

Chapters Five to Twelve are essentially descriptive and the chapter headings summarize their contents very well. This part of the book clearly draws heavily on the authors' own experience and observations and is an important addition to the literature on volcanology.

In keeping with the overall approach of the book Chapter Thirteen on volcanism and orogeny stresses the structural and geophysical aspects. The global distribution of modern volcanic activity is described in a plate tectonic framework and a non-mathematical approach is adopted for the discussion of local controls of the siting of vents. The section on the interpretation of palaeo-volcanism, which points out the inapplicability of some of the laws of stratigraphy to volcanic sequences, should be mandatory reading for visitors to North Wales or the Lake District. The final section in this chapter on the relationship between compositional variations and structural settings is of a very general nature and no analyses are presented. While the authors do not comment directly on the employment of geochemistry as a predictor of tectonic setting they do point out the extreme variations of chemistry that may be encountered along as well as across volcanic chains. This is one of the few places where the reviewer felt the book would have been strengthened by an expression of the authors' own views.

It is difficult to imagine a book on volcanology without a chapter on gases and hydrothermal phenomena, but it is very far from clear how much studies of gases have aided the interpretation of volcanological events. Chapter 14 makes the matter no clearer. The section on hydrothermal phenomena is interesting and provides a convenient summary of the workings of hydrothermal activity and its use as a supply of energy. However, it does not add significantly to the book as a whole.

The book is well produced and at £19.50 cannot be considered expensive. However, because a matt paper is used the details in the photographs are not as sharp as they would be on gloss. The line diagrams are heavily drawn, with a quasi-italo-gothic script for the notations, but notwithstanding most of them are very easy to read and illustrate the material well.

Overall the work achieves the objectives set out in the preface. The middle chapters provide a first-rate source of authoritatively written material for postgraduate students and others starting research in volcanology while the early chapters would give final year undergraduates a valuable insight into processes leading to intrusion and extrusion of magma.

R. M. F. PRESTON

Mitchell, A. G. H., and Garson, M. S. *Mineral Deposits and their Global Tectonic Settings*. London (Academic Press), 1981. xviii + 405 pp., 164 figs., 1 pl. Price £23.60.

This interesting book follows a series of papers by both authors discussing apparent relationships between mineral deposits and plate tectonic processes, of which some twenty-one by Dr Mitchell and others, and a further six by Dr Garson and co-workers, are cited in the reference list. Despite the prolific output of publications on the subject of metallogeny and plate tectonics during the last decade, the value of the resulting hypotheses as a practical aid to prospecting is still regarded by many exploration geologists with some scepticism. It is interesting, therefore, to note that Mr R. Rice, an eminent exploration geologist with Riofinex Ltd., should have written such an enthusiastic foreword.

The book is systematically structured and readable, and describes relationships between mineral deposits of various types and plate tectonic settings, in a logical arrangement. After an introduction in which global metallogeny is discussed in the context of geotectonic theory development, individual chapters are devoted to: deposits formed at continental hot spots, rifts and aulacogens; passive continental margins and interior basins; oceanic settings; subduction and collision related settings; transform faults and lineaments in continental crust. The book ends with a discussion of relationships between mineralization and the Wilson Orogenic Cycle, and possible uses of plate tectonic models as guides for mineral exploration. There is an interesting index summarizing the authors' interpretation of relationships between individual metallic elements and plate tectonic environments.

Inevitably, in writing about such a controversial aspect of earth sciences, the authors find themselves in strange company. The reference list of some 750 papers includes one of the privately published books of Mr J. H. Tatsch whose concept of the 'tectonospheric earth' appears to this structural geologist to approach the bizarre. Some of the illustrations purporting to show correlation between metal deposits and major crustal structure bear little relation to tectonic history and rock distribution as represented on geological maps. This is shown by fig. 158 from Kutina's work illustrating a postulated correlation between major hydrothermal ore deposits (large dots) across the entire width of North America, and the extrapolated projections, on shore, of the Mendocino, Pioneer, and other transform fault zones in the floor of the Eastern Pacific.

Nor are the theories of Drs Garson and Mitchell universally accepted, as can be seen from the comments on their previous work by that other pundit on metallogeny Professor Routhier in his memoir 'Où sont les métaux pour l'avenir?' (itself reviewed by Sir Kingsley Dunham in *Mineral. Mag.* 44, 239–40, 1981), not 'Ou sont les Metause pour l'arenir?' as this reference list suggests. Unfortunately, there are typesetting, proof readers', and editorial errors in what, at this price, should be a technically perfect book. Besides those mentioned above, these mistakes include three words missing from the sub-title of Professor Routhier's book and 'Robinson' substituted for 'Robertson' in two papers by Fleet and R. (1979 and 1980).

One of the biggest difficulties in the application of plate theory in mineral exploration is recognition of plate environments in the fossil state—particularly in Precambrian rocks. Indeed there is still considerable dispute about the fundamental nature of Precambrian crustal processes. These problems inevitably hamper the testing of Drs Mitchell and Garson's ideas in practical situations.

Nevertheless, this book should follow the several anthologies of collected papers, conference proceedings, and the very few textbooks on this subject on the library shelves of those concerned with global metallogeny. It contains a thought-provoking series of hypotheses which will undoubtedly stimulate researchers and may encourage company geologists to re-consider the dominantly empirical philosophy on which much mineral exploration is traditionally based.

J. MCM. MOORE

Pichler, Hans. *Italienische Vulkan-Gebiete III* (Sammlung Geologischer Führer Bd. 69). Berlin and Stuttgart (Gebr. Borntraeger), 1981. xix + 270 pp., 53 figs., 12 tables, 4 folded sheets of maps and tables. Price DM 48.

This admirable pocket-sized guidebook follows some distance in the wake of previous members of the series which began in 1970 with Parts I and II (*Mineral. Mag.* 38, 537). Volume III of Professor Pichler's guides to the Italian volcanic districts covers the Aeolian Islands of Lipari, Vulcano, and Stromboli, together with an account of the vulcanism of the Tyrrhenian Sea; the author predicts in his preface that a fourth volume will deal with Etna, Monti Iblei, Capo Passero, and Pantelleria, and a fifth with the other Aeolian Islands (Salina, Filicudi, Alicudi, Panarea, Basiluzzo), Ustica, Linosa, and Mte. Vulture.

The present volume is to be considered alongside the publication in 1980 by the Società Italiana di Mineralogia e Petrologia (*Rendiconti S.I.M.P.*, vol.

xxxvi) of a memoir in English, *The Aeolian Islands: an active volcanic arc in the Mediterranean Sea*, under the general editorship of Professor L. Villari of the International Institute of Volcanology at Catania. This latter comprises also a new series of handsomely colour printed geological maps, of which Professor Pichler provides simplified uncoloured versions of the relevant islands in his guide: he was himself responsible for the coloured map and the account of Lipari incorporated in the Italian publication.

There is not too much overlap between the two publications; the one under review is a detailed field guidebook, and less of a geological and petrological memoir, although Pichler manages to incorporate a very great deal of such information. It follows the now familiar pattern of its predecessors in the series, which the reviewer and others have found in practice admirably to fulfil their intended purpose. The volume opens with a preface giving useful logistic details: travel by bus, boat, etc., and a suggested itinerary; and (as in previous volumes) a brief review of the Streckeisen-IUGS system of rock nomenclature. Next follows a substantial review (70 pp.) of the regional and structural geology of the Tyrrhenian region and the petrogenesis is of the recent volcanism in the Tyrrhenian Sea. This is excellently done (a slight shock, in the review copy, to find a boat timetable destined for p. 92 bound in at p. 68 amidst a discussion of submarine volcanicity).

The following sixty pages are devoted to Lipari: a concise general account of its volcanological history, structure, and petrology followed by thirty-seven pages describing in detail the best exposures and itineraries for excursions, with much logistic as well as geological detail. We are told (p. 104) that the beginning of the pathway up Mte. Pilato is difficult to find, so we are thoughtfully provided with the correct Italian phrase in which to ask the way. Having followed the detailed route around the well-described exposures we eventually regain the coast at Canneto—where we are assured that the Miramare bar will provide much-needed iced Kronenbourg lager. Similar treatment is accorded Vulcano (pp. 130–88) and Stromboli (pp. 189–231). An enormous amount of detailed geological information is given, and every kind of reader from the professional volcanologist to the interested holiday-maker can extract what he or she requires with little difficulty. The German text is straightforward and lucidly written; the line illustrations and occasional half-tones are legible and clearly reproduced; there is a comprehensive bibliography, and subject and locality indexes. Black and white maps of Vulcano, Lipari, Stromboli, and the Tyrrhenian Sea are enclosed in