

uplift-cooling interpretation in a number of cases. In addition, the authors nowhere mention that a good approximation to age of crystallization *can* often be obtained by dating whole-rock specimens of low-grade metamorphic rocks such as slates and phyllites. A little time and space surely ought to have been spared for a brief comparative evaluation of the principal age methods. The K/Ar method has both advantages and severe limitations as compared with the other methods. One-method geochronology can be very one-sided!

This is in many ways a very useful book, although the body of the subject is perhaps more adequately catered for than its soul.

S. MOORBATH

CORRENS (C. W.). *Introduction to Mineralogy, Crystallography, and Petrology*, 2nd ed. in co-operation with Josef Zemmann (Part One) and Sigmund Koritnig (Mineral Tables). Translated by William D. Johns. London (Allen & Unwin), 1969. xi+484 pp., 391 figs., 1 pl. Price £5. 5s.

The short title of this book, *Introduction to Mineralogy*, is misleading. In fact, Correns pulls on his seven-leagued boots and leads us far and wide across the field of mineralogy and petrology, like a monarch exhibiting his well-loved kingdom. Few regions escape his observation and remark; but some provinces receive only a brief glance, and even in the main centres of its commerce the pace is often bewildering, and we are left a little breathless. As is indicated in the acknowledgement of collaborators, his own personal imprint is most marked in the section on Petrology.

The sections are: Part I, Crystallography (178 pp.); Part II, Petrology (158 pp.); and Part III, Appendix (124 pp.) including crystallographic tables, a tabular summary of the properties of common minerals, petrological tables, and selected literature.

Naturally, this coverage has only been achieved by intense compression of the material, and while this has been done with masterly skill, it makes dense reading, unsuitable for the student and scarcely in keeping with an Introduction. For example, it is doubtful whether the 80-odd lines given to the stereographic projection would really enable a student to master this descriptive aid. Nevertheless many individual sections abound in interest and many topics neglected in other texts are sharply illuminated.

In Part I the opening section on Crystal Mathematics is unattractive. That on Crystal Optics is notable for the uncompromising introduction of elliptical polarization in explaining the passage of light through the polarizing microscope, instead of the usual (and easier) resolution of vibrations on to the plane of the analyser. But no advantage is taken of this in the account of the reflected light microscope, which is disappointingly brief. The account of X-ray Optics is a good conspectus, but too condensed to be a practical guide. Chapter IV on Crystal Growth and Dissolution deals interestingly with a topic often neglected in textbooks.

Part II, Petrology, begins with a brief treatment of phase equilibrium diagrams. Approximately equal space (33 to 41 pp.) is then devoted to each of igneous, sedimentary, and metamorphic rocks, with short chapters on weathering and soil formation, and geochemistry. On igneous rocks, to treat differentiation before description

seems to put the cart before the horse. In the following descriptive section Niggli's mineralogical divisions are shown, and the calculation of Niggli values and the C.I.P.W. norm demonstrated by examples. The role of volatile constituents is treated rather fully, and well. The treatment of sedimentary rocks is illustrated by examples from the author's own researches, the emphasis being on processes rather than description. In *Metamorphic Petrogenesis*, too, the account of chemical processes dominates. A section of 12 pp. deals with fabric and rock deformation.

In a preliminary note it is admitted that the tables of mineral properties in Part III cannot be a substitute for a textbook of systematic mineralogy. The arrangement is a conventional chemical one—they are not determinative tables—and 300 species are listed. The petrological tables list chemical analyses and volume % modes for typical igneous, sedimentary, and metamorphic rocks. The high proportion of German books and papers in the selected literature list diminishes its usefulness to the beginning student, but will be very useful to those more advanced.

There are some infelicities in translation and a few misprints and mistakes, but the production on the whole is good. There are two qualities of paper interleaved, to allow for half-tones. The cheaper kind is pleasanter to read from, but the type-face and the rather large number of words per line make the text a little unattractive.

This is a good book for an instructor to possess, but not very useful to the student, who will, in any case, not be able to afford it.

M. H. BATTEY

ERNST (W. G.). *Earth Materials*. New York and Hemel Hempstead (Prentice/Hall International), 1969. ix+150 pp., 90 figs. Price 25s.

Twenty years ago the beginning student of Earth materials could get by with a minimal knowledge of physical chemistry, even of mineral structure. Today the approach has changed. The formation of minerals and rocks is ultimately referable to physics and chemistry, and therefore the student should be invited to think physico-chemically from the start. Professor Ernst's book goes further than most short books on the subject in promoting this requirement. The first two chapters are concerned mainly with crystal chemistry and petrochemistry. Then there are two chapters on minerals and three on rocks. The section on elementary thermodynamics, in Chapter 2, is of necessity highly condensed and the student may not get much from it, but it directs his attention to the fact that petrogenetic processes operate in accordance with thermodynamic principles. The three chapters devoted specifically to rocks comprise about one-third of the book, and here the beginner student is offered less than he needs, but this is fair enough as the book is intended (p. vi) 'to supplement and enrich other introductory textbooks'.

R. W. D. ELWELL

BATES (R. L.). *Geology of the Industrial Rocks and Minerals*. London (Constable: Dover Books), 1970. xiv+459 pp., 65 figs. Price 33s. 6d.

This is a reprint of a well-known textbook first published in 1960. The technical material has been in some measure 'up-dated' by supplemental references, but the