

THE SEVENTH CONTINENT: ANTARCTICA IN A RESOURCE AGE. By DEBORAH SHAPLEY. Washington D.C.: Resources for the Future, Inc., 1986. 332 p., 35 photos, 33 maps, appendix, index. Hardbound. US\$35.00.

The purpose of this book is to present a comprehensive picture of the role of Antarctica in world affairs today, with a focus on the political questions. The author succeeds in these objectives to a large extent.

Antarctica had its heroic age of exploration during the first part of this century. Science became the main activity after World War II, especially following the International Geophysical Year. This was when the Scientific Committee on Antarctic Research (SCAR) and the Antarctic Treaty came into being. The treaty came into force on 23 June 1961, when it was ratified by the last of the original 12 consultative parties.

The Antarctic Treaty is a unique international legal instrument. It has provided for the peaceful cooperation south of 60°S between countries of very different political beliefs. A major aspect of the treaty is its ambiguity on sovereignty. The states that have made claims, those that maintain they have basis for claims, and those without claims have "agreed to disagree." Article IV of the treaty froze the positions, and the negotiations at the consultative meetings strive carefully to maintain this balance by what is commonly termed the "bifocal approach" — using language that can be interpreted to cover the positions of both claimant and non-claimant states.

The first 20 years of the Antarctic Treaty System was a period of gradual evolution, leading to measures for the conservation of Antarctic flora and fauna and conventions for conservation of Antarctic seals and Antarctic marine living resources.

The 1980s have seen profound and accelerating changes in Antarctica. Numerous nations have joined the treaty, and negotiations and consultations have become more intense. There are three main reasons for this: Firstly, Antarctica has become an issue at the UN General Assembly. Secondly, the parties are attempting to develop a mineral resources regime. Thirdly, 1991 will become a critical time for the treaty: Article XII states that 30 years after the treaty came into force any of the consultative parties may call for a conference to review the treaty. Following such a conference any signatory may opt to withdraw from the treaty as early as 1995.

It is against this background that Deborah Shapley sets her book. The main chapters cover U.S. and international history of the continent, the Antarctic Treaty, living and mineral resources, and the future of Antarctica. The book contains a great deal of information presented in a very readable form.

The strongest sections of the book are those discussing the role of the U.S. I found her descriptions of other nations less accurate and curiously uneven, seemingly based on scattered information. Pages 68-82, which describe the interests of other countries, are not balanced in relation to the size of their historic activities and interests, and in some cases important elements are not mentioned. Thus the description of the country I know best states erroneously that Norwegian claims to the islands Bouvetøya and Peter I Øy and to Dronning (Queen) Maud Land were based "on their occupation and use by its [whaling] captains," and the map of historic expeditions (p. 80) omits Larsen's expedition down the eastern side of the Antarctic Peninsula, which has not been repeated, and most of the Norvegia expeditions.

The author at times seems impressed by size rather than quality. This is of course difficult to judge, but it is surely unjust to say of New Zealand that its contributions down on the ice "have been slim" (p. 72) or to consider the U.K. effort "threadbare" (p. 71). In comparison, she devotes much space to efforts such as the U.S. Operation Highjump in 1946-47, which was truly the largest single effort undertaken by any nation up to now, but which also probably produced the fewest results per dollar spent of any postwar expedition.

Shapley, in company with many environmentally concerned persons, seems to believe that exploitation of hydrocarbons on Antarctica could take place this century. This is exceptionally unlikely. The negotiations for a mineral regime, which will enter the ninth round at

the end of 1986, are *not* driven by imminent prospects of resource exploitation. The main forces are political. The common desire of the treaty nations is to conclude these complex negotiations *before* any mineral resource is discovered, in keeping with the best traditions of Antarctic diplomacy of staying ahead of the problems. At present hydrocarbon deposits are unknown in Antarctica — which indeed makes negotiations much simpler. There is no evidence for her statement on p. 131 that the 1973 USGS estimates "were *probably* too low." Most geologists believe that hydrocarbon exploitation will not occur in our generation, if at all.

The book seems to have been completed in 1983, which could explain the view on mineral exploitation, with the then rising oil prices. Publication in 1986 underscores how rapidly the Antarctic scene is changing, because some of Shapley's comments on the future are already outdated. Thus her prediction of possible composition of the treaty membership in 1991 does not include nations such as Italy and Finland, which have already joined. Her discussions of international negotiations seem at times naive.

Even though the book contains various minor errors it serves as a useful reference, especially on U.S. involvement in Antarctica. Experts who negotiate Antarctica's political questions may find thought-provoking observations in her discussions of the Antarctic Treaty System and its future evolution. The book is well illustrated and referenced and has a good index. It is reasonably priced for its size, and I recommend the book to anyone interested in this fascinating continent and its future.

Olav Orheim  
Head, Antarctic Section  
Norwegian Polar Research Institute  
P.O. Box 158  
1330 Oslo lufthavn, Norway

THULE PIONEERS. Edited by E. BIELAWSKI, CAROLYNN KOBELKA, and ROBERT R. JANES. Occasional Papers of the Prince of Wales Northern Heritage Centre, No. 2, 1986. Softbound.

This publication is the second volume in the occasional paper series of the Prince of Wales Northern Heritage Centre in Yellowknife, N.W.T. As outlined by Robert Janes in the Foreword to the first volume published in 1985, the objective of the series is to provide northern residents and others who work in the North with the opportunity to share their knowledge of the North in a manner that "strike(s) a balance between sound research and broad appeal to a non-specialist readership." The second volume of the series admirably fulfills this mandate. The volume contains two papers, the first one entitled "In Search of the Thule Pioneers," by Charles Arnold, and the second one "Exhibiting 'In Search of the Thule Pioneers,'" by Charles Arnold and Wally Wolfe.

In the first paper, which comprises the major portion of the volume, Arnold tells the story of the prehistoric Thule culture and how he and members of the Banks Island Archaeological Project went about researching the origins of Thule culture in one area of the western Canadian Arctic. The story of Thule culture lifeways and our current interpretation of Thule prehistory is skillfully interwoven with a description of how arctic archaeologists carry out their field research. Arnold begins by explaining why Banks Island was chosen for study, how the study area of Nelson River was selected, how the initial survey for archaeological sites was conducted and what was found. The procedures involved in the excavation of a site and the nature of the house remains are well described in the text and through ample photographs complemented by line drawings illustrating how the excavated house was originally built and what it might have looked like when occupied.

The artifacts recovered from the Nelson River site are discussed under the functional categories of hunting and fishing tools, transportation, manufacturing and processing tools, personal adornment and art. Photographs and line drawings are used to illustrate the artifacts and clearly demonstrate the manner in which each tool was used.

The bones of the animals eaten by the Thule people were also analyzed and the methods for deriving information on Thule economy and hunting practices from these remains are documented. The faunal remains and the artifactual evidence allow the archaeologist to reconstruct the prehistoric economy and hunting strategies of the Thule people who lived at the Nelson River site.

In discussing how the site is dated, Arnold succeeds in clearly explaining the technique of radiocarbon dating cultural material and the use of cross-dating artifacts as an alternative dating technique. The story of Thule lifeways as reconstructed from the Nelson River site remains is fleshed out by an imaginative fictional account of a Thule hunter's thoughts as he and his family prepare to leave their winter home. In a brief epilogue to the story of Thule history, the development of Thule culture into the distinctive tribes of the Arctic is traced.

The second article follows the steps involved in preparing a museum exhibit to tell the story of the Thule culture pioneers in the western Canadian Arctic. This article is an excellent introduction to the behind-the-scenes workings of a museum and the prodigious amount of work involved in researching, designing, producing and assembling a museum exhibit. In this way, the excitement of archaeology and the rich cultural heritage of northern peoples can be shared with hundreds of museum visitors.

The papers in this volume are clearly written and well illustrated and should have a broad appeal to laypersons, students and also to professional archaeologists, particularly those involved in teaching at the introductory level. Northern high schools could also make good use of this volume in their history classes. In conclusion, I echo Red Pedersen's hope expressed in the Foreword that similar papers on the various Dene cultures of the North will soon be forthcoming.

*Karen M. McCullough*  
Research Associate  
The Arctic Institute of North America  
The University of Calgary  
2500 University Drive N.W.  
Calgary, Alberta, Canada  
T2N 1N4

**REMOTE SENSING OF ICE AND SNOW.** By DOROTHY K. HALL and JAROSLAV MARTINEC. New York: Chapman and Hall, 1985. vii + 189 p., maps, figs., coloured plates, tables, refs., index. Hardbound. US\$39.95.

Owing to its immense storage of freshwater and intensive heat exchange with the atmosphere, the cryosphere, that part of the Earth covered by ice and snow, plays an important role in the Earth's hydrological and climatic cycles. However, our knowledge of this important part of the Earth is limited by the remote location and severe environment of the cryosphere. Remote sensing techniques are thus most useful for exploring and monitoring the cryosphere of the Earth by allowing fast and global observations of its ice and snow covers. This book presents a description of the utility of remote sensing for identifying, mapping and analyzing surface and subsurface properties of worldwide ice and snow features.

The book begins with two short chapters intended to provide the reader with some background on (1) the optical, thermal and electrical properties of ice and snow and (2) the sensors and observation platforms referred to later in the book. The remaining chapters provide descriptions of the science, application and observation techniques

associated with snow, lake and river ice, permafrost, glaciers and sea ice.

In general the book has achieved its objective in emphasizing "the use of remote sensing for developing an improved understanding of the physical properties of ice and snow and understanding the interrelationships of cryospheric processes with atmospheric, hydrospheric and oceanic processes." However, the scope and style of the book is lacking a coherent and balanced approach. The first two chapters are simply too short and sketchy to be reasonably useful. The two chapters on snow were written mostly from a snow forecaster's point of view, and thus are heavily biased toward that application with unjustified details. The remaining chapters, on the other hand, can be characterized as a series of short review articles that attempt to provide a somewhat comprehensive summary of recent progress in a particular field.

The book in general is well illustrated with high-quality photos and figures. Unfortunately, some of the illustrations are not well enough explained to allow the reader to fully appreciate their meaning. The overall coverage of bibliography is adequate, providing reasonably updated information on this rapidly developing field.

Some erroneous information and misleading nomenclature have been noted. The NASA GEOS-3 altimeter has been mistakenly quoted as "the NOAA GOES-3 altimeter" many times in the book. In addition, it is misstated that the primary application of radar altimeters is for ocean wave height determination; actually, radar altimeters are used primarily for measuring sea surface topography.

Apparently the authors have failed to draw the distinction between a synthetic aperture radar and an ordinary side-looking radar. The former requires measurement of both amplitude and phase of a return pulse, whereas the latter measures only the amplitude.

The techniques of impulse radars and radio echo sounding are the same, whereas the authors have never mentioned any connection between them. Actually, the term radio echo sounding appears in the chapter on glaciers without any explanation.

Because of the unbalanced scope of the book, it is difficult to recommend it to a single group of readers. The chapters on snow are certainly useful to snow forecast practitioners in providing a perspective of the utility of remotely sensed data. For the chapters on ice and permafrost, the book can be used as a reference by graduate students interested in research opportunities on the subject.

*Lee-Lueng Fu*  
Jet Propulsion Laboratory  
California Institute of Technology  
4800 Oak Grove Drive  
Pasadena, CA 91109  
U.S.A.

**THE UPPER PALEOLITHIC OF THE CENTRAL RUSSIAN PLAIN.**

By OLGA SOFFER. Orlando, Florida: Academic Press, 1985. xxiv + 539 p., figs., tables, refs., index. Hardbound, US\$98.50; soft-bound, US\$49.50.

Olga Soffer has produced a most valuable and novel addition to our knowledge of the Upper Paleolithic of the Central Russian Plain (European part of the U.S.S.R.) from an economic-ecological perspective. The Central Russian Plain is well studied in the Soviet Union, and some Western specialists are well acquainted with the topic. The monograph under review, however, is not simply a descriptive source of the 29 key Upper Paleolithic sites of the Russian Plain but is analytical as well. It discusses the most recent theoretical (procedural) approaches in contemporary archaeology, such as subsistence adaptive behavior and economic strategies of non-industrial populations in