

Argentine relief expedition

So it goes on: there are all the major, classical voyages of exploration and all the minor ones, with and all the support and relief ships involved; so much we would expect for our money. But that is not the half of it. There are all the sealing voyages of the 18th and 19th centuries and the whaling voyages from 1904 onward. There are the annual visits to castaway depots on the southern islands of New Zealand and Australia, the voyages of the Discovery Investigations ships in the 1920s and '30s, British and German naval operations in World War II, the station-relieving voyages of all the modern expeditions, individual oceanographic cruises and, most recently, the tourist ship cruises. Who discovered Campbell Island? How far south did James Weddell penetrate, and what were the names of his ships? What took the Earl of Crawford to Tristan da Cunha in 1906? Who were the first women to visit Antarctica? When did the Australians start operations on Heard Island? When did the French fish-cannery start on Ile St. Paul, and when did it end? How many tourist ships have visited Antarctica since 1949? I do not know, but I think I could turn up answers to any these questions in about 10 minutes, with the help of this book.

I have left no room to enlarge on the 105-page index, the bibliography, the line-maps, the historic illustrations, the fifty-odd pages of introductory matter including information on SCAR, the Antarctic Treaty System, statistical information on ships and stations, the southern islands and... This is a good, solid reference book, strongly recommended for libraries, institutes, and as a retirement present for polar buffs from all disciplines. (Bernard Stonehouse, Scott Polar Research Institute, University of Cambridge, Lensfield Road, Cambridge CB2 1ER UK.)

SOUTHERN OCEAN RESOURCES

ANTARCTIC OCEAN AND RESOURCES VARIABILITY. Sahrhage, D. (editor). Berlin, Springer-Verlag. 304 p, illustrated, hard cover. ISBN 3-540-19294-8. DM 198.

Published late in 1988, sponsored by IOC and CCAMLR and supported by SCAR and SCOR, this volume is the report of a seminar held in Paris in June 1987. The theme was variability in the circulation of the Southern Ocean and its consequences for the ocean biota. This volume embodies 25 research papers plus the editor's summary and conclusions.

The papers are grouped in four sections: Meso/large-scale variability in the environment; Meso/large scale variability in the biota (related to the environment; krill variability in relation to the environment, and krill variability detected from predator studies. The first section includes discussions of variations in atmospheric circulation (Van Loon, Shea, Kaufeld) and ocean circulation (Gordon, Sievers, Nowlin, Stein, Nagata and others). The remaining sections include paper on variations in phytoplankton production in the open ocean (El-Sayed) and in such special areas as the marginal ice zone (Smith and

others) and pack ice (Ainley and others), and many on variations in krill population, estimated and measured in different ways.

Sympathies go out to the editor of such a volume, faced with so massive and heterogeneous a bunch of papers. Sahrhage's summing-up can only draw attention to the large range of variability in the Southern Ocean — seasonal, annual, local, regional, long-term and short-term — to the mass of data being collected, and the need to relate data more precisely to the needs of organisms. Climatic and oceanographic variations are large; so too are variations in biomass of krill; over most of the ocean these occur for reasons that we do not understand, though intensive work in the southwest Atlantic sector and around Antarctic Peninsula is offering glimmers of light. Lack of reliable methods of assessing krill stocks makes much of the modelling uncertain. Biological methods of monitoring, for example noting the performance of established krill predators, offer some hopes of accuracy, though results are puzzling and key elements of understanding seem still to be missing.

The problems these papers present are familiar to all ecologists the world over; what is the norm for the ecosystem we are trying to model, what the normal range of variation, and how reliable are our sampling methods? Working on titmice in nest boxes in an Oxfordshire woodland, David Lack concluded after more than a quarter of a century that he had not yet encountered a 'normal' year. What hope have ecologists to establish norms among widely-varying resource populations in a widely-varying Southern Ocean? By the evidence of this volume, the problem will keep many good folk out of mischief for a very long time. It is a worthy collection, full of good concepts both familiar and new, and probably representing fairly how Southern Ocean ecologists feel at present. (Bernard Stonehouse, Scott Polar Research Institute, University of Cambridge, Lensfield Road, Cambridge CB2 1ER UK.)

PERIGLACIAL MORPHOLOGY

ADVANCES IN PERIGLACIAL MORPHOLOGY. M. J. Clark (editor). 1988. Chichester, John Wiley. 481 p, illustrated, hard cover.. ISBN 0-471-90981-5. £70.00.

This international collection of papers by 'periglacial' specialists is informative and authoritative. Editorially the contributions are well-presented and easily read. In his introduction M. J. Clark seems unduly concerned with the inevitable limitations of such a compendium — the uneven coverage of the subject, a degree of overlap and, indeed, some contradiction. But these characteristics follow from bringing specialists together and should be seen positively, in fact as the essence of an account of 'advances' in research. The book will be of most value to those keeping abreast of the subject; in any case, the price of £70.00 militates against the book as a general or classroom text.

In Part 1 J-P. Lautridou gives a sound precise account of experiments on cryogenic weathering. Priesnitz writing

on 'Cryoplanation' is more traditionally geomorphological, as is Thorn on 'Nivation'. 'Rock glaciers' is a review, with a lengthy bibliography, by Barsch. Questions of sedimentology are considered by DeWolf. The eclectic nature of the book is already apparent.

In Part 2, 'Frozen ground and active layer processes', Harry writes well on 'Ground Ice and permafrost', French on 'Active layer processes' and Vandenberghe on 'Cryoturbations'. Harry, and French, deal to some extent with the geotechnical and process (physical science) questions. These aspects have the greatest practical significance and these authors could well have written more. While the near-total absence of even simple equations may make the book superficially attractive, it reflects the continuing all-too-frequent absence of the necessary scientific rigour in periglacial studies.

'Seasonal frost mounds' (Pollard), 'Earth hummocks (thufur)' by Schunke and Zoltai, 'Palsas and related forms' (Seppälä) are placed with a review of pingos (by Pissart) and of pingo scars (de Gans) to make up Part 3: Process and form — the example of frost mounds' (do we really call pingos 'frost mounds?').

The final group of papers, 'Perspectives on the Periglacial System' has 'Slope processes' by Lewkowitz, Harris on 'The alpine periglacial zone', and two papers which are somewhat philosophical and about periglacial topics rather than on them. Perhaps both authors thought they were writing 'concluding' comments for the volume. If so, they should have mentioned pressing issues such as the effects of climate change in the periglacial regions, or the application of materials science to frozen soil behaviour. A broader vision in selection of topics might, after all, have improved this useful volume. (P. J. Williams, Carleton University, Ottawa, Canada)

BRIEF REVIEWS

ICELAND: VOLCANOES: GLACIERS, GEYSERS. Münzer, U. 1985. Luzern, Atlantis Verlag. 182 p, illustrated, hard cover. ISBN 095-148-38-03. £27.50.

Published originally in Germany, translated by Ellen Sallet, now available through a UK distributor, this is a most elegant illustrated account of Iceland's geography and structural geomorphology. The text is clear and intelligent, outlining the history and social background of the people and giving a detailed account of the glaciers and volcanic areas. The pictures include stunning aerial photographs, satellite images and occasional down-to-earth photographs of remarkable quality. Available from Cordee3a De Montfort Street, Leicester LE1 7HD: add £2.50 for surface mailing.

WHEN THE WHALERS WERE UP NORTH. Eber, D. H. 1989. Kingston, McGill, Queen's University Press. 187 p, illustrated, hard cover. ISBN 0-7735-0702-7. £26.95.

Subtitled 'Inuit memories from the Eastern Arctic', this is an account of late 19th and early 20th century commercial

whaling, by Inuit who became involved with the UK and US whalers operating off Baffin Island, Cumberland Sound and Hudson Bay, accurately billed as '... a story drawn from oral memories ... which will soon disappear with the last Inuit generation to have seen the whalers.' A fascinating mix of history, folk-lore and gossip, well illustrated with contemporary photographs and Inuit prints.

HYDROLOGY OF ICE CAPS IN VOLCANIC REGIONS. Björnsson, H. 1988. Reykjavik Societas Scientiarum Islandica, University of Iceland. 139 p, maps, illustrated, hard cover. ISSN 0376-2599.

Results of 15 years' studies of glaciology and hydrology on the Vatnajökull and Hofsjökull ice caps of Iceland, especially the drainage of water and ice from Icelandic glaciers, with emphasis on jökulhlaups from subglacial water reservoirs. The text includes a historical overview of Icelandic glaciology, and accounts of water drainage at the glacier bed, formation of subglacial reservoirs and locations of glacial lakes, the ice surface and bedrock topography of Hofsjökull and western and northeastern Vatnajökull, delineation of ice catchment basins, the triggering of jökulhlaups, the mass balance of Grímsvötn basin, and the estimation of area and location of other water-drainage basins from bedrock and surface topography, with a summary and conclusions. 21 maps are boxed separately.

ANTARCTIC CENOZOIC HISTORY FROM THE CIROS-1 DRILLHOLE, McMURDO SOUND. Barrett, P. J. (editor). 1989. Wellington, DSIR Publishing. (*DSIR Bulletin* 245). 254 p, illustrated, soft cover. ISSN 0077-961X. NZ\$29.95.

Presenting results of a wide range of studies on core material from a hole drilled between 16 October and 14 November in the Transantarctic Mountains of Victoria Land, Antarctica. Individual sections include papers covering scene-setting geophysical surveys, data from the down-hole logs and from seismic reflection surveys, basic stratigraphy, sedimentology studies, palaeontology, strontium isotope ages, palaeomagnetic stratigraphy, petrology and geochemistry, organic chemistry, biostratigraphy and chronology, and a synthesis by the editor and associates. The core material represents sediments accumulating from 36 to 34.5 Ma and 30.5 to about 22 Ma in a shore environment and a regime of temperate glaciation.

THE TRAVELLERS: CANADA TO 1900. Waterston, E., Easterbrook, I., Katz, B and Scott, K. (editors). 1989. Guelph, University of Guelph. 321 p, illustrated, hard cover. ISBN 0-88955-170-7. Can\$49.00.

Subtitled 'An annotated bibliography of works published in English from 1577', this focuses on travel books written about Canada, including a few of regional flavour. Over 700 are represented, in chronological order, starting with an account by Dionyse Settle of Frobisher's expedition to Greenland and eastern North America, and ending with William Barr's 1987 translation of Klutschak's classic