leading. One would expect to find some information on materials such as boron phosphide and the silicon borides; actually only the *metal* compounds are treated. From the subtitle a *review* implies a rather comprehensive literature compilation and *critical* implies a detailed comparison of a specific item of information among several authors. With only 276 references, the literature cited is not very exhaustive, although the inclusion of several review articles is helpful. With eight pages devoted to characterization and preparation, and thirteen pages to chemical and physical properties, the word *critical* does not seem applicable.

The usefulness of this book lies mainly in its chapter on crystal chemistry (45 pages) and in its appendix of crystallographic data (10 pages) for the metal borides, silicides, and phosphides. The Appendix would be more useful if arranged alphabetically, based on the metal atom, but the current grouping according to the periodic table does serve the purpose of concentrating information on chemically similar metals.

As the authors point out, a great deal of crystallographic and physical property measurement research remains to be done before a 'satisfactory treatment of the borides, silicides, and phosphides becomes possible'.

R. B. ROOF, JR

University of California
Los Alamos Scientific Laboratory
Los Alamos
New Mexico
U.S.A.

Metallic solid solutions. Edited by J. FRIEDEL and A. GUINIER. Pp. xi + 653. New York: W. A. Benjamin, Inc., 1963. Price, $19.75.

This book contains proceedings of the international symposium on the electronic and atomic structure of metallic solid solutions held at the University of Paris at Orsay, France, in July 1962.

Some 63 papers describe and review theoretical and experimental studies on metallic solid solutions. The papers concerned with atomic structure encompass short- and long-range order in alloys, precipitation, and pay particular attention to Guinier–Preston zones. Those primarily concerned with electronic structure treat the transition and rare-earth impurities in alloys, and correlate electronic properties with problems of atomic structure. Interatomic interactions and interactions between vacancies and impurities are also presented. A number of papers dealing with magnetic resonance, superconductivity, and thermodynamic properties, to mention a few, are included.

The papers printed in this book give a well rounded presentation of research activities in metallic solid solutions, with the exception of questions relating defect structures to mechanical properties.

K. HAEFNER

Department of Metals and Ceramic Engineering
Virginia Polytechnic Institute
Blacksburg
Virginia
U.S.A.

The direct observation of dislocations. By S. AMELINCKX. Pp. x + 487 + 236 Figs. New York and London: Academic Press, 1965. Price 121*s.* 6*d.* [Supplement 6 of *Solid State Physics,* Edited by F. SEITZ and D. TURNBULL.]

Theoretical and experimental investigations of dislocations have considerably increased within the past 10 or 15 years. In particular the technical development of electron microscopy of thin single-crystal foils has given so much new and striking information that a report of about 500 pages can present only a general review of the numerous results given by the various methods.

The author begins with the observation of dislocations at the crystal surface, as revealed by crystal growth, evaporation, etching and surface decoration. The second chapter describes different decoration techniques for studying the dislocation lines themselves by optical microscopy. The detection of dislocations by X-ray methods based on the dynamical theory of X-ray diffraction is included, and a short review of the investigations of the stress field around a dislocation by measurements of the optical birefringence is given. The third chapter covers about two-thirds of the whole contents and is devoted to thin-film methods in electron microscopy. A detailed introduction to the kinematical theory and a brief survey of the dynamical theory of electron diffraction is given, which enables the reader to evaluate all observed effects quantitatively. The determination of the direction of the Burgers vector of dislocations and the displacement vector of stacking faults is described. The splitting of normal dislocations into two or more partial dislocations is demonstrated and thoroughly discussed with respect to the lattice geometry in question and the determination of the stacking-fault energy. Several pictures are shown and interpreted with respect to the complicated movement of dislocation lines. The chapter ends with a review of recent results on moiré patterns. Finally the results of field-emission electron and ion microscopy are very briefly discussed. The Appendix gives some additional theoretical treatment of electron diffraction:

1. The calculation of stacking-fault fringes in crystals with anomalous absorption.
2. The intensity distribution of dislocation images in case of negligible absorption.

The general scope of the book is the geometry of dislocations and their diffraction effects in electron microscopy rather than the application to the physical properties of the crystal. This restriction is necessary, but the reviewer felt that sometimes a more detailed treatment of the applications would be useful, even if more space were needed. A more detailed description of the results of X-ray diffraction would round off the knowledge given in this book.

The presentation of the theoretical part is clear, and its application to the experimental results convincing. All figures are of first-class quality; only very few errors and misprints could be found by the reviewer. Author and editors must be congratulated for an excellent book which may be recommended to all advanced students and scientists working in the fields of Crystallography and Solid-State Physics.

H. JAGODZINSKI

8 *München* 2
Luisenstrasse 37
Germany