

A survey course

INTRODUCTION TO DISLOCATIONS. By Derek Hull. 259 pp. Pergamon, Oxford, 1965. Paper \$4.95

by H. M. Otte

The next few years will indubitably see a proliferation of books, all written by highly competent and qualified authors, on dislocations in crystals. As a means of communication and popularization of an important subject this has its advantages. However, where the finances of the individual are concerned, this can become costly, even at \$5 per volume, especially if the text is merely an arrangement of the subject matter as a particular author likes to see it presented. Hull's book tends to fall in this category; the eleven chapters take the form of an extended, well illustrated, review article covering selected classical and therefore less polemical aspects of dislocations. All but a few of the simplest illustrations are directly from, or based on, those published in the scientific literature, with little effort to present the author's own understanding or interpretation of the subject. Furthermore, towards the end of the first chapter vectors are introduced together with the concept of dislocations, but no attempt is made at the beginning of the chapter to introduce the Miller indices for planes (and directions) in the same way. Instead, these are presented in the century-old traditional way developed before the widespread use of vector algebra. The lack of originality could be excused partly, though not entirely, on the grounds that the aim was to write an account of dislocations and their properties that could form an introduction to the understanding of the properties of crystalline materials.

The geometry, properties and behavior of dislocations in crystals are developed from first principles so that the approach is applicable to all crystalline materials. In the first part, the basic features of the geometry, movement and elastic properties of dislocations are described along with an account of the methods of observing and studying dislocations. This is followed by a description of the more detailed features of dislocations in

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specific structures: face-centered cubic, hexagonal close-packed, body-centered cubic, ionic, layer and super-lattice structures. Two chapters are devoted to the basic properties of dislocations associated with their movement, such as intersections with other dislocations, jogs and multiplication of dislocations. Another chapter describes the geometry and properties of arrays of dislocations. Finally, the interaction between dislocations and imperfections in crystals, e.g., impurities, point defects and other dislocations, is described and related to the stress required to move dislocations through a crystal containing such imperfections.

The coverage is intended to be appropriate for a course at the undergraduate level. Nevertheless, a fairly extensive bibliography of books and research papers is to be found at the

end of each chapter. The author has drawn freely on the outstanding books by A. H. Cottrell and T. W. Read that were published over ten years ago, and the first ones in their field. On the whole the text is clearly written and the printing relatively free of typographical errors (although some were found on casual perusal). The drawings and photographs are of good quality. There is an adequate subject index but no author index. The book may be unhesitatingly recommended as an elementary survey of generally accepted concepts and observations about the properties, behavior and effects of dislocations, and as suitable supplementary reading for some of the more rigorous texts.

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H. M. Otte is manager of the Materials Research Laboratory at the Martin Company in Orlando, Florida.

BOOKS RECEIVED

NUCLEI

Criticality Control of Fissile Materials. Conf. proc. (Stockholm, Nov. 1966). International Atomic Energy Agency, Vienna, 1966. \$15.00.

FLUIDS & PLASMAS

Microwave Breakdown in Gases. By A. D. MacDonald. 201 pp. Wiley, New York, 1966. \$7.95.

The Theory of Hydrodynamic Stability. By C. C. Lin. (Reissue with corrections, of 1955 edition). Cambridge University Press, Cambridge, England, 1966. \$7.50.

SOLIDS

Irradiation Damage to Solids. By B. T. Kelly. 232 pp. Pergamon Press, Oxford, 1966. Paper \$4.50.

Single Crystal Diffractometry. By U. W. Arndt, B. T. M. Willis. 331 pp. Cambridge University Press, Cambridge, England, 1966. \$15.00.

Fundamental Phenomena in the Materials Sciences. Vol. 3: Surface Phenomena. Conf. proc. (Boston, Jan. 1965). L. J. Bonis, P. L. de Bruyn, J. J. Duga, eds. 230 pp. Plenum Press, New York, 1966. \$12.50.

CLASSICAL PHYSICS

Selected Readings in Physics: Kinetic Theory. Vol. 2, Irreversible Processes. S. G. Brush, ed. 249 pp. Wiley, New York, 1966. Paper \$4.95.

MATHEMATICS & MATHEMATICAL PHYSICS

Fourier Transforms and the Theory of Distributions. By J. Arsac. Trans. from French by A. Nussbaum, G. C. Heim. 318 pp. Prentice-Hall, Englewood Cliffs, New Jersey, 1966. \$14.00.

Analytic Functions. By M. A. Evgrafov. Trans. from Russian by Scripta Technica, Inc. 336 pp. Saunders, Philadelphia, 1966. \$6.00.

INSTRUMENTATION & TECHNIQUES

Communication Systems and Techniques. By M. Schwartz, W. R. Bennett, S. Stein. 608 pp. McGraw-Hill, New York, 1966. \$16.50.

COMPILATIONS

Scientific Research in British Universities and Colleges 1965-66. Vol. 1, Physical Sciences. British Information Service, New York, 1966. \$7.50.