

tural aspects of polymetamorphic rocks, but possibly this is deliberately sparse in anticipation of the publication of the atlas of metamorphic rocks), Bruce Yardley has managed successfully to give a very readable account of most of the important aspects of the subject and introduced some of the complexities without intent to baffle. I would highly recommend this book to anybody wanting an introduction to the subject, or indeed an update on current research trends in metamorphic petrology. It should be essential reading for all geology undergraduates, and at £13.95 is affordable.

K. H. BRODIE

Carr, D. D. and Herz, N. (eds.). *Concise Encyclopaedia of Mineral Resources*. London and Oxford (Pergamon Press), 1989. xxiii + 426 pp. Price £80.00.

This volume is intended as a companion volume to 'Encyclopedia of Materials Science and Engineering'. Many of the articles have been taken from that work and they were originally written for the 'materials scientist'. As such, many of the articles are not really suitable for the 'mineralogist'.

The book is clearly an attempt to produce a relatively compact work (of 426 pages) and to cover a huge field in an encyclopaedic fashion. It begins with a useful but brief introductory chapter and an even briefer guide to the use of the encyclopaedia. The bulk of the work consists of a series of articles on topics in mineral resources. These articles are relatively brief and the importance given to each topic appears to be somewhat haphazard. Certainly the encyclopaedia contains many articles of general interest: there are, for example, fascinating accounts of 'metals recycling' and 'plate tectonic settings for metallic ore resources'. This latter article seems a little out of place alongside an extensive discussion of Portland cements and prices of industrial minerals. The basic problem with the book, however, is that it tends to begin discussing a topic and then stops before saying anything useful about it. It is difficult to see who would really want to buy the book, especially at its present price. The book falls between two stools. On the one hand, if it had been produced as a cheap popular publication, it might have been valuable to the mineralogist as a quick reference guide. On the other hand, if it is to be sold as a high-price encyclopaedia, it really needs to be radically rewritten with far more detailed information.

The encyclopaedia claims to be a 'comprehensive reference work covering all aspects of mineral

resources' with information presented as 'alphabetically arranged articles which deal concisely with individual topics in a self-contained manner'. The topics selected, however, are very strange to the mineralogist and possibly to the materials scientist as well. For example, under B, we find only four entries (Beryllium Resources, Binders: Clay Minerals, Binders: Industrial Minerals, Bismuth Resources) and T warrants five entries (Thorium Resources, Tin Resources, Titanium Resources, Traditional Ceramics: An Overview, Tungsten Resources). To be fair there is a better coverage of some other areas.

Overall, it is difficult to recommend this book almost regardless of price. It contains interesting and useful information and many of the individual entries are worthwhile in themselves and indeed may be helpful, but the basic thinking behind the book is very doubtful.

J. N. WALSH

Ineson, P. R. *Introduction to Practical Ore Microscopy*. London (Longman Group), 1989. 181 pp. Price £11.95.

This cheap paperback is intended for the novice/undergraduate market—a market that has been, and will continue to be, best served by the soft-back edition of Craig and Vaughan's excellent 'Ore Microscopy and Ore Petrography'.

Ineson's book itself owes a great deal to Craig and Vaughan. Some of the line drawings, used instead of photomicrographs to illustrate textures and textural relationships, can only be recognised and understood after seeing the original photomicrographs in 'Ore Microscopy, Ore Petrography'. This is a rather nice confirmation of Ineson's assertion that 'descriptive terms . . . are of limited value. A photomicrograph with a scale is essential' (p. 44). What is true of descriptive terms is also true for poor line drawings.

The text carries few typographical errors (mainly restricted to localities—Great Gossan Lake (sic) and authors Shouten (sic)) which is surprising as the level of proofing has allowed numerous factual inconsistencies, far too many low-grade misunderstandings (reflectance and pleochroism are confused in a number of the mineral descriptions) and a dozen or so errors that would be extraordinary for an ore microscopist. Statements in bold type are no more likely to be correct than those in normal typeface.

A book where rutile is described as having no internal reflections (p. 115), as not showing twinning in polished section (p. 136) and as having high reflectance, and where native copper is said

to appear blue – green to grey against cuprite is difficult to recommend.

R. A. IXER

Ghose, S., Coey, J. M. D. and Salje, E., eds. *Structural and Magnetic Phase Transitions in Minerals*, (Advances in Physical Geochemistry, volume 7). Springer-Verlag, Berlin, Heidelberg & New York (Springer-Verlag), 1989. xii + 244 pp. Price DM 108.00.

The seventh volume of the Springer series on 'Advances in Physical Geochemistry', maintains the high standards set by the previous volumes. In this text, the editors have gathered together contributions which attempt to give an impression of the range and sophistication of current mineralogical research on phase transformations. Although many non-specialists may not be familiar with the ideas now central to contemporary research on phase transformations, such as Landau theory or molecular dynamics, the authors of the various chapters in this book have generally attempted to provide a broad introduction to their contribution, in which the key concepts used in their analyses are introduced and qualitatively explained.

The book is divided into twelve chapters, which address a variety of topics. Some chapters provide new insights into 'classic' mineralogical problems, such as the nature of phase transformations in the plagioclase feldspars, while others, which are equally fascinating to the research worker committed to the study of phase transitions, may be considered somewhat esoteric by the more general mineralogist.

Chapters 1 and 2 (by Salje and Dolino, respectively) show how Landau theory, when combined with careful diffraction experiments, can be used to interpret the phase transformations both in plagioclase feldspars, and in quartz and its isostructural analogue berlinite. Davidson, in Chapter 3, uses more classical thermodynamics to model mis-

cibility gaps in the pyroxene quadrilateral, while Burton and Davidson in the following chapter show how the Bragg-Williams model and more sophisticated cluster variation methods can be used to simulate a variety of complex, subsolidus phase diagrams.

Research into minerals, or hypothetical minerals, that are stable only at very high pressures is outlined in chapters 5 to 7. Bukowinski and Wolf describe how their computer simulations of magnesium silicate perovskite can be used to obtain estimates of the equation of state of this major Earth-forming phase, and discuss the resulting geophysical implications. The effect of pressure on the spin state of iron (II) is addressed in chapter 6 by Sherman, while Matsui and Matsui outline their recent molecular dynamics simulation of the high-pressure SiO<sub>2</sub> polymorphs, and predict the existence at very high pressures of a cubic polymorph, related to pyrite structure.

The role of electrons in mineral phase transformations are discussed in chapters 8 to 11, which concentrate on magnetic phase transitions in silicates. Chapter 9 by Coey and Ghose, provides a particularly useful review on this subject. Finally, Salje and co-workers provide a chapter on polytypism, and present results of experiments on PbI<sub>2</sub>, which they attempt to interpret in terms of theoretical models for polytypism, such as the ANNNI model.

Each of the chapters in this book is of the highest standard, and cannot be faulted. The book, however, is more akin to a 'Special Issue' of a journal, such as *Mineralogical Magazine* or *Physics and Chemistry of Minerals*, than to a comprehensive text on the subject of Phase Transformations. As such, despite the clearly written text, I imagine few general mineralogists will be tempted to buy this book, however I hope they may find it on the shelves of most institutional libraries, and I urge them at least to peruse this volume during a leisured visit to their local mineralogical library.

G. D. PRICE