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Secrets of the Ice: Antarctica's Clues to Climate, the Universe, and the Limits of Life.

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Egerton organizes *Roots of Ecology* chronologically, although some later chapters also have thematic overlays. Chronology may seem logical, given the broad historical sweep of the book, but I found this organizational plan to be problematic. The lack of interpretive themes makes the chapters overly episodic and the narrative somewhat disjointed. Inevitably, related topics in important fields, such as botany and zoology, appear in several different chapters. Egerton frequently reminds the reader of this fact—a tactic that I sometimes found annoying. I was often tempted to use the index to skip from chapter to chapter, finding information on topics of interest, rather than reading chapters from start to finish.

Even within a single chapter, the overall treatment is, at times, confusing. For example, in the important chapter on nineteenth-century precursors to ecology, Egerton sandwiches an admirably detailed discussion of the rise of microbiology between sections on entomology and Ernst Haeckel's concept of ecology. Surely, the germ theory of disease has some ecological relevance, but the chapter provides no suggestion of how Koch, Pasteur, and other bacteriologists influenced either Haeckel or the later development of ecology. The abrupt transition between these topics is jarring. Intrepid readers may wade through *Roots of Ecology* from cover to cover, but others may find that the parts of the book are more satisfying than the whole.

The task that Egerton set for himself in writing this book was gargantuan, and writing a tightly organized, compelling account within such a short space may have been impossible. Nonetheless, despite its literary defects, *Roots of Ecology* is an extremely useful source of information about the many scientific contributions that make up the prehistory of ecology.

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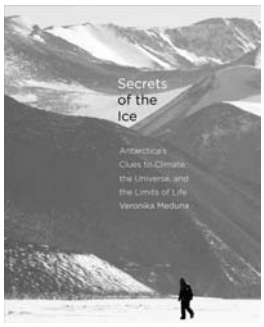
COLD DEDICATION

Secrets of the Ice: Antarctica's Clues to Climate, the Universe, and the Limits of Life. Veronika Meduna. Yale University Press, 2012. 232 pp., illus. $40.00 (ISBN 9780300187007 cloth).

For most people, the Antarctic is and will always remain the impenetrable continent. Locked in the grip of massive ice sheets and surrounded much of the year by pack ice, this land is the only continent that lacks permanent human habitation. In the last 60 years, increasing numbers of scientists from many nations have been probing the secrets of this "last place on Earth." As a New Zealand science journalist writing for a popular audience, Veronika Meduna has attempted to bridge the gap between those Antarctic scientists and the rest of the world with her book *Secrets of the Ice: Antarctica's Clues to Climate, the Universe, and the Limits of Life*. In it, she admits to writing "from a New Zealand perspective," focusing mainly on the New Zealand sector of the continent: a piece of the Antarctic pie that encompasses much of the Ross Sea region and a wedge of land that comes to a point at the South Pole. Nevertheless, she succeeds with real talent in making Antarctic science accessible to the general public.

Meduna does not allow her text to get bogged down in technical detail or jargon, avoiding the trap to which many scientists fall prey, but still manages to include informational chapters that introduce the continent; reconstruct its ancient environments through bedrock geology and ice-core drilling; feature the biology of penguins and near-shore marine life; and focus on the very limited terrestrial life of bacteria, invertebrates, mosses, and lichens that can survive extremely cold and arid conditions. There is also a chapter on the remote Antarctic Dry Valley, as well as lake and river environments, and a brief concluding section on the study of atmospheric phenomena.

Meduna makes Antarctic science personal by showing it to the reader through the eyes of the scientists on site. This approach humanizes certain topics that are difficult for nonscientists to grasp and shows the motivation behind the scientific work, answering the obvious question of why anyone would want to go to the coldest, most inhospitable place on Earth to do research. From geophysicists and ice-core geochemists to penguin experts and marine biologists, *Secrets of the Ice* introduces the reader to a broad spectrum of scientists and their work. Through their eyes, we see the extreme conditions, the isolation, and the lack of creature comforts, but we also sense their enthusiasm and dedication and their shared fascination with Antarctic science. They cannot wait to return each year to carry on with their research projects; below are two examples.



Meduna visited fellow New Zealander Nancy Bertler's glaciology field camp near a location called Dome C, one of the highest ice domes on the continent and one of the coldest places on Earth, with winter temperatures recorded as low as –80 degrees Celsius, not unlike the average surface temperature on Mars. Bertler's international ice-coring team is in charge of digging a massive trench in the snow to store the cores of ice extracted from a drill rig. This is backbreaking work, as is the drilling, but the team perseveres because they know the true value of these ice samples. The bubbles of air trapped

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in each layer of ice represent tiny samples of the Earth's ancient atmosphere. Through painstaking analysis, the history of atmospheric composition can be reconstructed—decade upon decade, century by century, millennium after millennium. In this way, we can accurately assess the long-term changes in the concentrations of greenhouse gases such as carbon dioxide and methane. This is vital information for climate models, and it cannot be obtained in any other way.

Fish biologist Art DeVries has been researching how fish living near the shores of Antarctica keep themselves alive in subfreezing waters. He began his fieldwork in Antarctica in 1961, and he and his team of researchers have now discovered how these fish make antifreeze compounds in their bodies and how the compounds isolate and essentially neutralize the inevitable ice crystals—both those that are ingested from the icy waters and those that form inside fish's body cavities. It has been a long, hard struggle, but 50 years of research by DeVries and his colleagues has produced invaluable discoveries about fish physiology and biochemistry.

Secrets of the Ice is richly illustrated with color photographs of Antarctic landscapes, wildlife, and the scientists at work in the field and laboratory. I highly recommend it to readers interested in cold-regions research.

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NEW TITLES

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The Cambrian Explosion: The Construction of Animal Biodiversity. Douglas Erwin and James Valentine. Roberts and Company, 2013. 416 pp., illus. $48.00 (ISBN 9781936221035 cloth).

Climate Change and Inland Waters: Impacts and Mitigation for Ecosystems and Societies. Charles R. Goldman, Michio Kumagai, and Richard D. Robarts, eds. Wiley, 2013. 496 pp., illus. $129.95 (ISBN 9781119968665 cloth).

Concealing Coloration in Animals. Judy Diamond and Alan B. Bond. Harvard University Press (Belknap), 2013. 274 pp., illus. $29.95 (ISBN 9780674052352 cloth).

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Evolving: The Human Effect and Why It Matters. Daniel J. Fairbanks. Prometheus Books, 2012. 352 pp., illus. $19.00 (ISBN 9781616145651 paper).

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Harvesting the Biosphere: What We Have Taken from Nature. Vaclav Smil. MIT Press, 2012. 312 pp., illus. $29.00 (ISBN 9780262018562 cloth).

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