

the South Pole. Little need be said here about Nansen or Amundsen — the greatest mind and the greatest technician, respectively, in the history of polar exploration — but it is certainly satisfying to see Sverdrup receive his due. Not only was he a member of Nansen's first crossing of Greenland and the captain of *Fram* on its polar drift, but under his leadership the second *Fram* expedition discovered and charted some 200,000 km², more land than any other polar expedition before or after.

The book then finishes with three chapters by Johansen on expeditions led by Thor Heyerdahl: the *Kon-Tiki* expedition from Peru to Polynesia on a balsawood raft, the *Ra* expeditions crossing the Atlantic Ocean on a reed boat, and the *Tigris* expedition through the Persian Gulf, the Indian Ocean, and the Red Sea. These chapters, obviously, have nothing to do with the polar regions, but they are fascinating, and make entertaining reading.

Norwegian maritime explorers and expeditions charts some of the most innovative and exciting adventures in the history of exploration. Due to its brevity, it lacks the depth for which a historian in the field would look, but it serves as an excellent introduction to a wide range of expeditions covering a period of more than 1000 years. Indeed, the book has only one major flaw — by comparison to the three chapters dedicated to Thor Heyerdahl, the space allotted to Nansen and Amundsen is simply not adequate. There should be a chapter about Nansen's crossing of Greenland, one of the major events of late-nineteenth-century exploration. One could defend it not being included because it was not a maritime expedition, but then the same would be true of Amundsen's South Pole expedition, which is included. Similarly, Amundsen's successful navigation of the Northwest Passage, coming after three centuries of efforts to do just that, deserves its own story, rather than two paragraphs near the beginning of the South Pole chapter. Arguments could also be made for the inclusion of Amundsen's *Maud* expedition.

The overall presentation of the book is very pleasing. It has one or more maps for each chapter, and the reproduction of its many drawings and photographs — both black-and-white and colour — is outstanding. (T.R.D. Grade, History Department, Stanford University, Palo Alto, CA, USA.)

THE ANTARCTIC REGION: GEOLOGICAL EVOLUTION AND PROCESSES. C.A. Ricci (Editor). 1997. Siena: Terra Antarctica Publication. xii + 1206 p, illustrated, hard cover. ISBN 88-900221-0-8. 150,000 lire.

This book is the proceedings volume of the VIIth International Symposium on Antarctic Earth Sciences, held in Siena, Italy, 10–15 September 1995.

Professor Antonio C. Rocha-Campos (president of SCAR and a geologist) addressed the participants at the symposium and assured them that earth-science research in the Antarctic was alive and well, judging by the number of participants and the standard of the presentations. Indeed, the sheer size of the proceedings volume shows that the

subject is not just alive and well but positively flourishing, despite the funding difficulties faced by so many national programmes in the Antarctic.

More than 400 participants from 26 countries attended the symposium, providing more than 400 papers for oral and poster presentation. Of these, more than 200 were submitted for publication in the proceedings volume, which contains 162 papers accepted after peer review. The volume is divided into 11 chapters, reflecting the thematic sessions of the symposium, and each chapter has one or more associate editors, who have provided brief introductions.

Following the introduction by Carlo Alberto Ricci and an appreciation of Professor Felice Ippolito, the chapters are as follows:

1. Antarctica in the amalgamation of Gondwana (21 papers edited by S.L. Harley, B.J. Jensen, and J. Jacobs);
2. Tectonic evolution of the active margins of Gondwana and Antarctica (32 papers edited by T. Flötmann and R.A.J. Trouw);
3. Break-up processes—Jurassic to recent (28 papers edited by G. Leitchenkov and T.J. Wilson);
4. Southern Ocean evolution (14 papers edited by A. Giret and C.A. Raymond);
5. Climate change in Cenozoic records (five papers edited by G. Brancolini);
6. Onshore and offshore geological signatures of the last glacial cycle (13 papers edited by L.R. Bartek and Y. Yoshida);
7. Investigations in petrology, sedimentology, and glaciology (eight papers edited by C.H. Smith Siddoway);
8. Antarctic fossil biotas through time (nine papers edited by R.M. Feldmann and J.E. Francis);
9. Antarctic station geophysics (10 papers edited by K. Kaminuma and A. Meloni);
10. New directions in Antarctic earth sciences (nine papers edited by R.E. Bell and A. Morelli); and
11. Antarctic geoscientific maps (13 papers edited by J.W. Thomson).

Finally, there is an 'Author and keyword index' and a loose map inside the back cover.

The first three chapters constitute just over half of the volume and indicate the great interest in understanding the evolution of Antarctica from earliest times and not just the fragmentation of Gondwana. Much of chapter 1 focuses on East Antarctica, where highly sophisticated analytical techniques have been used to look beyond the pan-African metamorphism to shed light on the earlier history of continental development. The complex South America–southern Africa–West Antarctica and Dronning Maud Land region is not neglected and includes a serious challenge to the SWEAT hypothesis. The greatest obstacle to the progress of geological research in East Antarctica is still the blanket of the ice sheet, but great advances are being made despite this handicap. Chapter 2 has two principal foci, the Transantarctic Mountains, representing the palaeo-

Pacific margin of East Antarctica, and West Antarctica, where most of the papers are concerned with the Antarctic Peninsula. Many of the papers provide additional evidence to support the generally accepted scheme, but a few look more broadly at New Zealand–Marie Byrd Land relationships. In chapter 3 new geophysical, structural, and geochemical data are used to present new insights on various aspects, including plume magmatism and its relation to Gondwana break-up processes. Together these demonstrate the growing complexity of the former, more simple models.

Papers on marine seismic and sedimentological studies constitute the bulk of chapter 4. The evolution of the ocean floor between South America and Antarctica and in the southeastern Pacific Ocean form the principal regional focus, with additional papers on Bransfield Strait and George VI Sound. Only one paper deals with the Australia–Antarctic region and a final paper proposes that Iles Kerguelen may constitute a third type of oceanic island.

Chapter 5, covering climate-change records, includes papers that discuss the Sirius Formation and the contentious issue of possible deglaciation during the Cenozoic based on the presence of diatoms that may or may not be of wind-blown derivation. Another paper contests this hypothesis, and the arguments are likely to continue for some time. Chapter 6 is concerned only with the last glacial cycle and contains detailed micro-palaeontological analyses from lakes onshore and from sediment cores on the continental shelf offshore. Other papers examine glacial fluctuations recorded in outcrop geomorphology, demonstrating the wide ranges of techniques that can be used. Chapter 7 is an eclectic mix of papers that did not fit easily into other chapters in the volume.

The palaeontological papers in chapter 8 show, amongst other things, the changing climate of Antarctica from the Permian to the present and how plant life flourished close to the Pole during warm climates and was able to cope with the seasonal extremes of solar radiation, an environment that is absent on Earth today. There are also reports of new ungulate species from the Eocene of the northern Antarctic Peninsula.

Chapter 9, on station geophysics, includes descriptions of station facilities as well as research studies, particularly in seismology. There are three papers on volcanic studies at Deception Island and Mount Melbourne, including the relationship between fumarolic gas composition and seismic activity. The section on new directions (chapter 10) deals mainly with the application of new techniques to earth-science research in Antarctica. Various types of remote-sensing from satellites, as well as aeromagnetism from aircraft, are covered. There is also a paper on beryllium isotope analysis to determine exposure ages of rocks, which has significance for the age of the Dry Valleys in Victoria Land.

Chapter 11 is a set of selected extended abstracts describing the geoscientific maps that formed a permanent exhibition during the symposium. An interesting develop-

ment was that the majority of maps were produced digitally rather than by traditional cartographic techniques. Examples range from conventional geological maps to those with specific themes, such as tectonics, geomorphology, geopetrography, and aeromagnetism.

Serious criticisms are few, but an annoyance to this reviewer is the occasional inclusion of references in some abstracts. In some places there appear to be a few words or even a line or two missing from the text, but these are minor complaints. This volume represents a magnificent editorial effort and at 3.65 kg it is not light reading. On the contrary, it contains a wealth of information and demonstrates very clearly the breadth and depth of current earth-science research in the Antarctic; there is something in it for everyone. No library with a clientele of Antarctic geologists should be without a copy, and at 150,000 lire (about £47) it is astonishingly good value by today's standards, although still pricey for many students. The message has to be that if you want a copy of a proceedings volume these days, make sure you present a paper at the symposium. (Peter D. Clarkson, Scientific Committee on Antarctic Research, Scott Polar Research Institute, University of Cambridge, Lensfield Road, Cambridge CB2 1ER.)

ACROSS ARCTIC AMERICA: NARRATIVE OF THE FIFTH THULE EXPEDITION. Knud Rasmussen. 1999. Fairbanks: University of Alaska Press. xl + 415 p, illustrated, soft cover. ISBN 0-912006-94-3. \$US24.95.

On a cold day in 1923, Knud Rasmussen stopped his sledge and 12-strong dog team to rub some warmth into his frozen face. He had left his base at Danish Island, north of Southampton Island, some weeks before, and had been travelling deeper into the Canadian high Arctic. As he paused, he heard the unmistakable report of a gun being fired and glimpsed several figures on the horizon. Without considering whether the intentions of these people might be friendly or hostile, Rasmussen set his team hurtling across the hard-packed snow towards them. One of the strangers forged ahead of the others, but his unfamiliar clothes and smell sent Rasmussen's dogs into a frenzy. Rasmussen leapt from his sledge and 'embraced the stranger after the Eskimo fashion.'

This was a moment Rasmussen had yearned for all his life: a meeting with the 'Akilinermiut' or the 'men from behind the Great Sea,' of whom he had heard tales in his Greenland childhood, and a description of his first encounter with the Lyon Inlet people is how he chose to begin his remarkable book *Across Arctic America*. His excitement at the meeting, even several years after the event when he wrote his popular account of the Fifth Thule Expedition, leaps from the page, as does his evident love of the people with whom he chose to spend so much of his life. From the first, Rasmussen's vivid descriptions take the reader into a white world of villages and settlements where the inhabitants had seldom or never encountered western visitors. The journey from Greenland to the Pacific coast of America