

Book reviews

Antarctica: a catalogue of maps and charts

Produced by *Scientific Committee on Antarctic Research (SCAR)*. Fifth Edition (1988). \$(Aus)125. ISBN 0 642 51611 1.

This Catalogue was first published in Australia in 1960 by the Secretariat of the SCAR Working Group on Geodesy and Cartography. Since 1976, when the last revision was made, there had been no attempt to update it until early in 1988, when material was requested for a new edition to be published in time for the SCAR meeting in Hobart in September 1988. That this was achieved is remarkable: a tribute to those who undertook what they realised would be a daunting task. But it has been at the expense of clarity and accuracy.

The new Catalogue contains some 1400 entries from 17 contributors. As in the past, these are listed first by nation, then geographically, by quadrants of the continent. Sub-sections divide items under the same headings as previously; Topographic Maps, Aeronautical Charts, Hydrographic Charts and Miscellaneous, to which have been added the useful section, Thematic Maps, and another, Remotely Sensed Maps. It is not clear why these are not included under Topographic Maps since remote sensing is one of a variety of sources from which maps are constructed.

The first section, listing each contributor's maps, should replicate information supplied by each nation. In the case of Britain this is not so. From some 150 items, nine have been omitted or scrambled, twelve, all obsolete or inappropriate, have been added, and the original local order abandoned. A further 76 typographical errors have been introduced.

The second section, listing items by quadrant, cries out for more use to be made of diagrams to clarify geographical position and to juxtapose similar publications by different nations. The order within one quadrant appears to be haphazard. By sub-divisions of scale and use of co-ordinates or the International Map of the World reference system, the 1:10 000 Argentine chart, Islotes Debenham, would not have been separated by 13 pages from the 1:25 000 British chart, Debenham Islands. Again, sorting the sub-section on Thematic Maps into theme sub-headings would have rescued the exquisite large-scale Japanese geological maps from obscurity.

It appears that the 'original' Antarctic mapping nations have recently been resting on their laurels or reflecting their scientific commitment in the production of thematic maps. Apart from the plethora of derived topographic maps and charts, it is clear that new mapping, from both remotely sensed and photographic data, is now largely in the hands of West Germany, Japan and the USSR. This change undoubtedly reflects nations' financial commitments to map-making.

The attractive loose-leaf format of this fifth edition belies a confusing interior. It is to be hoped that the computerized database, from which it was compiled, will not only facilitate

updating, as is claimed, but will also lend itself to the elimination of error, and to the presentation of facts, so that the general user may more easily extract information.

PETRA SEARLE

High latitude limnology

Edited by *W.F. Vincent and J.C. Ellis-Evans*
Kluwer Academic Publishers, Dordrecht (1988).
336 pages. £80.00. ISBN 9 061 93660 8.

In 1953, the renowned Canadian limnologist D. S. Rawson (*Limnology in the North American Arctic and Subarctic Arctic*, 6, 198–204) lamented that even basic data for polar lakes were lacking. He argued that research programmes on polar limnology 'should prove fruitful in both practical and theoretical fields'. In spite of these early words of encouragement, it is somewhat surprising and a little alarming that relatively few comprehensive limnological studies were conducted in the intervening quarter century. Fortunately, over the last few years, a number of papers, books, and edited volumes have begun to add important data on the lakes, ponds, and streams of polar habitats, with some very exciting results. *High latitude limnology* (which is a reprint of *Hydrobiologia*, 172) is an important and timely addition to this developing literature.

This edited volume of 22 contributed papers is the result of a 1987 symposium held at the 23rd Congress of the Societas Internationalis Limnologiae in Hamilton, New Zealand. The symposium was well attended, and no doubt the proceedings will also draw a broad readership. The book is divided into two sections: one dealing with rivers and streams (10 papers; 6 from Antarctica and 4 from Alaska), and the second with lakes and ponds (12 papers; 9 from Antarctica, 2 from Alaska, and 1 from the Canadian Arctic). The contributions were reviewed and in general are of high quality. The stream papers mainly focus on attached cyanobacterial and chlorophyte floras. The lake papers cover several aspects of the physical, chemical, and biological components of polar systems, but some important areas still require elaboration (hopefully in future studies). For example, the compositions of the phytoplankton and zooplankton communities are still poorly described and understood.

Because this is a symposium volume, the editors cannot be faulted for the scope and geographic range of the papers. Nonetheless, it is unfortunate that, with one exception, 'Arctic' meant 'Alaska'. Little mention is made of aquatic research in Canada, Greenland, and the European and Asian Arctic. One of the book's designated missions was to identify similarities and differences between northern and southern polar regions. Although the editors' preface par-

tially fills this role, an overview summary paper, synthesizing and discussing the new data and ideas, would have been a most welcome addition. More integration between papers and a detailed subject index also would have enhanced the value of this publication.

Hobbie (*In* TAUB, F.S., ed. *Lakes and reservoirs*. Amsterdam: Elsevier, 63–105), in an historical overview of polar limnology, identified three major phases in research: an early stage of incidental gathering of data during expeditions devoted to exploration; a second phase of descriptive limnology; and the final phase of research on factors affecting and controlling various limnological processes. Most of the contributions in *High latitude limnology* are firmly planted in the latter phase, which most would consider to be a desirable sign of progress and maturity, and a requirement for the large research grants that must accompany polar studies. In general, I would agree, but I hope ongoing studies will recognize the need for a solid 'descriptive' (I shudder to use the word) foundation on which these process-oriented studies must be based. For example, many new taxa are undoubtedly present in these lakes and rivers, yet little research is being done on the systematics of these organisms. There is a great temptation to use taxonomic schemes developed for more temperate regions, even though this approach is fraught with difficulty. If, for example, no one really knows which organisms are living in these lakes and streams, then how are we to answer questions such as 'how different are these systems from more temperate ones?' These shortcomings are difficult to correct after-the-fact, and at best result in further confusion and 'noise' in attempts at comparison and synthesis. The above is not meant to be a direct criticism of the contributions to this volume, but my general concerns about research directions in high profile, 'trendy' areas.

High latitude limnology is a good piece of work and belongs on the shelf of any limnologist interested in polar research. The main benefits of a book such as this are to serve as a catalyst for the crystallization of ideas and to identify gaps in our knowledge. The papers provide some answers, but, as in any growing field, they also pose many new interesting questions. The contributions are clearly presented and relatively free of jargon. As with other books in the *Developments in hydrobiology* series, the volume is handsomely produced, but expensive.

JOHN P. SMOL

Polar ecology

Bernard Stonehouse

Blackie, Glasgow and London; Chapman and Hall, New York (1989), 222 pages. £27.00 hardback, £12.95 paperback. ISBN 0 216 92480 4 and 0 216 92481 2 Pbk.

This book, in Blackie's Tertiary Biology Series, is unusually broad in scope as it covers plant and animal ecology in both

Arctic and Antarctic regions. Emphasis throughout is on polar environments and the responses of the biota to these environments, rather than topics such as population biology or ecosystem processes.

The first chapter describes the varied topography and geography of the polar regions and discusses the geological history of these areas, emphasizing that most polar habitats and communities are of relatively recent origin. The boundaries of polar and subpolar regions, as employed here and throughout the text, are based on ecological criteria such as the timber line in the Arctic, and in the South on the distribution of water masses of different origin as marked by the Antarctic and Subtropical Convergences. Chapter 2 reviews polar climates and microclimates using an energy budget approach, stressing the importance of solar radiation receipt in relation to surface albedo, as well as cyclonic and anticyclonic air movement, in determining local climates. Attention is rightly drawn to the diversity of climatic regimes within the polar regions. Low temperature is viewed as a major ecological factor, and the contrasting strategies of poikilothermy and homeothermy are discussed. The third, fourth and fifth chapters consider respectively terrestrial, fresh water and marine environments. Attention is centred on physical features of these habitats in regions as varied as the low-arctic tundra as compared with the Antarctic polar-plateau, and the predominantly ice-covered Arctic Ocean as opposed to the vast, open expanse of the Southern Ocean. The principal biotic communities are briefly discussed in relation to food webs, and the richness of polar seas in terms of bird and mammal densities is contrasted with the relative paucity of both tropical seas and polar terrestrial habitats. In chapter 6 Dr Stonehouse discusses the native plants and animals in terms of morphological and physiological attributes which permit growth and survival under conditions of severe cold and, in many terrestrial habitats, of aridity. A recurrent theme, applicable to organisms as diverse as lichens and mammals, is that such attributes were in all probability characteristic of the biota concerned as they first colonized arctic and Antarctic habitats. Thus they cannot be regarded as adaptations resulting from local selection pressure, a view consistent with the recent origin of polar habitats and the short time available for colonization since the retreat of Pleistocene glaciations. The final chapter is concerned with man's impact on the polar regions. It draws a sharp contrast between the economy of native arctic peoples, who were entirely sustained by an ecosystem of which they formed a non-disruptive component, and that of more recent arrivals from lower latitudes who have had a major impact on the local ecology while remaining dependent upon imported resources.

Such a wide array of topics can clearly not be considered in depth in a relatively slim volume such as this. Nevertheless, Dr Stonehouse's book will form a useful introduction to polar biology for students of many disciplines. The text has few typographical errors and is well illustrated with appropri-

ate tables, photographs and line drawings. There is an extensive bibliography, principally covering works written in English, although a frustratingly large number of the references cited in the text are not included. The book contains a few factual errors and surprising statements unsupported by references: e.g. the Polypodiaceae is not an angiosperm family (p. 83), and one would like to know the source of data indicating that receipt of short-wave radiation exceeds $300 \text{ kcal cm}^{-2} \text{ yr}^{-1}$ in places on the Antarctic polar-plateau (p. 31). However, such deficiencies are minor and do not seriously detract from what should prove a useful and timely addition to the polar literature. The simultaneous publication of student texts in hardback and paperback formats, as in this case, is to be encouraged as a means of providing for the needs of libraries while at the same time increasing accessibility to the student market.

R.E. LONGTON

Living ice, understanding glaciers and glaciation

R.P. Sharp

Cambridge University Press, Cambridge (1989).
235 pages. £15.00. ISBN 0 521 33009 2.

Any review of Robert P. Sharp's book must first point out that although it is written to appeal to a large audience, some background in geophysics would be useful.

In 225 pages the author invites us to follow a long journey through the world of glaciers. The first two chapters describe

glaciers, the third one deals with ice movement and then chapter 4 describes unusual glacier behaviour, such as surges, which are of particular importance in understanding ice dynamics.

The next four chapters deal with geological aspects of glacial processes and deposition. Finally the last chapter is devoted to past and future ice ages.

This large 'tour d'horizon' is written in an easily read, non-technical and pleasant style. A very comprehensive and useful glossary and index are added. Illustrations (including eight colour plates) are remarkable and illustrate general landscapes as well as details such as glacial morphology features; legends also provide useful information.

This appealing book constitutes a very nice initiation and provides useful background information for further detailed reading. However, as in all introductory books, the author has had to simplify explanations. We may regret, for instance, that some of the mechanisms which drive the behaviour of glaciers are presented as though generally accepted when they are still a matter of research and even controversy.

We must also point out some weaknesses in chapter 9, dealing with the important area of past and future climate. The Milankovich theory of orbital forcing is not really discussed, and northern ice-sheet growth and decay as a strong feedback factor are not even mentioned, not to speak of the possible impact of CO_2 variation on glacial-interglacial temperature change. It would have been better if the likely warming due to the greenhouse effect had been mentioned before considering the possibility of a future ice age.

LOUIS REYNAUD & C. LORIS