

tainly not useful for a college student who meets such subject matter for the first time, for the work is much too detailed. Neither is it for the specialist, who does not need the mass of detailed computation to orient him in a specific problem. Nor is it, finally, a comprehensive introduction to the subject of "short-wave radiation phenomena," for no modern book on the subject can afford to devote but two pages in its entire length to horns and only about one page to metal-lens antennas. Such disregard for the value of modern radiating systems might have been fully justified in a text largely devoted to important theoretical aspects of the subject, leaving no space for discussion of practical problems. No such lack can justly be claimed as an excuse, as a large amount of space is wasted in actual arithmetic, trivial trigonometric relations, and extensive numerical examples occupying page after page.

Perhaps there will be a group of readers who will appreciate having as a permanent reference the minute examination of the problems of reflection, refraction, and diffraction. These subjects occupy about half of Volume II. Here one finds, in the problem of radiation in free space, the detailed examination of reflection and refraction of plane waves in passing from one isotropic medium into another. The examination of this problem, with arbitrary angles of incidence, requires 8 pages of general discussion and 27 pages of tabulated calculations and discussion. This is then followed by some 150 additional pages of discussion of related topics, such as calculation of Brewster's angle for various conditions, magnitude and phase of reflections from the earth, and calculation of field patterns from simple radiators in the presence of a reflecting medium. Each of these is considered in great detail and should be of value to anyone to whom the specific problems happen to be important.

The subject of electromagnetic diffraction is also discussed in considerable detail, starting with the usual basic principles—i.e., Huygen's principle, Fresnel wave interference, and other matters usually taken up in a course in physical optics. These are applied to the study of parabolic electromagnetic radiators, wave propagation through apertures, diffraction from sharp edges, diffraction around a spherical earth, etc., each case being considered thoroughly and completely. Here the book is at its best, and the reader will find the matter well presented, with numerous references to the original works in the field.

The first volume is divided as follows: Chapters I, II, and III present the fundamental concepts and relations of currents and electromagnetic fields, occupying a space of 360 pages. In their scope, they represent a standard introduction, containing the required elements of the theory of electricity and magnetism for the study of radiation phenomena. Chapter IV, entitled "Propagation Characteristics," discusses the properties of the propagation constant in unbounded and guided space, including such topics as phase, group, and signal velocities and cutoff frequency for waveguides. Chapter V discusses transmission line

problems, starting with the usual formulas, impedance matching with stubs, and suggests the use of acorn tubes for standing-wave detector probes. It concludes with problems of radiation from transmission lines. Chapter VI deals with the problem of free-space radiation. This can be considered as the first chapter on radiation phenomena, with the preceding 528 pages being more or less preparatory material. In this 255-page chapter one meets the classical problems of radiation from simple dipoles and combinations of such dipoles in radiating arrays. As can be seen from the number of pages devoted to this, the discussion is quite detailed. Chapter VII is concerned with radiation in presence of "obstructions," such as the ground. Chapter VIII is the chapter on diffraction, mentioned earlier. Chapter IX contains 60 pages on waveguides and cavities, being rather brief, with completely standard material. It is doubtful if one would have any reason to prefer this chapter to any of numerous and well-known references on the subject.

As a whole, the book leaves much to be desired. In spite of its bulk, it covers but a small fraction of the important problems of interest today. The superfluity of numerical details is oppressive and does not make it easy to understand the basic problems. In no sense can it be construed to be a "modern" treatise on the important subject of short-wave radiation.

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Scientific Book Register

The Scientists Look at Our World. The Benjamin Franklin Lectures of the University of Pennsylvania, fourth series. John M. Fogg, Jr., Ed. Philadelphia: Univ. Pennsylvania Press, 1952. 147 pp. \$3.00.

Electrodynamics: Lectures on Theoretical Physics, Vol. III. Arnold Sommerfeld; trans. by Edward G. Ramberg. New York: Academic Press, 1952. 371 pp. \$6.80.

The Clinical Application of Antibiotics: Penicillin. M. E. Florey. New York: Oxford Univ. Press, 1952. 730 pp. \$17.50.

Fleas, Flukes & Cuckoos: A Study of Bird Parasites. Miriam Rothschild and Theresa Clay. New York: Philosophical Library, 1952. 304 pp. Illus. \$8.75.

The Range of Human Capacities. 2nd ed. David Wechsler. Baltimore: Williams & Wilkins, 1952. 190 pp. \$4.00.

Paper Chromatography: A Laboratory Manual. Richard J. Block, Raymond LeStrange, and Gunter Zweig. New York: Academic Press, 1952. 195 pp. Illus. \$4.50.

Basic Medical Physiology. W. B. Youmans. Chicago: Year Book Pub., 1952. 436 pp. Illus. \$7.50.

Imperfections in Nearly Perfect Crystals. Symposium held at Pocono Manor, October 12-14, 1950. Sponsored by the Committee on Solids, Division of Physical Sciences, National Research Council. W. Shockley *et al.*, Eds. New York: Wiley; London: Chapman & Hall, 1952. 490 pp. \$7.50.

Education and the Spirit of the Age. R. W. Livingstone. New York: Oxford Univ. Press, 1952. 114 pp. \$2.00.

Deformation and Flow in Biological Systems. A. Frey-Wyssling, Ed. Amsterdam: North-Holland Pub.; New York: Interscience, 1952. 552 pp. \$11.50.