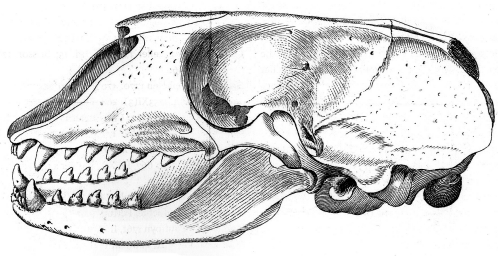
Book reviews

Review of *Otto Fabricius and the seals of Greenland. Meddelelser om Grønland: Bioscience 55*, by Finn O. Kapel (2005). Copenhagen: Danish Polar Center. 150 pp. ISBN 87-90369-77-7.

Kit M. Kovacs
Norwegian Polar Institute, Polar Environmental Centre, NO-9296 Tromsø, Norway, kovacs@npolar.no.

In this three part volume Finn Kapel presents us with 1) a brief biography of Fabricius, 2) a translation of his treatise on the seals of Greenland and, finally, 3) a reflection on the contribution of Fabricius as a seal naturalist/scientist. I concur with Dr Kapel's belief that the key paper is the second one. This work on Greenland's pinnipeds has until now been available only in Danish and German and certainly deserves to be more widely read and acknowledged. However, the first and last chapters are also an interesting read and give a nice basis for evaluating the biological and ethnographic material presented in the volume's middle section, although now and again they are redundant. The book contains an interesting and eclectic collection of black and white illustrations including portraits, historical photographs, and technical and biological drawings.

Portrait of Otto Fabricius. (Reproduced with permission of the Danish Polar Center.)



Skull of the "hook-snouted seal", now known as the grey seal (*Halichoerus grypus*). The drawing illustrated Fabricius's *Detailed description of the seals of Greenland* (1791). (Reproduced with permission of the Danish Polar Center.)

Otto Fabricius was a cleric, philologist, naturalist and ethnographer. Much of his scholarly work stems from the relatively short period of his life spent as a missionary in Greenland (1768–1773). His observations during these five years and the experiences he had with Greenlandic people clearly left a great impression on Fabricius that lasted until his death. Unlike many missionaries of his time, Fabricius left the European colony-town where he was posted and lived in a Greenlandic Inuit community. He resided in a house built of stones, turf and timbers and learned the language and the ways of the people. Much of their hunting culture revolved around knowing the habits of seals, and hence the people were a wealth of knowledge to Fabricius in his faunal and ethnological studies. Fabricius is undoubtedly best known for his publication *Fauna Groenlandica* (1780), but the work translated by Kapel in this book, published a decade later (1790–91), allowed Fabricius to expand greatly on the seal material presented in the earlier book.

Fabricius's *Detailed description of the seals of Greenland* focuses first and foremost on the harp seal or Greenland seal (*Phoca groenlandica*), describing: nomenclature; appearance and morphology; distribution (occurrence); behaviour; variation in occurrence and movements; breeding; feeding; predators; hunting methods; utiliza-

tion; parasites; and synonyms. Ringed seals (*Pusa hispida*), harbour seals (*Phoca vitulina*), hooded seals (*Cystophora cristata*) and bearded seals (*Erignathus barbatus*) are presented similarly, although more briefly. Fabricius also gives short synopses of four additional "species" reported to him by the Greenlanders. Three of these animals are either mythical beasts or some sort of biological oddity such as albino specimens. The fourth species summary is the first scientific account of the grey seal (*Halichoerus grypus*), which Fabricius describes primarily from material in his possession from an island off the Danish coast.

Given the era in which Fabricius was writing, his restricted time in Greenland, and limited travel in the north, his biological accounts are remarkably insightful. Occasionally, they are definitively incorrect, such as when he says, "As for the breeding of the harp seal, the mating-time is beyond all doubt in August" when in reality harp seals mate in March. But Fabricius can be forgiven for using the size of the embryo in September to back-calculate the time of mating: delayed implantation was unknown in the 1700s. Other small slips can be similarly accounted for. He is probably not credited as often as his work warrants; perhaps this book by Finn Kapel will help correct this situation. If Allen's *History of North American pinnipeds* (1880) or similar books are on your shelf, *Otto Fabricius and the seals of Greenland* undoubtedly also deserves a place there.

References

Allen, J. A. 1880: *History of North American pinnipeds. A monograph of walruses, sea-lions, sea-bears and seals of North America.* Washington, D.C.: U.S. Geological and Geographical Survey of the Territories.

Fabricius, O. 1780: *Fauna Groenlandica. (Fauna of Greenland.)* Copenhagen(?): J. G. Rothe, Hafniae & Lipsiae.

Fabricius, O. 1790–91: *Udførlig beskrivelse over de Grønlandske sæle, første og andet stykke. (Detailed description of the seals of Greenland, parts one and two.)* Copenhagen: Skrivter af Naturhistorie-Selskabet.

Review of *Le monde polaire, mutations et transitions*, under the direction of Marie-Françoise André (2005). Paris: Ellipses–Carrefours. 187 pp. ISBN 2-7298-2683-1. In French.

Bernard Lefauconnier
Place du Mollard, F-38700 Le Sappey en Chartreuse, France, b.lefauconnier@wanadoo.fr.

As mentioned on its back cover, *Le monde polaire, mutations et transitions* comprises part of a collection (*Carrefours*) intended for students of geography, history and the social sciences as well as for a wider public interested in understanding the changes our world is undergoing. Other volumes in the series concern, for example, water in the Arab world, large cities of North America and international commerce.

Twelve authors have collaborated on the book. The work is divided into two parts, made up in total of 11 chapters and six brief inset texts. The first part is supposed to present some general aspects of the subject, regional aspects being introduced in the second part.

Seven of the book's 11 chapters concern the indigenous peoples of the circumpolar region and constitute the heart of the volume. Chapter 3 explores how the Inuit conceive of—and are integrated with—their environment. Chapter 4 discusses the transition from a subsistence economy to the present situation in the Canadian Arctic, focussing on Nunavik, northern Québec. Major social transformations are described in Chapter 10, with examples from the central Canadian Arctic. Chapter 5 describes the emergence of the sense of an Inuit identity, the creation of the Inuit Circumpolar Conference and the building of Inuit managerial and administrative competence, especially in the Nunavut and Nunavik territories, northern Canada. Chapter 7 concerns the transformation of Greenlandic society. The situation of the Saami, the subject of Chapter 8, is unusual in that this population is represented in four countries: Norway, Sweden, Finland and Russia. The relationship between the Saami and the Norwegian state is described. The small-numbered indigenous ethnic groups—mainly reindeer herders—of the Russian Arctic are briefly presented in Chapter 9.

Only two chapters are devoted chiefly to the

physical environment: Chapter 1 presents a review of some recent research on the melting of glaciers and the related sea level rise while Chapter 2 discusses the impacts of climate change through the metamorphosis of polar landscapes.

One chapter (6) describes the development of polar tourism and Chapter 11 summarizes past and present scientific activities in the Antarctic.

The limited space allotted to the environment in this book is regrettable. Impacts related to climate change are not confined to glaciers and landscapes. In a book with academic intentions, references to the Arctic Climate Impact Assessment and the Arctic Monitoring and Assessment Programme would have been minimally necessary. In Chapter 1, one of only two chapters devoted to the environment, some of the research results that are discussed are erroneously interpreted. For example, Arendt et al. (2002) estimated the contribution to sea level of Alaskan glaciers from the mid-1950s to the mid-1990s to be 0.14 ± 0.04 mm per year. This is equivalent to 5.6 ± 1.6 mm over the period, not 5 cm. Another example is where the chapter's author (incidentally, also the book's editor), referring to Rignot et al. (2003), writes that Patagonian glaciers contribute even more than Alaskan glaciers to sea level rise. In fact, Rignot et al. said that the contribution from the Patagonian glaciers is larger than that of Alaskan glaciers *per unit area*. This is an important distinction. Finally, the chapter mentions glacier surging but this phenomenon is evidently not understood by the author.

There are other flaws. Chapter 6 takes into account the local and regional environmental impacts of tourism but does not mention the contribution to global pollution generated by the transportation of voyagers from low latitudes to the polar areas. In two places—a short inset in Chapter 10 and a section heading in Chapter 4—the use of the phrase "welfare state" (*état providence*) seems inappropriate. The texts discuss social and economic transformations and large-scale interventions by the Canadian central power. The "welfare state" must have been developed to try to counter-balance negative social effects of these transformations and is not in itself the cause of these negative effects.

This is a strange book. The title claims to embrace the polar world but only a single chapter concerns the Antarctic. The chapters discussing the environment merely skim lightly over a narrow slice of this important topic, without any real look at current climatic changes or the fact that the Arctic and Antarctic have already been affected by pollution, including ecotoxins, coming from sources elsewhere in the world.

Even with these drawbacks *Le monde polaire* has value: there are few books presenting a broad picture of circum-Arctic peoples. Social, economic and geopolitical problems and the similarities and differences in the relationships between far northern indigenous peoples and the modern states that encompass them are briefly but, in general, clearly described. I was particularly captivated by the subject of Chapter 3—"Corps inuit, espace géographique et cosmologique", which opened for me, as an occidental scientist, a new window on the Arctic and enriched my vision of it.

References

Arendt, A. A., Elchemeyer, K. A., Harrison, W. D., Lingle, C. S. & Valentine, V. B. 2002: Rapid wastage of Alaska glaciers and their contribution to rising sea level. *Sciences 297*, 382–386.

Rignot, E., Rivera, A. & Cassasa, G. 2003: Contribution of the Patagonia ice-fields of South America to sea level rise. *Science 302*, 434–437

Review of *The North Pole*, by Kathan Brown (2004). San Francisco, CA: Crown Point Press. 504 pp (xi-xvi). ISBN 1-891300-18-0.

Thor B. Arlov

Research and Innovation Unit, Norwegian University of Science and Technology, NO-7491 Trondheim, Norway, thor.arlov@ntnu.no.

At first glance a medium brick sized book entitled *The North Pole* seems a promising read to anyone interested in the Arctic, such as this reviewer. Unfortunately it does not quite deliver according to expectations, presuming you expect solid information about the polar region. If, however, you are particularly interested in the personal experiences of Arctic tourists with a dash of environmental concern, this book may not be a complete waste of time.

The author Kathan Brown is the founder and

director of a renowned San Francisco-based fine art printing press and publishing house. She has previously published various books on art and artists. However, her professional or personal connection with the polar regions are, as it were, shrouded in northern mists. The introduction to *The North Pole* is not very helpful about her motives for writing this book. It appears she took part in a trip to the North Pole sponsored by the American Museum of Natural History aboard the Russian nuclear powered icebreaker *Yamal* in 2002. The following year, she spent a week on a coastal cruise around Svalbard. Her experiences during these two trips have obviously inspired the book. In addition she has read a number of works about various Arctic subjects and talked to some knowledgeable people, but to call this a thoroughly researched book would be stretching it. Admittedly, Brown seems to have no pretences in this direction.

The North Pole is voluminous in pages—a little more than half a thousand. The genre is a bit difficult to decide as the author mixes forms. Since the voyage seems to be the structuring element, I suppose the book might be placed in the travel literature category. Following a brief introduction that attempts to explain the somewhat odd composition of the book, there are eight main chapters. The first seven are devoted to the North Pole trip on the *Yamal*. Each of them is divided into three sections: a personal narrative by the author; excerpts from the journal of Fridtjof Nansen from the *Fram* expedition; and a conversation with various people rendered in verbatim form. The last chapter is on the visit to Svalbard and also contains a conversation, but—quite understandably—no excerpts from Nansen. In between there are more than 100 photographs, the vast majority taken by the author herself. To the extent that there are any main themes at all, the issue of climate change and the question who was the first on the North Pole (if indeed Peary cheated) recur frequently with slight variations throughout the book.

If I were to be very polite I would call this unusual lay-out interesting, but to be honest I am rather put off by what seems to be a lack of serious effort making this book. The author's own, original contribution represents the lesser part of the manuscript. The "journey" sections written by Brown make up some seventy pages, or less than 15 % of the book. The photographs, also the work of Brown, constitute nearly a quarter of the book. Of the remaining 60 %, the excerpts from the journal of Nansen fill almost 100 pages. The conversations or interview sections, where Brown acts as "moderator", occupy over 150 pages. At the end of the book there is a rudimentary time line, a short bibliography and a decent index. The only map in the book is a poor sketch of the Arctic.

Although neatly organized, this book is in effect a compilation of somewhat disparate elements. By themselves the journey sections work fairly well; Brown is a good observer and masters the style of a well-read journalist. She makes a pretty good job of popularizing science. This is the kind of prose one might expect to find in for example *National Geographic*: a personal account supplemented by factual information, or vice versa.

The conversation sections function less well. Their consistently verbatim form leaves the question open whether editing has taken place or not. Anyway, stronger editing would have been desirable—considerable parts of the conversations are just plain small talk between fellow travellers. I kept wondering why the reader is invited to listen in. Some of the contributors have more to offer, but the knowledge and capacity of participants like, for instance, Arctic Climate Impact Assessment director Gunther Weller and Scott Polar Research Institute archivist Bob Headland, could have been exploited far better in more elaborate interviews. In general, Brown does not seem to distinguish between the substantial and the trivial in her role as moderator. For example, rendering an exchange of opinions concerning rock bands or SUVs leaves me, in this context, cold. A more selective approach would certainly not have been amiss.

Nansen's journal of his and Hjalmar Johansen's dramatic attempt to reach the North Pole from *Fram* and their subsequent wintering on Franz Josef Land in 1895–96 is a classic in Arctic literature, but should rather be read in the original and in extenso. Brown's excerpts seem out of context and do not lend her account authority—just extra pages. I feel the use of Nansen borders on literary theft when the author does not even make the effort of paraphrasing or commenting.

Finally, the photographs are for the most part unimpressive and appear to be ordinary amateur snapshots. Considering the author's professional background the reproduction is disappointing; the colours seem washed out and the subjects are fre-

quently unsharp. Variations on ice floes are only interesting to a certain point, which Brown oversteps. It does not make things better that there are no captions to the pictures, leaving the reader to guess when, where and why they were taken.

In all fairness, Kathan Brown's *The North Pole* is probably not intended for well-read polar enthusiasts. It is indeed hard to imagine that readers of *Polar Research* will find very much of interest in this book. It is simply too superficial with regard the factual parts and has too little to offer in literary terms. In my opinion, neither the gracious contributions of some prominent savants of the Arctic nor the extensive quoting of Nansen's diary help salvage this North Pole voyage from wreckage.

At the uttermost ends of the Earth: *The physiology of polar fishes*, edited by Anthony P. Farrell & John F. Steffensen (2005). Amsterdam: Elsevier. 396 pp. ISBN 0-12-350446-5.

Andrew Clarke
Biological Sciences, British Antarctic Survey, High Cross, Madingley Road, CB3 OET Cambridge, UK, accl@bas.ac.uk.

Ecologists and physiologists have always been interested in organisms living in extreme environments because of the light they shed on fundamental problems, and the general public has long been fascinated by animals living in climates so inhospitable that unprotected humans would rapidly perish. The pioneering physiologists of the early 20th century had quickly recognized that teleost fishes with their dilute blood would have real problems in the cold waters of the polar regions, and when Johan Ruud collected the first scientific specimens of an icefish he was able to confirm that there really did exist a group of polar fishes with no blood pigment. The scene was thereby set for an exploration of the physiology of polar fishes, and this remains a vibrant field of research to this day. The latest volume of the prestigious *Fish Physiology* series brings together a group of distinguished workers in the area of polar fish and provides a state-of-the-art survey of our understanding of the physiology of a group of organisms that have successfully adapted to one of the most physiologically challenging marine environments on the Earth.

The opening chapter (DeVries & Steffensen) provides a brief overview of the marine environment of the polar regions, emphasizing the marked differences between the Arctic and Antarctic as much as their similarities, and thereby defining an important theme for the rest of the book. As well as differences in topography, bathymetry, riverine input and oceanography, attention is drawn to the very different tectonic, climatic, glacial and evolutionary histories of the two polar regions. The latter are fundamental to understanding the very different fish faunas of the Arctic and Antarctic, which are described in exemplary fashion in the second chapter by Møller, Nielsen & Anderson. It is refreshing to see due attention being paid to the systematic and biogeographic aspects of the fauna in a volume devoted primarily to physiology, for this is essential to any complete understanding of evolutionary aspects of the physiology. The systematic treatment also covers all depths, thereby providing a broad context for the traditional (but not universal) concentration by physiologists on the more easily sampled shallow waters.

The physiological chapters start with a thorough review of current knowledge of the metabolic biochemistry of polar fishes by Pörtner, Lucassen & Storch. The main themes of this chapter are the central role played by oxygen in shaping both thermal limits and lifestyle, and the trade-offs inherent in the utilization of energy in a strongly resource-limited environment such as the polar seas. The strengths of this chapter are the way physiological processes are set in an environmental context, the use of a wide range of model organisms, and the links between physiology and ecology. Antifreeze proteins and freezing avoidance are reviewed by DeVries & Cheng. The physiological challenge to teleost fish living in polar regions was recognized in the 1960s: even with an elevated blood salt concentration, polar fish are under cooled by almost 1K. Whilst this may seem a small interval, because polar oceans contain ice crystals freezing of these fish would be inevitable in the absence of a protective mechanism. The existence of antifreeze glycoproteins and proteins in polar fish was quickly established by elegant work by Art DeVries himself, but almost four decades later we are still unravelling the complexities of this system. In addition

to providing a masterly summary of the classical work, the authors also discuss areas of active current research making this the best current review of freezing avoidance in polar fish.

In the next chapter Steffensen concentrates on the respiratory system and metabolic rate; this chapter is thus closely allied to the earlier one by Pörtner and colleagues but takes a quite different perspective by concentrating on the organismal rather than the molecular level. Steffensen revisits the arguments over the existence of metabolic cold adaptation (MCA) in polar fishes, and does so in a thorough and balanced manner. Once a fish has taken up oxygen, it then needs to move this oxygen around the body and the circulatory system is described by Axelsson. A major factor here is the increase in blood viscosity at low temperature, and it is likely that selection for reduced circulatory costs coupled with the increased solubility of oxygen at low temperatures is what drove the evolution of reduced hematocrit in many polar fishes and the complete loss of haemoglobin in one group, the icefish family Channichthyidae. A key feature of this chapter is the discussion of the control of heart rate, setting the Antarctic notothenioids in the wider context of non-polar fish.

Wells covers blood gas transport and haemoglobin, principally from studies of notothenioids but also setting the results in a wider context. Wells also revisits the topic of MCA, coming to a less definitive conclusion than Steffensen. Davison describes the skeletal musculature and locomotion, again principally based on studies of notothenioids. Data are compared with warmer water fish and the differences related to ecological factors such as growth rate and buoyancy. In exploring the various ways in which temperature may limit muscle performance in polar fish, Davison also discusses the limitation of mitochondrial ATP supply, which links this chapter nicely to that by Pörtner and colleagues. The final chapter in the book is an authoritative review of the nervous system of polar fishes by Macdonald & Montgomery.

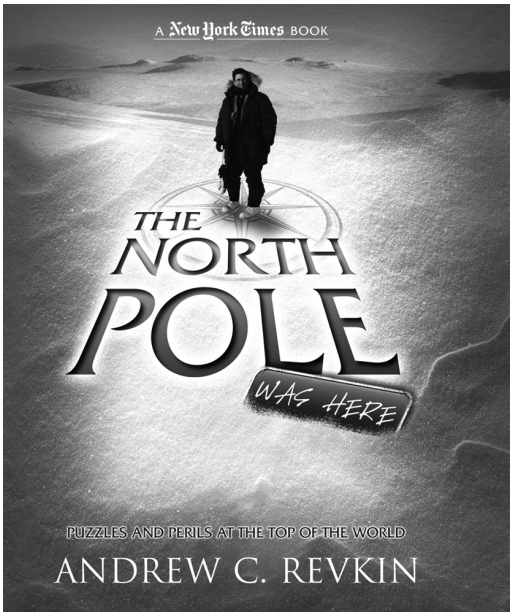
How does this volume rate overall? I believe it succeeds in providing a thorough, timely and authoritative survey of the physiology of polar fishes. It will find a place in my library and I have already found myself making extensive use of it. It is a pity that not every author has taken the opportunity to cover both Arctic and Antarctic studies, for the book does tend to concentrate on studies of notothenioids in many places. Important and interesting as these fish are, they are confined to the Southern Hemisphere and physiologists have much to learn from thorough comparative studies. Nevertheless this is an excellent summary of current knowledge and will remain for some time the place to go to learn about the physiology of fishes living at high latitudes.

Review of *The North Pole was here: puzzles and perils at the top of the world*, by Andrew C. Revkin (2006). Boston: Kingfisher. 128 pp. ISBN 0-7534-5993-0.

Helle V. Goldman
Norwegian Polar Institute, Polar Environmental Centre, NO-9296 Tromsø, Norway, goldman@npolar.no.

Ever wondered what the men's toilet at Camp Borneo, a temporary Russian camp on the ice about 96 km from the North Pole, consists of? In *The North Pole was here*, Andrew Revkin reveals this—"a waist high igloo-style wall of ice blocks" (p. 16)—and other details of the field conditions experienced by scientists who carry out research near the very top of the world.

Using Revkin's own visit to the North Pole Environmental Observatory—a science camp set up every year on the ice about 48 km from the North Pole—as a jumping off point, the book describes the Arctic and our past and ongoing efforts to understand it. Climate change is a major theme. Other topics, like early exploration of the region and the Earth's shifting magnetism, are also covered. In an enchanting chapter called "The imagined pole", Revkin describes early notions of the Far North. We learn, for example, that in ancient Hindu/Buddhist cosmology, the stars in the sky were tied by ropes of wind to the North Star, which was positioned above a gigantic mountain that constituted the world's centre. Four landmasses, divided by great rivers, lay around that centre. Three thousand years ago, Greek historians supposed that there was a society of "Hyperboreans": "an immortal race of people who lived in happiness and warmth beyond the source of the North Wind" (p. 28). (This is sure to raise



a smile from readers who, like me, reside north of the Arctic Circle.) As late as the 19th century some maintained that the Earth was hollow, with large openings into the interior at the North and South poles. According to another tenacious and surprisingly recent theory, the North Pole was topped by a huge iron cone, which was the source of the planet's magnetism.

The bulk of *The North Pole was here* is set in the present. Revkin focusses his account on the scientists who undertake polar research, how they do it and the diverse challenges they face. One chapter begins with this riveting opening: "Six of the world's leading experts at solving Arctic riddles are on their knees on the sea ice thirty miles from the North Pole, stumped by three broken bolts" (p. 89). The chapter goes on to relate how the bolts were replaced and the winch repaired, and how the equipment contributes to our knowledge of the ocean, atmosphere and climate in the Arctic. The heroes of Revkin's book are polar scientists and the divers, technicians and others who work with them. In the harsh environment of the Arctic, research teams must combine "the brainpower of scientists with the brute strength of furniture movers, the wile of small-town mechanics, the courage (or recklessness) of extreme athletes, and the willingness to carry a shotgun to ward off polar bears" (p. 92).

Without oversimplifying its subject matter, *The North Pole was here* makes science accessible to the nonspecialist reader. The slim book is aimed particularly at young adults but will also appeal to their parents. The chapters are short, the type is large and the text is amply illustrated with photographs, diagrams, maps and other illustrations. Excerpts from *New York Times* stories relating to the Arctic (about half by the author) are sprinkled throughout the book.

An award-winning journalist, Revkin has been reporting on environmental issues for the *New York Times* for over a decade. Some readers may recognize the author's name from his recent coverage of the Bush administration's attempt to stifle Jim Hansen, Director of NASA's Goddard Institute for Space Studies, after Hansen publicly called for prompt reductions in greenhouse gas emissions.

The North Pole was here is well timed: 2007-08 is an International Polar Year, during which scientific resources around the world will be concentrated on the Arctic and Antarctic. Its antecedents have taken place in 1882-83, 1932-33 and 1957-58. Revkin traces the Polar Year project back to the inspiration of the Austrian Karl Weyprecht. Upon returning from an Arctic expedition in 1874, the explorer and scientist was determined to persuade the scientific institutions of many nations that it was crucial to coordinate meteorological and geophysical research and to share the resulting data. Weyprecht's efforts bore fruit, though it was posthumous: he died the year before the first Polar Year. Fourteen stations ringing the Arctic were established by 11 countries (Norway, Sweden, Finland, Austria, Netherlands, France, Germany, UK, Russia, Canada, US). Revkin observes that the first Polar Year marked a major change in the culture of science, which became more open, collaborative and self-critical.

This book is written with the American reader in mind. For example, the Arctic Ocean near the North Pole is described as "two miles deep—deep enough that ten Empire State Buildings could be stacked beneath us" (p. 11). That the book tilts decidedly toward a youthful American readership is appropriate. The American Association for the Advancement of Science (1990) has made the point that most schoolchildren in the US are not science literate. It behooves the generation of Americans about to come of age to develop a basic understanding of the causes, signs and potential impacts of climate change, as well as to improve their knowledge of other major environ-

mental problems confronting us, such as natural habitat destruction and loss of biodiversity. The scientists who are spotlighted in *The North Pole was here* are perhaps among the first people to discern the magnitude of human impacts on the natural world; our children may be among the first to have to cope with these changes during their lifetimes.

Revkin entitled his book after a sign erected by a scientist at the North Pole Observatory. The joke plays on the fact that the ice supporting the temporary science camp is in constant motion. Less amusing are computer simulations according to which the ice on the surface of the Arctic Ocean may be gone by the end of this century. As is well known in the scientific community, this would have radical consequences for the world.

Let us hope that *The North Pole was here*—a lively paean to polar scientists—is the kind of book that engages young minds in the Arctic and in science itself.

Reference

American Association for the Advancement of Science 1990: *Science for all Americans*. New York: Oxford University Press. Accessed on the internet at www.project2061.org/publications/sfaa/online/sfaatoc.htm.