UBBELOHDE (A. R.). *Melting and Crystal Structure.* Oxford (University Press), 1965. xi+325 pp. Price: 63*s*.

Mineralogists and geochemists are usually more concerned with solidification and crystal structure than with melting, but the two approaches meet among the unsolved problems of the structures of liquids. Unfortunately, disappointment awaits any mineral scientist who hopes that this book will help him to take adequate account of that often neglected term in solid–liquid equilibria. Rather it will show him how difficult it is to reach any unified theory of liquids, because of the great differences in the order of importance of different disordering mechanisms in different kinds of substances—inert gases, metals, salts, silicates, long-chain organic compounds, polymers, and so on. The author assembles a large amount of data gathered by many different techniques for many types of material, and presents many theoretical analyses of their behaviour. Unfortunately he has to admit that '. . . it may even happen that the concepts involved warrant careful consideration, but that the experiments described to test them must be regarded as untrustworthy'.

The book must be regarded, then, as one to stimulate interest and to lead the interested reader to the literature, rather than either to expound a theory or to present reliable data. It is therefore a pity that there seems to be at least one notable gap in the quoted literature (the name of Bernal does not occur in the bibliography), and the index is not really adequate (it is largely directed to phenomena and very little to substances). In view of the difficulties in dealing even with simpler substances in the liquid state, it is perhaps not surprising that the information presented is minimal on the melts of importance in geological systems.

E. J. W. WHITTAKER

VERMA (A. R.) and KRISHNA (P.). *Polymorphism and Polytypism in Crystals.* New York (Wiley), 1966. xix+341 pp. Price: 96*s*.

This book is the first of a new series of Monographs in Crystallography, and contains a foreword to the series by M. J. Buerger and a foreword to the volume by H. Lipson. The book deals primarily with the phenomena of polytypism in silicon carbide and cadmium iodide, the determination of the polytypic structures of these substances, and with theories of polytypism. Polytypism in other substances is mentioned rather briefly. This main part of the book is preceded by three chapters (20 % of the book) that give an introduction to polymorphism

generally. There is also a chapter on dislocations and crystal growth, which provides a useful background to the discussion of dislocation theories of polytypism.

Rival theories of polytypism are treated very fairly, and the final chapter makes it clear that no existing theory accounts for all the phenomena. The whole treatment is very readable, well illustrated, and maintains the reader's interest, in spite of some slightly annoying and sometimes trivial repetition. There are some curious mis-statements (of which perhaps the most remarkable is the statement that the vapour-pressure curve of sulphur comes to an abrupt end at the boiling point), but some of these are corrected on other pages, and they are mostly confined to the introductory chapters. In so rapidly developing a subject it is commendable that references in general extend to 1963 and references to the authors' own work to 1965. The book can be recommended both for general reading and to anyone interested in polytypism in minerals. Although the methods of structural investigation described are specific to the substances discussed, they may well inspire the development of corresponding systematic approaches in other systems.

E. J. W. W.

SINKANKAS (JOHN). *Mineralogy: A First Course.* London & Princeton (D. Van Nostrand Co., Inc.), 1966. xi+587 pp., 327 figs., 12 coloured pls. Price: 72*s*.

This book is in two parts of approximately equal length: the first part of 272 pages is devoted to concepts and methods, including consideration of atomic bonding, silicate tetrahedra, solid solution, mineral classification, crystal growth, crystallography, physical and optical properties, identification procedures, and a chapter on mineral associations. This is separated from the second part by twelve coloured plates, many of which are of doubtful use or relevance, for instance mudcracks in sandstone and a fossil fish, whereas those of minerals although generally good occasionally do little for the subject, for example augite. The second half of the book deals with descriptive mineralogy. Nearly 300 species are described: those most likely to be encountered during personal collecting activities or found in collections are given fullest treatment whereas the species that do not ordinarily appear in nature in good cabinet specimens are given brief treatment. This somewhat novel approach is backed up, however, by numerous clear annotated crystal drawings and by an abundance of very good black-and-white photographs of museum-type specimens. The emphasis on the avail-