

BOOK REVIEWS

BUERGER (M. J.). *Introduction to crystal geometry*. New York and London (McGraw-Hill), 1971. xiv+204 pp., 268 figs. Price £6.50.

In his preface the author states that his aims in writing this book are to give an authoritative account of basic crystallography appropriate to an undergraduate course, and also to include data on space groups and their symbolism in such a way that it will serve as a useful reference text. Professor Buerger is well qualified to do this and he gives a lucid account of a subject that, although of wide application, is often imperfectly understood. His presentation is clear and vigorous, and the approach throughout is to take little for granted and wherever possible to return to first principles. This has been done using only simple geometry and the book can be recommended to those who are starting to study crystallography in the clear hope that, by its use, they should be able to obtain a grounding in the subject free from many of the misconceptions and half-truths that are often handed down. Half the book is taken up with tables and diagrams, which, when taken together with the text, provide an insight into matters that are often left obscure.

The book progresses from the consideration of the various kinds of order in crystal structures to a rigorous derivation of point groups. The correspondence between the Hermann-Mauguin and Schoenflies notations for these is given in tabular form, but it would have been more helpful if all, instead of only some, of the elements of the Schoenflies symbols had been explained in the text. There follows a discussion of lattice types and coordinate systems that should do much to clarify some of the imprecise statements that are made about crystal systems, and their significance. Professor Buerger's comments on the undue importance that is sometimes given to crystal systems and to crystallographic axes could well be taken to heart by all who have to teach the subject.

Throughout the book the author's main concern is with the internal geometry of crystals and, in consequence, the chapter on crystal morphology is rather thin and the nomenclature employed differs somewhat from that agreed by the International Union of Crystallography. There is no mention of the relationship between morphology and structure: a mention of the work of Friedel as developed by Donnay and Harker would have been appropriate in presenting a more complete view of the ways in which internal and external crystal geometry are related. The three chapters on space groups and one on equipoints are illustrated with many diagrams and tables, and give a full account of space groups, rather than selecting a few examples and leaving the reader to work out the remainder for himself. A minor criticism is that when introducing the concept of screw axes, and because of a sparsely captioned figure, the reader has to study the text with particular care if he is to follow the developing argument. One is not misled but the going is harder than usual.

The book concludes where most others begin, with the history of the development of crystal geometry. In choosing to place the historical section last, the author is able to measure the magnitude of the contributions of Haüy, Barlow, Bravais, Schoenflies,

and others against the present situation, and in a way that enhances their stature. There is hardly a mention, however, of workers in the field of external crystal geometry. The book contains no methodology, nor discussion of chemical properties of crystals. The reader is referred on the dust jacket to other volumes by the author, but this book is, in many ways, similar to his *Elementary Crystallography* (1956). As it stands, however, the book is a succinct exposition of crystal structure and should find acceptance in undergraduate courses.

A. C. BISHOP

ROTH (R. S.) and SCHNEIDER (S. J.) (Eds.). *Solid State Chemistry*. NBS Special Publication 364, U.S. Govt. Printing Office, Washington D.C., 1972. xv+783 pp. Price \$7.50.

This book contains the proceedings of the fifth Materials Research Conference held in July 1971. The 63 papers are grouped into sections on oxides (37), borides, carbides, silicides, and related materials (10), chalcogenides (12), and discussions on non-stoichiometry (4). The papers are well illustrated, and even photographs have reproduced surprisingly well for a work printed by offset methods. The papers are of consistent and respectable quality, and some are of outstanding interest and importance.

About one-tenth of the papers are of direct and obvious mineralogical interest, including those on the use of infrared and Raman spectroscopy in the study of order-disorder in oxides (White and Keramidas), on defects in oxides (J. S. Anderson), and on the system FeO-SiO₂-TiO₂ at high pressure (Woermann and Lamprecht). Of the work on chalcogenides, the papers on Cu₂S (Cook) and CuFeS_{2-x} (Adams *et al.*) are directly applicable to mineral systems.

The many papers on such phases as the tungsten bronzes, in which non-stoichiometry is accommodated by a variety of ingenious mechanisms, are of less obvious mineralogical interest, but of great significance for our understanding of the microstructure of crystalline solid solutions. Outstanding among these are the papers by Bursill and Bursill, Hyde, and O'Keeffe on crystallographic shear in rutile. These, and the reviews by Allpress and Anderson, should be read and re-read by all mineralogists who are interested in the microstructure of complex mineral solid solutions such as the pyroxenes of the lunar rocks, the more chemically complex pyroxenes and amphiboles of igneous and metamorphic rocks, and many rarer minerals.

R. G. J. STRENS

HYNDMAN (D. W.). *Petrology of igneous and metamorphic rocks*. New York and London (McGraw-Hill), 1972. x+533 pp., 141 figs. Price £7.70.

The appearance of a new undergraduate textbook on igneous and metamorphic rocks is something of an event, and when it shows some resemblance to Turner and Verhoogen's notable book (almost identical title, similar format, same publisher), and has the advantage of being 12 years more up-to-date, it merits special attention.