

papers and is the theme of section 11 with six papers and three abstracts and of the succeeding short section 12 on plate tectonics.

Section 13 is misleadingly entitled Antarctic Meteorites, as it does not deal with the meteorites themselves but with their concentrations on icefields and implications for climatic change and ice movements. The last two short sections discuss Cenozoic alkaline igneous activity in the Subantarctic islands and Antarctic mainland.

There is something in this book for everyone, but with such a wide-ranging subject matter it will probably only sell personal copies to those working in Antarctic or Gondwanan geology, for whom it will be an invaluable reference. Although much of the content is only of relevance in an Antarctic or Gondwanan context it also includes many papers of a more general interest. As is the nature of such conference reports it will be superseded by the next volume of symposium proceedings in about five years' time, but the descriptive geology in the present volume will continue to be referred to. For anyone interested in the progress of research in the least explored region of the world it provides an up-to-date and comprehensive review of the present state of knowledge and, although expensive, is good value for money. The editors are to be commended for the prompt publication of the book, a welcome change from the previous two Antarctic symposium proceedings which took several years to appear. The only serious criticism is of the unfortunately large number of typographical errors resulting from its hasty publication.

A. W. M.

VINE, F. J. & SMITH, A. G. (eds) 1981. *Extensional Tectonics Associated with Convergent Plate Boundaries*. A Royal Society of London Discussion held 19–20 March 1980. 224 pp., illustrated. First published in *Philosophical Transactions of the Royal Society of London, Series A, Volume 300* (No. 1454), pages 217–442. London: The Royal Society. Price £29.75 (U.K.), £31.25 (elsewhere). ISBN 0 85403 161 8.

This book is a collection of papers presented at a meeting in March 1980 and first published in the *Philosophical Transactions of the Royal Society* (Series A, vol. 300, pp. 217–442). Although this meeting took place four years ago, and although most of the subjects covered have since moved on, it is still a book worth getting for libraries that don't already receive the *Phil. Trans.* because many of the papers contained in it are so often quoted.

The title of the volume suggests more coherence of topic than is actually the case and reflects an implicit wish to find driving mechanisms to explain the origins of extensional phenomena. In fact, the areas discussed are so widely different in nature and setting that, as Vine & Smith point out in the Introduction, it is very unlikely that their extensional phenomena have a common origin; particularly one understandable in a plate tectonic framework. This does not especially matter, as these papers are valuable for their collections and summaries of observational data from a number of regions where extension either occurred in the past or is still active now. None the less, the reader is left uncertain of what to make of the 'association' between the extensional tectonics described and convergent plate boundaries.

The book begins with four papers on geophysical and geochemical observations in the oceanic marginal basins of

the West Pacific and Scotia Seas, including a particularly useful summary of magnetic observations in the West Pacific by J. Weissel.

Following these are two papers on the Oman ophiolite and the southern Andes, both of which are believed to have involved back-arc spreading in the Mesozoic. These contributions summarize an enormous amount of work that has been published by these authors and their co-workers elsewhere.

The remaining seven contributions are concerned with extension that is either active, or was recently active, in continental areas. These include a summary by J.-L. Mercier of the work he and his group have carried out on the neotectonics of Greece and the northern Andes. His summary is particularly welcome as it reviews data that have otherwise been published mainly in French and is consequently unfamiliar to much of the English-speaking community. The Mediterranean receives further attention from Le Pichon & Angelier (The Aegean Sea) and Horvath *et al.*, who discuss the evolution of the young oceanic basins of the Alboran and Tyrrhenian Seas. Molnar *et al.* briefly summarize the active extension occurring in central and eastern Asia which, in a large body of work published elsewhere, they convincingly argue is a consequence of the collision of India with Asia. M.-L. Zoback *et al.* provide a comprehensive review of Cenozoic fault patterns in the Basin and Range Province, and Effimoff & Pinezich consider the detailed structural evolution of particular Tertiary basins in Nevada, based largely on seismic reflection profiles.

As is customary, the Royal Society have maintained a high quality of printing throughout and should be commended for the inclusion of 11 large pull-out maps and seismic sections (which they should be encouraged to repeat). These particular figures would have suffered serious loss of detail if reduced to normal page size.

The papers singled out by authors' names in this review are all widely referred to. In many cases the current state of the art in their topic has moved on significantly since 1980; that is surely to be expected in fields that arouse great interest, as these certainly do. However, observations, unlike interpretations, do not become out of date or change with fashion. These people all made (and continue to make) major contributions to their subjects and have provided a valuable service by summarizing their observations in this book, and making them more accessible. Although the reader will not find a unifying topic, he will find the contents interesting and rewarding.

J. A. J.

GARY, J. H. (ed.) 1983. *Sixteenth Oil Shale Symposium Proceedings*. vii + 611 pp. Golden: Colorado School of Mines Press. Price U.S. \$25.00. ISBN 0 918062 56 X.

When this symposium took place, the oil shale industry was in the doldrums: the immediate future of the industry depended on the success of a new plant built by Union Oil which started operating in late 1983. Otherwise, the falling price of crude has meant that most existing refineries are operating under capacity. The director of the symposium argues that a structured development towards an established industry will only happen in the next few years if the economic recovery continues and oil prices rise.

Despite the malaise affecting the commerciality of the science a solid basis of research is being constructed, funded by both governments and industry. The *Proceedings* provide