

## Book Reviews

### Circum-Atlantic orogens

Harris, A. L. and Fettes, D. J. (editors) 1988. *The Caledonian–Appalachian Orogen*. Geological Society Special Publication No. 38. Blackwell Scientific, Oxford. 643 pp. Price \$146 (hardback).

This volume is based on the 5-day symposium held in Glasgow in September 1984 at which were presented papers representing the end-product of research in IGCP Project 27—The Caledonide Orogen. The results of the first symposium of the project, held in Dublin in 1978, gave rise to the Geological Society's Special Publication No. 8—*The British Caledonides—Reviewed*. In contrast to the earlier volume, the editors of *The Caledonian–Appalachian Orogen* have presented the work in four time slices, each related to a particular stage in the evolution of Iapetus and its successor oceans. In each of the periods the entire orogen has been covered, with papers ranging from faunal provinciality, palaeoenvironments, tectonism, isotopic dating, metamorphism, volcanism and plutonic activity as appropriate. A final paper in each section attempts to review the main tectonic events of that time stage in the evolution of the orogen. In addition, a preliminary section deals with 'geophysical' aspects of the orogen. Not surprisingly, in order to keep the text within limits, the articles are for the most part written in a condensed review style. Thus readers looking for new data or details of a particular area or aspect of Caledonian geology will not find them in this book. On the other hand there is a wealth of references; something like 150 pages (25%) of the book contain reference lists, and although many of the references have been cited in several papers, the book provides an invaluable source for Caledonian–Appalachian literature.

It is most unfortunate that publication of the volume was so long delayed. Although the editors argue that most items have been revised up to 1986, the whole flavour of the book reflects the 1984 view of the orogen. Many of the papers have been superseded in part or in whole by more recent reviews by the same or other authors. New data on particular aspects have demonstrated errors in both fact and interpretation. This is particularly noticeable with the work on isotopic dating. There has been a burst of activity in both the Scottish and Scandinavian Caledonides such that the age of the main Dalradian deformation in the Grampians and of the Finnmarkian deformation in North Norway are both now considered to be Pre-Caledonian, a possibility considered by none of the contributors to the volume. Another example is the recent surge of interest in terrane tectonics as applied to the Circum-Atlantic Palaeozoic orogens, which has resulted in many models interpreting the orogens in terms of terrane analysis and of oblique plate motions. This approach, recognizing the importance of transcurrent displacements, is only seriously considered in the volume, for the Appalachians.

A welcome consequence of including Appalachian geology in the volume is to introduce Variscan events into a study of the Caledonides. These are included in the fourth time slice (mid Devonian–end Permian), and, although the section deals largely with the end Acadian and Alleghanian orogenies in North America, there is a particularly interesting paper on floral and faunal provinces and another on fluvial sedimentation in NW Europe.

As with most of the Geological Society's special publications, the standard of editing and production is generally very high. Readers, however, may find the spelling of Iapetus in place of Iapetus in some of the North American contributions irksome. On the whole, despite the fact that much of the contents is already out of date, I think serious workers in the Appalachian–Caledonide Orogen will want to buy this book. In the words of the editors: the volume is "intended to indicate the 'state-of-the-art' knowledge of the orogen in 1984" and in this I am sure it is successful.

Cardiff, U.K.

R. A. Gayer

### Circum-Atlantic terranes

Dallmeyer, R. D. (editor) 1989. *Terranes in the Circum-Atlantic Paleozoic Orogens*. Geological Society of America Special Paper 230. Geological Society of America, Boulder, Colorado, U.S.A. 277 pp. Price \$45.

In his preface, editor Dallmeyer explains that "Project 233 of the International Geological Correlation Program was established in 1985 to provide a forum of exchange between earth scientists attempting to develop similar terrane concepts in Paleozoic orogens of the circum-Atlantic realm". This book could be viewed as the vanguard of the IGCP 233, in that it offers a collection of 15 papers in which workers from most Paleozoic orogens around the north Atlantic will find a good summary of the geology of their region written in the light of terrane concepts by a key researcher(s). Much of the material is not new, but the value of this publication is that it will make well-established data and ideas more accessible. The book is laid out as a series of independent papers, each accompanied by an extensive reference list necessary for such regional overviews (20% of pages). In providing an outline of the regional geology and tectonic history of their areas, the authors appear to embrace terrane concepts and terminology with varying degrees of reluctance or enthusiasm, controlled mainly by the ease with which the concepts can be applied. Many authors provide a useful and stimulating summary of 'open questions' or 'outstanding problems' for their area, either as a separate section or as discussion throughout their text. Strangely, papers on the important Paleozoic orogens of Spain and Portugal are absent and thus the book cannot be called comprehensive.

Stephens and Gee provide a clear summary of well-defined terranes and their emplacement in the Scandinavian Caledonides, while Ohta, Dallmeyer and Peucat focus on the smaller but immensely complex region of Svalbad in northern-most Scandinavia. Hutton describes the principal Caledonian terranes defined in the British Isles. Gibbons tackles the 'prime suspect terrane country' of Anglesey, North Wales, defining three Precambrian terranes and using some dubious field terminology ('knockers'): Franke gives an introduction to the wealth of data amassed on central Europe, where Variscan tectonothermal events predominate but where terrane definition is ambiguous. Comparison of Franke's treatment of the Bohemian Massif with that of Chaloupsky highlights the controversy still surrounding the description and interpretation of the geology of central Europe. Frisch and Neubauer boldly attempt to reconstruct the Paleozoic geotectonic setting of the eastern Alps from basement zones by applying the terrane theory. Piqué outlines the Paleozoic and Precambrian history of Morocco which lay on the edge of the west African craton. Unfortunately, I found that his figures did not satisfy the demands of his text. Lécroché, Dallmeyer and Villeneuve provide a clear summary of the evolution of the West African orogens where polyphase tectonics (Pan-African and Variscan) complicated the resolution of terranes. The coverage of Proterozoic events in many papers is necessary to provide the complete geological story; however the paper by Caby on the late Proterozoic belt of SW Nigeria and NE Brazil which has no Paleozoic history is out of place in this collection.

Keppie provides a highly authoritative paper on Northern Appalachian terranes and their accretion in which he redefines the term 'terrane'. In contrast, the majority of authors adopt a less rigorous attitude to terrane theory and few discuss the terrane terminology or concepts used. Keppie's paper contains a considerable amount of very detailed data in the form of superb time–space diagrams. Gromet discusses the implications of finding a late Paleozoic age for the accretion of Upper Proterozoic Avalonian terranes in New England. Horton and Drake delineate, interpret and classify 26 terranes accreted and amalgamated through four orogenies in the central and southern Appalachians. They usefully point out that terrane analysts can, philosophically, be divided into 'splitters' and 'lumpers', i.e. those