

the reviewer found the chapters on N, Zn, and Ba, and the newly available section on the crystal chemistry of silicon particularly lucid and informative.

Again, the quality of typography and production is good, and obvious errors few. The price of this instalment, like its forerunners, is high. The work is essential for any chemical, geochemical, or geological library, but rather few private subscribers will feel able to afford it.

E. A. VINCENT

STANTON (R. L.). *Ore petrology*. London and New York (McGraw-Hill Book Co.), 1972. xviii+713 pp., 242 figs. Price £9.35.

This book, as the title implies, is concerned with the study of ores as rocks—rather than as exotic entities derived from extraneous sources and superimposed on geological situations to which they bear little or no genetic relationship. There are two parts: in part one principles are dealt with in not unreasonable detail (pp. 7–302), and the remainder of the work is concerned with the nature, mode of occurrence, and origin of the principal ore types. The development of ore-genesis theory has been slow, haphazard, and repetitious, and the popularity of various well-known theories has waxed and waned substantially as a matter of fashion. This is attributed in part at least to a lack of co-ordination in research between field and laboratory. Whereas in silicate petrology studies based on field observations, petrography, and mineral chemistry have advanced together and each technique has received continuous help from the others, with ore research this has not generally been the case. The author's approach to the theories and principles of ore formation illustrate the main philosophy of this work: thus ores are considered as rocks and, provided the relevant conditions for the stability of ore minerals are observed, it is shown that they may have formed in all the ways that 'ordinary' rocks have formed. The ores themselves are treated as natural polycrystalline aggregates, conforming with the principles of phase equilibria and geochemistry.

The first part presents a great deal of basic information, ranging from banding in minerals, through a classification of ore minerals, the diagrammatic representation of phase equilibria, the behaviour of ore minerals in aqueous systems, and the fractionation of sulphur isotopes. In the concluding sections of part one the features and behaviour of ores are approached from the point of view of modern 'materials science', with chapters on growth and growth structures in open space and in polycrystalline aggregates, and on structures due to deformation and annealing.

In part two the ores are grouped under broad petrological headings but any immediate genetic connotation is avoided. In each association, e.g. ores in mafic and ultramafic igneous rocks, descriptions of the geological setting and of typical examples of the association are followed by a discussion of views on the genesis of the ores in relation to experimental and analytical data. Associations considered include ores of felsic igneous rocks, iron and manganese concentrations of sedimentary affiliation, stratiform sulphides of marine and marine-volcanic rocks, stratabound ores of sedimentary affiliation, ore veins, and ore deposits of metamorphic affiliation. This section ends with a chapter on ore type and the tectonic cycle, in which an account is given

of the apparent parallelism between the evolutionary pattern of the continental crust and progressive changes in the ore types that each continent contains. The author warns that, like most books on petrology, this one is only concerned with primary, unweathered materials; no consideration is given to weathering processes, the formation of 'secondary' ores and gossans, or to placer-type deposits. There is a 20-page bibliography and in addition each chapter has its own recommended reading list.

The book sets out to cover a very broad field and inevitably there are local inadequacies but the balance of coverage seems good. It should succeed in encouraging a co-operative relationship between those who study ores and those who find and mine them, and will be a most useful text for students of economic geology.

R. A. HOWIE

BARNES (V. E.) and BARNES (M. A.), Editors. *Tektites* (Benchmark Papers in Geology). Stroudsburg, Pennsylvania (Dowden, Hutchinson and Ross, Inc.), and London (John Wiley and Sons), 1973, xvi+445 pp., 150 figs. Price £10.00.

The editors have selected 46 papers, which have been reproduced wholly or in part in this volume. Groups of papers chosen as representative of different aspects of tektite research are introduced by brief editorial notes. Particular attention has been paid to bibliography, which is complete to about 1972, and for which the editors and publishers deserve congratulation. There are both subject and author indexes.

The book should prove especially useful for university teachers, and for students preparing dissertations or seminars on the subject, for Professor and Mrs. Barnes have obviously tried to achieve a balance between papers supporting their own belief in the terrestrial origin of tektites and those of their opponents, such as Chapman, who still favour a lunar origin. The time-consuming literature search (which is a useful exercise for undergraduates) will, however, have been largely eliminated.

Reproduction of figures is generally excellent and I recommend purchase of the book by university or polytechnic libraries. My main criticism is that, because of space limitations, parts of papers or essential figures have been occasionally omitted.

ROBERT HUTCHISON