ROBERTS (W. L.), RAPP (G. R., *Jr.*), and WEBER (J.). *Encyclopedia of Minerals.* New York, Toronto, and London (Van Nostrand Reinhold Co.) 1974/75, xxv+693 pp.+128 pp. colour pls. Price bound £31·60.

The publishers' claim that this book contains descriptions of over 2200 mineral species, and nearly 1000 colour photographs, is overly modest; I counted 2239 major entries, and a further 635 short entries including synonymy cross-references. The 128 colour pages are grouped into 8 sections of 16 pages, and carry 941 separate photographs, each $3'' \times 2''$; these represent 541 species, of which 209 appear more than once (diamond tops the list at 16, closely followed by pyrite (14) and quartz (12)). The book is $11\frac{1}{2}'' \times 9'' \times 1\frac{3}{4}''$, and weighs over 5 lb.

Wherever possible, each entry contains the following information: name and common synonyms; chemical formula; crystal system, class, and space group; lattice constants and Z; three strongest diffraction lines; optical constants (but not orientation); hardness; density; cleavage; habit; colour and lustre; mode of occurrence; locality data; 'best reference in english' [language]. I am delighted that the authors decided to use an alphabetical arrangement of the entries, rather than one of the many available systems; the latter have their uses, but hinder rapid reference. I have not checked how many species are missing, since this would start another round of the fruitless argument about 'what is a species?'

Knowing the authors, I expected a high standard of their work and have not been disappointed. They clearly aimed at popular appeal with minimal sacrifice of scholarship, and came very close to a full score; it is their success rather than any failure that prompts me to make the following criticisms. Roberts and Rapp have done a most commendable job in condensing the available data into readably brief but informative entries; anyone who has attempted this kind of compilation will sympathize with their wish, in the introduction, that they had had the time and facilities to resolve all the discordant data they encountered, and they have clearly indicated which species they consider to be inadequately characterized. Weber joined the project later, in 1972, and did well to assemble so many excellent photographs in so short a time.

I was amazed to find no spelling errors, apart from the missing diacritical marks that one learns to expect from even the better American printers, but I wish the authors had paid more attention to IMA rulings on nomenclature (e.g., *Min. Mag.* **38,** 102); we thus have metastrengite, cerargyrite, *et al.* in place of phosphosiderite and chlorargyrite, *et al.* However, I am glad they share my preference for sphene and idocrase over titanite and vesuvianite (a conflict yet unresolved). It would have been better if the descriptions had carried an asterisk to indicate which species were figured in the plates, and I noted two discrepancies; alstonite (text) is bromlite (under 'B') in the plates, and guarinite (plate) has no entry in the text. The inclusion of refractive indices in the data would appear to presuppose access to a microscope and immersion liquids by the reader; exclusion of the optical orientation means that he cannot make intelligent use of the R.I.s given.

The coverage for recently described species is good, and includes several for 1973, but corrected data for older species may be lacking: crichtonite, for example, is an

independent species and not synonymous with ilmenite (*Min. Mag.* **37,** 349). In this connection, the 'best reference in english' is not always what it claims—the 7th edition of Dana's *System* is already dated—and would have been better supplemented on occasion by the source of revised data or by a reference to, say, Strunz's *Mineralogische Tabellen* [and if the authors had used the 5th edition (1970) of this work, instead of the 3rd (1957), some of their difficulties might have been more readily resolved]. Space could have been saved for this by using abbreviated references (cf. *Min. Mag.* **38,** 987; **39,** 904).

With the exception of a handful of pictures of larger specimens (or so I assume, since magnifications are deplorably lacking throughout and have to be guessed from indirect evidence such as background, shadows, depth of focus, knowledge of the specimen material, and—occasionally—chromatic aberration), and one or two scanning electron micrographs, the colour plates are photomicrographs of small crystals and the majority are strikingly successful. Indeed, they have provided me with my first 'sight' of one or two species, notably sincosite. However, the short time for getting together so many fine photographs has led to a few shortcomings. Some of the pictures are spectacular, such as those of the surface features of diamond, but add little to the determinative value of the work. Others are indistinct (e.g. blödite, roscherite) or poorly oriented (e.g. benitoite) and so fail to give the reader a 'typical' view of the crystal(s). There are some redundancies (e.g. francevillite, where one picture rather than four would have sufficed), and some misidentifications (e.g. the platy transparent 'tennantite' and the 'felsőbányite'). This excellent set of pictures should appeal to all who are interested in minerals, and particularly to the micromount collector who so rarely has much more than the appearance ('eyeballing') to help him, and herein lies my main criticism or regret—apart from the lack of magnification data: the colour reproduction varies from superb to bad, fortunately mostly the former. I am incompetent with a camera, but I have long maintained that where there is disagreement between what the camera 'sees', however 'correct', and what the eye sees, the eye is always right. If some of the silvery metallic minerals come out with convincing realism, they all should; if so many of the blues and greens are good, why is the liroconite such a mendacious purple? If visual realism is lacking, it is up to the professional photographer to adjust or even falsify the lighting until the final result is convincing. Finally, and this is a limitation of the collection drawn upon, some of the pictures are atypical of the general run of the species in question: thus, I have seen many rectangular platy and tabular crystals of bertrandite, from different localities, but none like those illustrated. If the Connecticut crystals were the only ones I had seen I could have been badly misled.

The volume is handsomely produced, and although heavy is sufficiently strongly bound to have survived being dropped a couple of times without damage; at the price, it should be! The layout is clear, but very wasteful of space: there was no need whatever for the data headings (e.g. 3 STRONGEST DIFFRACTION LINES) to be printed in full and in capitals each time, nor for brief data to take a whole line. At least one inch per major entry could have been saved without loss of clarity—and this would have shortened the book by about 120 pages, and presumably reduced

production costs. I wish I could understand the pricing policy of publishers! Here is a book at £31·60, yet visitors tell me they have already seen it on offer in New York, through Astro Minerals, for about $35. It is the best book of its kind that I know, with potential sales to libraries, collectors, and professional mineralogists running to three or four thousand copies or even more—yet this market has probably been halved by the price asked. The day of the £25 specialist reference work is already regrettably with us, but £31·60 for a book with considerably greater popular appeal seems very short-sighted. If you can afford it, I recommend it.

P. G. EMBREY

BANCROFT (G. M.). *Mössbauer spectroscopy: An introduction for inorganic chemists and geochemists.* McGraw Hill Co. (U.K.) Ltd., 1973, xii+252 pp., 84 figs. Price £6·95.

This book falls naturally into three sections of almost equal length. Chapters 1–3 cover the theory and practice of the Mössbauer effect itself, and of fitting Lorentzian lines to Mössbauer spectra; Chapters 4–6 cover the applications to inorganic chemistry, and the last three chapters those to mineralogy and geochemistry. Any mineralogist wishing to understand the background to the work that has been done on the subject in the last ten years would be well rewarded by reading the first section, and if he was seeking a summary of the applications themselves he would find it in the third section. If he intended to contribute to the subject himself he would be all the better prepared by stretching his mind to follow the details of the chemical applications in the central section, even though he is unlikely actually to become involved either with the more exotic Mössbauer nuclei like Xe and Ru or with most of the ligands that are there discussed. Each chapter is followed by problems, which would serve either to test his own understanding or to use in his teaching.

By way of criticism one could say that the author found it difficult to know where to begin and where to stop. The former is the more trivial criticism, but any reader who needs the contents of the first three pages will be in real trouble by Chapter 2, if not before. In the third section there are included topics such as pleochroism and the thermodynamics of ordering that have nothing to do with Mössbauer spectroscopy as such. The only excuse for the section on the pleochroism of glaucophane–riebeckite is that it can be explained on the basis of the cation distribution 'partially deduced from Mössbauer spectra'—although in fact already deduced before Mössbauer spectra were invented.

More importantly the reader could be misled by the author's enthusiasm for his subject. Although one finds in the text caveats against most of the pitfalls, the presentation is such that they are likely to be lost on the unwary. Much use is made of the concept of 'fingerprint technique', but a fingerprint is a pattern so complex as to be unique.

Mössbauer spectra are far from satisfying this criterion and one is staggered at the logic of 'a doublet is observed with a quadruple splitting of 2·15 mm s^{-1} *indicating*