and others against the present situation, and in a way that enhances their stature. There is hardly a mention, however, of workers in the field of external crystal geometry. The book contains no methodology, nor discussion of chemical properties of crystals. The reader is referred on the dust jacket to other volumes by the author, but this book is, in many ways, similar to his *Elementary Crystallography* (1956). As it stands, however, the book is a succinct exposition of crystal structure and should find acceptance in undergraduate courses. A. C. BISHOP

ROTH (R. S.) and SCHNEIDER (S. J.) (Eds.). *Solid State Chemistry*. NBS Special Publication 364, U.S. Govt. Printing Office, Washington D.C., 1972. xv+783 pp. Price $7·50.

This book contains the proceedings of the fifth Materials Research Conference held in July 1971. The 63 papers are grouped into sections on oxides (37), borides, carbides, silicides, and related materials (10), chalcogenides (12), and discussions on non-stoichiometry (4). The papers are well illustrated, and even photographs have reproduced surprisingly well for a work printed by offset methods. The papers are of consistent and respectable quality, and some are of outstanding interest and importance.

About one-tenth of the papers are of direct and obvious mineralogical interest, including those on the use of infrared and Raman spectroscopy in the study of order–disorder in oxides (White and Keramidas), on defects in oxides (J. S. Anderson), and on the system $FeO$–$SiO_2$–$TiO_2$ at high pressure (Woermann and Lamprecht). Of the work on chalcogenides, the papers on $Cu_2S$ (Cook) and $CuFeS_{2-x}$ (Adams *et al.*) are directly applicable to mineral systems.

The many papers on such phases as the tungsten bronzes, in which non-stoichiometry is accommodated by a variety of ingenious mechanisms, are of less obvious mineralogical interest, but of great significance for our understanding of the microstructure of crystalline solid solutions. Outstanding among these are the papers by Bursill and Bursill, Hyde, and O'Keeffe on crystallographic shear in rutile. These, and the reviews by Allpress and Anderson, should be read and re-read by all mineralogists who are interested in the microstructure of complex mineral solid solutions such as the pyroxenes of the lunar rocks, the more chemically complex pyroxenes and amphiboles of igneous and metamorphic rocks, and many rarer minerals.

R. G. J. STRENS

HYNDMAN (D. W.). *Petrology of igneous and metamorphic rocks*. New York and London (McGraw-Hill), 1972. x+533 pp., 141 figs. Price £7·70.

The appearance of a new undergraduate textbook on igneous and metamorphic rocks is something of an event, and when it shows some resemblance to Turner and Verhoogen's notable book (almost identical title, similar format, same publisher), and has the advantage of being 12 years more up-to-date, it merits special attention.

The overall balance is satisfactory, with general introductory and concluding chapters, and the bulk of the text divided between igneous and metamorphic rocks (approximately 200 and 150 pages respectively). Although the organization of the material into chapters is distinctly curious, with the principal chapter on igneous rock associations (surely a 'natural' for subdivision?) reaching nearly 150 pages, there are many good features. Each association, igneous and metamorphic, is illustrated by a type area (almost all in North America), followed first by a brief mention of other important examples, and then by a convenient summary of the main petrogenetic theories applied to the rocks under discussion. Most of the maps and diagrams are commendably clear.

The major criticism of a book expressly designed as an introduction to its subject is its obsession with original references. The reference list occupies an incredible 105 pages (20% of the whole book) and contains approximately 2000 titles. This means that the text itself is cluttered with unnecessary references. The prize entry is Holland (1893) on 'The petrology of Job Charnock's tombstone', while a single paragraph listing 76 references to 17 layered intrusions mentions *Wager and Brown (1968)* nine times! Surely all that is needed for each topic is a reference to the most recent review and research contributions, and the space saved could be devoted to a more adequate treatment of important igneous and metamorphic associations outside North America, or to a sizeable reduction in price (£7·70).

Other disadvantages of the book are as follows: an obsession with the geosynclinal context, to the extent that both lunar and Hawaiian basalts (among other unlikely candidates for this honour) are termed 'post-orogenic'; the truncated treatment of the rock-forming minerals in chapter 1, where feldspars, $SiO_2$ minerals, olivines, and pyroxenes are the only 'common' groups admitted; many of the photographs are virtually useless (notably figs. 4–3 and 7–7), although this may be partly the result of poor quality reproduction; the world locality maps inside the front and back covers, although an admirable idea, are spoiled by serious errors and omissions.

This book could have been a useful addition to the undergraduate literature on petrology. As it is, the defects sadly outweigh the good points, and its most useful function will be to provide a convenient, but expensive, check list (with chapter and verse referencing) of notable igneous and metamorphic occurrences.

W. J. WADSWORTH

BROECKER (W. S.) and OVERSBY (V. M.). *Chemical equilibria in the Earth.* New York and London (McGraw-Hill), 1971. xii+318 pp., 67 figs. Price £7·90.

The authors have set out to show—both in the text and in problems at the end of the chapters—how thermodynamic principles may be applied to the interpretation of geochemical processes, and they have done it with commendable success. This is not, as some might imply from the title, a book that deals systematically with our knowledge of the chemical nature of the multifarious processes occurring in the Earth.

The first 5 chapters and chapter 10 (a total of 145 pages) are devoted to a treatment