

## BOOK REVIEWS

Smart, P., and Tovey, N. K. *Electron Microscopy of Soils and Sediments: Examples*. Oxford (Clarendon Press: Oxford University Press), 1981. viii + 177 pp., 167 figs. Price £30.00.

The compilers of this collection of SEM and TEM photographs have a very wide experience of electron microscopy and this is reflected in the somewhat eclectic subject-matter. There are seventeen sections in all ranging from descriptions of individual particle types to consolidation and deformation fabrics, and in each case striking examples are chosen. It is with this latter point that I must first take issue slightly with the authors. Any user of an electron microscope will know the temptation always to record the most spectacular or best-defined features. These are not necessarily the most typical, however, and in some ways it might be more useful for a text to illustrate the more common, poorly defined examples, with comments on their interpretation.

My second reservation concerns the actual purpose of the volume. The short introduction does not make this clear; is it intended as a laboratory manual or an introductory text? Several of the topics included have been covered in much more detail in previously published monographs or review papers (e.g. on authigenic clays or sand grains), and so research workers might be better advised to refer to these where available.

The book is attractively presented with a short explanatory caption accompanying each micrograph (on matt paper). The text is largely free from errors, but it is not always easy to elucidate magnifications. It is difficult to recommend any volume costing £30 and consisting mostly of about 240 photographs as good value for money, and without a clearly defined market it is also difficult to identify potential customers. The same authors' companion volume on techniques is likely to prove of much more general appeal.

ANDREW PARKER

Fleischer, M. *Glossary of Mineral Species 1980*. Tucson (Mineralogical Record), 1980. vi + 192 pp. Price \$6.00 (available, +50c. postage and packing, from Mineralogical Record, PO Box 35565, Tucson, Arizona 85740, USA). Additions and Corrections to the above, 1981 (*Min. Rec.* 12, 61-3). 50c.

This 1980 edition, with the names, symmetry, and chemical composition of mineral species, supersedes the 1975 edition which itself superseded the

first edition (1971). This new edition of what has become a vital tool for all mineralogists is particularly welcome due to the unprecedented research activity in mineralogy since the 1975 edition was prepared. The widespread use of new techniques, such as the electron microprobe, has resulted in a flood of descriptions of new minerals. Thus of the nearly 3200 entries in the main section, more than 400 are new entries and 728 entries have been changed significantly. That this flood of new data is continuing is shown by the need to publish a supplement; in less than a year, thirty-eight new minerals had been described together with abundant new data on established minerals. It is hoped to publish such new lists annually. For updating the consolidated Glossary in this new edition Dr Fleischer deserves all our thanks.

R. A. HOWIE

Sinkankas, J. *Gemstone and Mineral Data Book*. New York and London (Van Nostrand Reinhold), 1981. xii + 352 pp. Price £5.90.

This is a reissue of the 1972 edition which brought together information of relevance and interest to mineralogists, lapidaries, and collectors. There are chapters on abrasives, metals in jewellery, chemicals, adhesives, physical properties of minerals, and methods of cleaning specimens. While the book is succinct and economical, the chapter 'Mineralogical Miscellany' is stimulating reading and echoes smaller sections elsewhere. Inevitably there have been advances in the treatment of diamonds and other gemstones and in our understanding of colour in minerals, and the coverage of these topics needs updating. But this is minor criticism of an extremely useful reference book.

R. R. HARDING

Gill, J. B. *Orogenic Andesites and Plate Tectonics*. Berlin, Heidelberg, and New York (Springer-Verlag), 1981. xiv + 390 pp., 109 figs. Price DM 98.00.

This is essentially a book-length review article, bringing together all the modern information and ideas about andesites, and only incidentally mentioning plate tectonics. It is based on a very extensive literature survey, with a reference list running to over 1100 entries, mostly later than 1970. The first seven chapters are a critical discussion of this large mass of data, organized into sections on occurrence, magma properties, geochemistry, mineralogy, and variations in magma

composition. Subsequent chapters deal with each of the main processes which may be responsible for the formation of andesites.

The review of factual data is very comprehensive, and there is even a list of the active andesite-erupting volcanoes of the world with chemical information on each, and maps of all the regions where andesitic volcanism occurs, giving tectonic information such as the depth of inclined seismic zones. The first chapter is the least satisfactory, mainly because the nomenclature of andesites is not very logically discussed. For example, 'orogenic andesite' is defined by chemical parameters, selected in such a way as to exclude most trachy-basalts, icelandites, and other intermediate lavas occurring in non-orogenic environments. One wonders why 'orogenic andesite' could not have been defined by a combination of composition and tectonic environment as the name implies. However, this distinction is of little consequence as all andesites, including non-orogenic ones, are subjected to scrutiny in subsequent chapters of the book.

The discussions of petrogenesis are tackled in a very systematic way. Firstly, the author discusses the possibility that andesites might be primary magmas, either from subducted oceanic crust or from the overlying mantle wedge. Both alternatives are found to be inadequate by themselves, but the possibilities multiply as one considers interactions between subducted oceanic crust and overlying mantle, especially the transfer of fluids and metasomatism. The more complex the hypothesis, the more difficult it is to test by geochemical and other criteria, but the spatial relationship between andesites and inclined seismic zones must obviously be of some significance. Next, the secondary processes are examined, such as contamination, differentiation, and magma mixing. The arguments for and against all of these are stated, but Professor Gill comes down in favour of low pressure (plagioclase + orthopyroxene/olivine + augite + magnetite) fractionation from a basaltic parent magma as the most likely origin of andesites. He recognizes the difficulty of explaining why andesites predominate at convergent plate boundaries if they are simply differentiates of basalt which occurs everywhere, and most of his final chapter is spent in trying to resolve this paradox. He concludes that although the plate tectonic environment must influence the nature of the parental magma from which andesites evolve, the andesites themselves are the result of nothing more exciting than ordinary crystal fractionation.

The book will be essential reading for anyone interested in the origin of andesites. The first two-thirds, i.e. the data review, is very detailed, and

is primarily for research students and specialists working in this field. The later chapters on petrogenesis are more readable, and could be studied with profit by the undergraduate or less specialized petrological reader.

A. HALL

Turner, F. J. *Metamorphic Petrology: Mineralogical, Field and Tectonic Aspects. 2nd Edition.* Washington, New York, and London (McGraw Hill), 1981. xv + 524 pp., 162 figs. Price £26.95.

The second edition of Turner's textbook on metamorphism is a substantially enlarged and updated version with more than 100 extra pages. Several new chapters on metamorphic facies have been added, and Professor Turner has extensively updated the parts dealing with phase equilibria for several systems, and has followed recent developments in the regional geology of his many case study areas.

In many ways this book seems to be more of an essay than a textbook, and indeed this is the source of much of the enjoyment of reading it. Turner expounds his views about many topics without actually getting down to details of how they work, so that his discussion of, for example, experimental methods requires a prior knowledge of the field. Similarly the thermodynamics section starts from an elementary level but fails to explain many of the steps—for example, there is no mention of standard states. Curiously, there is no reference to any of the recent texts on this subject.

The structure of the book makes it an excellent reference for the worker seeking information about the assemblages found in a particular facies, but it is difficult to extract information about metamorphism of a particular rock type or area, and there is a lot of repetition. The metamorphism of the Haast Schist appears in more than ten separate sections spread amongst 400 pages, with ten separate maps. Inevitably, inconsistencies sometimes result.

Although the equilibrium aspects of metamorphism have been thoroughly updated, many other areas of current research have not been so closely attended to and the book is now far more specialized than it was in 1968. The discussion of kinetics is disappointing, and does not include many of the new approaches developed since the first edition. The book sticks to a more rigid concept of progressive metamorphism than many petrologists would accept, and there is no discussion of ideas about the variation of facies series with time within a belt, currently being developed from both field studies and theoretical considerations. Typically, the old ideas and controversies of the first edition are