

hope of a solution. But any solution is as likely to be the result of economic pressures as a desire by fishery managers and the wider fish-buying public to put the conservation of petrels ahead of fish on the dinner plate. I cannot improve on John Warham's closing sentence: 'The target animals, tuna, albacore, swordfish, etc. are so valuable that, as with whales, the stocks may have to be considerably depleted before the fishery becomes uneconomic, by which time the birds may have been even more depleted.' (M. de L. Brooke, Department of Zoology, University of Cambridge, Downing Street, Cambridge CB2 3EJ.)

**GLACIAL GEOLOGY: ICE SHEETS AND LANDFORMS.** Matthew R. Bennett and Neil F. Glasser. 1996. Chichester, New York, Brisbane, Toronto, Singapore: John Wiley. xi + 364 p, illustrated, soft cover. ISBN 0-471-96345-3. £19.99.

Those interested in glacial geology and geomorphology were for a long time served by only one dedicated text, David Drewry's *Glacial geologic processes* (1986). Furthermore, the mathematical approach of this text did not suit all readers. However, two new texts have lately been published in this field: *Glacial environments*, by Michael Hambrey (1994), and, now, *Glacial geology: ice sheets and landforms*.

In their preface, the authors state that the text arises from their enthusiasm for glacial geology and a perceived need for a student text with which to stimulate this enthusiasm in others; their aim is to provide an accessible account of glacial geology at the undergraduate level. The authors have indeed produced a text that both undergraduates and their teachers will find a useful learning and teaching resource. However, it is also likely that this text will continue to be useful for reference at postgraduate level and beyond.

Early chapters provide a glacier dynamics context: 'The history of ice on Earth,' 'Mass balance and the mechanism of ice flow,' and 'Glacial meltwater.' The main part of the text is concerned with the processes and products of glacial erosion and deposition: 'The processes of glacial erosion,' 'Landforms of glacial erosion,' 'Glacial debris transport,' 'Glacial sedimentation on land,' 'Landforms of glacial deposition on land,' 'Glacial sedimentation in water,' and 'Landforms of glacial deposition in water.' The emphasis is on the interpretation of glacial landforms and sediments for former ice dynamics. The final chapter, 'Interpreting glacial landscapes,' synthesises information on the processes and products of glacial erosion and deposition from previous chapters to deal with the pattern of landform-sediment distribution produced at the ice-sheet scale.

The text is attractively presented and, as might be expected, profusely illustrated with diagrams and black-and-white photographs. The examples given partly reflect the authors' field experience in Argentina, Great Britain, Greenland, Iceland, and Svalbard, although examples from other parts of the world are also cited. The writing style is clear and non-mathematical. A novel and useful feature is

the use of discrete information 'boxes' providing concise stand-alone information on key topics, such as glacial history and the oxygen isotope record, the structure of glaciers, grain-size distributions and transport distances, eskers and sub-glacial deformation, and the measurement and analysis of till fabric.

A feature of this text is the presentation of material in summary form, which enhances the value of the text for reference at all levels. Concise tables at the ends of chapters on 'Landforms of glacial erosion,' 'Landforms of glacial deposition on land,' and 'Landforms of glacial deposition in water' summarise the morphology of the principal erosive, direct depositional, glaciofluvial, glaciolacustrine, and glaciomarine landforms and their significance for glacier reconstructions. For instance, p-forms are described as smooth-walled, 'sculpted' depressions and channels cut into bedrock, indicative of warm-based ice, abundant meltwater, and low effective normal pressures, and typical of thin ice; flutes are described as low, linear sediment ridges formed in the lee of boulders or bedrock obstacles, indicative of local ice-flow directions, thin ice, and the presence of warm-based ice; and plough marks are described as linear furrows or depressions on the seabed, indicative of iceberg grounding. Another good example from the chapter 'Glacial sedimentation on land' is a table summarising diagnostic criteria for the recognition of common diamicton lithofacies in the field, which is followed with examples of facies models with typical vertical logs for different glacier thermal regimes. The same chapter also provides a great deal of detail on the various till types, and additional material on fluvial sedimentation, and includes a table summarising the principal sedimentary characteristics of the main types of till (described as lodgement, sub/supraglacial melt-out, deformation, flow, and sublimation) in terms of particle shape, size, fabric, packing, lithology, and structure.

It is difficult to identify significant shortcomings in this text. Neither of the chapters on 'Glacial meltwater' nor on 'Glacial debris transport' consider fluvial sediment transport, such as suspended sediment or bedload: readers seeking up-to-date material on this subject could refer to the *Annals of Glaciology* proceedings of the Reykjavik symposium on glacial erosion and sedimentation (volume 22). Given the unavoidable profusion of terminology, a glossary might have been helpful, but several summary tables to some extent serve this purpose and the index is comprehensive. There are a small number of typographic errors, the most obvious of which is the substitution of the prefix 'austra' for 'Austre' in Norwegian glacier names.

Inevitably, comparisons will be made between this text and Hambrey's. At 364 pages, Bennett and Glasser's text is longer than Hambrey's (296 pages), but both provide useful and stimulating treatments of glacial geology, and neither is clearly better nor worse than the other. There are some differences in emphasis: Bennett and Glasser tend to emphasise landforms and the results of ice-sheet modelling, whereas Hambrey tends to emphasise the description of sedimentary facies and marine environments, although

there is naturally much common ground. The two texts are probably best viewed as complementary, each providing comprehensive views of a field in which the necessarily meticulous description, classification, and interpretation of field evidence benefit from the widest appreciation of the variety of glacial environments. In this respect, the use of numerous Alaskan examples in Hambrey's book is a useful complement to the largely Scandinavian examples of Bennett and Glasser.

In summary, the authors have achieved their aim of producing a concise, accessible text that conveys their own enthusiasm for the subject, and it should be recommended to all who have an interest in learning about, teaching, or researching in glacial geology. (Richard Hodgkins, Department of Geography, University of Bristol, Bristol BS8 1SS.)

**I MAY BE SOME TIME: ICE AND THE ENGLISH IMAGINATION.** Francis Spufford. 1996. London: Faber & Faber. 372 p, illustrated, hard cover. ISBN 0-571-14487-X. £15.99.

The English polar explorers of the first part of the present century had a supreme capacity for understatement and unintentional irony. Robert Falcon Scott recorded that the Antarctic continent was a place that: 'comes nearer to satisfying my ideal of perfection than any condition I have ever experienced...No words of mine can convey the impressiveness of this wonderful panorama displayed to my eye.' Yet, the stated attitudes of the members of the Scott expedition towards the Antarctic interior were often quite ambivalent. The Antarctic was not only a desolate and foreboding space, it was also intensely poetic and beautiful. Positive images of nature could be combined with an appreciation of the harsh charms of the polar world: the long polar nights, the changing rhythms of light and darkness, and the dangerous polar blizzard.

The cultural and ideological significance of polar exploration is the subject matter of Francis Spufford's *I may be some time*. The poles did undoubtedly fire the imaginations of English polar explorers and administrators. As with their European and Soviet counterparts, the poles, as the literal and figurative ends of the Earth, were often considered remote, inaccessible, unattainable, and, therefore, as worthy adversaries. Within English public culture, the subsequent conquest of the poles was considered indicative of industrial progress and modernity, technological prowess, masculine endeavour, scientific curiosity, national prestige, and humankind's mastery over the natural world. However, the English record on polar exploration was undoubtedly mixed, as explorers either implanted the British flag on the polar wastes and claimed everything they could see for Great Britain or died somewhere en route. The members of the former group were often uncertain of their geographical position, whilst those of the latter group later became immortalised. Thus, the failure of the Scott expedition was to be of lasting cultural significance within England, judging by the stream of

newspaper stories, works of fiction, state-sponsored memorials, and postage stamps generated in the aftermath.

However, Spufford's account of polar exploration is far more wide-ranging than just Scott's expeditions. It stretches from a discussion of the eighteenth century and the Burkean sublime to nineteenth-century popular English literature. Spufford's account, through the employment of generous quotations and extracts, touches upon the varied geographical imaginations of nineteenth-century polar writings. This does produce a paradoxical consequence, however. On the one hand, his account is rich and varied in terms of sources and contextual background, especially as it relates to the writings of Charles Dickens, Sir John Franklin, and Jane Austen. It is a potent mixture of historical scholarship and a form of literary criticism. There are many rich insights, such as noting the growing popularity of polar images and references within the urban landscape and the production of commemorative commodities such as pottery and cigarette cards. On the other hand, the writing style is long-winded and often tedious in relating key points. A more concise version of this book might have been more effective, had some of the details pertaining to the descriptions of the polar landscape or polar personalities been compressed. The descriptions of Clements Markham are classic in this respect, as the reader is bombarded with anecdotes and asides that ultimately detract from some interesting observations about either Markham's relationship with Scott or his dreams of imperial conquest and territorial aggrandisement.

The final pages of Spufford's account return to the ill-fated *Terra Nova* expedition and the last moments of Scott's party, in a tent somewhere on the polar ice. The poor planning of Scott, the arrogance of Clements Markham, and Oates' spirit of self-sacrifice are joined together for one last moment. The British Empire had acquired another dead hero. Visual technologies associated with the cinema and photographic journalism played their part in reproducing the thrills and perils of polar exploration for English audiences. The tragic failure of Scott was later to be used for another form of imperial incitement: this time for the troops fighting for king and country in the muddy fields of Flanders.

In spite of some reservations over the turgid writing style, this is an important book, and it one that is likely to have enduring significance. Within polar studies, there has been a tendency to be remarkably uncritical of polar exploration in terms of thinking about its importance in shaping public culture, ideas about nature, and national identity. A dominant, and largely whiggish, approach to the history of exploration has also prevented more critical appraisals of those expeditions and their ideological significance. Spufford has produced a book of considerable scholarship, which draws together many relevant sources. It is a pity, however, that the referencing is not more thorough, given the extensive quotations and inferences.

There are a number of key themes that Spufford could and probably should have addressed within this book. Whilst Spufford may not be aware of the growing aca-