KELLY (A.) and GROVES (G. W.). *Crystallography and Crystal Defects.* London (Longman Group, Ltd.), 1970. xi+428 pp., 275 figs., 8 pls. Price £5.

The main purpose of this book is to treat the subject of imperfections in crystals, but in order to do this properly, the authors have devoted the first third of their work to explaining the fundamentals of crystallography as it applies to perfect crystals. Thus Part I, 'Perfect Crystals', deals with crystal symmetry and the crystal systems and classes, developing the subject from the basis of lattices and their properties. Stereographic projections and stereographic constructions are explained and the seven systems are illustrated, not exhaustively, but with sufficient examples to show the characteristic features of each. Space groups are treated in a similar fashion by the explanation of principles with selected examples. Another section of Part I deals with the principal crystal structures characteristic of metals, some non-metals, and some simple compounds, and this is followed by a chapter on the nature and manipulation of tensors, the latter being used extensively in later parts of the book.

Part I is not only a prelude to Part II, 'Imperfect Crystals', but is a useful text in its own right for teaching basic crystallography. Some points may appear to be overlaboured, but I feel that this occurs where the authors know from their teaching experience that the concept concerned is a difficult one for the average student. It was amusing to see from one of the many end-of-chapter exercises that Quito and Perth are still among the favoured places through which to draw great circles, as they were in my own undergraduate days.

Part II of the book begins with a chapter on 'Strain, Stress, and Elasticity', which includes tabulations of the elastic constants of some common cubic and hexagonal elements and compounds. This is followed by a chapter on 'Glide', including a list of glide elements for a large number of crystals with different symmetries, lattices, and structure types. The next two chapters deal with dislocations, their motions, interactions, and associated strain energies. These concepts are illustrated with respect to hexagonal and face-centred cubic metals, the rock salt structure, body-centred cubic crystals, and some covalent solids. There follows a concise treatment of vacancy and interstitial point defects and their effects on the properties of ionic crystals and metals. Of the last three chapters, one deals with twinning, in particular deformation twinning, another with the crystallographic aspects of Martensitic transformations, and the third with crystal interfaces or grain boundaries.

There are five appendixes to the book dealing with various topics, among which are the reciprocal lattice and interplanar spacings. It seems strange to find these topics in a book that as far as I can see hardly mentions X-rays or electron diffraction or the Bragg Law. While it would have been impractical to deal with techniques in any depth, some general mention of the above topics might have been made, since so much of the information contained in the book has been derived from experiments in X-ray diffraction and electron microscopy. Even the several excellent electron-micrograph plates are presented without saying that they are electron micrographs.

Part II, like Part I, gives a very clear though very condensed exposition of its subject, and the book as a whole can be recommended for undergraduate students, or

postgraduates commencing research who are concerned with the solid state. With regard to undergraduate users, those with good physics and mathematics will find it ideal; others will find it useful, but heavier going.

Technical production of this book is excellent, with clear text, diagrams, tables, and plates. It is a pity, however, that the plates are presented with little comment, few of them being referred to in the text.

The subject matter of this book has been of long-recognized importance for metallurgists, but is increasingly relevant for mineralogists also, since clues to the history of minerals are to be found not only in their chemistry and over-all crystal structures, but also in micro-textural features and imperfections. The imperfections so far most studied by mineralogists are stacking faults in layered minerals, but other kinds of imperfection, both in layered and other minerals, can be observed by modern electron-microscope techniques. For minerals, as compared with metals, the techniques are probably less straightforward, and because of their generally more complex crystal structures, interpretation may be more difficult. Even so, those involved in this growing field of interest will find the book invaluable. J. ZUSSMAN

WEDEPOHL (K. H.), executive editor. *Handbook of Geochemistry*. Vol. I and Vol. II/1. Editorial Board: CORRENS (C. W.), SHAW (D. M.), TUREKIAN (K. K.), and ZEMANN (J.). Berlin, Heidelberg, and New York (Springer-Verlag), 1969. Vol. I: xv+442 pp., 60 figs., cloth-bound. Vol. II/1: x+586 pp., 172 figs., loose-leaf binder (Vols. I and II/1 are not sold separately). Price DM224, $61.60 (Subscription price applicable on orders for the whole Handbook DM 179.20, $49.30).

The broadening of the range of analytical methods available to the geochemist over the past fifteen or twenty years, and in particular the increasing application of sophisticated radiochemical and isotopic methods has led, since the appearance of the standard works of V. M. Goldschmidt (1954) and of K. Rankama and T. G. Sahama (1950), to a torrent of fresh data on the abundances and distribution of the elements in all kinds of terrestrial and extra-terrestrial materials. Widely variable in quality and significance as these data are, and widely scattered over a steadily increasing number of scientific periodicals, the editors and contributors to the work under review have set themselves a formidable task, the completion of which will surely earn the gratitude and admiration of all concerned with the chemistry of the Earth and the planets.

Earlier standard works in geochemistry, including Vernadsky's classic and Mason's extremely successful introductory text as well as those mentioned above, strove to clarify the underlying principles of the subject as far as the available analytical results and knowledge of such topics as crystal structure and crystal chemistry then permitted. Goldschmidt's achievement, in particular, was and is a cornerstone, and although capable of revision in detail, his posthumously completed book will long retain its special place in the literature of geochemistry. The present work is in no sense a substitute for Goldschmidt in what might be called the philosophy of the subject, but will, on its ultimate completion, provide a far more accurate and up-to-date source of factual information. Its title—a *Handbook*—is well chosen.