

although they can be found in the bibliography. Appendix V (24 pp.) has a series of determinative tables for about 100 minerals—more than adequate for student use and a good example of the types of data compilation available.

A more detailed treatment of certain aspects of important theoretical and practical topics in earlier chapters is found in the 46 pp. of Appendix VI. In particular the measurement of ellipticity, the optics of biaxial absorbing crystals, glare effects in reflectivity measurement, and the variation of hardness with load are well described. Adequate references and indexing are provided and Appendix II is a useful table of opaque mineral names in English, French, German, and Spanish.

The mathematical deficiencies of many Geology students have been catered for by extended explanations of certain points and the extensive use of graphical methods, whilst research workers will undoubtedly find interest in the excellent treatment of reflectivity measurement and the detailed optics of biaxial absorbing crystals.

There must of course be criticisms—inadequate proof reading has allowed a number of small printing errors to appear and one or two references in the text do not appear in the bibliography. None of these however are particularly serious. The treatment of quantitative colour specification is disappointingly brief and incorrect statements are made about the chromaticity diagram on p. 151. Apparently contradictory statements about colour memory are made on pp. 104 and 148. A corrigenda slip is available from the authors. Nevertheless the book is essential reading for anyone with the slightest interest in the optics of opaque materials, at any level, practical or theoretical. The text and figures are clearly printed on a matt surface paper. The quality of the black and white plates is adequate but no more. Comment on the price is these days essentially useless, but it is less overpriced than many other books in its class.

The production of this timely volume with its up to date and extensive scholarly coverage of the topic can have been no easy task for the authors. Let them then be assured of its probable establishment as a standard text, for a part of their just reward.

R. PHILLIPS

OBST (K. H.), MÜNCHBERG (W.), and MALISSA (H.). *Elektronenstrahl-Mikroanalyse (ESMA) zur Untersuchung basischer feuerfester Stoffe*. (Applied Mineralogy Series, Volume 2.) Vienna and New York (Springer-Verlag), 1972. x+125 pp., 73 figs., 16 tables. Price DM 67.

The second volume of this Applied Mineralogy Series is on the electron probe microanalyser and its use for the examination of basic refractory materials. (The first volume, *Abrasives*, was reviewed in *Min. Mag.* 38, 777.)

After a short introductory chapter (2 pages), Ch. 2 (Apparatus and Methods, 22 pages) briefly reviews the related techniques of light microscopy, electron microscopy, X-ray emission, X-ray diffraction, microradiography, and cathodoluminescence for the examination of basic refractories and related materials.

Ch. 3 (Electron probe microanalysis, 32 pages) outlines the general principles and practice of the analytical method, including such problems as line-shift of characteristic X-rays of light elements, X-ray generation, analysing crystals for long-wavelength X-rays, sample preparation, techniques of measurement, and selection of standards. Ch. 4 (5 pages) briefly discusses correction procedures.

The remaining chapters describe applications of the microprobe in refractories research. Ch. 5 (16 pages) illustrates the use of the microprobe for the determination of phase diagrams, using the systems MgO-CaO-SiO₂, CaO-Fe-oxide, and CaO-SrO as examples. Ch. 6 (39 pages) describes the use of the microprobe in the examination of unused and used basic refractories. Dolomite (i.e. CaO+MgO) and magnesite (i.e. MgO) refractories are given 25 pages, while chromite, chrome-magnesite, and other refractories (carbon, zircon, and silicon carbide) are dealt with more briefly.

The book is neither a manual for the use of the microprobe nor a comprehensive account of the findings obtained from its use in the refractories field. Rather it is a review covering all methods of examination, and particularly by use of the microprobe, of a specialized but important type of refractory material. About 180 references are cited; these are not comprehensive but are mainly included as being important examples of the use of particular techniques for the examination of materials or for the importance of the results obtained. Although the form of treatment gives a first impression of superficiality, the wide coverage and careful selection of examples and references provide an introductory account of the subject which fulfils the stated aims of the Applied Mineralogy Series—'to inform the engineer and technically interested scientist on mineralogical methods and knowledge relevant to technological problems'.

B. C. M. BUTLER

JAMES (BILL). *Collecting Australian gemstones*. (Fourth edition.) Sydney and Melbourne (Murray) and Folkestone, England (Bailey Bros. and Swinfen), 1972. 192 pp., 32 figs., 48 pls. (8 in colour), 12 sketch-maps. Price £5.00.

This is primarily a book for the rockhound and intending amateur lapidary. Written in a journalistic and enthusiastic style, it includes practical information on mineral hunting and lapidary work, good lists of Australian mineral localities, and a not inconsiderable proportion of somewhat irrelevant detail on Australian personalities in the lapidary field, which will be of little interest to most non-Australian readers.

The first chapter contains a collection of interesting and odd facts on gemstones in history, the second gives some account of the equipment needed for gem hunting, and the third chapter a very brief account of natural gem concentration concluding with a useful list of Australian gem localities.

The fourth and fifth chapters give details of mining laws and prospecting in the various Australian states and further information on equipment, modes of gemstone occurrence, and the code of conduct expected. Chapters six and seven are devoted to elementary mineralogy and gold panning and goldfields respectively. Chapter eight lists gemmology and lapidary classes in the various states.