

BOOK REVIEWS

Mathematics Applied to Electrical Engineering. By A. G. Warren. New York, Van Nostrand, 1940. 384 pp., 131 figs. \$4.50.

This is a review course in college mathematics for electrical engineers. Some pages read as if they were a part of a mathematical text in electricity and magnetism, except that the emphasis is on mathematics; other pages read as if they were out of a book on "unified" college mathematics; in its entirety the book is a compact presentation of a number of useful mathematical principles and methods, illustrated by a wide selection of electrical problems.

Thus we find: complex numbers and their use in steady state electric circuit problems; linear differential equations with constant coefficients and their application to transients; the Bessel equation and the skin effect problem; partial differential equations and a discussion of plane waves, spherical waves and waves along wires; elements of functions of complex variable and problems of steady current flow; Heaviside's operational calculus and transients in transmission lines.

The above is not a complete list of either the kinds of mathematics or types of problems (some more elementary than others), which are taken up in the book. To help those who may be "rusty" on the principles of electricity and magnetism the author provides brief review chapters. Altogether, the book may appeal to college students and to practicing engineers—to the latter as a review book in fundamentals and to the former as a bridge between their mathematical and engineering studies.

SERGEI A. SCHELKUNOFF

Elemente der Operatorenrechnung mit geophysikalischen Anwendungen.

By Hans Ertel. Berlin, Springer, 1940. 6+133 pp. RM 7.50.

This monograph demonstrates the applications of the operational calculus according to Heaviside to problems in geophysics. In the first section some pertinent remarks are made about certain simple differential equations with the view of later applications. The second section is concerned with the derivation and a brief physical discussion of some of the partial differential equations of mathematical physics, in particular the Stokes-Navier equations, the Maxwell equations and other equations derived from these. The third and fourth sections are concerned with a discussion of the Heaviside operational calculus and its applications to a variety of interesting problems in geophysics.

This text gives a brief but excellent account of the methods of mathematical physics. Despite the fact that this monograph is concerned primarily with the applications of the operational calculus to geophysics, one interested in a bird's-eye view of certain classical phases of mathematical physics can find them put down in short order. Many unusual problems of theoretical physics with geophysical applications are to be found.

A. E. HEINS

Matrix and Tensor Algebra for Engineers and Chemists. By Clarence E. Rose. Brooklyn, Chemical Publishing Co., 1940. 8+143 pp. \$4.00.

Matrix and Tensor Algebra has been written "for electrical and communication engineers and chemists who wish to learn about determinants, vectors and tensors." Its only mathematical interest lies in the complete novelty of its point of view.

For example, no need is felt for proofs; theorems are stated as *obiter dicta*. Such definitions as "a matrix is a group of independent but related quantities," "a determinant is a finite, imaginary, or complex quantity, or generalization of the algebraic number zero" illustrate its unorthodoxy further. However, as the book was not designed for mathematicians, it would be out of place to go into more detail.

GARRETT BIRKHOFF

Compendio di Meccanica Razionale. 2d revised edition. By Tullio Levi-Civita and Ugo Amaldi. Bologna, Zanichelli, 1938. 12+423+8+310 pp.

The two thousand page work by the same authors, entitled *Lezioni di Meccanica Razionale*, has already been adequately reviewed by K. P. Williams (this Bulletin, vol. 36, p. 781). It is one of the great standard works on mechanics of almost an encyclopaedic nature.

The *Compendio*, the work now under review, represents an attempt to cut down the *Lezioni* to the usual academic course of study in Italian universities and technical schools. This has been done by wholesale omissions of entire subjects rather than by abridged exposition. On the contrary, the emphasis on the foundations of the subject has been strengthened by a certain amount of additional material. Also included are a few minor corrections and revisions. For the most part, however, whole sections of the *Compendio* read word for word exactly as do the corresponding sections in the *Lezioni*.

Some of the subjects omitted in the *Compendio* are rather sur-