

matter of the chapter on rock-forming minerals and rocks, by T. J. W. van Thoor, may be deemed to be familiar to most mineralogists and petrologists, it contains much useful information on the uses of various materials such as perlite, pumice, bentonite, talc, mica, and asbestos. There is a separate chapter (124 pp.) by F. H. Clews on clays and ceramic products, a third of which is devoted to building, facing, and paving bricks, with other sections on refractories, whiteware, and porcelain. The related topic of adsorptive materials, including bleaching earths, molecular sieves, and chromatography is dealt with by A. J. B. Spaul, and there is a chapter on lime, cement, and concrete by S. Marks. Abrasives are dealt with by G. Spence and S. H. Manning, who cover manufactured, metallic, bonded, and coated abrasives as well as diamond and corundum; the principles of the abrasive process are also discussed. Glass and raw materials for glass-making, etc., are described by S. M. Budd and the mining, beneficiation, synthesis, properties, and uses of graphite are summarized by M. Smith. One of the largest chapters (104 pp.) is that on diamond and other precious stones by B. W. Anderson: two-thirds of this chapter is devoted to diamond, not unnaturally, in view of its commercial and technological importance, and in the rest of the chapter the more important other gemstones are discussed briefly. There are also notes on synthetic gemstones. The remaining chapters of this volume deal with solid mineral fuels, the carbonization of coal, and alternative sources of energy. The book opens with some useful tables, including conversion factors between imperial and metric or SI units, and ends with a very full index. Other volumes in the series will cover such items as air, water, and inorganic chemicals; metals and ores; vegetable food products; wood, paper, textiles, and photographic materials; and petroleum, organic chemicals, and plastics. The scope of this truly encyclopaedic work is wide, but at a total cost of apparently well over £100 one cannot help wondering as to its market. However, anyone concerned with non-metallic minerals will undoubtedly benefit from having the present volume on their shelves.

R. A. HOWIE

BLOSS (F. D.). *Crystallography and Crystal Chemistry*. New York and London (Holt, Rinehart and Winston Inc.), 1971. xiv + 543 pp., 302 figs. Price £4.90.

This book is intended for undergraduates and aims to give them a grasp of crystallography and crystal chemistry in a way that is easily understood. The text is clearly written, and the book provides the basis for a sound understanding of crystalline materials.

The policy throughout has been to take little or nothing for granted, but to show the derivation of concepts from first principles. Thus, at the outset, when dealing with the external symmetry of crystals, the author is careful to show the derivation of point groups and the permissible combinations of symmetry elements. Crystallographic projections, crystal morphology, and appropriate calculations are clearly explained, and the names of crystal forms are those which emphasise the relationship of faces to symmetry elements, and which are becoming increasingly accepted (with minor variants) by teachers of crystal morphology.

The principles of internal symmetry and the concept of the space lattice are next presented, followed, logically, by the chemistry of crystals, the derivation of space groups, and a review of crystal structures. The author defends his preference for 'island silicate' in preference to 'orthosilicate' and the reference to Zoltai's classification of tetrahedral structures introduces an additional view of structure that should both stimulate discussion and help understanding.

One of the most welcome parts of the book is the treatment of the physical properties of minerals. Instead of a paragraph or two on hardness, lustre, streak and so on, Professor Bloss gives a clear account of physical properties following logically from preceding chapters on structure, chemistry, and structural defects of crystals. The use of tensors in the description of physical properties is explained and is valuable as part of a book that is likely to be used by geologists and mineralogists. There is a useful appendix, explaining the matrix algebra necessary to make the chapter understandable without extensive reference to mathematical texts.

The chapter on optical properties of crystals is short because the field is covered in many other books, including the author's own [M.A. 16-14]. The brief account given includes a section on crystal field theory.

The book concludes with a section on X-ray crystallography sufficient to give a good working knowledge of the powder method and an understanding of the basis of single-crystal work.

Each chapter ends with a list of references, and questions and answers. The excessive use of abbreviations and acronyms calls for comment. The reader may quickly come to terms with 'equipooints' and 'identipooints', but the use of 'AB' and 'OB' for acute and obtuse bisectrices seems rather unnecessary when Bx_a and Bx_o have long been in common use. Although 'relp' is used among X-ray crystallographers, a general reader may, in these days of change to SI units, wonder whether a relp is one such unit he has overlooked. If an abbreviation is needed for reciprocal lattice point it seems a pity that r.l.p. could not have been used in place of relp, because it has the advantage of drawing the reader's attention to the fact that it is an abbreviation.

The book has been carefully checked for errors and is well illustrated, though in places I feel there has been an over-enthusiastic use of shading tints. The illustrations are enhanced by the use of accompanying captions that are written in sufficient detail for the diagrams to be understood without undue reference to the text.

The book should commend itself to students and teachers as giving an up-to-date grounding in crystallography for mineralogists, chemists, metallurgists, and indeed all who have to do with the crystalline state.

A. C. BISHOP

CHAYES (F.). *Ratio Correlation. A manual for students of petrology and geochemistry.*

Chicago and London (University of Chicago Press), 1971. viii+99 pp., 1 fig. Price £2.70, \$6.00 (cloth); £1.00, \$2.25 (paper).

This book deals with the vexed subject of how to distinguish between substantive relations between variables and spurious correlations resulting from the inherent negative correlations that must exist between any set of variables that sum to a constant