BOOK REVIEWS

Fundamentals of Acoustics

By Lawrence E. Kinsler and Austin R. Frey. Published (1950) by John Wiley, 440 Fourth Ave., New York 16. 499 pp. + 5 pp. appendix + 3 pp. glossary + 6 pp. index. 163 illus. 5½ × 8½ in. Price $6.00.

This book presents the fundamentals underlying the generation, transmission and reception of acoustic waves. It was prepared as a textbook on the fundamentals of acoustics and is a very usable book for this purpose. The illustrations are good and each chapter is followed by a set of very well chosen problems.

The first half of the book develops the theory of vibration of solid bodies and the propagation of sound waves through fluids. It starts with simple oscillators having a single degree of freedom. In a logical manner follow chapters on the vibration of strings, bars and stretched membranes. The general acoustical wave equations for fluids are developed and applied particularly to plane and spherical waves with various boundary conditions including transmission from one medium to another. Then follows the fundamental theory of the radiation of sound from vibrating bodies of various sorts such as pistons, vibrating spheres, etc. These principles are applied to Helmholtz resonators and acoustic filters. Finally in Chapter 9 there is a brief but excellent treatise on the absorption of sound waves under various circumstances.

The theory developed in the first half of the book is applied to direct radiator loudspeakers and horn-type loudspeakers. Chapter 12 is a discussion of microphones; carbon, condenser, crystal, electrodynamic moving coil and velocity ribbon. The electroacoustical reciprocity theory is very clearly presented and applied to the calibration of these microphones.

There is a chapter on psychoacoustics dealing with the mechanism of hearing, loudness, masking, binaural localizations, etc., followed by chapters on each of the following general fields: architectural acoustics, underwater acoustics and ultrasonics.

The authors have maintained a very good balance between the fundamental aspects of the physics of the problems and the engineering applications. Numerous references are made to analogous electrical problems, but this is not overdone and each important equation is derived from the fundamental laws of physics.

It should serve as a very useful text in senior college and graduate courses, both in physics and engineering classes.—Dr. Harvey Fletcher, 5 Westminster Rd., Summit, N.J.

Fundamentals of Optics, New 2d Ed.

By Francis A. Jenkins and Harvey E. White. Published (1950) by McGraw-Hill, 330 W. 42d St., New York 18. 626 pp. + 4 pp. Answers to Problems + 17 pp. index + xi pp. 447 illus. 6 × 9 in. Price $7.00.

This book represents a new edition of the authors' well-known *Fundamentals of Physical Optics*, first published in 1937. As a physical optics text, it is hard to see how this book could have been improved, and it is gratifying to find that it has been reprinted almost without change in the new edition. A few sections have been added, covering the quantum nature of light and some modern developments such as the Twyman-Green interferometer, phase-contrast microscopes, interference filters, and gratings giving a 'blaze' in one order. Each topic has been treated with just the necessary degree of detail for students' use, and difficult side-issues have been carefully avoided. Having read any chapter, the reader has the pleasant feeling that now he knows all about that sub-

ject. The diagrams are clear, and the photographic illustrations excellent. A particularly gratifying feature of the treatment is that mathematics is used only to provide a deeper analysis of some physical phenomenon which has already been explained in a clear qualitative way. Too many teachers reverse this process, and feel that a mathematical treatment is the whole story. The book can be confidently recommended as an unusually clear exposition of the nature and properties of light.

The new edition also contains a lengthy section (175 pp.) on geometrical optics, which justifies the more general title. Unfortunately the method of treatment here is not nearly as good as that adopted for the physical optics part. Fermat's and Malus' theorems, and the dispersion of glass, are clearly treated, but they are actually physical optics phenomena. No less than 52 pp. are devoted to the formulas for conjugate distances and magnification, first for a thin lens, then for a single refracting surface, then again for a thick single lens, and finally for a spherical mirror. Surely it would be simpler, and more satisfying to the student, to derive the formulas for a general optical system defined by its two focal points and two principal points, and then to regard thin lenses and single surfaces as simple special cases.

It is good to find a brief reference to the photometry of optical systems and the theory of image brightness. Spectroscopic and other prisms are adequately covered. The properties of chromatic aberration are described clearly, but spherical aberration is treated in unnecessary detail. The references to coma and the sine condition suffer from the usual misunderstandings; for example, the term "sine condition" is used first to refer to the "sine theorem" (Eq. 8l, p. 121), but later it is used to refer to the difference Δf between the focal lengths of a lens for paraxial and marginal rays (Fig. 9K). The word "coma" is correctly used as a transverse measure of an aberration pattern in Fig. 9I(b), but in Figs. 9K and 9L, and in Table 9III, the same term is used to represent the longitudinal difference between the Δf curve and the spherical aberration curve. Obviously both meanings of the same word cannot be correct. The diagrams of distortion (Fig. 9T) are misleading, for when a lens suffers from barrel distortion, all parts of the image are too small, the corners being excessively reduced in size; likewise in pincushion distortion all parts of the image are too large, the corners again being excessively so. Figure 9V, (b), is incorrect, for a single lens with central passage of the light cannot possess any lateral chromatic aberration. This is an aberration of the chief ray, and will appear only where the chief ray has been dispersed into a spectrum by eccentric passage through a lens. The Huygens' eyepiece is referred to in 9.11, line 1, as an achromatic system; this is, however, contradicted later in the same paragraph. There are two errors in labeling of lens cross-sections: in Fig. 10C, the diagram shows the Zeiss Topogon, not the Ross Wide-angle, and in Fig. 10G, the lens shown is the "Varo," not the "Zoomar." The Galilean telescope diagram in Fig. 10R is incorrect, for the eye is actually the exit pupil, and only those rays which enter the eye should be considered. The entrance pupil of a Galilean telescope is virtual and situated at a considerable distance behind the eye.

The book is very well produced, on good paper, and beautifully printed. A series of useful review problems has been included at the end of each chapter.—R. KINGSLAKE, Eastman Kodak Co., Rochester, N.Y.

Electrical Engineers' Handbook -Electric Communication and Electronics, Vol. II, 4th Ed.

Edited by Harold Pender and Knox McIlwain. Published (1950) by John Wiley, 440 Fourth Ave., New York 16. i–xiii + 1,564 pp. including approx. 130 tables and approx. 1,050 illus. + 54 pp. index. 5½ × 8¼ in. Price $8.50.

This edition has been entirely rewritten and enlarged to meet the widening fields of communication and electronics. Each section is written by an expert in that field and is accompanied by a bibliography.

The twenty-three sections cover a wide variety of electronic applications as well as fundamental properties of materials and

circuit elements. Frequency modulation, television and radar have been given considerable space.

As is the case with any handbook attempting to cover such a wide field, the space devoted to any one subject must be small compared to a textbook on that subject. In the present volume the editors and authors have shown good judgment in selecting tables and formulas to which a worker familiar with the subject may refer, and sufficient description so that one unfamiliar with the particular subject may obtain a good introduction to it.—CLYDE R. KEITH, 5 N. Terrace, Maplewood, N.J.

Television, Volume V (1947–1948)

Edited by Alfred N. Goldsmith, Arthur F. Van Dyck, Robert S. Burnap, Edward T. Dickey and George M. K. Baker. Published (1950) by *RCA Review*, Radio Corporation of America, RCA Laboratories Div., Princeton, N.J. i–x + 458 pp. + 3 pp. summary. 315 illus. 6 × 9 in. Price, $2.50, plus $0.20 per copy for postage to countries other than U.S.

Television, Volume VI (1949–1950)

Same editors and publisher. i–x + 402 pp. + 20 pp. appendix. 284 illus. 6 × 9 in. Price, $2.50, plus $0.20 per copy for postage to countries other than U.S.

Television, Volumes V and VI, are respectively the eleventh and twelfth volumes in the RCA Technical Book Series and the fifth and sixth volumes devoted exclusively to television.

The books are comprised of a compilation of reprints of articles by RCA authors which appeared in *RCA Review, RCA Licensee Bulletin, Broadcast News, Proceedings of the I.R.E.*, the JOURNAL of this Society, *Communications, Teletech, Journal of the Optical Society of America, Electronics* and *Harvard Business Review*.

In the appendix of Volume VI is given a complete television bibliography of technical papers by RCA authors for the period 1929 to 1950. Of the total published within the periods covered by *Television, Volumes V and VI*, selected articles are reprinted in full, others in summary form only, while the remainder are omitted except for their listing in the bibliography.

The papers are presented in each of these volumes in six sections: pickup, transmission, reception, color, ultra-high frequency and general. Within each of these sections, distinct phases of television development are covered by three types of articles: (1) pure theory and analyses of performance factors, (2) new techniques and proposed new designs not yet reduced to practice and (3) descriptions of new equipment, facilities, methods, techniques and concrete applications of principles reduced to practice.

Material of the first type serves as a guide for the conception and development of advanced television designs of the future. An outstanding article by Otto H. Schade is entitled "Electro-Optical Characteristics of Television Systems." It is so advanced and basic as to be of permanent value as a text.

Material of the second type forms a basis of designs of tomorrow's improved television. An example is entitled "Standardization of Transient Response of Television Transmitters" by R. D. Kell and G. L. Fredendall.

Of the third type, descriptions of new equipment are published soon after the equipment design is completed. Thus, such descriptions represent the latest equipment as of that date. Examples are: "New Television Field Pickup Equipment Employing the Image Orthicon," by J. H. Roe, and "Development of a Large Metal Kinescope for Television" by H. P. Steier, et al. Descriptions of most of the major equipment and circuit features now constituting present-day television systems may be found in these two, together with preceding volumes of *Television*.

Television papers by RCA authors are highly authentic because the findings are the results of intensive and extensive activities of the writers in all phases of television, each of whom is a specialist in his particular field.

These volumes contain a wealth of authentic television information in a concise form and they should be included in every engineer's television library.—FRED G. ALBIN, 241 S. Wetherly Dr., Beverly Hills, Calif.

Proceedings of the National Electronics Conference, Vol. 5

Published (1950) by National Electronics Conference, Inc., 852 E. 83 St., Chicago 19. i–x + 581 pp. text + xi–xxi pp. Contents, Previous Issues. Approx. 600 illus. + numerous tables. 6 × 9 in. Price $4.00.

This book is intended to serve as a permanent record and handy reference of the papers presented at the National Electronics Conference in 1949. Since only a small group can attend such a conference, the publishing of this volume allows all engineers to receive the benefits of the papers. Many papers which are presented at such meetings are never published elsewhere, consequently this provides the only permanent record of these papers.

There is not sufficient space here to review each of the 59 papers included in the book. However, it can be said that the papers range from basic theory to component design and application. Subjects covered include audio-frequency, supersonics, magnetic devices, vacuum tubes, circuits, theory of communication, antennas, television, measurements, computers, electronic instrumentation and others. One paper, "The Magnetic Cross Value and Its Application to Subfrequency Power Generation," presented a very interesting new magnetic device. The analysis of the operation of this device was well presented. It is refreshing to find that we are still discovering new principles in magnetism, one of the older phases of electronics.

It is unfortunate that no attempt was made to group papers on the same general subject or to provide an index which would facilitate rapid exploration of the volume to find everything on a particular subject.

Since the discussion of papers at such meetings frequently adds important information it is regrettable that no comment on the discussions of these papers is included.

In spite of these shortcomings the N.E.C. is to be commended for publishing its Proceedings, and it is hoped that other conferences will soon follow suit.—OGDEN PRESTHOLDT, Columbia Broadcasting System, 485 Madison Ave., New York 22.

Manuel de Sensitometrie (3d ed.)

By L. Lobel and M. Dubois. Published (1950) by Publications Photographiques Paul Montel, 189, Rue Saint-Jacques, Paris (5e). 216 pp. 103 illus. 5⅜ × 7¼ in. Price 375 francs.

This elementary book gives the principal definitions concerning sensitometric measurements, some of the properties of the characteristic curve, and a review of the chief systems used for the definition of the negative emulsion speed. It includes a chapter on paper sensitometry and the choice of printing conditions, and another on sensitometry for positive films used by projection.

It also gives information on reversal development, including the influence of the solvent action and that of the second exposure, on intensifying and reducing processes, on the control of color photography and the use of the masking method.

Finally, about forty pages concern the elementary principles of sound recording and the application of sensitometry to sound film.

As regards the apparatus used in sensitometry, the descriptions are very short and the authors emphasize the densitometers designed by Mr. Lobel.

This booklet, despite a few errors and many oversimplifications, should be useful to amateurs and beginners in photographic science.—R. PINOIR, Kodak-Pathé, 30, Rue des Vignerons, Vincennes, France.