BOOK REVIEWS

Marshall, D. J. *Cathodoluminescence of Geological Materials.* London and Boston, (Unwin Hyman Ltd.). xiv + 146 pp., 12 colour plates. Price £60.00.

Cathodoluminescence is a most useful, but possibly under-utilized petrological or mineralogical technique. D. J. Marshall has written a highly readable book, which should bring the subject out of the shadows. There can be no doubt that this book is a most valuable addition to the mineralogical literature. The author sets out by introducing the phenomena of luminescence, then discusses the history and instrumentation associated with cathodoluminescence, and finally provides detailed chapters on the cathodoluminescence properties of a variety of important mineral groups. In addition there is a chapter by A. N. Mariano on further geological applications of cathodoluminescence, and a fine set of colour plates illustrating many important features described in the text.

The introductory chapter is pitched at exactly the right level for the average mineralogist or petrologist, and provides a clear description of the physics behind the various types of luminescence, without getting bogged down in detailed theory. Electron energy levels, the effect of imperfections, and the importance of activators and quenchers are discussed qualitatively, but the author provides sufficient references to enable the motivated reader to obtain a more quantitative and rigorous understanding should it be required.

The brief history of cathodoluminescence is most interesting, and stresses, amongst other things, the impact that a 1965 paper, by J. V. Smith, had on the subject, because of its use of colour plates. The understandable difficulty that authors have in attempting to get colour plates printed in journals may well account for the relatively limited impact that cathodoluminescence has had in the wider mineralogical world. The author of this book, and the publisher, are to be congratulated for the excellent and essential colour plates presented in the text. There is, however, a price to pay for these plates, but it would be a shame if the relatively high cost of this volume were to limit its sales.

The chapter on instrumentation for cathodoluminescence studies is most authoritative and detailed. It includes a discussion of available instruments, safety, sample preparation, spectral analysis, and the problems of the photographic recording or cathodoluminescence. There then follows a chapter in which a highly condensed, but fully referenced, review of mineral cathodoluminescence is presented. The properties of elements, sulphides, oxides, halides, carbonates, sulphates, phosphates, and silicates are outlined. Subsequent chapters delve more deeply into the properties of feldspars, quartz and carbonates. These three chapters are very thorough, and bring the reader rapidly to the frontiers of the subject. This is emphasized by the final section of these chapters, which outlines areas of potentially fruitful future research.

The chapter by A. N. Mariano concentrates on cathodoluminescence in minerals from igneous and metamorphic rocks, and reveals the importance of rare-earth elements in determining the luminescence behaviour of minerals like apatite. A final chapter discusses briefly the role of cathodoluminescence in the study of gem materials, and of lunar and meteoritic samples.

This book is well written throughout, clearly illustrated and has an extensive reference list. It should be essential reading for all those working in the field, and for all mineralogists and petrologists concerned with petrography, mineral growth and textural evolution.

G. D. PRICE

Kodera, M., and Kolektív, A. *Topografická Mineralógia Slovenska I: A–Kl.* (in Slovak). Bratislava (Veda Vydavatel'stvo Slovenskej Akadémie Vied), 1986. 577 pp. Price Kčs. 105.00.

This encyclopaedic work on the topographic mineralogy of Slovakia aims to provide comprehensive information on the mineral and raw material wealth of the country. This first of two volumes starts with a complete bibliography of some 3200 numbered items up to 1982 from over 130 domestic and also foreign periodicals. This is followed by an alphabetical listing of the main localities, chosen to cover the territories of the main towns and villages. The genetic principle is then used to classify particular types of mineralization found in these localities. The names used for territorial units are the current ones, but cross references to the older names often used in the

literature are promised in the full locality index in volume 2. The language should prove no real barrier: thus under the locality Hnúšta-Likier one is given a mineral list for the hornfels—'aktinolit, cordierit, epidot, flogopit, granáty'—and, for example—the latter is followed by 'ideoblasty az 1 cm vel'ke [2674] (2674 = the reference number). Identifikované opticky *n* 1.803, promocou RTG (explained as = XRD in the abbreviation list) *a* 11.52 Å [927] a CHA (= wet chemical analysis) ako almandín. CHA: SiO_2 37.74, Al_2O_3 17.47, etc. . . *D* 4.15 [927]'.

The book contains an immense amount of data and the two-volume set (when Vol. 2 becomes available) should be in all Earth Science libraries.

R. A. HOWIE

Trewin, N. H., Kneller, B. C., and Gillen, C. eds *Excursion Guide to the Geology of the Aberdeen Area.* Edinburgh (Scottish Academic Press), 1987. x + 296 pp., 18 photos, 40 maps. Price £8.75.

This book, produced by the Geological Society of Aberdeen, provides an account of the geological history of northeast Scotland. The 24 excursions illustrate the great variety of geological features to be seen in the area. Topics and localities covered include the classic areas of the Barrovian metamorphic zones in the Dalradian of Glen Esk, Buchan-type metamorphic zones near Banff, the Huntly layered igneous intrusion, the Insch 'Younger Basic' igneous mass and the 'Newer Granite' of Bennachie, and the chloritoid-bearing assemblages and structures in the folded Dalradian rocks north of Stonehaven.

Each excursion is based on a series of numbered localities and accompanied by sketch maps. There are clear instructions as to access, parking spots, and time needed to visit the various outcrops. The book starts with a 50-page summary of the geology of the area and concludes with some 220 references. It is well produced, with numerous diagrams as well as locality maps, and available at an eminently sensible price.

R. A. HOWIE

Smith, D. K., McCarthy, G. J., Bayliss, P., and Fitzpatrick, Joan. *PDF Mineral File Workbook: Use of the X-ray Powder Diffraction File of Minerals.* JCPDS International Centre for Diffraction Data. Swarthmore, PA, U.S.A. 1986. pp. v + 170. Price $10.00.

The powder X-ray diffraction method is very widely used for identifying the mineral constituents of rocks and other materials. This publication is concerned not with the X-ray technique but with the methodology for interpreting the data. It gives seven worked examples of the use of the Mineral File as follows: 1. Comparison of the search methods of the Hanawalt and Fink Indexes. 2. Illustration of the difficulties encountered with solid solutions. 3. Determining composition and structural state of feldspars. 4. The identification of polymorphs. 5. Clay minerals. 6. Quantitative analysis. 7. Comparison of manual and computer search methods for multi-mineral mixtures.

The workbook is self-contained, reproducing all the necessary extracts from the various data books and manuals (the publishers permit copy making for student use). It is undoubtedly a valuable teaching aid for undergraduate courses, postgraduate students, technical assistants and other users or potential users of the Mineral File.

J. ZUSSMAN

Sears, D. W. G. *Thunderstones: a study of meteorites based on falls and finds in Arkansas.* Fayetteville and London (University of Arkansas Press), 1988. xii + 98 pp., 30 figs., 8 tables. Price £6.80.

In this paperback, meteorites recovered from Arkansas, USA, are described and used to illustrate a variety of meteorite compositions and structures. The meteorites comprise six falls and seven finds, including five stones, seven irons and one stony-iron. Meteorite types not represented in Arkansas are briefly discussed. Although written at a popular level, this book is also scientifically authoritative and includes brief insights into current research aimed at understanding the history of meteorites. Numerous references are given as footnotes to the text. The final chapter discusses the possible origins of meteorites. The book ends with a page of references to books for further reading and is a good, if limited, introduction to meteorites in general. It should be useful and instructive to the non-specialist as any specific terms used are well explained. This book should not be confused with another on meteorites with a similar title: Thunderstones and shooting stars, By R. T. Dodd.

A. L. GRAHAM

Boscardini, M., and Sovilla, S. *Il giacimento mineralogico di S. Pietro in Montecchio Maggiore (Vicenza).* Montecchio Maggiore (Museo Civico 'G. Zannato'), 1988. 93 pp, 37 figs., 45 colour photos.