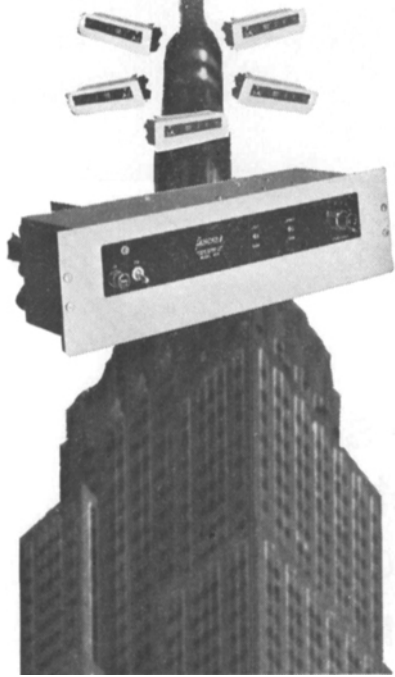


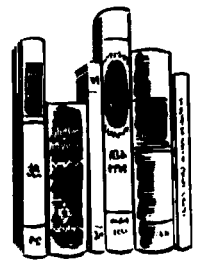
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 reviewed**



Chemical Analysis in Photography

By G. Russell. Published (1966) by Focal Press, Inc., 20 E. 46 St., New York, N.Y. 10017. 272 pp. incl. Indexes. Charts, Diagrams, Tables. 9½ by 7 in. Price \$18.75.

This book is intended as a technician's guide to analytical methods of use in the photographic industry. It is all that and more. Besides giving well tested procedures that are detailed enough for direct use, there are many references and suggestions for people who want to explore and develop newer procedures.

First there are suggestions for laboratory layouts and a section on instruments useful in photographic analysis. Next are chapters on analysis of raw materials (gelatin, silver nitrate, and halide salts), minor emulsion ingredients, film and paper bases, coated film and paper, processing solutions, water and effluents, and processed materials.

The section on instrumental methods gives a good description of principles and applications of potentiometry, polarography, spectrophotometry, chromatography, electrophoresis, and flame photometry. The very useful recording potentiometric titrator is not included. It should have been mentioned that the terms absorbance, A, and optical density mean the same, and A is favored by analytical chemists. Two newer techniques, atomic absorption spectrometry and electron probe analysis that have great potential in trace metal analysis and elemental analysis of small particles respectively, might have been included.

Raw materials are covered with assay methods and tests for likely contaminants. The excellent treatment of gelatin is in two parts: (a) tests for water, ash, metals, halides, grease, etc., and (b) tests for more photographically active impurities such as active sulfur, carbohydrates, aldehydes, and restrainers. Both chemical and silver halide grain growth tests are given.

Specifications and tests for silver nitrate and halide salts include those of American Chemical Society, Rosin and Johnson Mathey, but not those of the American Standards Association, whose tests are designed for the photographic industry.

Chapters V, Auxiliaries and Additives, and VII, Analysis of Coated Products, cover tests for a very wide range of materials such as silver halide, composition and coating weight, sensitizing and antihalation and coating weight, sensitizing and antihalation dyes, stabilizers, hardeners, metal additives and antistatics. These chapters will be very useful in photographic research and development, production

control, and especially in examination of competitive products.

X-ray absorption and fluorescence are described under nondestructive methods for silver halide coating weights, but it must be realized that film would ordinarily receive a large exposure to x-rays in such tests. No mention was made that x-ray fluorescence offers a simple and accurate means for measuring halides in coated stock and processing solutions, such as iodide in developers. The latter is an important test but it is difficult, lengthy, and often inaccurate by chemical means.

The section on determination of silver in fixing baths did not give a rapid titration method using thioacetamide as for silver halide coating weights nor x-ray and atomic absorption spectrometric methods that are both very rapid.

Chapter IX (Analysis of Water and Effluents) is especially timely in view of growing problems of water supplies and water pollution.

The appendices include much useful analytical information such as indicator pH ranges and colors, pH buffers, standards for volumetric solutions, calibration of spectrophotometers, and a concise introduction to use of statistics in analysis, control charts, and experimental design. The inclusion of only United Kingdom sources limits the value of the list of instrument suppliers.

Anyone involved with analysis of photographic materials is indebted to Russell for sharing his wide knowledge and experience in this field.—*John G. Lofstrom*, Research and Development, Photo Products Dept., E. I. du Pont de Nemours & Co., Parlin, N. J. 08859.

Fundamentals of Display Systems

By Harry Poole. Published (1966) by Spartan Books, A Division of Books, Inc., 1250 Connecticut Ave., N.W., Washington, D.C. 20036. 416 pp. Illus., Diagrams Appendixes. 9½ by 6 in. Price \$20.00.

The end product of motion pictures, television, most photography, and of a large proportion of the graphic arts is a display on a screen, a sheet of paper, or some other surface that is viewed by a human being. It is also often the end product in many other fields, such as radar, computer operations, metering that ends on dials or numeral exhibits to be read, and so on at great length. The art of carrying this out effectively has been studied more or less through the years, but usually only in connection with its associated activity. More recently there has been an effort to correlate all these studies, largely in the field of optics. As noted in the introduction to this book, Mr. Poole "has undertaken ... to recapitulate the basic techniques, devices, and systems which are products of a new industry, a new technology." Here the objectives are utilitarian uses, rather than entertainment uses, for the displays.

The author has undertaken to outline the essential principles of observer viewing, most of the numerous systems of graphic display (including their construction and how they function), of how these are applied, and in a general way to outline the economic problems in their use. He

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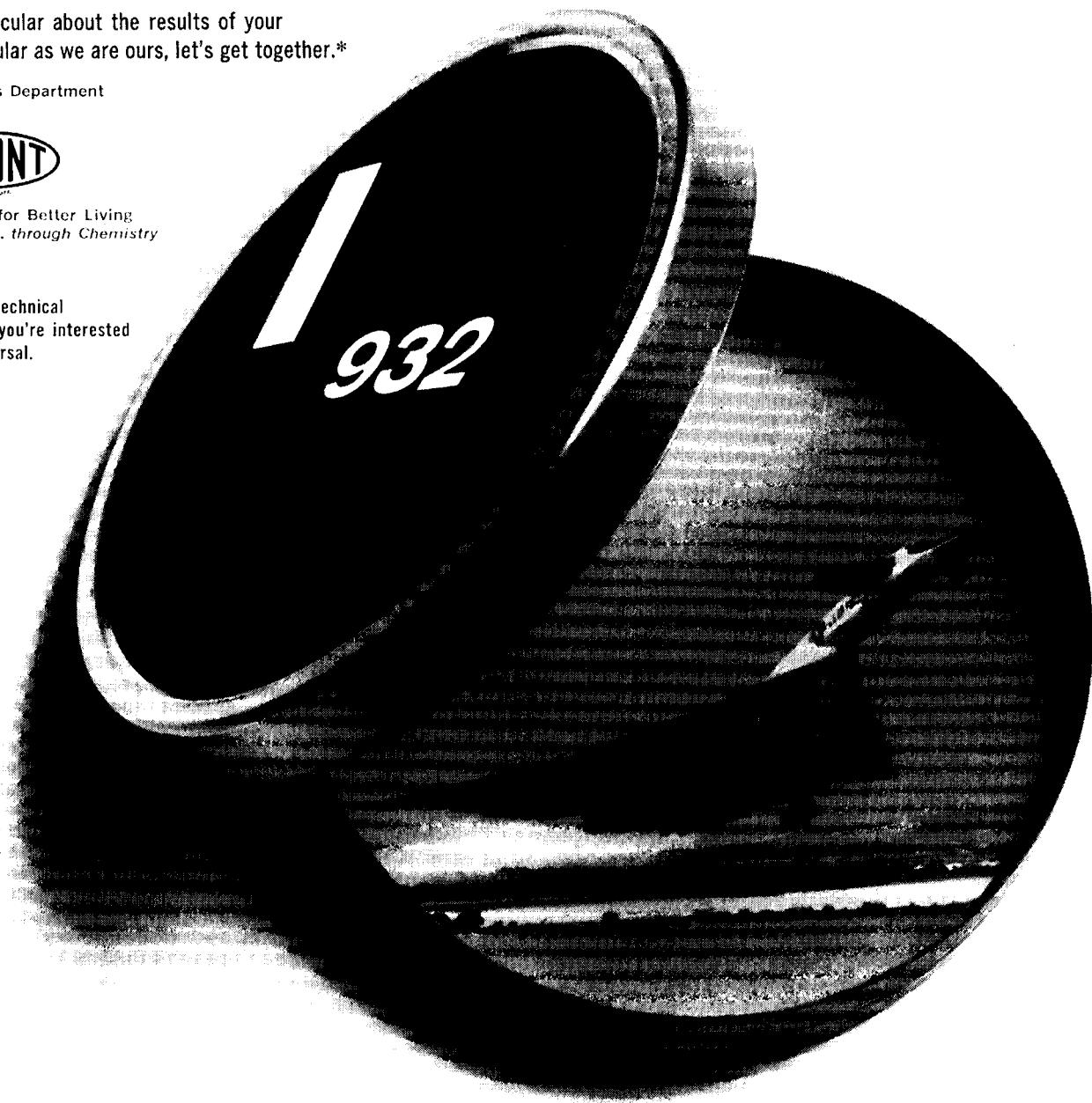
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even hazards some possibilities on future display techniques. The techniques that he covers include a variety of cathode-ray-tube displays (including color tubes), large-screen projections, large-screen display discrete arrangements (where only a limited number of symbols are to be displayed), and individual display units using electromechanical, electrooptical, and electronic techniques. The application systems that he discusses, after a general engineering outline, include television systems (monochrome and color), radar systems, computer-generated displays, and a group of miscellaneous applications involving such things as data plotters, facsimile systems, analog displays, etc.

In addition to this, the author has chapters on human engineering (chiefly regarding vision), optics (including photometry, but not its measurement techniques), luminescence and as mentioned before, likely future display techniques. There follow appendices on commercial television standards, a glossary, symbol nomenclature, and a bibliography.

All this is a great deal, but in addition the author has fairly obviously aimed at using as simple language as possible—though one might sometimes wonder at his choice of wording. He has been beset with more than the usual number of misprints and errors. Some serious cases of these are found in Table 16-1, page 317; and they will probably baffle the innocent reader who starts to make use of the table. Here 1 meter candle is given as 10.76

foot candles. It is of course really the same as 1 lux, given in his next line, correctly, as 0.0929 foot candles. Also 1 candle per square foot is given as 929 candles per square centimeter. The last figure is obviously meant as $1/929$, or 1.076×10^{-3} . Further 1 blondel is given as 10^4 lamberts. It is really the same as 1 apostilb, correctly listed in his next line as equal to 10^{-4} lamberts. Again, "lumerg" is misspelled, and the specification of the unit is a little puzzling.

Despite these various comments, the book represents a handy compilation of the numerous current techniques and will be generally useful to the engineer who is involved in the specific design of display arrangements, particularly where they are of a special nature.—*Pierre Mertz*, Consultant, Lido Beach, L.I., N.Y. 11561.

Fluid Amplifiers

Joseph M. Kirshner, Ed. Published (1966) McGraw-Hill Book Co., 330 W. 42nd St., New York, N.Y. 10036. i-xviii + 295 pp. Illus. Diagrams. 6 by 9 in. Price \$16.50.

It is unusual to visualize a faucet in a water pipe as an amplifier. But the British term for electron tube is "valve," and the amplification element is clear when a water current is powerful, e.g., as in a fire hose. A whole school, devoted to the study of fluid devices for amplification, has developed at the Harry Diamond Laboratories in Washington, D.C. Specialization has been narrowed to the point

that only devices with no moving parts except the fluid are studied. To make such systems work effectively often requires analysis of a highly sophisticated nature.

The book is an outgrowth of a course given at Catholic University, Washington, D.C. on the basic concepts of this field. The various chapters have been written by specialists in the particular aspects of the art. The editor himself has contributed over a third of the material. A good proportion of the chapters are devoted to reviews of the basic principles including thermodynamics. The subjects covered include the kinetic theory of gases, thermodynamics, fluid equations, a variety of types of flow jets (including control jets), vortex motion, fluid circuit theory, and noise. The applications covered include bistable fluid amplifiers, beam-deflection proportional fluid amplifiers, vortex devices, and other fluid interaction devices. Some chapters on analysis techniques are given regarding characteristic curves, multiple staging, and flow visualization (mostly by schlieren techniques).

The circuit theory shows much similarity to electrical circuit theory, but it is more complicated and difficult. For, as the author says, "there is no unique expression for the mechanical potential in terms of the thermodynamic variables." Thus there is no exact analogue to the voltage, and electrical models must be used with caution.

The applications of fluid amplifiers are relatively unusual and interesting. The most notable historical moving-part application is of course the slide-valve on a steam engine, and next in line is the air brake. Some of the modern devices cited by the author are a heart pump, a respirator, and other medical devices, logic and timing circuits, rocket thrust vectoring, missile attitude control, automatic piloting of aircraft, hydrofoil control and jet engine control, and some industrial inspection and control. Other applications cited are vortex devices for separating parts of a gas at different temperatures (using the energy of a stream flow, and not a Maxwell "demon"!) to employ the hot portion if needed, or the cool portion for cooling (in one case, drinking water); devices for permitting one-way fluid flow (without moving parts); and other devices where space and weight are critical, where electric or electromechanical devices are a danger, where environmental conditions are severe, or where fluid power is relatively inexpensive.

These fields of application are all relatively specialized, but they can occur in many different areas, and can at times be very appropriate. The book is particularly designed for the engineer who may face such cases.—*Pierre Mertz*, Consultant, Lido Beach, L.I., New York 11561.

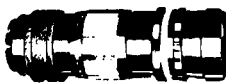
Integrated Circuit Engineering

By the staff of Integrated Circuit Engineering Corp. Published (1966) by Boston Technical Publishers, Inc., Central Square, Box 111, Cambridge, Mass. 02139, 405 pp. Illus. Photos. Diagrams $8\frac{1}{2} \times 11$ in. Price \$22.50.

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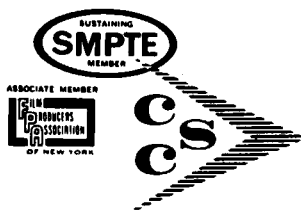
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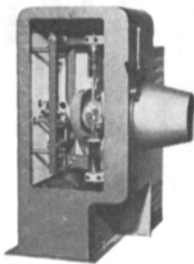
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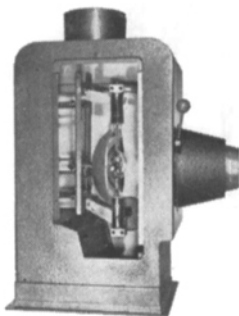
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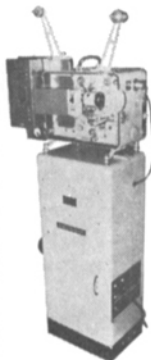
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technology, theory, design, evaluation, and usage of integrated circuits. The authors have gone to great lengths to assemble in one volume, all of these areas to give the reader a rather complete background in the state of the art of integrated technology. The material has been covered in a manner to give completeness to each topic although it does not delve into the more specialized or esoteric areas of the topics.

Beginners and more advanced workers will both find this volume of value as the presentation is so clearly performed that it is readable at several levels of experience. Specific topics covered include Basic Materials and Processes, Wafer Processing, Integrated Circuit Assembly, The Mathematics of Integrated Circuit Design, Digital Integrated Circuits, Linear Integrated Circuits, Reliability Considerations and Specifications, and Device Fabrication Processes.

Generally, this book will serve as an excellent reference volume if one is interested in the basic technology. It is clearly a most comprehensive study of the integrated circuit technology and the associated thin and thick film technologies.—*C. Staloff*, RCA Astro-Electronics Div., Box 800, Princeton, N.J.

Physical Optics in Photography

By Georg Franke. Published (1966) by The Focal Press, 20 East 46th St., New York, N.Y. 10017. 218 pp. Illus. Diagrams. Appendix. 9½ by 7 in. Price \$20.00.

A considerable published literature is developing in the field of optics, testifying to the growing importance of this subject in a wide variety of applications. The present volume is a translation of a 1964 work of the author, *Photographische Optik*. It represented an approach to the theory of the photographic objective through the concept of the contrast transfer function.

The subject is introduced by a discussion of the requirements set by perfect image formation. It is here that the nature and potential usefulness of the contrast transfer function are developed. This discussion is followed by an analysis of the departures from Gaussian theory in an actual optical system. Here are treated the various aberrations and the selection of the most favorable image plane—this last not as simple a matter as might casually be assumed.

A third chapter is entitled "The Classification of Optical Systems," and the most of it is really an historical review of the development of the photographic objective. It includes a brief analysis, at each step, of the advantages and weaknesses of the design considered, and the reasons for expectation of improvement from the next step. It ends with the Sonnar of Bertele of 1933, although a Leitz lens of 1957 (possibly Summicron?) is described in another chapter. Some discussions are also given on telephoto, wide angle, zoom and reproduction lenses, and reflective optics.

A final chapter describes testing and assessing photographic objectives. Various standard tests are outlined, both for checking a design, and for controlling lens pro-

duction. The discussion on image quality is interesting to the extent that it reflects the changes in attitude that have come about in recent years. One now is inclined to doubt that quality can be expressed by any single figure of merit (though some efforts at this are noted). The author suggests three factors, resolvable detail, sharpness of contours, and shade gradation. Since he includes the film, one wonders at his omission of graininess as a fourth factor. In any case, he admits in the preface that "this field is insufficiently explored, and that a number of important questions remain unanswered."

The book will be of interest to the moderately advanced student. In the space which it allots, the treatment must be relatively condensed, and the reader will need to dig further for a complete story. Also the index of less than two pages seems very brief.—*Pierre Meritz*, Consultant, Lido Beach, L.I., N.Y. 11561.

A Tower In Babel:

A History of Broadcasting in the United States. Vol. 1 – to 1933

By Erik Barnouw. Published (1966) by Oxford University Press, 417 Fifth Ave., New York, N.Y. 10016. 314 pp. Chronology, Laws, Bibliography, Index. Illus. 6½ by 9½. Price \$8.50.

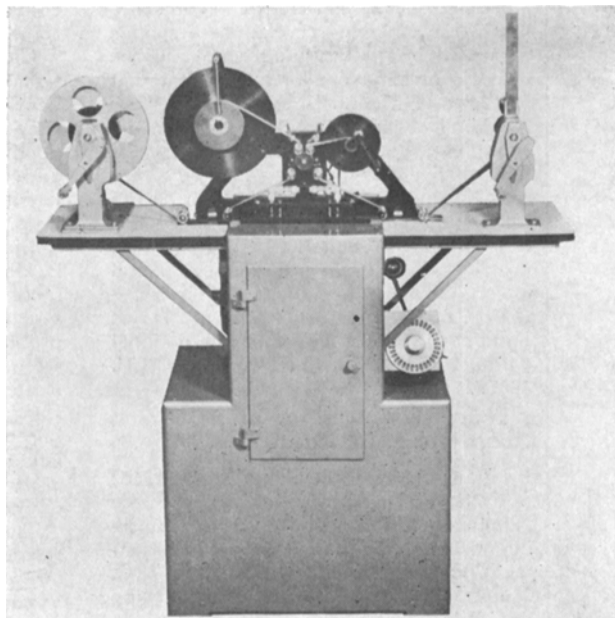
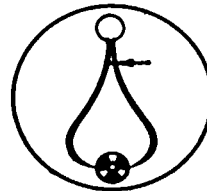
In this first published volume of a projected three-tome study devoted to the growth of the broadcasting industry in this country, Erik Barnouw displays sound scholarship combined with a gift for informative, interesting and eminently readable prose. He is Professor of Dramatic Arts at Columbia University and his familiarity with radio, television and films has been shown in the several excellent books he published previously.

His new work covers the period between Marconi's pioneering in wireless telegraphy in the early 1890's and President Franklin D. Roosevelt's first inauguration in 1933. The experiments of such early researchers as Dr. Mahlon Loomis, Reginald Aubrey Fessenden, Lee de Forest and many others are reviewed in chronological perspective, followed by the activities of "ham" operators. After the greatly expanded use of radio during World War I, high finance and corporate growth were the features of the 1920's, also marked by the introduction of new formats for entertainment shows and a diversification of programming.

Television's first steps are duly recorded and its bright future anticipated in the research and experiments of that period. Vladimir K. Zworykin, Philo Farnsworth and Ernst F. W. Alexanderson are given proper credit for their contributions.

Professor Barnouw also discusses at length the effects of broadcasting's growth in the fields of government regulations, sociological impact and artistic creativity. The formation of the Federal Radio Commission in 1927 substantially modified the rules of station licensing started some 15 years earlier. Public ownership of radio outlets was vigorously debated in Congress and the press. New talent was drawn from the theater and vaudeville in ever increasing numbers.

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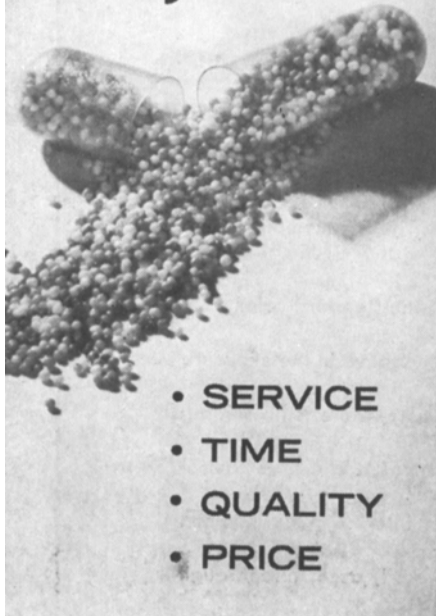
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This is not a technical book since its emphasis is on the historic progress of the industry and it records technological developments without going into their engineering aspects. But the book's significance lies in the emerging revelation of change in our cultural patterns under the influence of environmental pressures. It is not that Professor Barnouw subscribes to "the medium is the message" theory of Marshall McLuhan; he merely alerts us, perhaps unwittingly, to the ever-increasing encroachments of the machine on man's intellectual life. In this respect, the book is a most timely reminder of our current problems, as well as a gratifying compound of erudite lore and colorful history.—*George L. George*, Administrator, Trust Fund of the Screen Directors International Guild, 250 W. 57th St., New York, N.Y. 10019.

Magnetic Tape Recording

By Skipwith W. Athey. Published (1966) by National Aeronautics and Space Administration (available from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402), 326 pp. Illus. Diagrams. 6 by 9 in. Price \$1.25.

The author attempts to reduce the voluminous NASA research into a cohesive and well-organized presentation of magnetic recording technology per se. No doubt this confrontation may have burdened the author to the extent that some of the criticism may be unjustified. However, opinions, and a little flag waving interspersed throughout the book should have been consolidated and used more effectively in appropriate places if necessary.

A survey that is both general and comprehensive cannot be broad and critical at the same time and do justice to both in such a limited space. The material presented is a survey coverage of the development of miniature severe-environment tape recorders for satellite and space probes sponsored by the NASA Agency and its contribution and influence to magnetic recording technology. The book does admirably in the former case and in the latter is so microscopic at times that it is distracting and possibly unwarranted to begin with.

If magnetic-tape recording is considered the integration of many skills and can be summarized as a hybrid of electrical and mechanical systems, the author attempts to emphasize the mechanical aspects (such as mechano-electrical, p. 167). The description and details concerning the mechanical aspects of magnetic tape recording are enlightening, informative and possibly more comprehensive than any other book on the subject at this time.

There are 15 chapters to this book. In Chapter 2, after a brief history, the field of magnetic recording is examined. Chapters 3, 6, 7, 11 and 13 are primarily devoted to mechanical elements, tape-moving systems, tape-motion disturbances, mechanical components, and miniature high-environment recorder mechanical configurations. These chapters abound in diagrams, photographs and descriptions of numerous mechanical operating systems. Chapter 4, Recording Methods, sum-

marizes briefly instrumentation recording in terms of analog recording, FM recording, pulse duration modulation (PDM), pulse amplitude modulation (PAM), pulse code modulation (PCM) and basic digital recording methods.

Chapters 5 entitled Head-Tape Interaction is an appropriate description. The head and tape relationship is reviewed concerning head dimensions and signal fidelity in terms of frequency response and signal recovery. Chapter 8 covers magnetic heads, their structure and functions. In Chapter 9, Magnetic Tapes, special tapes for flight recording are sadly lacking. Furthermore NASA has not been successful in obtaining support from major tape manufacturers for their complex problems and limited market. Chapter 10, Recorder Electronics, are considered as neither complex nor unusual by modern standards. Methods of testing and evaluating tape and recorders are covered in Chapter 12. In Chapter 14 attention is given to overall system requirements and design comprises for space applications.

The final Chapter 15 examines tape recording density and Shannon's formula on channel capacity (bandwidth) of a communication link. An attempt to establish a criterion for individual recorder performance on the basis of achieved recording density is out of place at this point. Also, the subject matter is in conflict with the scope and survey content.

No doubt NASA has contributed considerably in mechanical design, performance and packaging of special-purpose tape recorders for operation in a hostile environment such as outer space. Many unique tape-path configurations and speed-control operations are detailed, and the corresponding manufacturers are complimented. There is much to compliment on mechanical detail presentation for those responsible for tape recorders in general and mechanical designers in particular.

The book is a documentary of NASA's effort to develop numerous special purpose magnetic-tape recorders to probe outer space.—*Bernard B. Bycer*, Huntingdon Valley, Pa. 19006

Communication Systems and Techniques

By Mischa Schwartz, William R. Bennett and Seymour Stein. Published (1966) by McGraw-Hill Book Co., 330 West 42 St., New York, N.Y. 10036 618 + xiii pp. Illus. Diagrams. 6 by 9 in. Price \$16.50.

The communication of information is becoming one of the very important components of our present technology. The information may be in pictorial form, or as voice, or coded as in telegraph or data, or otherwise. The treatment in this book broadly covers general communication, but it is studied in its applicational forms mostly in terms of coded data (much as Nyquist studied television transmission from basic telegraph theory).

The material is organized into three parts, one each contributed by the three authors. The first part covers general tutorial material, statistical communication theory for digital information, and

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F&B/CECO MARK II PRO-JR. FRICTION HEAD

The new Mark II Pro Jr. Head with Teflon® bearings combines fluid-head smoothness with the fast, free movement of a friction head. Features include "T" level; accessible knob for mounting camera; adjustable angle telescoping pan and tilt handle; 3 positions for attaching pan handle; tension control knobs.

Head only \$125.00 with Pro-Jr. V-Grooved legs \$195.00



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Just as the original Pro-Jr. Friction Head was a world leader in reliability, this has created a new standard for fluid heads in the motion picture industry. Exclusive formula of silicone fluid assures maximum smoothness. Features positive grip locks; camera balancing and tightening lever; removable pan handle adjusts in any position; "T" level; accommodates any camera up to 30 lbs.

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F&B/CECO PRO-JR. SPRING HEAD

The F&B/Ceco Professional Junior Spring Head is similar to the Pro-Jr. Friction Head. It incorporates torsion spring for counterbalance. Interchangeable telescoping pan handle. "T" level. Can be supplied with ¼ x 20 or ⅜ x 16 camera tie down screw.

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The F&B/Ceco Professional Junior geared drive tripod head includes metal crank handles which control pan and tilt action. Crank handles snap on either side. "T" level. Can be supplied with ¼ x 20 or ⅜ x 16 camera tie down screw.

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Professional Junior adjustable V-Grooved Tripod Base (legs complete). Constructed of hard maple legs, aluminum and steel hardware. For use with all Professional Junior tripod heads, except integral ball joint. The "V" groove design gives almost twice the gripping surface as before and greater rigidity at any extension is assured.

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continuous wave (CW) communications, with a comparison of AM and FM. The second part covers amplitude and angle modulation in CW systems, and pulse modulation. The third part covers binary channel communication, without and with additive noise, fading communication media, linear diversity combining techniques, and decision-oriented diversity for digital transmission. There are two mathematical appendices, a rather extensive bibliography, and an index.

The study in each subject goes into fairly detailed mathematical analysis, sometimes of a rather sophisticated nature. Thus the book gathers together and summarizes much of the analytical literature that has appeared in this field. The dust jacket says "The needs and background of the practicing engineer have been kept in mind, with the result that theory and practice are closely interwoven." However, at a number of places the reader can well wonder at the choice made of the "practice" described.

A single illustration may be noted. There is no mention anywhere of the recent and by now classic work of Alexander, Gryb and Nast on the noise and other impairments measured on actual transmission over common carrier communications plant and influencing its capabilities for coded information transmission. Other authors have also examined facets of this problem and are not cited, and this is despite the demonstrated hazard of using only conventional hypothetical probability theory noise for many cases of engineering design.

Nevertheless the book does give a very convenient compilation of much of the current and extensive analytical thinking on the transmission of information.—*Pierre Mertz*, Consultant, 66 Leamington St., Lido Beach, L.I., N.Y. 11561



The American System of Broadcasting; Variations in Negro/white television preferences; the FCC's 50-50 requirements; and religious broadcasting are among subjects discussed in papers appearing in the current issue of the *Journal of Broadcasting*, published by the Association for Professional Broadcasting Education, University of Southern California, University Park, Los Angeles, Calif. 90007. The issue also contains a list of schools teaching broadcasting.

The duality of the American system of broadcasting is discussed by W. Theodore Pierson, a communications lawyer located in Washington, D.C. The "duality" refers to the separation of commercial and non-commercial stations. In his paper Mr. Pierson takes the point of view that this separateness should be preserved and that the intent and purposes of the two types of broadcasting should be distinct.

In his report on differences in Negro and Caucasian TV program preferences, James M. Carey, who is Research Assistant Pro-

fessor in the College of Journalism and Communications at the University of Illinois, sets forth results of national audience research data that show substantial differences do exist and that many Negroes prefer programs of decidedly better quality.

The FCC "50-50 requirement" is explained by Ashbrook Bryant, Chief of the Federal Communication Commission's Office of Network Study. The issue also contains the third installment of Donald Dick's bibliography of religious broadcasting for the years 1920-1965.

The Make-Up Artist is the title of a series of books by Vincent J-R Kehoe covering all major make-up methods for all mediums. The series is published by The Make-Up Artist Publishing Service, 429 E. 52 St., New York, N.Y. 10022. Of special interest is *The Make-Up Artist in the Laboratory* and *The Make-Up Artist in the Film and TV Studios*. Other books in the series include *The Make-Up Artist for the Stage*, *The Make-Up Artist in the Beauty Salon* and *The Make-Up Artist at the Wigmakers*. The books are in loose-leaf form so that new pages can be added to keep each volume up to date. Each volume is priced at \$7.50. An earlier book by Mr. Kehoe, *The Technique of Film and Television Make-Up (Journal, p. 704, Oct. 1958)* is highly regarded as a valuable source of information in this important field.

A library of "How-To" electronic books has been introduced by IRC, Inc., 414 N. 13 St., Philadelphia, Pa. 19108. The first 12 books in the library are: *Diodes*; *The Volt-Ohm Milliammeter*; *Basic Alternating Current*; *How To Read Circuit Diagrams*; *Basic Electronics Math*; *Handbook of Transistor Circuits*; *Learn Electronics in 5 Minutes, 37 Seconds*; *The Oscilloscope*, *The Vacuum-Tube Voltmeter*; *Elements of Electronics*; *How to Use and Enjoy Your Tape Recorder*; and *Practical Radio*. Called the 103 Series, the library will consist of 103 books when it is completed. The books are priced at \$1.25 each.

Technical Review No. 166, a 24-page publication available from B&K Instruments, Inc., 5111 W. 164 St., Cleveland, Ohio 44142, contains a 7-page paper on "Windscreening of Outdoor Microphones" by Fred Skode, and a 7-page paper on "A New Artificial Mouth" by Peter Wilhelm. The booklet also has a section called Brief Communications which contains items covering the practical aspects of the use of B&K instruments.

Motion Pictures: An Indispensable Aid to Industry, a 14-page illustrated booklet available from Paillard Inc., 1900 Lower Rd., Linden, N.J. 07036, is one of a series of reprints from *Bolex Reporter Magazine*. The booklet includes brief articles on Manufacturing Methods; Industrial Photographic Unit; Product Demonstration; the Bolex H16 Rex; Applications and Techniques; Sales Training; Visual Information; Sales Promotion; Sound Production; Security; and Agricultural Research.

The 1966 Optical Industry and Systems Directory (12th ed.) is available from Opti-