

Ocean was turned towards the whales. 'The tern and the whale' describes the birds in the title, but focuses on the whales, their behaviour, and their migratory and reproductive cycles, all of which make fascinating reading. Hypotheses of animal navigation are discussed, although no conclusions are drawn; there are some amazing records quoted, such as the sei whale that swam 3550 kilometres in 10 days. Then the whaling industry is exposed in 'The passing of the leviathans,' bringing the history up to date. The author evidently disapproves of the industry, describing the whaling stations on South Georgia as 'these ghost settlements are themselves vandalous acts on a pristine landscape, graffiti left by an industry of such rapacity that it extirpated its prey and extinguished its own fires' (page 229). The final chapter, 'The tempest,' describes the last days on the station, sitting out bad weather while waiting for the relief ship to arrive. Here the author also mentions other matters that have escaped discussion: ozone depletion, the Antarctic Treaty, and the nuclear reactor at McMurdo Station. The journey ends in Punta Arenas and a night camped in a beech copse at the foot of the Torres del Paine.

The dust jacket of the book proudly proclaims that this is the 'Winner of a Houghton Mifflin Literary Fellowship Award' and continues on the flap, '*The crystal desert* is not only the most eloquent book ever written about Antarctica but one of the best portraits of a place ever published.' Such blatant self-serving propaganda by the publisher is guaranteed to raise this reviewer's hackles at the outset; who has ever read all the published books about Antarctica to be able to make such a statement, let alone all the world's travel books? Despite starting to read in a very negative frame of mind, I quickly came to appreciate the reasons for these comments. This is a wonderfully written book with an intricately woven thread that keeps the reader enthralled and thirsting for more. It is a beautiful description of a unique part of the planet, and I began to find sympathy with the publisher's puff, although I still regard it as excessive. Nevertheless, I would recommend the book to anyone wishing to read a description of the Antarctic. Memories of Admiralty Bay came flooding back to me as I recognized individual features described by the author; I could see it all again in my mind's eye. But I wonder how accurate a picture the general reader will paint in his mind's eye, because the book contains not a single illustration; perhaps it will not matter that his picture is inaccurate, enjoyment of the pen picture may be more important. There are, inevitably, some errors: Shackleton's party was on Elephant Island in 1916, not 1918, and he sailed to South Georgia, not South Georgia Island; 35 million chinstrap penguins is almost certainly a gross over-estimate. Such errors are irritating because they are avoidable, but they should not detract from the overall enjoyment of the book.

This book is an excellent addition to the literature on Antarctica and should be on every explorer's shelves. However, the armchair-explorer may like to have one of the many good photographic essays on Antarctica to hand

to provide a visual reference frame. (P.D. Clarkson, Scientific Committee on Antarctic Research, Scott Polar Research Institute, Lensfield Road, Cambridge CB2 1ER.)

CLIMATE MODES OF THE PHANEROZOIC. L.A. Frakes, J.E. Francis, and J.I. Syktus. 1992. Cambridge: Cambridge University Press. xi + 274 p, illustrated, hard cover. ISBN 0-521-36627-5. £40.00.

In recent years concern over climate change as a result of anthropogenic release of greenhouse gases has led to increased interest in the mechanisms and geological history of climate change. Indeed, the study of palaeoclimatology has proliferated as a result of renewed interest by earth scientists and funding councils alike. This book provides a much needed review of the climatic history of the Earth during the last 600 million years, and discusses possible mechanisms of global climate change.

Based on the available data, the authors divide the Phanerozoic into alternating cool and warm modes. Four warm modes are recognised: 1. Early Cambrian to Late Ordovician, 2. Late Silurian to Early Carboniferous, 3. Late Permian to Middle Jurassic, and 4. Late Cretaceous to Early Tertiary. These warm modes alternate with five cool modes: 1. Late Ordovician to Early Silurian, 2. Early Carboniferous to Late Permian, 3. Middle Jurassic to Early Cretaceous, 4. Early Eocene to Late Miocene, and 5. Late Miocene to Holocene. The evidence for each warm or cool mode is covered in individual chapters. The amount of available information and consequent chapter length are directly related to geological age, with considerably more detail available for the Late Mesozoic and Tertiary than for the Palaeozoic. Some of the climatic interpretations are widely accepted (such as the Early Carboniferous–Permian glaciation), whilst others are more controversial (for example, the cool mode during the Middle Jurassic to Early Cretaceous). The final chapter of the book considers the causes and chronology of climate change. In particular, the chapter focuses on the importance of atmospheric CO₂ levels as a control on global climate, and considers the significance of the carbon isotope record for palaeoclimatic studies.

Although this book reviews the evidence for climate change, it is a very personal view of the available data, and some aspects will prove to be controversial for a long time. The authors are inconsistent with their acceptance of certain techniques. For example, stable isotope data and calculated palaeotemperatures are apparently accepted for the Ordovician–Silurian cool mode (chapter 3, page 21), yet in chapter 4 the reader is told that the estimation of palaeotemperatures from oxygen isotopes is an unsatisfactory technique for the Palaeozoic! Commonly the authors quote palaeotemperature values calculated from oxygen isotope data rather than quoting the actual oxygen isotope values, or provide a mix of both temperatures and isotope data. As the calculated palaeotemperature values are dependent upon assumptions made about the original water composition, and, indeed, which equation was used, it would have been considerably more useful to the reader

to have quoted the isotope data, and discussed trends in the isotope data with time.

One of the most controversial topics covered in the book is the interpretation of a cool mode in the Middle Jurassic to the Early Cretaceous, with the development of periglacial conditions with seasonal winter ice at high palaeolatitude sites. However, direct evidence for glaciation depends upon the interpretation by the authors of mudstone sequences with dispersed coarse clasts representing ice transport. As this is controversial, more detailed documentation and description of these sediments would have allowed the readers to examine the evidence for themselves.

Despite these criticisms, this is a useful addition to the literature on palaeoclimatology. Earth scientists working on any aspect of Phanerozoic climate will find it to be of value for three reasons: 1. it provides a broad framework within which to view one's own work, 2. it is a useful source of ideas to stimulate new research, and 3. it is an invaluable reference source, with nearly 900 references listed, of which more than 50% have been published since 1984. The book is well produced with few typographic errors, and at £40.00 is probably affordable by most libraries and individual research workers. Whether you agree with the authors or not, this book will probably become an essential reference for anyone trying to unravel part of the Earth's climatic history. (Duncan Pirrie, Camborne School of Mines, Trevenon, Pool, Redruth, Cornwall TR15 3SE.)

THE VARANGER SAAMI: HABITATION AND ECONOMY A.D. 1200–1900. Knut Odner. 1992. Oslo: Scandinavian University Press; Oxford: Oxford University Press. vii + 320 p, illustrated, hard cover. ISBN 82-00-21285-8. £27.50.

Knut Odner is a researcher who combines interests in archaeology and social anthropology, and who should also be called an ethnohistorian. All three approaches are mirrored in this fine monograph. The core of his data is from fieldwork totalling five to six months, conducted between 1981 and 1986 among the Saami of Varanger Fjord, Finnmark. He describes his work as 'an archaeological survey,' but there has also been intensive analysis of available documentary sources, touching on resources and their exploitation, settlement patterns, and social organization. One might regret that much of the sociological material might have been supported by personal observations of these phenomena — he tends to take the observations of his predecessors somewhat uncritically, although these refer to material from the past, which was often collected with a different intellectual frame of reference.

Odner also engages in a certain amount of 'shadow-boxing' with the trendier post-modernist anthropology that will, I believe, date rather rapidly, but the body of his material is firmly empirical. As a researcher with some identical interests, it is refreshing to find the 'new archaeology' being incorporated into anthropological discussion of the Saami.

His argument is complex, but a couple of items can be examined. He shows that the pre-1600 Coast Saami society was not merely a hunting economy, as frequently asserted, but was accompanied by the domestication of sheep, goats, and cows. The extent of this diversification is not certain, but it must have had consequences within the household, reducing the transhumance for women. Thus, in the seventeenth century, some Saami were sedentary, whilst others migrated. Moreover, yet other Saami engaged in sea-fishing. As in an earlier book, Odner is somewhat inclined to detect ethnicity as a distinctive variable at a time when there is no documentary evidence available, and when, perhaps, it was less significant than the strictly economic differentiation. This will no doubt be debated; Odner certainly gives some excellent data for such a discussion. (Ian Whitaker, Department of Anthropology, Simon Fraser University, Burnaby, British Columbia V5A 1S6, Canada.)

THE REAL PEOPLE AND THE CHILDREN OF THUNDER: THE YUP'IK ESKIMO ENCOUNTER WITH MORAVIAN MISSIONARIES JOHN AND EDITH KILBUCK. Ann Fienup-Riordan. 1991. Norman, Oklahoma and London: University of Oklahoma Press. x + 420 p, illustrated, hard cover. ISBN 0-8061-2329-X. US\$35.00.

John Kilbuck was born in 1861. His education was directed by Moravians from primary school through theological seminary, and, in 1884, he became the first Delaware Indian to receive ordination into the Moravian Church. He and his wife Edith lived and worked among the Yup'ik peoples in southwest Alaska for the better part of 40 years, representing first the Moravian Church and subsequently the United States government, almost without a break between 1885 and 1922. The Kilbucks were thus undeniably agents of powerful institutions that defined (and continue to define) the nature of social relations quite differently from much contemporary Yup'ik ideology and practice. While admiring much about the Yup'it, the Kilbucks thought of them primarily as errant children and *set about to bring them into the fold, not only of Christianity but also of capitalist society.* Their job was that of most missionaries of the time, although carried out with perhaps a good deal more sympathy and respect for the people with whom they worked than was demonstrated by many of their contemporaries.

Working primarily from letters and journal entries written by the couple, Fienup-Riordan examines this period of intense Yup'ik/Euro-American interaction. It is her intention to challenge and redefine a number of assumptions prevalent in many descriptions of the missionising process — assumptions that tend to canonise the missionary project as 'civilising' or to demonise it as the source of cultural imperialism and, ultimately, the destruction of the other. Both positions tend to assume that the effects of these interactions are determined by the external institutions and deny the agency of the missionised. Neither incorporates an understanding of points of possible conjunction between the local and global institutions,