

Research in Polar and Alpine Geomorphology 3rd Guelph Symposium on Geomorphology, 1973

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Arctic and Alpine Environments

Edited by Jack D. Ives and Roger G. Barry
Methuen, 999 pages, 1974.
 \$99.00.

Reviewed by J. R. Mackay
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Arctic and Alpine Environments is a beautifully produced 1000 page, 4½ pound book, scholarly written by 31 contributing authors, carefully edited, but priced at the staggering sum of \$99.00. The book "is aimed primarily at the senior undergraduate and graduate student in ecology, in its broadest sense, as well as professional colleagues in one or other specialist branch of the environmental sciences." The coverage is encyclopaedic, but not total, because some topics have been deliberately omitted by the editors. For example, the focus has been on terrestrial environments, so there is no discussion of the arctic marine environments. A summary of the contents will indicate the breadth of coverage. The volume commences with present environments (climate, including snow; hydrology; ice, including permafrost, arctic and alpine ice covers but no discussion of sea ice); past environments (palaeoclimatology; history of glaciation in both arctic and alpine areas); present biota (treeline; vegetation; terrestrial vertebrates); development of biota (historical plant geography; palaeoecology and palaeogeography); abiotic processes (geomorphic processes; soils); man in cold environments (bioclimatology; archaeology); and a concluding catch-all section on man's impact on the environment (radioecology; impact of twentieth-century technology on the environment at both large and small scales). The majority of the chapters were completed either in 1970 or 1971, in essence three years prior to publication. The chapter bibliographies are, in general, excellent and detailed. Many of the bibliographies, as separate from the textual material, have been updated to 1973 or even 1974.

The individual chapters vary a great deal in style and approach, but it is a tribute to the two editors and the contributing authors that those differences which do exist are an asset, rather than a detraction to the book. Some of the chapters are succinct treatments of a specific topic, such as "Arctic climate" by R. G. Barry and F. K. Hare, or "The geomorphic processes of the alpine environment" by N. Caine. Such chapters seem well suited to a senior undergraduate course or for the non-specialist reader. However, other chapters are more in the nature of extended review articles, examples being the thorough coverage by J. T. Andrews in "Cainozoic glaciations and crustal movements of the Arctic" or A. Love and D. Love in "Origin and evolution of the arctic and alpine floras." These chapters appear most suited for reference purposes, and will be consulted mainly by the professional reader. For the non-specialist, and this must include everyone for at least some portions of the book, there is an extended glossary which, though not complete, is very helpful.

The last section of the book, dealing with man's impact on the environment seems largely out of place. The section appears to have been designed to make the preceding sections environmentally relevant. In view of the rapid pace of environmental concern since 1971, when most chapters were completed, few people need to be convinced of the relevancy of such studies.

No book is ever perfect, and faults can be found when sought after, but the only strong reaction of this reviewer is to the price. The book, designed primarily for academic use, is priced beyond the reach of undergraduates, graduates, and most faculty. Even libraries will find acquisition of multiple copies for class use most difficult. It is no consolation to the Canadian resident that the book, printed in Great Britain, is considerably cheaper in the United States. There are no foreseeable plans for the book to be produced in paperback form. *Arctic and Alpine Environments* will be read and enjoyed by only a small portion of the potential audience for which it was written - a pity.

MS received April 9, 1975.

Research in Polar and Alpine Geomorphology 3rd Guelph Symposium on Geomorphology, 1973

Edited by B. D. Fahey and R. D. Thomson
Geo Abstracts Ltd., 206 p., 1973.
 \$10.00.

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"Thus generations of young scholars are being misled, confused or simply misinformed by what might best be described as a form of scientific inertia - the time lag between the development of new ideas by the active research group involved and the presentation of the new material by teachers in the colleges and lower division of the universities." Presumably, symposia are held to offset these problems as identified by Dr. J. D. Ives in his opening address to the 3rd Guelph Symposium. However, this symposium like most symposia suffers from a need to insure a critical minimal number of speakers, a need to have representatives from important institutions and, if possible, speakers who are at the forefront of current research in the field. Obviously, the best that can be realistically expected is a proper balance between these various elements. Thus, a good symposium is one at which a few very good papers are presented along with a series of review articles. Review articles may be extremely valuable if they provide new synthesis but this also is a rare occurrence.

This paperback on Research in Polar and Alpine Geomorphology results from a typical symposium. The paper which most impressed this reviewer (who will readily admit to being biased) is the one by V. N. Rampton on "The influence of ground ice and thermokarst upon the geomorphology of the Mackenzie-Beaufort region". It is a well structured, well illustrated, well written paper which brings together a great deal of knowledge into a geomorphological model which, at long last incorporates discreet features within a general evolutionary framework. For this paper alone, the book would be worth

acquiring. Several other papers, although less substantive than Rampton's are valuable because they are good reviews. This is the case with D. E. Kerfoot's "Thermokarst features produced by Man-Made Disturbances to the Tundra Terrain" a good case study which can be usefully compared to a more recent study by H. M. French published in the *Canadian Journal of Earth Sciences* v. 12, no. 2, 1975, p. 132 - 144. The paper by McCann and Cogley on fluvial activity at high latitudes is well documented and well illustrated. It should go a long way towards insuring that the importance of fluvial processes in periglacial areas is adequately evaluated. This is certainly not the case in presently available textbooks.

These papers along with others dealing with frost action, ground ice, permafrost, talus slopes, avalanches, glaciers, till and moraine formation will maintain the now well established reputation of the Guelph Symposium on Geomorphology series.

MS received April 24, 1975

Evolution and Diagenesis of Quaternary Carbonate Sequences, Shark Bay, Western Australia

By Brian W. Logan, James F. Read, Gregory M. Hagan, Paul Hoffman, Raymond G. Brown, Peter J. Woods, and Conrad Gebelein.

American Association of Petroleum Geologists Memoir 22, 358 p., 1974.
AAPG and SEPM members \$32.00;
others \$40.00.

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This well-illustrated memoir contains seven separate papers detailing various aspects of the continuing investigation of Shark Bay, a preliminary account of which appeared as AAPG Memoir 13 (1970). Much detailed work has gone into the project, directed by Brian Logan, and each paper contains a wealth of descriptive and interpretive information useful in the analysis of modern and ancient carbonate sequences.

Shark Bay, about 13,000 Km² in area, is situated in an arid climatic zone and has a variety of carbonate depositional environments, largely controlled by bathymetry, salinity, tides and wind, restricted inlets and sedimentary sills. The climatic aridity leads to the development of hypersalinity in the bay and in the interstitial waters and results in a diagenetically active regime. All this is reflected in the diversity of topics covered, which include accounts of the formation of carbonate banks and platforms, development of supratidal flats, discussion of diagenetic alterations within the sediments and upon their subaerial surface, and a detailed account of algal mat development.

The stromatolites of Shark Bay have been discussed for over a decade but I found the account of algal mats and associated structures particularly illuminating. The development of seven basic types of mat and the distinctive sediment fabrics that they produce are clearly portrayed. These fabrics can then be used to interpret vertical sequences of sediment by relating them

to the mat position with respect to sea level, and are shown to present excellent analogies to Proterozoic stromatolites near Great Slave Lake, N.W.T. Canada.

Considerable emphasis is placed upon vertical sequences of sediment as well as lateral distribution and on the geometry of the sedimentary bodies. This three-dimensional approach greatly helps in visualizing similarities to ancient limestone units.

The memoir should be of great value to geologists concerned with problems of modern carbonate sedimentation and diagenesis, as well as to those involved in the interpretation of ancient depositional environments. I enjoyed reading this book, and it is a pity that the price is such to undoubtedly limit its sale.

MS received May 16, 1975