

## BOOK REVIEWS

UYTENBOGAARDT (W.) and BURKE (E. A. J.). *Tables for microscopic identification of ore minerals* (second edition). Amsterdam, London, and New York (Elsevier Publ. Co.), 1971. xii+430 pp. Price £6.75.

This new edition of a book first published 20 years ago [M.A. 12-6] is a great achievement. The bibliography alone, containing 1739 items, makes it particularly welcome. Some 500 minerals are listed in the 12 determinative tables and in the extensive mineral descriptions. As before, the approach mainly involves the identification of the ore minerals through their hardness and reflectance, though the quantitative aspect of these properties is used on a wider scale. One wonders, however, whether a list in order of polishing hardness is of much use now that polished sections are much flatter than they were; micro-indentation hardness can be measured so rapidly nowadays that the purely comparative approach is of less use. The main part of the work consists of mineral descriptions (pp. 33-359), where in addition to the listing of the physical properties a series of useful notes are included on the habit and paragenesis of each species. There is no discussion of principles or techniques and this is not to be expected but one could quarrel with the use of the term 'birerectance' as being synonymous with 'reflection pleochroism' (p. vi, footnote): the former is simply ( $R_2 - R_1$ ) in monochromatic light whereas the latter is a necessary term for a visible change of tint on rotation of an (anisotropic) section over one polariser in white light. In such a fine and useful collection of data it is perhaps a pity that meteoritic metallic phases are not included in view of their current interest. But all such minor quibbles cannot detract from the great value of this collection of tabulated data. The photo-printing is good and clear.

R. A. HOWIE

GAY (P.). *The Crystalline State*. Edinburgh (Oliver and Boyd), 1972. ix+348 pp., 167 figs., 4 plates. Price £5.00.

The Introduction describes the scope of the book, from which some abstracts are quoted. 'Our objective in this text . . . is to provide a basic knowledge of those concepts which are essential to an understanding of crystalline matter in whatever context it is found. To do this we must analyse the principles of the construction of repetitive patterns, first for the more familiar planar patterns, and subsequently . . . for the 230 space patterns basic to the internal atomic architecture of all crystalline solids. Inevitably this involves the introduction of the symbolic language of the subject and its use to describe those essential geometrical features which are our concern.' 'In this book we shall be concerned with the general properties of these pattern types . . . we shall mention only rarely the details of individual structures that are important in crystal chemistry or in the fullest investigation of some particular substance.' These quotations have not been made in serial order, but I believe they give a fair summary.

The book may be divided into three sections: two- and three-dimensional patterns and the basic information required for their study; X-rays and their interactions with

crystals; symmetry relationships in physical properties and imperfections in real crystals. These chapters are followed by four appendixes; projections, calculations on stereograms, growth of crystals, and twinning.

The first section begins with a chapter on two-dimensional patterns, in which the elements of symmetry are described and used in a clear manner to derive two-dimensional lattice types, point groups, and space groups. The next four chapters (on stereographic projection, crystal classes and systems, axial systems and indexing, and morphological crystallography) lay the foundation for the chapter on three-dimensional lattice types and space groups. Detailed description is limited to space groups of the triclinic and monoclinic systems and brief comments are given for more symmetrical space groups. The second section begins with a chapter on the generation of X-rays, principles of diffraction, and the determination of space groups. Subsequent chapters describe diffraction by single crystals and powders. Laue, rotation, and oscillation photographs and the determination of cell dimensions are described, but structure analysis is deliberately omitted. The third section has an interesting chapter on symmetry relations in physical properties and one on imperfections in real crystals.

The style of prose often makes comprehension difficult, either through its complexity, or less often by undue compression. The treatment of the chapter on imperfections in real crystals and the appendixes on growth of crystals and on twinning do not seem to be entirely satisfactory; either the same subject matter should be treated in more detail or fewer topics should be covered in the space available. The standard of illustrations is generally good, but a number of crystal drawings are inaccurate and their crystallographic axes are grossly misorientated. There are also some elementary errors in the captions.

The author succeeds to a considerable extent in fulfilling the aims he set himself, of writing 'a modern introduction to the crystalline state' for students wishing to acquire 'an elementary knowledge of the fundamental language of the crystalline state' for studies in such diverse subjects as molecular biology, metallurgy, mineralogy, pharmacology, and petrology. However, many students would probably prefer a more comprehensive coverage of the crystalline state, including crystal chemistry, treated in a simpler manner.

A. F. SEAGER

BATTEY (M. H.). *Mineralogy for Students*. Edinburgh (Oliver and Boyd), 1972. xii+323 pp., 263 figs. Price £4.00.

It is difficult to say what is an ideal course in mineralogy for Honours Geology students. Not only does one have to decide on which minerals to include and the amount of detail for each, but also the amount of classical and X-ray crystallography, crystal optics, and crystal chemistry that is needed. Teachers are free to form their own preferred 'mix', using as texts appropriate parts of the various rather specialised books each of which deals with one of the subjects concerned. It is, of course, tempting, and various attempts have been made, to produce a suitable treatment of all under one cover. Not so long ago, there was undoubtedly wide variation in the importance