome photos. I particularly appreciated the author's comments on what identification features can and cannot be expected to be seen at sea. I found only one identification error: On p. 74, two penguins, the Fiordland penguin and the Snares penguin, are misidentified. It is easily seen to be an error, because there is a photograph of a Fiordland penguin right next to the photograph with the erroneous identification.

The third section of the book, site descriptions of the islands and the Antarctic, will be of interest to any armchair adventurer. Most of us will never be lucky enough to travel to these areas (and many areas are off-limits to tourists), so it was

fun to read the different descriptions. However, there is still a problem with the level of expertise that is expected of the reader. In some passages, only Latin names for species are used in describing the flora. A professional botanist might understand these terms, but it is quite a stretch to think that a layperson will. Another problem with the section is that there are no legends for the maps. This means, for example, that the reader has no idea why the maps show different shades of green. I imagine they denote topography, but without a key, the colors are meaningless. In addition, some names on the maps are labeled in red rather than black, without explanation. I think the difference in color indicates that those areas are mentioned in the text, but again, without a key, the effect is puzzling rather than informative.

This section also has a wide variety of errors of fact. For example, Rothera Station is positioned in the wrong place on Adelaide Island (the map on p. 389); there is no Togerson Island at Palmer Station (it is *Torgersen* Island; p. 395); and the Transatlantic Mountains do not divide east and west Antarctica (the mountains are the *Transantarctic* Mountains; p. 470). There are many other errors in this section, including two mountains (or high points) that change height from the text to the map (in one case, the difference is 155 meters); a switch from the metric system to non-metric units (miles) in one paragraph; and the statement that a treaty (signed in 1998) puts oil reserves off-limits until the mid-20th century (we are currently in the 21st century). Finally, Charles Wilkes was convicted in his court-martial; the court-martial was not “quashed,” as claimed in the text.

The number of factual errors in the book invites suspicion about the accuracy of other information. Numerous grammatical errors mar the text as well. Some are clearly typographical (e.g., the lack of capitalization at the beginning of sentences), but others make me question how carefully the book was edited (e.g., using “affect” when the correct word was “effect”). Proofreading was poor in many places. Here are two examples: “to have come second was almost not have run”

(p. 464) and “matters also did not go to plan” (p. 465). I eventually got tired of keeping track of such mistakes. This is not what I expect from a book with a Princeton University Press imprint. I talked to three other people about this book, and they all said the same thing: “The pictures are gorgeous.” If you want a picture tour of the Southern Ocean, this is your book.

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THE PRICE OF RESISTANCE

Battling Resistance to Antibiotics and Pesticides: An Economic Approach. Ramanan Laxminarayan, ed. Resources for the Future, Washington, DC, 2003. 400 pp., illus. \$65.00 (ISBN 1891853511 cloth).

I should state at the outset that, although the book in review is about the economics of battling evolved resistance to pesticides and antibiotics, I am a microbiologist and much more familiar with antibiotics than with pesticides. Furthermore, living in a country whose economy is handled by politicians with scant respect for rational analysis, I had not even realized that the economic approaches described here were possible.

Ramanan Laxminarayan, the editor of *Battling Resistance to Antibiotics and Pesticides*, is a fellow at the Washington, DC, think tank Resources for the Future and an expert on the intersection of economics and public health, especially resistance and the management of malaria. More than half of the book is devoted to pesticides. Most chapters deal with specific mathematical models borrowed from economic theory and applied, sometimes with modification, to resistance. Although I lack the mathematical background to evaluate the math critically, the book includes, intercalated among the mathematical chapters, critical discussions by biologists knowledgeable