

describe the more useful sensors which have been flown in recent years. Both imaging and non-imaging systems are described. Chapters 3 and 4 examine the seasonal snow cover of both polar regions and of more temperate, mountainous regions. They discuss important applications such as river flow forecasting as influenced by snow melt. Chapter 5 deals with the remote sensing of lake and river ice, particularly thickness determination and the monitoring of ice break-up. Permafrost is discussed in Chapter 6, especially remote detection of its presence, and of factors that disturb permafrost conditions. The final two chapters examine terrestrial ice, including glaciers, ice caps, ice sheets (shelves), and sea ice including icebergs. The book is extremely well illustrated with clear line diagrams, numerous black and white images, and photographs which have been reproduced to a high standard, and there are eleven colour plates. References are given at the end of each chapter and there is an adequate index. The concept of this book is well-founded. Glaciologists and polar workers have actively used remote sensing techniques for over two decades and there is much material to synthesize.

The authors have chosen to describe the high-level products and results of remote sensing within the context of ice and snow studies. Much of the text is concerned with discussing general glaciological issues which are suitable for study or have been remotely investigated, rather than focusing upon the details of remote sensing techniques. In dealing with snow, for instance, many of the 57 pages are devoted more to establishing and justifying hydrological techniques and models (very interesting in their own right) than to explaining the details of the remote sensing such as sensor suitability and algorithm development. General readers will find much to interest them in this book, particularly in the breadth of the topics. For professional glaciologists and those working in the field of remote sensing it will be less rewarding, due to the lack of detail, the inconsistent use of symbols and units, and a few equivocal explanations. Nevertheless those who dip into this very readable book will be left in little doubt as to the immensely valuable contribution of remote sensing to glaciology, the panoply of sophisticated techniques now available, and the exciting future prospects for study of ice and snow. It is no coincidence that the International Glaciological Society should choose to celebrate its 50th Anniversary in 1986 with a symposium on remote sensing! (David Drewry, Scott Polar Research Institute, Cambridge CB2 1ER.)

ANTARCTIC BIOLOGY AND CONSERVATION

ANTARCTICA. Bonner, W. N. and Walton, D. W. H. 1985. Oxford, Pergamon Press, 381 p, illustrated, hard cover. ISBN 0-08-028881-2. £14.95.

Antarctica is seventh in the 'Key Environments' series of Pergamon press. These publications endeavour to provide scientifically accurate, concise and well illustrated accounts covering major environments which are now, or soon will be, under threat. Additionally the series intends to assemble a wide range of information which may otherwise be difficult to collate. The International Union for the Conservation of Nature has collaborated in preparing these works by providing information and advice on the selection of critical environments, and experts to discuss the relevant issues. *Antarctica* contains contributions from eighteen authors, all currently involved in Antarctic research, whose fields of interest cover both conservation in the broader sense and virtually all parts of the continent.

The major sections of the book are introduced concisely, with more specialized monographs following. The particular aspects discussed are; physical geography, terrestrial habitats, marine habitats, birds and mammals, sub-Antarctic islands, food webs and

interactions, and conservation and exploitation. A historical introduction provides an interesting basis for understanding the progress of development of scientific knowledge about the region, and the several exploitative industries which have already had severe effects in it, notably sealing, whaling, and a comparatively small penguin oil industry. Present industries, mainly fishing and krill and squid catching, are assessed with discussion of future development and strategies necessary for effective conservation of these resources. A section similarly deals with the possibilities and problems of future mineral extraction. The editorial style is generally good in dealing with such matters as place-names and Linnean names, but there are notable differences in the amount of detail provided in the monographs. Each included extensive bibliographies, and the general index is comprehensive. A good and varied set of monochrome plates with many maps and diagrams greatly contribute to the work. This book has been published at a very appropriate time, as there is currently a need for an accurate modern account of Antarctic conservation matters. (R. K. Headland, Scott Polar Research Institute, Lensfield Road, Cambridge CB2 1ER.)

SCAR BIOLOGY SYMPOSIUM, SEPTEMBER 1983

ANTARCTIC NUTRIENT CYCLES AND FOOD WEBS. Siegfried, W. R., Condy, P. R. and Laws, R. M. 1985. Heidelberg, Springer-Verlag. 700 p, illustrated, hard cover. ISBN 3-540-13417-4. DM168.

This volume includes 92 of the 107 papers delivered to the Fourth SCAR Symposium on Antarctic Biology, held at Wilderness, South Africa on 12–16 September 1983. It makes a massive and considerable book. Antarctic biology has grown and moved on since the third SCAR biology symposium of 1974, which attempted to cover the whole spectrum of Antarctic research. SCAR biologists resolved that the next meeting should be narrowed in focus, and a theme of nutrient cycles and food webs was selected. As these are the basic preoccupations of most Antarctic biologists, the fourth meeting still managed to encompass a great deal of what is currently being discovered, and the volume of proceedings is no less encyclopaedic than before.

After an introduction by R. M. Laws, the book falls into five sections covering marine nutrient cycles, terrestrial and freshwater nutrient cycles, marine food webs, terrestrial food webs, and interactions between marine, freshwater and terrestrial ecosystems. Not surprisingly the marine sections predominate; marine papers outnumber terrestrial and freshwater papers by about three to one. Among marine papers it is interesting to see a healthy emphasis on microbial and micro-algal studies, especially in relation to sea ice, and a strong BIOMASS influence—euphausid, fish and bird studies are well represented. Terrestrial papers include a spate of new work on soils, with emphasis on decomposition studies and the role of guano in nutrient cycles. Terrestrial food webs are relatively neglected, mustering only six papers. There are five interesting papers on the chemistry and productivity of freshwater lakes, but food webs in fresh water are poorly represented. As a biologist trying hard to keep up with a fast-moving field I have found something new and interesting in almost every paper. There is a high standard of editing and production throughout. The papers by O. Holm-Hansen on marine nutrient cycles, R. I. Lewis Smith on nutrient cycles and productivity ashore, and G. Hempel on marine food webs are particularly informative guides to their sections, and A. Clark's contribution on energy flow in the Southern Ocean is refreshing reminder that there is still work to be done. The summing-up by Laws provides an overview of what work is being done, by whom and where.