

ANTARCTIC ECOLOGY

ANTARCTIC ECOLOGY. Laws, R. M. 1984. London, Academic Press. 2 vols, 850p, illustrated, hard cover. ISBN 0-12-439501-5; 0-12-439502-3. £46.00, US \$ 75.00; £35.50, US \$ 55.00.

The contents of these two volumes represent the response to a proposal from the Academic Press that M. W. Holdgate's *Antarctic Ecology* should be updated. All but one of the contributors are members of, or are associated with, the British Antarctic Survey. T. D. Foster, a United States oceanographer, is the exception.

Chapters on land-based research fill Volume I. In the introductory one D. H. W. Walton describes the origin and special features of the Antarctic, then considers the macroclimate and microclimate that impinge on plants and animals. General climatic patterns over the Continent are now evident, though biological microclimatology is still beginning. Concerning soils, most knowledge has accrued since 1950, due largely to Russian, American and New Zealand investigators.

On terrestrial plant life, both native and introduced, R. I. Lewis Smith's aim is 'to present for the first time a comprehensive overview of the macroscopic terrestrial vegetation and plant biology of the sub-Antarctic and Antarctic biome, and to provide a synopsis of the main plant ecological and related investigations'. Every section in his 100-page review depends extensively on research from the past 15 years or so. Outstanding developments are evident in the section on phenology, diaspore production and germination and the concluding one on survival strategies. Southern polar lands, Smith concludes, offer excellent opportunities in the way of relatively simple ecosystems, and the latter may soon face some commercial exploitation.

The micro-organisms, the micro-algae and the invertebrates and the parts they play in terrestrial ecosystems are reviewed by W. Block. A valuable section on the organisms (this 'impoverished and disharmonic flora and fauna') leads to treatment of mechanisms of invertebrate cold hardiness and of knowledge on ecosystem structure and function. Considering the low levels of pollution at present, Block urges further studies before it is too late.

Limnological aspects are treated by R. B. Heywood, who considers the evolution of Antarctic lakes before turning to their 'surprisingly rich' biota. Beside the proglacial and freshwater lakes, we learn of saline, epishelf and volcanic lakes, and then of lakes set far below the continental ice sheet that are detectable by radio-echo soundings. A final section on ecology deals first with environmental factors that influence the physiology, behaviour and productivity of the flora. Much less is known of the fauna and lake productivity.

Terrestrial aspects also include W. N. Bonner's chapter on introduced mammals, which range from mice to reindeer and include cats, rats and rabbits. Reindeer, which flourish in South Georgia, and mice, even more able than rats to colonize fresh habitats, are especially interesting in their ecology.

Volume II, which is concerned mainly with the marine ecosystems, is introduced by a chapter on the physical aspects by T. D. Foster. Concerning ice cover, nearly continuous year-round observation of pack ice growth and decay is now got from satellite imagery. Investigators of oceanic circulation have to do with less coverage, but what is known is justly reviewed. Under distribution of properties, specialists concerned with primary productivity will be particularly glad to have Foster's treatment of nutrient concentrations and mixing processes. Indeed, in their chapter on the Antarctic marine flora, notably in their section on marine productivity, R. B. Heywood and T. M. Whitaker, have such

factors partly in mind when concluding that '... the Southern Ocean does not appear to be any more productive per unit area than that of any other ocean except the Arctic Ocean'.

Secondary production is considered, inter alia, in the chapters on the animals. In his review of the invertebrates of the marine benthos, M. G. White begins with their abundance and diversity (the communities have a high biomass and an unexpected species richness), and then considers their biographical relationships. The concluding section on ecological strategies is largely concerned with the relatively slow growth and development and consequent K-adaptedness of the key species. Such factors are considered by I. Everson in his chapters on the zooplankton and fish biology. Concerning growth and development, an outstanding problem in the zooplankton is the life cycle of krill *Euphausia superba*. If krill is not to be over-exploited, relevant rates of replacement have to be known, and the same is true of the exploitable fishes. One species alone, *Notothenia rossii*, has a growth rate comparable to that of cod *Gadus morhua*, and then only when it is feeding on krill. For the most part, the fish fauna is dominated by small species, which grow slowly and may take more than five years to reach maturity.

J. P. Croxall's chapter on the seabirds begins with outlines of their zoogeography, taxonomy and speciation. Concerning reproduction, their dispersal and habitats lead through apt timing of the breeding season to resultant patterns of breeding biology (eggs and incubation, the chick, fledgling period, growth and breeding success). Extensive advances in food and feeding ecology are reviewed and there is finally much on population structure and dynamics and studies of energetics.

The biology of the six species of Antarctic seals is covered by R. M. Laws. In the past 15 years or so much has been learnt of their overall distributions, abundance and habitat preferences. (The most abundant large mammal in the world may well be the crabeater seal). Comparative studies of the social organisation of ice-breeding and terrestrial breeding species are both illuminating and heuristic. Why is there not above-ice mating in the Weddell seal? Among the numerous studies of food and feeding we learn that the leopard seal eats much krill. There is also much to add to knowledge of animal breeding cycles and population dynamics.

The Antarctic is the last main support of the great whales and of smaller species. S. G. Brown and C. H. Lockyer consider their zoogeography, annual cycle, distribution and migration. We are also brought up to date on their growth and age, reproduction, social structure and trophic biology. In particular, C. H. Lockyer summarizes his work on their bioenergetics. A final section reviews ways of estimating whale populations. At the end of this chapter we appreciate that the biology of the great whales is much better known than that of the smaller species.

In a penultimate chapter on marine interactions, I. Everson begins with food chain relationships and ecological models, then turns to new assessment of the biology around South Georgia, which encompasses water circulation, nutrients, phytoplankton, whales, birds and the interrelationships of krill and hydrography. The effects of predation on krill can now be specified, which is '... a valuable first step in providing initial figures on which to base management strategy.'

Conservation and the Antarctic head the final chapter by W. N. Bonner. The need for conservation not only exists in exploited resources (and the great whales are paramount) but also for resources that are potentially exploitable. The inroads of fur sealing, elephant sealing and whaling are all too well known and we should not forget the local impact of scientific expeditions. Bonner concludes with a section on legislative controls and the thought that a reasonable balance between exploiters and conservers may be emerging.

All who use these volumes will realize that the contributors have brought us handsomely up to date. Most of the significant advances made since 1968 will be found

here. If the Antarctic Treaty, as R. M. Laws says, is robust enough to survive, future ecological investigations will make other than proper management of Antarctic resources unthinkable. (Professor N. B. Marshall, 6 Park Lane, Saffron Walden, Essex).

INDIANS OF NORTH AMERICA

HANDBOOK OF NORTH AMERICAN INDIANS. 5. ARCTIC. Damas, D. (editor). 1985. Washington DC, Smithsonian Institution, US Government Printing Office. 862 p, illustrated, hard cover. ISBN 185-8. US \$ 29.00

The *Handbook of North American Indians* is a twenty-volume series designed as an encyclopaedia of the prehistory and anthropology of the aboriginal inhabitants of North America. The first volume is an introduction to the series, and the final volume is an index. Two volumes form a biographical dictionary of fieldworkers and native peoples, and five volumes are thematic, covering such topics as 'Indians in Contemporary Society' (Volume 2) and 'Languages' (Volume 17). Each of the remaining eleven volumes covers an environmental region and discusses the cultures which inhabited that region. There is a separate editor for each volume but the production is coordinated by the permanent *Handbook* editorial committee at the Smithsonian Institution in Washington, D.C.

The series is aimed at universities and libraries; however, volumes can be purchased individually. To date two volumes have appeared that would be of special interest to *Polar Record* readers. 'Subarctic' (Volume 6, 1981) covers the Indians of Alaska and the tundra regions of Canada. 'Arctic' (Volume 5, 1984) discusses the Eskimos and Aleuts. The remarks below deal specifically with the Arctic volume although the comments on production are also true of all the six volumes so far published.

It is often difficult for an individual when approaching a new subject to know where to start. This is especially true for those wishing to begin a study of Arctic peoples. The earliest information about these people is scattered throughout the accounts of explorers, whalers and traders. It was not until the late nineteenth century that ethnographic fieldwork was undertaken, and during this period and the early twentieth century several classic ethnographies were published. Since then the trend has been towards articles which appear in specialist journals and are often inaccessible to the general public. By gathering much of this information into a single volume, 'Arctic' provides a much needed starting point and reference manual for anyone interested in Eskimos or Aleuts.

There are fifty-nine articles by forty-four authors in this book, a fact that alone could have resulted in a very disjointed work. However, the volume has been carefully structured and manages to avoid this problem. The first section introduces the volume and includes an important note on the transcription of native names. Several articles provide an overview of the history of academic research in the region. A general outline of the Arctic environment and ecosystems is presented, as well as an introduction to Eskimo and Aleut languages and physical anthropology. The rest of the monograph is divided into four sections; the Western Arctic, Canadian Arctic, Greenland and The 1950-1980 Period. The first three sections share a common structure. The prehistory of each area is discussed first. This is followed by an article on the history of exploration by non-natives and their contact with the natives. The main body of each section is devoted to articles which treat the different sub-groups of the Eskimos separately. The cultures are usually described as they would have existed in pre-contact or early contact times, and then the changes that occurred following contact are outlined. Articles of this sort form the major portion of the book. They have been carefully structured so that