# BOOK REVIEWS

Brindley, G. W. and Brown, G., Editors. *Crystal Structures of Clay Minerals and their Identification.* London (Mineralogical Society), Monograph 5, 1980. viii + 496 pp., 103 figs., 7 pls. Price £28·00 including postage.

There has long been a need for a source of information concerning this subject and this book furnishes this need in a comprehensive manner. The book is very well organized and has an excellent table of contents for each chapter.

Since the authors have assumed that the reader knows something about clays, it is not a book for the beginner. However, it is an excellent source for a vast amount of information that should be on the shelf of every clay mineralogist and anyone who has an interest in clay mineralogy.

The chapter on 'Structures of Layer Silicates' is very well presented and is all inclusive. The chapter on X-ray diffraction procedures is of particular interest. It thoroughly details methods that should be followed to obtain reliable data. The inclusion of X-ray powder data for the many clays and clay minerals is an outstanding feature of the book. This information, plus a table relating reflections likely to occur in clays in order of decreasing $d$ (Å) values provides excellent information for clay identification.

For those interested in the adsorption of water and/or organic compounds by clays, a chapter is provided that treats the subject in a logical and comprehensive manner. The subject of quantitative analysis of clays by X-ray diffraction techniques is also presented. The many papers and symposia on this subject have never given it a thorough treatment. However, this chapter provides a wealth of information concerning procedures and the problems associated with such determinations. A 'Final Evaluation' at the end of the chapter effectively summarizes the problems that can be encountered with this type of analysis.

Many references are provided for each chapter and the author and subject indexes are certainly adequate. An added bonus is the appendix which contains tables for converting $d$ in Ångstroms from $2\theta$ from $K$-$\alpha$ and $K$-$\beta$ radiations of copper, cobalt, and iron.

The authors should be congratulated for this excellent contribution to clay mineralogy.

W. F. HOWER

Putnis, A. and McConnell, J. D. C. *Principles of Mineral Behaviour* (Geoscience Texts, 1). Oxford and Boston (Blackwell Scientific Publications Ltd.), 1980. x + 258 pp., 212 figs. Price: cloth £18·00, paper £9·80.

This interesting new book on the thermodynamics and, particularly, the kinetics of mineral transformations is aimed at an undergraduate mineralogy audience, primarily. Assuming a moderate amount of crystallography and thermodynamics (although the basics are covered succinctly), the reader is introduced to an atomistic, microstructural view of crystal structure (chs. 2–3) and processes in minerals (ch. 5). The thermodynamics and kinetics of transformations are covered briefly in chs. 4 and 6, the latter in terms of time–temperature–transformation (TTT) diagrams. The last three chapters provide a very interesting, largely qualitative, description of mineral transformations in some systems of geological interest.

Although one could argue about minor points of development or organization, the book successfully achieves the stated aim of the preface and ch. 1: to provide a largely descriptive account of mineral transformation, thus plugging a major gap in the geological literature. However, I doubt whether the book will be used much at an undergraduate level (though it should be of considerable, if not compulsory, interest to postgraduate and other research workers in mineralogy and petrology). There are several reasons for this. The first is that the scope of the book is not wide enough. My prejudice is that mineralogy taught as part of a geology degree should have as its aim an illumination of petrological processes. Thus a book which has on p. 1, 'we . . . will not discuss the broader aspects of transformations such as chemical weathering and reactions between minerals during metamorphism', is ignoring the major application of this sort of approach in petrology. The second comes out of the first. Although the blind acceptance of quenched-in equilibrium between/within minerals should be deplored, many mineral assemblages can be considered in terms of equilibrium (regardless of whether cooling has been accompanied by transformations in the individual minerals—provided that the minerals do not suffer much chemical exchange between minerals during cooling). Although the polemic against the assump-

tion of equilibrium is justified for the situations considered in this book, it is not justified when studying mineral assemblages. Given, then, that an equilibrium thermodynamic approach is of considerable use in petrology, students should have a reasonable appreciation of this approach before going on to diffusion and kinetics, at least at the level presented in this book. My experience is that it is difficult to teach the former, let alone the latter, in a crowded undergraduate syllabus (however unfortunate that may be).

It is unfortunate that the production of the diagrams is not better—though I gather that a 'misunderstanding' between the author and their publisher, Blackwells, was the cause—certainly Blackwells can have no reason to be proud of this and the authors every reason to be annoyed. Incidentally, I like to see G–X loops have infinite slopes at the axes for thermodynamic correctness.

A valuable addition to the geological literature.

ROGER POWELL

Taylor, R. G. *Geology of Tin Deposits.* (Developments in Economic Geology, 11.) Amsterdam, Oxford, and New York (Elsevier), 1979, xii + 544 pp. Price Dfl. 150 ($73.25).

Combining both academic and practical information, this book provides a comprehensive overview of the major aspects of the geology and search for tin. The basis for the text was a course given to the Australian Mineral Foundation in 1976 and although the work is aimed primarily at research-exploration and mining geologists directly involved in prospecting and exploiting tin, the well-illustrated text will appeal to a much wider readership. The major topics discussed include: metallogenic provinces, classification of primary and secondary deposits, characteristics of stanniferous granitoids, geological features of tin deposits, exploration philosophy, geochemical prospecting, province-district and ore-body analysis, low-grade deposits, hydrothermal alteration patterns, behaviour of tin in the magmatic, hydrothermal, and weathering environments, drilling-sampling and ore reserve estimation, and tin-bearing minerals.

Over-emphasis of 'academic' aspects at the expense of 'practical' information detracts from the over-all usefulness of the book to the exploration/mining geologist. The exploration geologist particularly would have appreciated many more case studies illustrating different approaches to searching for tin in a variety of geological environments. Furthermore, the lack of synthesis sections concluding some topics and chapters is a fundamental weakness. In such a compilation of information and ideas it is the author's responsibility to summarize and synthesize.

In spite of these critical comments the book contains a wealth of useful information which has never before been incorporated in a single volume. Notable sections include: the author's comprehensive classification of tin deposits (chapter 3), which integrates environmental, morphological, and mineral-chemical parameters; a discussion (chapter 6) of the most significant geological features of tin deposits and their application to search techniques; a very useful appendix which provides notes and key references for twenty-three of the most important tin provinces; and a comprehensive bibliography. Chapter 10 (co-authored with C. Cuff) provides an excellent review of the mineralogy and crystal chemistry of tin which any mineralogist would find useful.

The high price will discourage most individuals from buying this book but everyone engaged in tin geology will need to refer to it.

N. J. JACKSON

Phillips, W. R. and Griffen, D. T. *Optical Mineralogy: The Non-opaque Minerals.* Oxford and San Francisco (W. H. Freeman & Co., Ltd.), 1981. xiv + 677 pp., 332 figs. Price £19·95.

This book has two parts and was designed to complement the companion volume *Mineral Optics: Principles and Techniques* [MA 72-824]. Part I contains detailed descriptions of the common rock-forming minerals and Part II is a set of detailed tables of most of the non-opaque minerals arranged in order of increasing refringence under five headings—isotropic, uniaxial (positive and negative), and biaxial (positive and negative).

The first part describes the properties of the common rock-forming minerals with emphasis on the optical properties although physical properties, chemical composition (without chemical analysis), structure (with many drawings), alteration products, and occurrence are also included, and a small number of highly selective references (typically from 2 to 10) are cited which enable the reader to enter the specialist literature dealing with each mineral. The arrangement is by chemistry for the non-silicates and by structural group for the silicates. The most important section, especially for student use, is the Distinguishing Features listed for each mineral. Although this is generally well developed, with particular reference to the minerals