BOOK REVIEWS

Flora of Tierra del Fuego by David M. Moore. Anthony Nelson, PO Box 9, Oswestry SY11 1BY, UK, and Missouri Botanical Garden, St Louis, USA, 1983. 404 pp. £68.

There are estimated to be over 225000 species of flowering plants in the world, the bulk of them being found in the tropics. Yet a survey of the published floras of the world would show the tropics to be poorly researched and the much less rich temperate zones to be well covered. More surprisingly, the sparsely populated polar and subpolar areas with their depauperate floras are also well described floristically. The addition of two new important volumes on southernmost South America – Moore's *Flora of Tierra del Fuego* and Dudley's (1983) account of the flora of Isla de los Estados, make this area, one of great phytogeographical interest, amongst the best described in South America.

Moore's flora is on a grand scale, beautifully illustrated with many line drawings by Natalie Goodall, Sydney Parkinson (artist on Captain Cook's first voyage) and the illustrators from *Flora Patagonica*. The use of three different artistic styles for the plant drawings is an unusual and aesthetically very pleasing feature. There are also eight colour plates and these seem poorly chosen. Four are devoted to community types and the remainder to plant portraits. Since all the species shown in the colour plates are also present as line drawings it would have been more useful to have devoted this space to showing other important community types, e.g. *Poa flabellata* grassland, *Fuchsia* shrub, 'Krumholz'. The general key to families, and individual keys to genera make identification of the 545 species, of which 128 are classed as aliens, fairly straightforward. The collecting and research that underpin this volume are based on 20 years of effort and interest and exhibit a thorough knowledge of the region and its literature.

There is a brief introductory section describing climate, topography, geology, soils and human colonization of the region. Twelve pages are devoted to general community descriptions and a summary of the geographical affinities of the flora. Clearly, Moore has made good use of the Argentinian and Chilean herbaria but has greatly supplemented their holdings by his own collecting trips. On his own admission, the work has relied very heavily on the field collecting and observations of Natalie Goodall. His history of botanical exploration of the area appears exhaustive and the appendices of Indian and Spanish names for the plants are unusual additions. The distribution of most species is shown on small maps and this, together with a short description of typical habitats, does away with the need to cite details of any of the specimens examined. Several of the Fuegian plants are morphologically complex. Moore in general takes a very broad species concept for difficult species, e.g. *Poa alopecurus, Perezia recurvata, Plantago barbata, Oxalis enneaphylla, Acaena magellanica*, etc., pointing out problems in applying specific distinguishing features, useful elsewhere, to the character range found in the Fuegian populations.

The nomenclature appears to be of a high standard, with only *Parodiochloa* missing from the list of genera. The citation of synonyms is less complete than one might have hoped in a definitive flora but appears adequate to cope with the most frequently used floristic accounts of the area.

The *Flora* is a large and weighty tome, certainly not a pocket flora for the field. Yet, aside from that restriction (and how many users will ever have the opportunity of taking it into the field?), it is a first-class guide on several counts: it brings a simple coherent species concept to a nationally divided yet phytogeographical distinct area

of great importance to Antarctic botanists; it illustrates the flora for those unfamiliar with it; it provides a guide in English to a literature mainly in Spanish and includes a fairly comprehensive guide to the botanical literature of Tierra del Fuego; it gives preliminary distribution maps for most species and, finally, it advances the scientific study of Fuegian plants by highlighting the species that are most in need of further investigation. By providing an up-to-date critical flora of an important area Moore has aided the ecologists, biogeographers and phytosociologists, whilst hopefully stimulating renewed interest in a fascinating flora.

The book is well designed and illustrated, well produced with a lavish page layout and not unreasonably expensive when viewed against the cost of other major *Floras*, e.g. *Flora Europaea*. It should stand as a definitive work for some considerable time.

D. W. H. WALTON

REFERENCE

DUDLEY, T. R. 1983. *A contribution to the flora and vegetation of Isla de los Estados (Staten Island), Tierra del Fuego, Argentina. Antarctic Research Series Vol. 37.* Washington, DC, American Geophysical Union.

Portrait of Antarctica by Launcelot Fleming, Kevin Walton, Jonathan Walton, Jim Bishop, Paul Goodall-Copestake. Foreword by HRH The Prince of Wales. George Philip, London, 1983. 168 pp. £9.95.

This book consists of 182 photographs of Antarctic landscapes and wildlife as well as of the way of life of those who work there. Some of the photographs are in black and white, most are in full colour and are superbly reproduced. Each photograph is informatively captioned and there is a short introduction to each of the seven themes: The hostile land, Going south, Home from home, Travelling overland, Life in the field, In the air and Wildlife.

The book is virtually a family enterprise. Launcelot Fleming (British Graham Land Expedition 1934–37) inspired Kevin Walton to go to the Antarctic (Falkland Islands Dependencies Survey, FIDS, 1945–48). Jonathan Walton followed in his father's footsteps (British Antarctic Survey, BAS, 1973–76 and 1978), Paul Goodall-Copestake is Kevin Walton's nephew (BAS, 1980 to present) and Jim Bishop (BAS, 1972–75) was Jonathan's brother-in-law; he tragically died when a member of the Royal Geographical Society's International Karakoram Project in 1980.

The photographs illustrate three distinct phases in British work in the Antarctic over the last 50 years, marking the transition from privately organized expeditions (BGLE), through the early days of FIDS, with its emphasis on geographical exploration, to the present day BAS with its concentration on scientific research. Geographically, they range from Bird Island in the north, close to South Georgia, to Fossil Bluff in Alexander Island in the south. Devotees of the particular merits of BAS stations on Signy Island, Argentine Islands, at Halley Bay or of stations now closed may not find their favourite views in these pages but they and other readers will nevertheless have a feast. Those who have not had the chance to visit this hard and beautiful land will be enchanted and instructed, in the pleasantest fashion, about the Antarctic and what goes on there. Others, who have had the good fortune to go there, will find their memories stirred and their funny bones gently tweeked. 'Fids'

(as members of the British Antarctic Survey still call themselves) will chuckle at a picture of the 'human chain' in action, moving sacks of coal. Some of our Antarctic colleagues of other nationalities, more attuned to the use of mechanical rather than muscle power, may smile and shake their heads.

And yet, in many ways, that image offers a key to this compilation of images which I found – a quaint word to use about a book – endearing, for the manner in which it portrays the human element in Antarctica. While many of the pictures speak of the grandeur and power of the Antarctic environment, others show these British ventures as very much 'human scale' operations, in tune with that environment, so far as that was possible at each stage. Neither BGLE, FIDS nor BAS have applied means that are noticeably more than sufficient to meet the ends in view. The reverse way of looking at it, that the ends of FIDS and BAS have been dictated by the means allowed them by HM Treasury, is only partly true. I sense that the contributors to this book and, dare I say it without being labelled as a hopeless traditionalist, the present members of the Survey, would not relish being part of an operation ten times as big. The vast and powerful logistic back-up that would entail would dominate their experience, the immediacy of the contact between a 'Fid' and the Antarctic, vividly portrayed here, would be diminished. The book illustrates how experience has been passed down from year to year (a valuable by-product of the normal period of service in the south being two years), how the application of new technology has been tempered by know-how and the need to be sure that the equipment will work.

There was, I suspect, some element of nostalgia in the preparation of this book. One can sense, and appreciate, the happy hours of discussing about what to include or to leave out and the swapping of stories across the three generations of the contributors. But that, I take it, is not wholly why they prepared it. For a view as to why they did I can do no better than quote a part of the sensitive and discerning foreword to the book by HRH The Prince of Wales:

> 'this book manages to get across what it is like actually to live and work there from day to day . . . it is clear from the way in which this book has been compiled (I found it spellbinding) and from the concise, often humourous, comments it contains that those who come to know the Antarctic are enriched and humbled by the experience.'

If that is, indeed, the thought which Launcelot, Kevin, Jonathan, Jim and Paul wished to share with us they have succeeded and we should be thankful.

J. A. Heap

Antarctic Earth Science: Fourth International Symposium edited by R. L. Oliver, P. R. James and J. B. Jago. Cambridge University Press and Australian Academy of Sciences, Canberra, 1983. 697 + xxii pp. £45.

Antarctic Earth Science is a volume containing the texts or abstracts of 174 papers presented at the Fourth International Symposium held in Adelaide, Australia in August 1982. It is dedicated to Sir Douglas Mawson, the centenary of whose birth the meeting commemorated. In producing this book not much more than a year after the symposium, the editors, printers and publishers are to be congratulated, particularly considering the five-year delay that followed the publication of its predecessor, the mammoth tome which arose from the 1977 Madison meeting.

The editors expressed the wish that the volume would be worthy of Mawson's

memory. Mawson's own expeditions resulted in the publication of high quality scientific work. Continuation of the good work by present-day Antarctic geologists is evident from the papers presented in this volume. Contributors cover a wide spectrum of nations, and it is clear that the Antarctic is a place where international collaboration works on a large scale. However, considering the Soviet effort on the continent, there is strikingly little material from Soviet geologists. This unfortunate lack is mirrored by recent Arctic Symposia, suggesting a reluctance of the USSR to attend western countries for interchange of ideas, though no doubt some co-operation occurs in the field. Recent years have seen a transition from reconnaissance studies to projects aimed at solving particular problems, notably the evolution of the Antarctic in relation to other southern hemisphere continents. If Mawson were alive today, I think he would be impressed at the scale and scope of research of Antarctic geologists, both on land and offshore, and even indirectly beneath the ice. This book is indeed worthy of his memory.

After a number of brief introductory chapters and reprinted speeches, including references to Mawson's own life and scientific contributions, the main body of the volume follows. It comprises the papers divided into 15 sections, although to a non-Antarctic specialist the sections seem to cover rather a random selection of topics. For example, some sections deal with areas, some with tectonics, others with topical questions. The following statistics as to the number of papers (including abstracts) and pages in each section give some idea of the coverage and balance of the book:

1. Precambrian East Antarctic Craton, 22 papers, 85 pp.
2. East Antarctica – West Antarctica Boundary and Ross Orogen, including northern Victoria Land, 30 papers, 117 pp.
3. Beacon Supergroup and associated igneous rocks, 10 papers, 35 pp.
4. West Antarctica, 9 papers, 37 pp.
5. Scotia Arc and Antarctic Peninsula, 21 papers, 71 pp.
6. Marine geology, 12 papers, 37 pp.
7. Antarctic resources, 7 papers, 26 pp.
8. Glacial geology and geomorphology, 12 papers, 48 pp.
9. Crustal structure of Antarctica, 13 papers, 52 pp.
10. Cenozoic tectonics and climatic record – onshore and offshore evidence, 8 papers, 20 pp.
11. Antarctic in Gondwanaland, 9 papers, 34 pp.
12. Plate tectonics, 4 papers, 13 pp.
13. Antarctic meteorites, 5 papers, 12 pp.
14. Subantarctic islands, 7 papers, 31 pp.
15. Cenozoic igneous activity, 4 papers, 19 pp.

An index of 16 pages concludes the book. Several of the sections (nos. 1, 2, 5, 6 and 9) are headed by review papers, which are particularly useful for the general reader and provide a context for the more specialized studies that follow.

In the preface the editors outline the major developments in Antarctic earth sciences over that last few years and it is worth recounting some of them here. Probably the greatest developments have involved a combination of marine geology, glacial geology and geomorphology, and Cenozoic tectonics and climate. New technology, especially with regard to ocean drilling and bottom sampling, and involving Landsat imagery and satellite radar altimetry has aided considerably data acquisition in these fields. Work in the Scotia Arc and the Antarctic Peninsula has attained new significance since the concept of plate tectonics became accepted.

Plausible ideas concerning crustal development have arisen as a result of interdisciplinary studies. In contrast, the relation between Antarctica and the other continents of Gondwanaland has received less attention than a decade ago, but new evidence of direct land connections is still forthcoming, for example the first discovery of marsupials in Antarctica.

The largest number of papers in this volume concern the East Antarctica–West Antarctica boundary and the Ross Orogen. This reflects a major effort involving 50 earth scientists from Australia, New Zealand and the US representing a wide range of disciplines. Other developments have included measurements from Magsat and of heat flow, and the publication of data on plate tectonics, meteorites, Cenozoic igneous activity and rates of uplift. Antarctic earth scientists have been in the forefront in using new technology but whereas much of the work has become increasingly technical, there has perhaps been more evidence of a multidisciplinary approach to solving problems than elsewhere in the world.

The present volume runs to *c.* 700 pages, which appears significantly less than the Madison volume. However, the printing is small, so that a full page of text contains *c.* 1300 words. The size of the print is a significant drawback in reading more than a few papers at a time. This unfortunate feature, according to the editors, was the result of the wish of the Steering Committee to include all papers presented at the symposium, and the strict overall page limit set by the Australian Academy of sciences. Nevertheless the production is good, and a positive feature is the inclusion of numerous photographs, while most diagrams are clear and well-produced. This book is strongly bound in a stylish, embossed cover.

In conclusion, despite some irritations of presentation, the volume is a credit to all concerned. It is clearly an essential reference work to Antarctic geologists, and libraries will be required to purchase it, especially as general interest in, and awareness of the continent is growing all the time. Non-Antarctic geologists should at least be aware of its contents, and those working in the southern hemisphere continents will find many papers of interest.

M. J. Hambrey