

important, they have provided a substantive comparison of three northern development situations: by reviewing the effectiveness of management in Scotland (mostly the Shetland Islands) and Alaska (the North Slope), they make recommendations for the future management of Canada's Beaufort Sea–Mackenzie delta region. This seems a viable application of northern development experiences at a regional planning level.

The process of development is well covered in the report, with emphasis on environmental rather than social planning and impact control. Interests, events, and legislation are described. Management strategies and development conditions are outlined for all three areas, including a point-by-point assessment of the effectiveness of management in Shetland. Appended to the report is the authors' Beaufort Sea questionnaire, developed from the management assessment model, and the Canadian Arctic Resources Committee's response to it.

From the Alaskan and Scottish experiences, the authors note that regional governments are most effective in protecting regional interests, and thus should be deeply and vigorously involved in development planning and management. In this respect the Alaskan coastal zone planning process and the onshore planning policies of the Shetland Islands Council are important models for the development of the Beaufort Sea–Mackenzie delta region. Land ownership and strong local government are seen as fundamental to effective regional planning, so that national governments and business interests work within a system which looks after local interests.

Development in northern regions is so dynamic that any published report will be a little outdated. In Shetland, for instance, the recent completion of the Sullom Voe terminal has led to unemployment, and the new 'welfare state' has come in for some criticism. In Alaska, praiseworthy baseline monitoring and planning programmes are to be reduced or eliminated by cuts in federal spending, at a time of proposed accelerated exploration and development of the continental margin. Meanwhile in Canada, the boom of interest in Newfoundland's offshore oil resources has been strongly influenced and controlled by an assertive regional government, providing a particularly good model for planning in the Beaufort–Mackenzie region.

Though necessarily broad and brief, this report provides important background information for, and constructive suggestions for improvement of, the Beaufort–Mackenzie planning process. Just as offshore drilling technologies can be shifted and modified for use in northern areas, the authors prove that development management strategies can be transferred and adapted among northern peoples and governments.

## EVIDENCE FOR PRE-PLEISTOCENE GLACIATION

[Review by Peter Friend\* of *Earth's pre-Pleistocene glacial record*, edited and collated by M. J. Hambrey and W. B. Harland. Cambridge, Cambridge University Press, 1981, xv, 1 004 p, illus. Hardcover £98.00.]

The object of preparing this book was to assemble the geological evidence for early periods of glaciation in the earth's history. The early periods are those before the beginning (two million years ago) of the Pleistocene period, when the major glaciation that is still with us, reached its climax. The sorts of evidence involved are the occurrences in certain ancient sedimentary rocks of local features, like pebbles in characteristic settings, that are considered to indicate glacial processes of sedimentation.

The book is a remarkable 'data bank', rather than a book to be read from cover to cover. It results from contributions by an international group of more than 170 authors, organized by an international committee. But its completion is due to the vision and drive of one man (W. B. Harland), and the editorial devotion and stamina of another (M. J. Hambrey). So diverse and complex is the information available on each of the many localities at which evidence for early glaciation has been discovered, that it was decided to assemble the information in a standard way, using a carefully designed questionnaire. Most of the book consists of individual articles, over 200 in number, each describing a locality, under standard headings and well illustrated with maps.

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An archive of this sort has achieved its main object when it is published and becomes available to the world of learning, in this case through libraries. A clear regional layout of all the various contributions, full contents lists, indexes and index maps makes navigation through the thousand pages easy.

Apart from providing a wealth of local information, this book clears the ground for considerations of great general scientific interest, and there is some hint from the editors of future publications of a more generalized kind. One major question appears to be answered by this book: how substantial is the evidence for pre-Pleistocene glaciation? Until now, many scientists have expressed doubts about the reality of early glaciations, but they will be hard pressed to maintain total scepticism in the face of this compilation.

A second question can next be asked, and will be much easier to approach with the use of this book: does the pattern of global glaciation in space and time teach us anything about the reason for glaciation? Precision in dating the local evidences for glaciation is obviously critical in considering this question, and in this project much care has been given to establishing global standards, including the publication of a new geological time-scale incorporating new radiometric and stratigraphic data. The original position on the earth's surface of each piece of local evidence is also a matter for analysis, and the reader is provided with a statement of the available palaeomagnetic evidence in each case for the original latitudes. However the series of world maps for the main stratigraphic intervals that is provided, uses present-day land distribution and therefore postpones the job of interpreting the contemporary (different) distribution patterns.

This book is a first-rate contribution to science and should surely demonstrate the fallacy of the common scientific opinion that 'compilation is not research'.

## In Brief

### GREENLAND TO LEAVE THE EEC

Within three years of gaining home rule from Denmark in 1979, the people of Greenland voted in a referendum on 23 February 1982 to sever one more link with Europe by departing from the European Economic Community (EEC).

The poll, in which 75 per cent of the country's 32 000 electorate took part, resulted in a 52 per cent vote in favour of leaving the EEC, against a 46 per cent pro-EEC vote. Although the referendum was only consultative, the result will almost certainly lead to Greenland's departure from the EEC by 1985. The country was never a willing member of the EEC from the outset: it was obliged to join as a province of Denmark in 1973, in spite of a 70 per cent anti-EEC vote in a referendum held on the island at that time.

Greenland's decision was generally regretted by political leaders in Denmark, who still retain some control over the island's foreign relations. However, the Danish Prime Minister, Mr Anker Joergensen, confirmed that 'we are prepared to help the island in negotiations for a withdrawal from the EEC if that is the final decision the Greenland local parliament reaches'. There is little doubt that the local parliament will reach just such a decision: the ruling left-wing anti-EEC Siumut party holds 13 of the 21 seats in the Greenland Assembly.

Economically, Greenland can only lose from leaving the EEC. Combined regional, social and agricultural aid is currently about 185m kroner (£12.5m) and the European Investment Bank has granted Greenland 383m kroner in loans since 1973. Nor do Danish officials expect a warm reception in Brussels for any attempt by Greenland to gain associate status with the EEC, as is enjoyed by some French, British and Dutch overseas territories. But the voters' decision does not so much reflect economic considerations as the Greenlanders' growing sense of separate national identity, a feeling of estrangement from the distant continent of Europe, and a preference for developing closer ties with other Inuit communities in North America. They will also continue to maintain close economic ties with Denmark, which currently provides 1 800m kroner in aid per year. (*The Times*, 25 February 1982.)