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 enviroments 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 logisitic 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

a flimsy paper band inside the back cover. Otherwise the volume is well-produced, in a soft linen cloth cover of (large) pocket dimensions.

This is a real guidebook, in that it not only covers the geology with great thoroughness but also gives tips on travel and accommodation, cultural monuments, history, geography, climate, and much else. It is indispensable for anyone visiting these delectable islands with geological ends in view.

E. A. VINCENT

Sutherland, D. S., Ed. *Igneous Rocks of the British Isles*. Chichester and New York (John Wiley and Sons). xvi + 645 pp., 176 figs., 37 photos., 80 geol. sketch-maps, 1982. Price £55·00.

This book gathers together a systematic modern account of the major occurrences of igneous rocks in Britain and Ireland. Its thirty-four chapters on rocks ranging from those of the Precambrian to the Tertiary have been written by thirty-seven authors. There are also a substantial and well-illustrated 65-page appendix on the petrography of British igneous rocks, twenty-four tables of selected chemical analyses, and an up-to-date compilation of geochronological data.

The work is arranged in seven parts in chronological order, each with an introductory chapter which aims to place the igneous activity within the wider context of tectonics and plate movements. Much attention has been given to the provision of a useful bibliography: some 1900 references are placed together at the end of the book but are divided into seven sections corresponding with the part of the volume in which they are quoted, together with an indication of with which chapter or appendix the reference is linked.

The Precambrian igneous rocks of the Lewisian complex are of necessity given rather brief treatment, later deformation and metamorphism having obscured or destroyed their original relationship with other rocks. The scattered outcrops of Precambrian in England, Wales, and Ireland include a variety of igneous rocks, as do those of the Channel Islands. The Lower Palaeozoic volcanic rocks are well covered with individual chapters on volcanism in the Dalradian, Ordovician volcanism in Scotland, Lower Palaeozoic volcanism in Wales and the Welsh Borderland, Ordovician volcanicity in the English Lake District, and Lower Palaeozoic volcanism in Ireland.

In the introductory chapter to the Caledonian intrusive rocks, B. C. King points out that the mode of emplacement of the common transgressive granites is still far from explained: there are only local indications of displacement of adjacent structures and there is often evidence that the plutons enlarge with depth—stoping only becomes possible after some space has been provided by a mechanism that remains obscure. In this part there are chapters on the basic plutons, the Caledonian granites and diorites of England and Wales, and the alkaline intrusions of northwestern Scotland, but in many ways the most interesting and innovative chapter is that on the granites and diorites of Scotland (by R. J. Pankhurst and D. S. Sutherland, with contributions by G. C. Brown and W. S. Pitcher). The now classic grouping suggested by Read into 'Older Granites' and Migmatites is followed, but the 'Newer Granites' are placed in three groups, according to their time of emplacement; this and Sr isotopic ratios lead to the suggestion that there are affinities between the Older and Group I Newer Granites, which may be S-type granites, and between Group II and Group III Newer Granites, which conform more to the I-type of Chappell and White.

Devonian and Carboniferous volcanism constitutes Part 4 of the book, with consideration not only of the widespread volcanism of Scotland and SW England but also of the Late Carboniferous intrusions (Whin, Lugar and Midland Valley sills and associated dykes). The possible derivation of tholeiitic magmas by $\sim 40\%$ partial melting of lherzolite mantle is proposed by P. A. Floyd, who also suggests that alkali-basalt parent magmas only require 15–20% melting of the same source. The chapters on the various aspects of the Hercynian granites (their geological setting, petrology, late-stage alteration and petrogenesis) are virtually all by C. S. Exley and M. Stone. Particular attention is paid to the interpretation of textures and order of crystallization and to the chemical variations shown by the exposed granite cupolas before considering the origin of the granites. The structural and tectonic environment of the Permian and Mesozoic igneous rocks is discussed by Sir Peter Kent. In the Jurassic there was a basaltic volcanic centre in the North Sea and the widespread fullers' earth of southern England is essentially a vitric tuff; the clayey partings known in the Chalk can be interpreted as ashfalls.

As the Director of the Institute of Geological Sciences reminds us in his introduction to Part 7 dealing with the British Tertiary Province, generations of British petrologists have learned the fundamentals of their subject by early introduction to this young, well exposed, and dramatically complex assemblage of igneous rocks. And in their turn these rocks have probably provided more information per unit volume than any other such districts of the world. Here we have chapters on the eruptive volcanism, the central complexes, the