Antique Climate Change

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ANTIQUE GLOBAL CHANGE

After the Ice Age. E. C. Pielou. University of Chicago Press, Chicago, 1991. 355 pp., illus. $24.95 (ISBN 0-226-66811-8 cloth).

The environment is not constant, a fact many of us forget as we immerse ourselves in efforts to unravel the intricacies of today's biological problems. The earth, its atmosphere, and its biotic resources are in a constant state of short- and long-term change. Understanding short-term changes occupy most research efforts, but long-term change is often crucial to interpreting current data on populations, species, communities, ecosystems, and biomes.

After the Ice Age presents a natural history of northern North America for the last 20,000 years. The changes that took place in what is now Canada and the northern United States may well be the most dramatic occurring anywhere on the planet. North America was home to the dire wolf, mastodons, mammoths, sabertooth cats, camels, horses, sloths, and lions. What happened to these and many other lesser-known species? How did changing climate, land, and biota interact to cause extinctions? The answer makes fascinating reading.

The book is intended to satisfy readers with diverse backgrounds and interests, but it is not a book for specialists or those looking for a technical treatise. Biologists will find the writing comfortable and informative and the explanations balanced. The book is especially appropriate and rewarding for those with a limited background in paleoecology. All readers will appreciate Pielou's colorful, descriptive narrative of the ever-changing nature of Earth's landscapes and living resources.

Pielou gives brief lessons in dating methods, fossils and their interpretation, pollen records and sediment cores and how they are used, and other tools and techniques used by scientists to unravel the past. The introductory technical material is sufficient to provide an understanding of the scientific basis for Pielou's history, without detracting from the intrigue of the main messages: what changes have taken place and what caused those changes.

Pielou sets the historical stage with an excellent review of the changing climate of northern North America during the last 20,000 years. Especially noteworthy are the sections on the location of ice-free land, early shifts in vegetation zones, and the major points of scientific debate. I appreciated the clear distinction between what is more or less definitely known and what is open to scientific disagreement. The strengths and weaknesses of competing theories are presented clearly and evenhandedly. Readers can make up their own minds as to which of the alternative explanations makes the most sense.

Early chapters deal with the time of maximal ice cover, 18,000 years ago. This era was a fascinating time for its plant and animal changes. Changing climate stressed species, and they responded accordingly. The land link to Asia and the existence and likely importance of ice-free corridors within North America add intrigue to a natural-history detective story.

The melting of the ice covering much of northern North America was also a time of major ecological change. The physical landscape, especially surface waters, changed dramatically and accelerated biological transformations. Humans became a much more important factor as the ice receded, and the importance of this species in influencing changes in the landscape and biota continued to increase.

The final chapters bring the story to the near present (300 years ago). The various plausible explanations for the major extinctions are given balanced treatment in a particularly thought-provoking chapter, the most interesting in the book.

After the Ice Age is a timely book. The unprecedented public and scientific concern for global change makes understanding the last 20,000 years particularly important. It is the stage on which the drama of any human-caused global change will unfold. Unfortunately, the drama has had, and will continue to have, many subplots. Some subplots are reasonably well known and understood; others are yet to be revealed. It will be particularly difficult to isolate the anthropogenic "signal" from the background in assessing the effects of global change on biotic resources: What is the normal status of a biotic resource? What is the baseline?

There are other implications to be drawn, although Pielou does not dwell on these. How do you design ecological monitoring programs that isolate or define the influence of climate change? How can we interpret data sets to isolate the changes caused by climate change? After all, we usually implicitly assume a stable environmental background. After 300 pages discussing change, one is left wondering where the ecological controls or reference sites are. Managers of biotic resources are likely to find the implications thought-provoking.

A specialist in paleoecology might find the book too brief and simplified in some areas, but it is not written with specialists in mind. For most readers, the breadth of *After the Ice Age* will offer a chance to travel through 20,000 years of environmental change from varied perspectives. I recommend that you climb on board for the ride.

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