

theory of the single electron. The four-vector potential and current density and the six-vector fields are introduced to exhibit the space-time symmetry of Maxwell's equations: their "natural" invariance to a transformation from one reference system to another moving with a linear uniform relative velocity constitutes the principal of relativity in its electrodynamic formulation. The group of the Lorentz transformations, relativistic kinematics, and the theory of the electron are treated in some detail.

Part IV (42 pp.) considers Minkowski's equations for moving media, approaches to the generalization of Maxwell's equations to elementary particle theory, and general relativity.

The book ends with twenty-five mature problems; the answers and comments which are included are integral parts of the text.

In the reviewer's judgment this text is the best available for a graduate physics course in electromagnetics. That so much could be dealt with rigorously in so small a volume is remarkable; it was achieved by stressing the physics rather than the mathematics involved and by carefully selecting the problems so as to minimize the use of special functions and function theory. The reader is provided with a carefully chosen vantage-point from which to view the broad panorama of electromagnetic theory. Although certain gaps have been left, these are preferable to the detailed investigations that would have been required to fill them and which might have served to distract from the physically interesting and essential.

The present book, although complete in itself, should of course be considered within the framework of the six-volume set of the late Dr. Sommerfeld's lectures on theoretical physics. Thus Volume IV, *Optics*, and Volume VI, *Partial Differential Equations*, provide excellent supplements in which certain of the more specialized or mathematically sophisticated topics are treated.

Sommerfeld's experiences as a student during the period when Heaviside and Hertz "purified" Maxwell's equations and first wrote them in their present form lend a marked personal flavor to the writing. The personal tone of many sections (e.g., those dealing with waves on wires, the Lecher wire system, the space-time symmetrical form of Maxwell's equations) is highlighted by the significant contributions to the subjects made by Sommerfeld and his students.

The only feature of the book we find sufficiently negative to comment on is its almost mystical and morbid preoccupation with units: more than fifteen pages (or about five percent of the text proper) is devoted to this topic. Most of us will agree that the dimensional character of the fields deserves consideration and that the rationalized MKS system is most convenient when working with Maxwell's equations. However, few will go along with the implication that there is more than convenience to the choice of units and that there exists an ultimate set whose discovery awaits a theory of the elementary particles.

V. Twersky
Electronic Defense Laboratory

Books Received

ELEMENTS OF HEAT TREATMENT. By George M. Enos and William E. Fontaine. 286 pp. John Wiley and Sons, Inc., New York, 1953. Chapman & Hall, Ltd., London, England. \$5.00.

RELATIVITY AND REALITY. A RE-INTERPRETATION OF ANOMALIES APPEARING IN THE THEORIES OF RELATIVITY. By E. G. Barter. 131 pp. Philosophical Library, New York, 1953. \$4.75.

CRYSTAL STRUCTURES. Section III and Supplement II. By Ralph W. G. Wyckoff. 639 pp. Interscience Publishers, Inc., New York, 1953. \$18.50.

CIRCUIT THEORY OF ELECTRON DEVICES. By E. Milton Boone. 483 pp. John Wiley and Sons, Inc., New York, 1953. \$8.50.

KERNEL FUNCTIONS AND ELLIPTIC DIFFERENTIAL EQUATIONS IN MATHEMATICAL PHYSICS. By Stefan Bergman and M. Schiffer. 432 pp. Academic Press Inc., New York, 1953. \$8.00.

THE VITAL CORRELATIONS 3-DIMENSIONAL UNIFIED FIELD THEORY. By Morris J. Spivak. 23 pp. Vital Correlations Foundation for the Unification of Knowledge in 3 Dimensions, Ithaca, New York, 1953.

AN INTRODUCTION TO SYMBOLIC LOGIC (Second Revised Edition). By Susanne K. Langer. 368 pp. Dover Publications, Inc., New York, 1953. Clothbound \$3.50, paperbound \$1.60.

A HISTORY OF ASTRONOMY FROM THALES TO KEPLER (Second Revised Edition). By J. L. E. Dreyer. 430 pp. Dover Publications, Inc., New York, 1953. Clothbound \$3.95, paperbound \$1.95.

THE WORKS OF ARCHIMEDES, with a supplement THE METHOD OF ARCHIMEDES. Edited by T. L. Heath. 563 pp. Dover Publications, Inc., New York, 1953. Clothbound \$3.95, paperbound \$1.95.

COMMUNICATION THEORY. Papers Read at a Symposium on "Applications of Communication Theory", London, 1952. Edited by Willis Jackson. 532 pp. Academic Press Inc., New York, 1953. \$11.00.

STANDARD X-RAY DIFFRACTION POWDER PATTERNS. NBS Circular 539. Volume I. By Howard E. Swanson and Eleanor Tatge. 95 pp.; Volume II. By Howard E. Swanson and Ruth K. Fuyat. 65 pp. U. S. Government Printing Office, Washington 25, D. C., 1953. \$0.45 each.

PROBABILITY TABLES FOR THE ANALYSIS OF EXTREME-VALUE DATA. NBS Applied Mathematics Series 22. 32 pp. U. S. Government Printing Office, Washington 25, D. C., 1953. \$0.25.

ULTRA HIGH FREQUENCY PROPAGATION. By Henry R. Reed and Carl M. Russell, assisted by W. M. Browne and J. W. Plummer. 562 pp. John Wiley & Sons, Inc., New York, 1953. \$9.50.

SELECTED VALUES OF PHYSICAL AND THERMODYNAMIC PROPERTIES OF HYDROCARBONS AND RELATED COMPOUNDS. Comprising the tables of the American Petroleum Institute Research Project 44 extant as of December 31, 1952. By Frederick D. Rossini, Kenneth S. Pitzer, Raymond L. Arnett, Rita M. Braun, and George C. Pimentel. 1050 pp. Carnegie Press, Pittsburgh, Pennsylvania, 1953. \$7.00.

PASTEUR'S AND TYNDALL'S STUDY OF SPONTANEOUS GENERATION. Case 7 of the Harvard Case Histories in Experimental Science. Edited by James Bryant Conant. 61 pp. Harvard University Press, Cambridge, Massachusetts, 1953. \$1.25.