

Bryce thus presents very compelling evidence that Cook did not reach the Pole, but had decided to make a fraudulent claim to that effect long before he left the Arctic. Moreover, as regards Peary's claim, Bryce points out that 'based on his own papers, there is compelling circumstantial evidence that he did not [reach the Pole].'

Bryce has an important message to impart, but it is almost lost in the overwhelming mass of detail, often completely irrelevant to that message. He is clearly a master of archival research and a tireless burrower in files and stacks. But the occasional glaring error of fact tends to shake the reader's faith in the rest of the text. Thus, in the prologue, the depth of the Arctic Ocean is stated to be in excess of five miles, when in reality it nowhere attains even five kilometers. And on page 877, the reader finds the bafflingly erroneous statement that the traditional Inuit sledge 'was not designed for travel over sea ice, since the Eskimos feared it greatly,' when in reality the sea ice for millennia was the habitat of most of the world's Eskimos all winter and every winter.

Despite these slips, however, Bryce has made a very important contribution. One can almost guarantee, however, that the members of the two opposing camps, the Cook faction and the Peary faction, will not agree with him that the controversy has been resolved. One may safely predict that neither side will be satisfied with his conclusions and that yet more books on the subject will appear. (William Barr, Department of Geography, University of Saskatchewan, Saskatoon, Saskatchewan S7N 5A5, Canada.)

ANTARCTIC METEOROLOGY AND CLIMATOLOGY. J.C. King and J. Turner. 1997. Cambridge: Cambridge University Press. xi + 409 p, illustrated, hard cover. ISBN 0-521-46560-5. £55.00; US\$90.00.

Studies of Antarctic atmospheric behavior are emerging from a relatively quiescent period. This change is being driven in part by the increasingly global scale viewpoint of 'Earth system science.' Also, there are developments that are specific to Antarctica. On the observational side, automatic weather stations (AWS) and satellite remote sensing are revealing the spatial and temporal complexity of atmospheric events. The observational challenge for the future is to depict the vertical variations. Numerical modeling and more simplified theoretical approaches are providing the tools to understand the phenomena depicted by the limited observational arrays. Against this backdrop, King and Turner have set themselves the ambitious goal of surveying this rapidly expanding field and have succeeded admirably.

When schoolchildren come to visit our research center, we regale them with statistics about Antarctic weather that illustrate the notions of it being the 'highest, coldest, driest, and windiest' continent on Earth. This book does not serve as a source for such information about this land of extremes. Rather it outlines and explains the major components of the atmospheric behavior over and around Antarc-

tica. The first part of the book introduces the physical environment of the continent along with the instrumentation used to monitor the Antarctic atmosphere (chapters 1–3). This is followed by a long section that deals with the processes that make up the observed climate, from the large-scale circulation (chapter 4) to synoptic-scale features (chapter 5) and mesoscale phenomena (chapter 6). The last part is concerned with climate variability as depicted by the comparatively short meteorological records, and the prospects for a significant climatic perturbation in conjunction with 'global warming' (chapter 7). Rather than discuss each chapter sequentially, a selection of chapters is made for detailed appraisal that the general scientific reader may be more likely to consult.

Chapter 2 on observations and instrumentation is a particularly strong and somewhat novel contribution that draws on the long history of the British Antarctic Survey (BAS) in making reliable weather observations in this demanding environment, and that follows from BAS participation in the FROST project sponsored by the Scientific Committee on Antarctic Research's Working Group on Physics and Chemistry of the Atmosphere. The instruments used to measure pressure, temperature, humidity, wind velocity, precipitation, radiation, and upper-air parameters are described and their typical limitations outlined. This is followed by a detailed exposition of AWS, primarily based on the program run by Charles Stearns at the University of Wisconsin–Madison. The hardware and data collection are summarized, as are the processing and distribution of the data, the spatial distribution of AWS sites, and some typical applications of the observations. A similar summary is given for oceanic drifting buoys. After a brief presentation on surface-based remote sensing (for example, acoustic sounders), a long section covers satellite remote sensing. Visible, infrared, and passive microwave imagery are introduced along with satellite sounder observations (for example, from TOVS). Satellite-derived wind data over the ocean are considered next. The section concludes by describing the satellite receiving stations and outlining the future developments. A particularly useful section, but one that will quickly become obsolescent, details available data sets and specifies from where they can be obtained. The following data sets are outlined: conventional surface and upper-air data; AWS observations; data from drifting buoys; raw satellite data; surface and upper-air analyses; sea-ice observations; sea-surface temperatures, and ocean observation.

Chapter 3 focuses on the physical climatology of Antarctica, and starts with an overview of the shortwave, longwave, and net radiation components of the surface energy budget. This is followed by a detailed discussion of temperature: spatial distribution of the annual mean surface values; the seasonal variation of surface temperature; the surface temperature inversion; and a limited depiction of tropospheric temperatures. The important circulation section on surface pressure, geopotential height, and winds is unfortunately rather abbreviated. An exten-

sive and very useful presentation on cloud observations, distribution, types, and physical properties follows. The material on precipitation is similarly expansive, with formation mechanisms, synoptic origins, spatial distribution of annual mean values, and seasonal variations all being covered. The chapter concludes with an overview of the belt of sea ice surrounding Antarctica, as well as a discussion of the Southern Ocean itself.

The final chapter concerns climate variability and change. The trends in recorded surface air temperatures are examined primarily since the International Geophysical Year (1957–1958) with an emphasis on the Antarctic Peninsula and the East Antarctic plateau. This is followed by a section on the interactions between Antarctica and lower latitudes, in particular the teleconnections associated with the El Niño–Southern Oscillation (ENSO) phenomenon. Regrettably, the description of this important topic is not well organized and stops around 1993. Since that time, a number of important studies have been published (for example, White and Peterson 1996), and many more can be expected as a result of the very strong El Niño event during 1997–1998. The book finishes with a good summary of predictions of Antarctic climate in conjunction with a doubling of atmospheric carbon dioxide content ('global warming').

To summarize, King and Turner have done a good job in reviewing the developments in Antarctic weather and climate during the period 1985–1994, and are to be congratulated on their effort. It complements the earlier scholarly treatise by Schwerdtfeger (1984). Particularly strong aspects are the effort to place Antarctica in the context of the Southern Ocean, the attention paid to data aspects that are not readily obtained elsewhere, and the liberal use of satellite imagery from Rothera to illustrate key points. One drawback is the figures, especially in chapters 3 and 5. As Antarctic atmospheric investigations are progressing rapidly, it is inevitable that recent developments are not covered. Two areas that are not adequately treated by the text are atmospheric numerical modeling by regional and global models, and ENSO investigations; perhaps these topics will form the basis for the book's first revision. The book is well produced, of sturdy construction, and is reasonably priced in relation to similar offerings. This book is strongly recommended for the polar scientist who wants to gain an appreciation of modern Antarctic atmospheric investigations, as much of the material does not require an in-depth knowledge of meteorology to be understandable. All polar libraries should have a copy, and even more general science libraries could benefit from its acquisition. (David H. Bromwich, Polar Meteorology Group, Byrd Polar Research Center, The Ohio State University, 1090 Carmack Road, Columbus, OH 43210, USA.)

References

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White, W.B., and R.G. Peterson. 1996. An Antarctic circumpolar wave in surface pressure, wind, temperature and sea-ice extent. *Nature* 380: 699–702.

GREENLANDERS, WHALES AND WHALING: SELF-DETERMINATION AND SUSTAINABILITY IN THE ARCTIC. Richard A. Caulfield. 1997. Hanover, NH, and London: University Press of New England. xiv + 203 p, illustrated, hard cover. ISBN 1-87451-810-5. £25.00.

Aboriginal subsistence whaling by Inuit in Greenland, Canada, Alaska, and the Russian far east remains under close scrutiny by the International Whaling Commission (IWC) and anti-whaling groups, even though no organisation concerned with whale management and conservation has yet come up with a satisfactory definition of 'aboriginal' or 'subsistence.' Too often the rhetoric of whale management bodies and environmentalists is couched in moral and ethical language, while advocates for the continuation of aboriginal whaling have criticised the concept for its imperialist associations. Indigenous peoples themselves are arguing for the right not only to continue whaling but to develop domestic and international markets for whale products. This in turn has brought more opposition from anti-whaling organisations that express concern at what they see to be an increasing commercialisation of what was once a 'traditional' activity.

In this book, Richard Caulfield looks at these conflicts and contested perspectives, and describes the economic, cultural, and symbolic importance of whaling for Greenlanders in general and the people of Qerqertarsuaq, in Disko Bay, in particular. Aboriginal subsistence whaling in Greenland provides a powerful example of how environmentalist action and globalist models of environmental management clash with indigenous or local modes of production, and Caulfield's book is effective in its treatment of the Greenlandic position that international opposition and management fails to understand the needs of local people. Caulfield shows how co-management of whaling is increasingly effective in the way it attempts to reconcile global concerns about the exploitation of whales with the needs of local Greenlandic communities caught up in what is a global environmental issue — the discourse is influenced and made more complicated by the interests and concerns of a number of players, such as the IWC, international NGOs, the Greenland Home Rule government, local municipal authorities, indigenous peoples' organisations, and the Danish government, each of which has its own particular agenda.

Although the IWC has allowed aboriginal subsistence hunting for fin and minke whales in Greenland to continue under a strict quota system, it nonetheless faces increased regulation. Caulfield explains how whaling in Greenland must be understood as something that is important to Inuit in both a cultural and economic sense, as well as a political and symbolic one. He argues that whaling's contemporary significance can only be appreciated by understanding the historical connections between Greenland and global political and economic systems. Thus, while subsistence