

tion in the mantle is denigrated on p. 65, only to be accepted again on p. 204. This writing technique may be fun for the author and make the book very stimulating over all, but it is lethal for the hurried lecturer or sloppy student (or vice versa); beware!

R. N. THOMPSON

Mitchell-Thomé (R. C.). *Geology of the Middle Atlantic Islands* (Beiträge zur Regionalen Geologie der Erde, Band 12). Berlin and Stuttgart (Gebrüder Borntraeger), 1976. x + 382 pp., 102 figs. Price DM. 198.00.

The area covered by the title—and by the term Macaronesia used in this book—includes the archipelagos of the Azores, Madeira, the Canaries, the tiny archipelago of Selvagens [Salvage Islands] between Tenerife and Madeira, and the Cape Verde Islands further to the south.

Because of their relative isolation, combined with their petrological interest, work on these islands has appeared not only in Portuguese and Spanish literature but even more widely in books and journals published in other European countries. Although several authors have described the geology of individual islands, notably the Finnish geologist Hausen who produced monographs on each of the main islands of the Canaries, the literature is otherwise widely scattered between official survey documents, volcanological records, congress reports, and the scientific periodicals of half-a-dozen countries in almost as many different languages. The author has thus done a great service in collecting together, reviewing, and condensing all the available geological data. In general the references are to around 1973 but there is an addendum bringing these up to mid 1975.

All are volcanic islands, with volcanism still active in the Azores, the Canaries, and Cape Verde Islands. Alkaline rocks predominate, with phonolites, trachybasalts, and trachytes in the Canaries and a tendency to a less alkaline character in the Azores, which have abundant basalts, andesites, and dolerites. The whole range of volcanic morphology is well displayed, including vast areas of ignimbritic material; dyke swarms proliferate in several islands, and plutonic xenoliths are locally abundant. The Spanish word 'caldera' (cauldron) is believed to have first entered the geological vocabulary when von Buch used the term during his visits to the Canaries in the early nineteenth century: the calderas of Las Cañadas on Tenerife and Taburiente on La Palma being particularly well known. The author is at pains to point out that some Mesozoic and Tertiary sedimentary rocks do occur and even contain fossils, but in general it is

the volcanic features that dominate the geology and the whole life-style.

There are few geological items of economic importance (building stone, ceramic clays, salt); water is perhaps the most precious resource. One is struck by how little seems to have been done to utilize geothermal energy, although a study has been made of the Montañas de Fuego-Timanfaya area (Lanzarote) where at a few metres depth temperatures of up to 360 °C are encountered over an area of some 200 km², the heat focus being apparently a magma chamber at perhaps 4000 m depth (Arana and Fuster, *Estud. Geol.* **29**, 281, 1973).

It is immensely useful to have all available rock analyses for the various igneous complexes of this whole area assembled together in one volume together with notes on petrography and historic volcanicity, but it is equally useful to have the abundance of black-and-white geological maps of each of the main islands. It is clear that there is a lot of detailed mapping still needed and that a host of geological problems exist including plenty for the geochronologist and geophysicist, as well as the mineralogist and petrologist. Speculation on the exact place of these islands within the framework of global tectonics and in the history of the development of the North Atlantic is perhaps premature; indeed, the author entitles his last chapter 'Caetera desunt' (the remainder is wanting). This book reviews and reports but in general refrains from speculation.

R. A. HOWIE

Greenwood (H. J.), editor. *Short Course in Application of Thermodynamics to Petrology and Ore Deposits*. Vancouver (Mineralogical Association of Canada), 1977. xiii + 231 pp., 64 figs. Price \$7.50.

This is the handbook that accompanied a three-day short course on thermodynamics held before the April 1977 M.A.C. meeting. It follows an earlier M.A.C. short course on Microbeam Techniques, and courses on Sulfides, Feldspars, and Oxides held by the Mineralogical Society of America. The contents are listed in M.A. 77-3958, and they include fifteen chapters written by a total of ten authors. Three main topics are represented. Chapters 13 to 15 deal with the derivation of thermochemical data, errors in thermochemical calculations, and methods of checking the internal consistency of phase equilibrium results. Four chapters (6 and 10 to 12) are concerned mainly with the application of thermodynamic methods to practical problems. The remaining eight chapters are less applied, although many mineral reactions are used to illustrate the principles involved.

Short-course handbooks are invariably written in a hurry, and printed from typescript. This results in a high concentration of errors (nearly four pages of errata), and a certain lack of co-ordination (I read the chapters in the order 1 to 4, 9, 7, 5, 8, 6, and 10 to 15). These disadvantages are offset by a freshness of approach unusual in conventional books, by the low price, and by the opportunity to see how leading workers in the field were thinking as recently as April 1977.

Within the limitations of the form of publication, this is a good book. It is readable (which cannot be said of many books on thermodynamics), and it should provoke the interest of many of those who have been indifferent to thermodynamics and the enthusiasm of some who profess an interest in that subject. It ought to play a useful part in raising the general standard of work towards that which exists in the best laboratories. It should be bought by all libraries serving mineralogists and petrologists, and by many individuals.

R. G. J. STRENS

King (E. A.). *Space geology: an introduction*. New York and London (John Wiley and Sons), 1976. xiv + 349 pp., 180 figs. Price £10.75.

Few will find the title of this book misleading though it is somewhat biased towards petrology and terrestrial rocks are scarcely mentioned even in making comparisons. The book is lavishly illustrated, with more than 200 line diagrams and monochrome photographs making a large part of the 270 pages of text. There are also about 50 pages of notes and references and the glossary and index make about 20 pages. Many of the diagrams are taken from the literature and all are well produced. The photographs are well selected and are mostly of good quality. The text is plainly written and is well edited and presented; it is a pleasure to read but the beginner may have difficulty in understanding a few sections such as those dealing with generalized Hugoniot curves or europium anomalies. The text reports selectively what has been done and written, but the information is not analysed or discussed in depth and there is little attempt at synthesis of generalities. The last chapter, for example, is on comparative planetology and amounts to only four sides of text.

Nearly half the book is occupied by chapters on meteorites and the Moon. The remainder consists of long chapters on terrestrial impact craters, impact metamorphism, and Mars, and of short chapters on tektites, craters, asteroids, comets, and other planets and moons. At the end of each chapter there is a very useful set of notes giving

extra detail and a list of references. The main themes of the book are to do with rocks and surface forms and phenomena. Geophysical aspects of the planetary bodies are mentioned, but neither they nor geodetic or astronomical topics are treated thematically and experimental petrology is not treated in the depth it may deserve.

The book requires some prior knowledge of geochemistry and petrology but would be appropriate to second and third year undergraduates. Its greatest value may be in giving an introduction to an already vast literature and a short, readable, coherent, and authoritative account of the rocks of the Solar System.

W. J. FRENCH

Schneer (C. J.), editor. *Crystal Form and Structure* (Benchmark Papers in Geology, 34). Stroudsburg, Pennsylvania (Dowden, Hutchinson, and Ross Inc.), 1977. xiv + 369 pp., 139 figs. Price £24.00.

This book provides a conducted tour through some three and a half centuries (Kepler, 1611, to McLachlan, 1974) of developing thought on the relationship between crystal morphology and structure. The courier (editor Cecil J. Schneer) provides a stimulating and knowledgeable, but never obtrusive, commentary between numerous visits to monuments (the original papers of the time) marking former positions of the frontiers of the discipline—frontiers echoing with evocative phrases like 'Bravais' law', 'Donnay-Harker principle', 'Brillouin zones', 'PBC vectors', and 'Congestion factor'.

The wide variety of type faces (English language texts are photocopied from the original while others are in English translation) adds savour and, in some cases, considerable nostalgia to the tour. It is, however, irritating to find neighbouring papers from the same journal reproduced, quite needlessly, to two different scales.

The well-chosen hard core of key papers, the wealth of references, and the modest price make this a highly desirable book.

F. E. TOCHER

Dent Glasser (L. S.). *Crystallography and its applications*. London (Van Nostrand Reinhold Co., Ltd.), 1977. viii + 224 pp., 117 figs. Price £12.00 (cloth), £5.95 (paper).

This book provides an introduction to the subject for those interested in its practical applications. The initial chapters cover the elements of crystal symmetry, optical crystallography, and diffraction theory. The various photographic techniques of data collection are then dealt with, and their uses