

improved, type and diagrams are pleasing, and the section numbering is useful. The price too is very reasonable both *per se* and also in relation to what one can expect a university student to afford. J. ZUSSMAN

FYFE (W. S.). *Geochemistry of Solids*. London (McGraw-Hill), 1964. vi+199 pp. Price: 66s.

The book presents a lucid account of the chemical and atomic structure of solids with particular reference to minerals and is addressed to students of mineralogy, petrology, geochemistry, and inorganic chemistry.

Chapter 1 presents a brief introduction to elementary thermodynamics and Chapter 2 deals with the basis of atomic structure and quantum theory. Chapters 3-9 consider the arrangement of ions in solids and develop the concepts of ionic radii, ionization potentials, and types of bond. Isomorphism, solid-solution, and polymorphism are discussed in Chapters 10 and 11, and the remaining Chapters 12-14 are concerned with growth and defects in crystals. The book is well illustrated and the style of presentation reads like a carefully prepared series of lectures, punctuated in places with just the sort of questions and answers that might occur to one during the development of a particular topic.

T. W. BLOXAM

JUDD (W. R.), editor. *State of Stress in the Earth's Crust*. New York (Elsevier), 1964. xiii+732 pp. Price: 115s.

The book covers the proceedings of the International Conference on the State of Stress in the Earth's Crust, held in California in June 1963. It provides a comprehensive account of the state of the new science of Rock Mechanics, in terms both of fundamental principles and practical applications.

Contributions cover an extremely wide range of topics, but are systematically arranged under a convenient series of main heads. In the first half of the book the scope of the subject is outlined and the complex theory of rock response to stress systems is developed. Important laboratory and field studies dealing with such matters as brittle fracture, creep, and loading tests are described. The latter part of the book is concerned with *in situ* measurement of stress and rock properties, and the application of the subject to specific engineering and mining projects. It may surprise some to discover how far theorizing and experimentation have proceeded, but the book is also valuable in showing the vast scope for further inquiry.

In format the book leaves something to be desired. It is extremely

bulky, mainly because the contributions are typewritten in double spacing. Illustrations, however, are usually clear. There are good indexes and many excellent bibliographies. M. B.

SHUBNIKOV (A. V.), BELOV (N. V.), *et al.* *Coloured Symmetry*. Edited by W. T. HOLSER. Translated from the Russian by J. Itzkoﬀ and J. Gollob. Oxford (Pergamon Press), 1964. xxv + 263 pp. Price: 70s.

Classical crystal symmetry theory was completed some 70 years ago with the description of the 230 space groups by Federov, Schoenflies, and Barlow. Recently crystallographers and others have been interested in new elements of symmetry that arise when the symmetry-related objects can be regarded as having different signs, + and -; a mirror plane relating a + object with a - object is, for example, a plane of antisymmetry. Situations like this arise, for example, in two dimensions in the so-called generalized Fourier projections of crystal structures; in three dimensions in the magnetic superstructures found in antiferromagnetic crystals, where each magnetic atom may have one of two opposed directions of magnetization.

+ and - objects might also be denoted black and white, and the possible symmetries of arrangement of objects of this type are known as the black and white space groups. Clearly it is possible to imagine symmetries of arrangements of objects of more than two classes, and hence a generalized 'Coloured Symmetry'.

The 46 black and white plane groups were derived by Cochran (*Acta Cryst.*, 1952, vol. 5, pp. 630-4), but the main development of the symmetry theory and of the 1651 black and white space groups has appeared mainly in the Russian literature. This book collects edited translations of the main Russian papers covering this work, forming a connected account of dichromatic symmetry and an introduction to polychromatic symmetry. In the absence of a specially written textbook, this book is therefore unique in English and forms an essential introduction to modern developments in symmetry theory. It is clearly written and well produced.

R. J. DAVIS

PARRISH (William) and MACK (Marian). *Data for X-ray analysis*. 2nd edn, vols. 1, 2, and 3. *Charts for the solution of Bragg's equation*. Philips Technical Library, Eindhoven, distributed in U.K. by Cleaver-Hume Press Ltd., 10-15 St. Martin's Street, London, W.C.2.

All three volumes contain charts (θ and 2θ versus d) for the solution of Bragg's equation for various radiations. Thus the data for Cu-K α ,