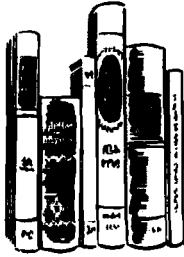


books reviewed



Color Television Engineering

By John W. Wentworth, Published (1955) by McGraw-Hill Book Co., Inc., 330 West 42 St., New York 36. 459 pp. Illus. Graphs. 6 × 9 in. Price \$8.00.

This book has been prepared for engineers who are familiar with basic television principles and circuits: deflection, synchronization, clipping, d-c restoration, etc. The material is based on lecture notes over the period 1950-1955, which fact has no doubt contributed to the orderly arrangement, freedom from errors, and noteworthy clarity.

Part 1 is an excellent presentation of the physical and psychological aspects of color, and the measurement and specification of color.

Part 2, Principles of Color Reproduction, includes useful background material on photographic color methods, and a very

comprehensive discussion of transfer characteristics.

Part 3, Principles of Color Television Transmission Systems, contains some details of color transmission on the standard 6-mc television channel, and the makeup of the NTSC color signal. Multiplexing techniques used in the NTSC system are described, and consideration is given to the field, line, and dot sequential systems. Historical information is held to a minimum consistent with clear explanation of the broad concepts. This section might have been expanded, and in parts would have been strengthened by more specific design detail.

Part 4, dealing with Apparatus and Circuits for color television; is the book's only major weakness. The author, by and large, emphasizes as "typical" the methods and equipment of but a single manufacturer, and minimizes contributions to the art by others. On page 326, relative to flying-spot scanners, it is stated "... several companies announced commercial models of color television cameras based on this approach." As a matter of fact, there are three companies that have commercial units of this type available for sale; and there are a number of color film scanner installations, the first of which was put into regular broadcast service in October 1954. Color slide scanners were in regular use before this. Live color scanners, admittedly a more recent application (demonstrated before NARTB in 1955) are not mentioned. Similarly, certain types of display tubes and test equipment which have been described in the literature are not discussed. This sec-

tion may have limited usefulness to an engineer desiring to obtain complete information on available equipment and circuitry.

The schematics and illustrations are clear; the index is properly detailed, and the references are relatively complete up to January 1954. Of interest to this reviewer was Fig. 7-7, which may inadvertently show some of the difficulties inherent in the color printing process. The test wedges were checked by 22 persons picked at random, and in every case the observed resolution of the color wedges was at least twice that indicated for the "typical observer."

On the whole, Mr. Wentworth's book is extremely well done. It is a valuable contribution to the literature and is recommended for all who are concerned with color television.—*R. D. Chipp*, Director of Engineering, Allen B. Du Mont Laboratories, Inc., 35 Market St., East Paterson, N.J.

Television and Radar Encyclopaedia, 2d ed.

Edited by W. MacLanachan. Published (1954) by Pitman Publishing Corp., 2 West 45 St. New York 36. 216 pp. Illus.; graphs. 5½ × 8½ in. Price \$6.00

The editor and his contributors have endeavored to compile, within the compact space of 216 pp., a volume fitting its title. It is amazing that they have done well, though not perfectly, at this task.

It seems to this reviewer that the volume is at its best where the subjects discussed are covered at some length. For example, the section covering the history of television in Britain is well done and quite informative to American readers. So is the article on Central Control Rooms, that on Aerial (Radar) and that on Outside Broadcast. There is a good appendix, including miscellaneous information such as details of BBC television transmitters and a comparison table of world TV standards.

The faults of the book reside mostly in the shorter definitions which it contains. Some of these are misleading — for example, frequency divider in television is "used principally in the frame time base circuit in which the series of eight frame synchronizing pulses are reduced to one by the coupling from the sync separator circuit." Fortunately this definition concludes with the words "See Integrator"! Also, the wording is not always clear. In the section on electron camera we are told that it has "a grid consisting of a one-ended cylinder with an aperture in the closed end." To one who is pedantic about his semantics, this is a very difficult piece to make! A final example, doubtful in respect of both semantics and science, is the definition of convex lens as "a lens which causes rays of light to be separated and converge to a point on a plane at the focal length of the lens, on the side remote from the object viewed." The book would be much improved by the omission of many of these shorter definitions.

Since the book is published in England, there is a natural tendency to emphasize British terminology. There has been some attempt to include American definitions, not always necessary since many of the



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terms are used on both sides of the Atlantic. Some unusual terms such as "Earthy" (referring to the bypassed end of a tube load circuit) and "Heart shape reception — see Cardioid Diagram" were new to your reviewer — perhaps they are to be regarded as England's answer to some quaint American technical terms, such as "parc" and "bootstrap"!

As a short technical reference in the fields of television and radar, the book has much to recommend it. It must therefore be forgiven for its shortcomings, in the hope that, if its authors agree with these criticisms, they may be corrected in a later edition.—*F. J. Bingley*, Philco Corp., Tioga and C Sts., Philadelphia 34.

Transistors I, RCA Laboratories.

Published (1956) by RCA Laboratories, N.J. 676 pp. Illus. 6 X 9 in. Price \$4.50.

Transistors I is a collection of 41 papers by 39 authors on various aspects of the transistor. These papers are the result of research and development work at the RCA Laboratories; ten of them have been published previously. The papers cover a wide range of transistor technology and are divided into six sections: General, Materials and Techniques, Devices, Fluctuation Noise, Text and Measurement Equipment, and Applications. Abstracts of 46 additional papers resulting from RCA transistor studies are appended. It should be emphasized that *Transistors I* is not an elementary text on transistors; it is a collection of useful reference papers on the subject.

The introductory or general section of the book contains two review papers. The first covers physical concepts of the transistor, and the second describes some state-of-the-art transistors, a few circuit applications, and some additional physical concepts. Both of these articles are interesting reading for those not already familiar with semiconductor devices.

The Materials and Techniques section includes three articles on innovations in germanium crystal processing, and six articles related to fabrication techniques in transistors. The paper on "Microscopic Examination of Germanium Crystals and Transistors" is a particularly interesting and thorough treatment of the topic. Generally, the Materials and Techniques section will be of most interest to semiconductor device engineers, and some of the techniques described will be well known to them. However, many engineers interested in circuit applications of the transistor would find this section useful in broadening their knowledge and understanding of the transistor.

The Devices section describes the design, construction and performance of new germanium and silicon devices. The first two papers concern improved emitter efficiency at high currents and improved germanium power transistors. The third paper describes a silicon alloy junction transistor. The fourth paper describes the design of a transistor with equal input and output impedances for use in direct coupled iterative circuits. The fifth and sixth papers discuss improved high-frequency transistors, while the seventh and last paper of the section covers a germanium junction

diode with voltage-variable capacitance for use in UHF circuits. Most of the devices described in this section are experimental and not available as production items. While semiconductor device engineers will find the Devices section well worth reading, it has less value to the circuit engineer.

Three papers comprise the Fluctuation Noise section. The first paper discusses in detail the noise power — inverse frequency relation, or 1/f noise in diodes and transistors. Two other papers cover noise representation and measurements in junction transistors. The effect of d-c bias on noise is shown.

The test and Measurement Equipment section provides detailed information on high-frequency transistor test equipment, and on testing transistors for power out-

put applications. This section will be very useful to device engineers or circuit engineers who are responsible for transistor testing, and will be of general interest to many others.

Almost half of *Transistors I* is devoted to the circuit Applications section. The first applications paper is a review of ambient temperature effects on transistor operation. Several bias stabilizing circuits are shown. The next five papers discuss the use of transistors in IF and RF circuits and include papers on an experimental automobile receiver and a developmental pocket size broadcast receiver. The next three papers cover power and audio amplifiers, including complete circuit and performance details of a 20-w transistor audio amplifier. The audio amplifiers are followed by a paper on amplitude and frequency modu-

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lation of transistor oscillators. Then there are three papers on transistorized television receiver circuits, including sync separator, vertical deflection and AFC circuits. Finally, there are three papers on transistor switching and counting circuits. The Applications section provides many practical ideas about transistor circuitry, and gives the performance evaluation of a number of experimental circuits. This section should be very useful and interesting to circuit engineers.

Following the Applications section there are 46 abstracts of papers resulting from RCA transistor work which were not included elsewhere in the volume. These abstracted papers also cover a wide range of transistor technology from solid state physics to transistor circuit applications.

Transistors I contains reference material valuable to all phases of transistor work, and it should be considered a worthwhile addition to an engineer's transistor library. The book is not definitive on all the subjects covered, but it does present a large quantity of otherwise unpublished material available within RCA. While the book does not teach basic transistor electronics, it has extensive supplemental value to those who have an introductory knowledge of transistors.—W. V. Wright, Jr., Pacific Semiconductors, Inc., Culver City, Calif.

Transistors Handbook

By W. D. Bevirt. Published (1956) by Prentice-Hall, Inc., 70 Fifth Ave., New York 11. 410 pp. Illus. $8\frac{1}{2} \times 6$ in. Price \$9.00

Transistors Handbook deals with the practical aspect of transistors and transistor circuits. The first eleven of twenty-one chapters describe transistor characteristics, measurement techniques and circuit analysis. The last ten chapters are devoted to various kinds of transistor circuit applications and are largely comprised of specific circuits. The book does not dwell on physical concepts or detailed circuit analyses of the transistor.

The chapter headings give an account of the material covered: introduction, fundamental definitions and concepts, point contact transistors, junction transistors, power transistors, measurement of transistor characteristics, methods of analysis of transistors and transistor circuits, tetrode and pentode transistors, photodiodes and phototransistors, some practical considerations in transistor circuits, noise and temperature effects in transistors, transistor audio and power amplifiers, transistor R-F amplifiers, audio oscillators, R-F oscillators, amplitude modulation and detection, frequency modulation and detection, transistor radio and television receivers, relaxation oscillators, computer applications, and miscellaneous applications. The appendix contains definitions of semiconductor terms (IRE Standards, 1954), transistor manufacturers and transistor characteristics.

There are two limitations to the usefulness of *Transistors Handbook*. First, almost all of the material and references compiled in the book are dated 1953 or earlier. Many transistors and transistor circuits representative of current practice have been developed since 1953; in fact, maturation of the transistor industry really started in the period 1954-6. Neither transistors

themselves nor transistor circuits are "standardized" yet, and there will be many useful innovations in transistors and circuits developed during the next several years. Secondly, the very practical approach used in *Transistors Handbook* which leans heavily on examples of early circuits (pre-1954) does not give the basic design steps of building a transistor circuit. The circuit engineer will not find much assistance in solving a current circuit design problem.

While it is probably too early in the rapidly growing transistor electronics field to accumulate enough accepted and standardized information for a true handbook, this book should be of considerable use to many experimenters, technicians, electronic servicemen, radio amateurs, etc. The transistor circuit engineer will be better served by current texts and reference articles on transistors and transistor circuits.—W. V. Wright, Jr., Pacific Semiconductors, Inc., Culver City, Calif.

Die Kinematographische Kamera

By Dr.-Ing. Harald Weise. In German. Published as Vol. III of a series entitled *Die Wissenschaftliche und Angewandte Photographie*. Edited by Dr. Kurt Michel of Aalen/Wuerttemberg, by the Springer Verlag, Moelkerbastei 5, Vienna 1, Austria, 1955. 472 pp. $6\frac{1}{2} \times 9\frac{1}{2}$ in. 521 illus., schematic diagrams and photographs. Available in the U.S. through Stechert-Hafner, Inc., 31 East 10 St., New York 3. Price \$20.00.

As indicated in the editor's preface of the volume, the above work is part of a series to replace and bring up to date the well-known *Handbuch der Wissenschaftlichen und Angewandten Photographie* by A. Hay and M. von Rohr. The intent was to supersede this almost classic work with a multi-volume, encyclopedic reference series, each volume of which would be a self-contained fragment of the art, thus overcoming the deficiencies of an all-encompassing single handbook which can be up-dated only by the unsatisfactory practice of issuing periodic supplements. The present volume is in the best tradition of its predecessors, combining technical accuracy and painstaking attention to detail with thorough coverage of recent developments, including high-speed photography.

Dr.-Ing. Harald Weise is the author, among other works, of *Kino Gerate Technik* which has previously been reviewed in the November 1951 *Journal*. He has thus been able to draw on an extensive experience in the precision mechanism field in general, and photographic apparatus in particular. *Die Kinematographische Kamera* includes some of the excellent illustrations of the earlier work, while intentionally presenting the present state of the art of camera construction from a more descriptive than an analytical viewpoint. The extent of the coverage of European and American equipment is quite astonishing when one considers that in many cases the author cannot have had much more information at his disposal than the sketchy sales literature of the manufacturers. This observation held true for *Kino Gerate Technik*, and holds true now. In support of this consideration, the

reader's attention is called to a bibliography of 736 items from U.S., French and German sources.

An effort has been made to present the construction details of such mechanisms as film drives, intermittent movements, shutters, governors, optical systems, finders, rangefinders, and coupled diaphragms in an easily understandable and systematic manner. To this end, families of devices related by common operating principles have been grouped, and certain historical trends in the evolution of these devices demonstrated. At the same time, the author avoided the pitfall of letting the presentation degenerate into a mere cataloging of museum pieces. The work is so profusely illustrated that, in the opinion of the writer, little or no knowledge of German would be required for the designer and engineer to use it as a thesaurus of camera mechanism. Though not explicitly stated, it is to be presumed that the bulk of the ideas diagrammed belong to the public domain, so that, in most cases, the problem of patent infringement would not exist. However, common caution in this regard should not be ruled out.

Besides photographs and pictorial diagrams, the book contains analyses of cycles kinematic and force diagrams, acceleration graphs and equations, making it necessary often to adapt only certain parameters and physical dimensions to the designers' specific problems, in order to obtain neat solutions to what otherwise might be tough nuts to crack. This is not to say that the know-how of precision mechanism can not be found with as great detail and often with far more profound mathematical treatment, in many texts of engineering mechanics and kinematics. Rather, we have here a selected concentration of those mechanisms apt to be encountered in camera design, and an impressive parade of the way in which many men and many manufacturers have solved problems which seem to have a nasty habit of recurring each time we set out to design a new piece of camera equipment.

Among other things, the book covers such topics as parallax characteristics of viewfinders, blurring due to image motion and its parameters, constructional details of a representative number of objective lenses, registration errors, et al. It has always seemed regrettable to the writer that there appear to be so few educational courses in this country, where a young man might train to become a photographic engineer and camera designer. Certainly the importance of photographic instrumentation to science and industry, to say nothing of the military establishment, would justify such a specialty. And yet the predominant part of the requisite skills must still be picked up on an on-the-job apprenticeship basis in the engineering departments of the companies in the field. Perhaps an increase in the number of good reference texts such as the present one, both here as well as abroad, would help in providing a much-needed impetus to the further propagation of the photographic art.—Peter V. Norden, IBM Research Laboratories, Poughkeepsie, N.Y.