you might need the allied volumes on geochemistry, mineralogy and structural geology (etc.), an appreciable investment will be involved. The justification must be that they capture a wide ranging contemporary view of the earth sciences, and thus provide a comforting foundation of reference material for those needing quick access to a broad background knowledge. One for the library budget!

In reviewing this volume, I was drawn to reflect upon the status of petrology as a distinct branch of Earth Science. A book which seeks to give a concise review of igneous and metamorphic petrology must be governed by the acknowledged limits of its subject, which are historical in origin. There is indeed a strong sense of the evolution of the science, without over-indulging in speculations about future developments (perhaps wisely). Moreover, the encyclopedia deals strictly with topics which fall into the field of academic petrology, in terms largely drawn from within its own tradition. You will find tuffs but not bentonites, whole-rock analyses but no account of analytical techniques, metasomatism and a little on hydrothermal processes but fluid inclusions are found in another part of the series.

However, such carpings do not detract from the overall strength of the encyclopedia, which is the shear abundance of useful information and the convenient manner in which it is arranged. I enjoyed delving into it, and look forward to using it in future.

N. J. FORTEY

Allaby, A. and Allaby M. (editors) *The Concise Oxford Dictionary of Earth Sciences*. Oxford and New York (Oxford University Press), 1990. xxii + 410 pp. Price £20.00.

The Concise Oxford Dictionary of Earth Sciences attempts to cover geology in all its aspects, together with (or are they now part of?) climatology, meteorology, oceanography, pedology, planetary geology, palaeontology and geomorphology as well as the philosophy and history of the Earth Sciences. This is a tall order and especially so when space is limited. The editors admit that they operated a 'rationing system' in selecting terms which were to be incorporated. That some sought-after information will be missing is to be expected: the field is so broad and the subjects are advancing so rapidly. This work tries to be all things to all men and in so doing it reveals its failings. We find reference to the Chemungian ['(Cohoktomian) *See* Senecan'] which some readers will be interested to know is part of the Devonian of Canada but will find nothing on the Cimmerian and all that it implies in the evolution of the North Sea province. Yazoo stream is described yet there is no mention of the Yoredales. A number of 'second-spellings' of words are omitted *-laurvigite* is missing, only *larvikite* is described. *Geophysics* is defined while the word *geology* is not.

Such criticisms reflect some of the shortcomings of the work but on the positive side one must say that the definitions therein are full and clear with ample cross references. The work is certainly global in its approach and this reflects credit on the contributors and advisers used in its compilation, but sadly some more 'domestic' terms such as Red Crag will not be found.

There is a useful bibliography of some 400 titles but surprisingly there is no reference there to other geological dictionaries—for example to Fairbridge's series of dictionaries published a decade or so ago. At £20.00 it is an expensive addition to one's library and it is not going to give all the answers: clearly the editors had realized this when they wrote the preface. The specialist, I suspect, will use his own sources, the amateur may be better served by some of the cheaper dictionaries available or indeed by the glossaries provided in so many of the new text books with broad appeal. I suspect that some users will find the work irritating.

A. J. SMITH

Cooper, M. P. and Stanley, C. J. *Minerals of the English Lake District—Caldbeck Fells*. London (British Museum [Natural History]). 1990. vi + 160 pp., 32 figs., 69 colour photos, 11 maps, 3 tables. Price £14.95.

This book, the second in a series on the minerals of the British Isles to be produced by The Natural History Museum, describes the comparatively small but richly mineralized area of the Caldbeck Fells in the northern Lake District. Unless further volumes are to follow on the minerals of other parts of the Lake District the title chosen for the present book is rather misleading: 'Minerals of the Caldbeck Fells' would be much better.

Like its companion volume on the minerals of Devon and Cornwall the contents of this book fall into two parts. In the first the geological framework of the Caldbeck Fells is outlined briefly. There follows a section in which the main groups of mineral deposits are described and classified and their origins discussed in the context of the whole Lake District. Several distinctive major mineralizing episodes produced a variety of deposits for which the area has long been celebrated. A section is devoted to mining, one of

Lakeland's oldest traditional industries. This has been an important but intermittent feature of the Caldbeck Fells from at least the 16th Century until the final closure of Carrock Fell Mine in 1981. After an introductory section, rather more detail is offered on the more important mines and mineralized sites. A chapter on the activities of mineral collectors and dealers gives a valuable insight into an important, but often neglected, aspect of mineralogy. It is interesting to learn here that for some reason Caldbeck Fells were largely ignored by scientists and collectors during the early years of mineralogy. Even in the 19th Century comparatively few dealers and collectors seemed to have been attracted to the area, in striking contrast to the over-collecting and damage caused to many sites in recent years.

In the second part of the book attention is turned to the minerals for which the area is famous. As the authors point out the area contains a greater abundance of mineral species than any other area of comparable size in Great Britain. For this section they opt for a descriptive catalogue in which all the vein minerals are listed: so called 'rock-forming' minerals are generally excluded, though listed in an appendix. Much of the information contained in this section is, of necessity, quoted more or less directly from the mineralogical literature and, although in large measure duplicating earlier compilations, the authors add numerous original observations drawn from both their own work and those of a small number of mainly amateur collectors. Within this section, and elsewhere in the book, some 61 mineral specimens are illustrated, all, except a handful of SEM pictures, in colour. Although the photography is of high technical quality there is a surprising dearth of illustrations of fine specimens from the national collections. Only 14 of the 61 are Natural History Museum specimens. The majority are specimens from private collections despite the authors' comment that for Caldbeck Fells minerals the collections of the Natural History Museum are 'without parallel'. An opportunity appears to have been missed to illustrate and discuss the history of some of the best specimens ever collected from the area as was done to great effect in 'Minerals of Devon and Cornwall'. Mineral species are listed by locality in a generally useful appendix which is, however, rather spoilt by the inclusion of the authors', apparently arbitrary, assessment of the 'importance' of certain occurrences. For example, it is difficult to understand why the occurrence of the recently described mattheddleite is accorded local importance at two sites, national importance at one and no particular significance at another. One small error noted here and in the catalogue: Carrock Fell Mine is not the first published British occurrence of powellite.

Criticisms of this book are, however, minor and detract little from what is undoubtedly a valuable addition to the literature of British Mineralogy. It will appeal equally to both the amateur and professional mineralogist. Not only are the authors to be congratulated on a fine piece of work, but the Natural History Museum deserves praise for initiating what promises to be a splendid series of books on British Mineralogy.

B. YOUNG

Naldrett, A. J. *Magmatic Sulfide Deposits*. Oxford and New York (Oxford University Press), 1989. viii + 186 pp. Price £40.00.

The magmatic sulfide deposits, a major world source of a range of metals including nickel, cobalt, iron and the platinum group elements (Pt,Pd,Rh,Ru,Ir,Os), have been a subject of research since the discovery of such classic deposits as those of the Sudbury Basin nearly a century ago. The last thirty years have been a particularly active period, with the traditional field of geological and petrographic methods being supplemented by the full range of modern analytical techniques, and with both experimental and theoretical approaches. There is, therefore, a very large body of information and this has never been comprehensively reviewed. This volume by Tony Naldrett sets out to do just this and, in the words of the author, to 'freeze and preserve, at this instant in time . . . understanding of magmatic sulfide ores'.

'Magmatic Sulfide Deposits' is comprised of seven chapters. Following an introduction dealing with general aspects of the geochemistry of transition metals and the arguments for a magmatic origin of Ni–Cu–PGE ores, the structure of the book is explained so as to lead the reader into Chapter 2 which treats the problem of classification of mafic and ultramafic rocks and the related magmatic sulfide deposits. Chapter 3 deals with the experimental studies undertaken on the relevant sulfide, sulfide–oxide and sulfide–silicate systems, whereas in Chapters 4 and 5 (the 'heart of the book' as pointed out by the author) are presented descriptions of a wide range of Ni–Cu and PGE-rich deposits along with discussions of their modes of origin. The large body of analytical data on the compositions of magmatic sulfide ores is critically reviewed in Chapter 6, and the use of genetic concepts in exploration for magmatic sulfide ores is the subject matter of the final