



3-LIGHT Additive Color

COMPENSATING HEAD

Supplied to fit existing machines
of Bell & Howell Continuous Printer
Models D & J and Depue-Carlson and
Andre Debrie Step Printers.

To fit Bell & Howell
Models D & J . . . \$5,100
To fit Depue-Carlson
and Andre Debrie Step
Printers . . . \$4,100
(F.O.B. New Rochelle, N. Y.)

This 3-light additive color unit supplies discrete blue, green and red beams. No one beam contributes to contamination of the others.

Solenoid operated, calibrated neutral density glass filters. Five filters in each color beam, giving 32 printer steps of .025 or .030 Log E.

High efficiency interference-type dichroic beam splitters to form a single mixed output beam.

Colored glass and/or high efficiency interference-type trimming filters, "peaked" to the positive stock sensitivity.

Printing speed up to 125 feet a minute from continuous printing; 55 feet a minute for step printing.

Three 750-watt bulbs, operating at 60-80 volts. Assures long bulb life, saving time in calibration.

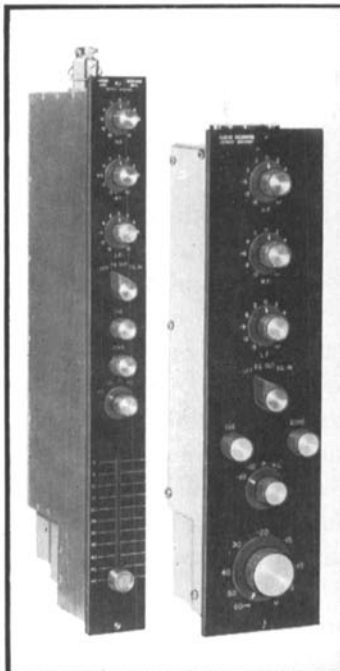
Adjustable lamp sockets to line up filaments. Three degrees of freedom; vertical, rotational, lateral.

Four-leaf adjustable diaphragm, imaged at the printing aperture which provides an optical printing aperture for exposure and/or uniformity control (on units to fit Bell & Howell Models D & J only).

Used by: Pathe Labs.
Movielab Color Corp.
Color Service Co.
General Film Labs.
Consolidated Film Inds.
Alexander Film Co.
Deluxe Laboratories
U. S. Signal Corps
Ace Film Labs.
Warner Bros.

Write for further information

FISH-SCHURMAN CORP., 85 Portman Road, New Rochelle, N. Y. 10802



introducing another

SYSTEMS INNOVATION

ADM 700 SERIES FEATURES

- MODULIZED AUDIO INPUT POSITION
- ALL-SILICON TRANSISTOR CIRCUITRY
- THREE COMPLETELY ISOLATED OUTPUTS
- CHOICE OF ROTARY- OR LINEAR-MOTION ATTENUATOR CONTROLS
- HIGH S/N RATIO
- FLEXIBILITY OF INSTALLATION
- CONTINUOUS DUTY
- STEP TYPE EQUALIZERS

AUDIO DESIGNS
AND MANUFACTURING, INC.
SYSTEMS BY INNOVATION

WRITE OR CALL FOR LITERATURE

17510 WYOMING AVENUE, DETROIT, MICHIGAN 48221

PHONE: (313) UN 3-7777



books reviewed

Modern Optical Engineering: The Design of Optical Systems

By Warren J. Smith. Published (1966) by McGraw-Hill Book Co., 330 West 42 St., New York, N.Y. 10036. 466 pp. incl. Bibliography and Index. Illus. Diagrams. 9 by 6 in. Price \$15.00.

The study of optics seems to be acquiring great popularity, to judge from the number of books on the subject that have been appearing in recent times. It is a broad field, and one that is difficult to contain in one volume with a reasonable degree of thoroughness. The present work, from the author's introduction, has a particular objective, "to emphasize the application of basic optical principles to practice." But he also aims at giving the reader a good grounding in these basic optical principles.

The author starts with the elementary principles of waves and wave propagation, refraction, interference and diffraction, etc. Then he applies these principles to simple image formation by thin and thick lenses, separated components, and mirrors. The next step covers Seidel and chromatic aberrations. From here on, chapters deal with prisms and mirrors, the eye and color vision, stops and apertures, optical materials and coatings, and photometry. Under this last item he has an introduction to the photometry of images and image-forming systems, a subject that often receives but limited attention.

At this point the reader is considered ready for applications. The usual ones are described: telescopes, microscopes, radiometers, etc. The real task is then introduced, of optical computations and the design of optical systems. It is of course clear that in the space available only an introduction can be managed; the reader must not expect to be able to design anything beyond relatively simple systems merely upon reading this treatment, even if it does keep an eye close to the practical situations.

An additional subject covered in this group is image evaluation. It is treated first in terms of aberration tolerances as measured by the Rayleigh criterion of one-quarter-wavelength path difference. Then it is described in terms of image energy distribution, point spread functions, and geometrical spot size. Finally it is given as determined by the modulation transfer function. The difficulty is clear, of measuring image quality by just one number, except under quite special circumstances.

The book concludes with a special practical chapter on optical manufacture, specifications and tolerances, mounting techniques, and laboratory practice. Throughout the various chapters are included exercises and problems, together

this sound studio gets up and goes!

The one-of-a-kind Siemens 2000 16/16 double and single-system sound projector is an amazingly useful and versatile addition to your complement of production equipment. Fully portable, it travels from the editing room to preview room to the conference room . . . even packs up and goes with you to the client's office. And everywhere it goes, it does some remarkable things.

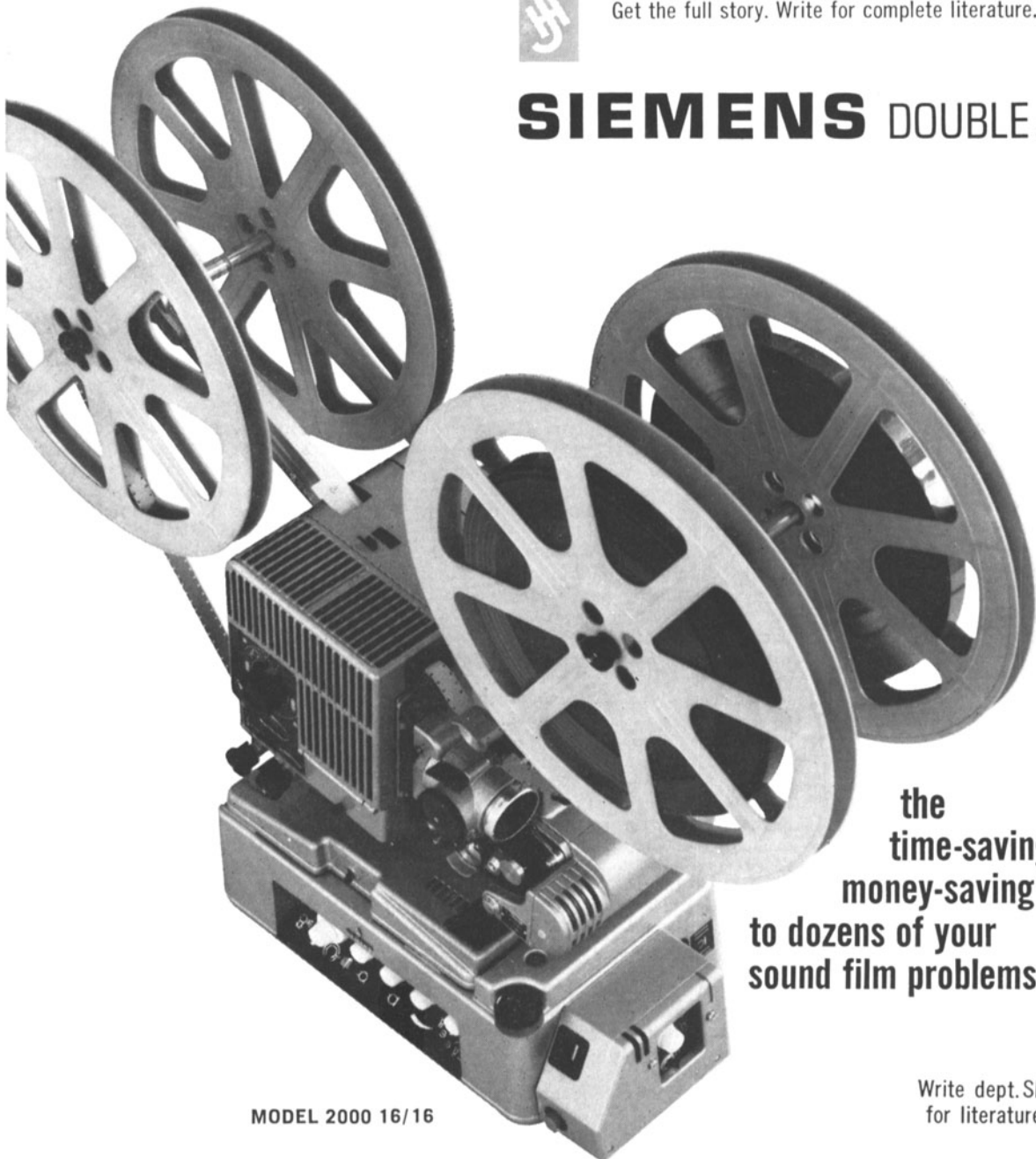
Actually, it's a top quality optical/magnetic 16mm sound projector, mechanically interlocked with an equally fine audio deck for 16mm full coat magnetic stock. Its mechanical linkage keeps absolute sync between picture and sound.

How many ways can you use the Siemens 2000 16/16? Count 'em. As a fine, single system projector for optical and magnetic sound tracks; as a double-system projector for preview screenings, in your preview theatre or your client's office; to record, re-record and post-record 200 mil tracks on 16mm magnetic stock; for multi-lingual and other multi-track purposes; for test tracks and scratch tracks; for "quick access" film showings; for one-shot screenings of originals, and for all the etceteras you can think of.



Get the full story. Write for complete literature.

SIEMENS DOUBLE / SIXTEEN



MODEL 2000 16/16

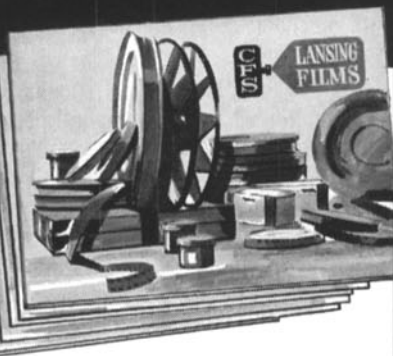
the
time-saving
money-saving answer
to dozens of your
sound film problems

Write dept. SM
for literature.



ARRIFLEX CORPORATION OF AMERICA ■ P. O. BOX 1050, WOODSIDE, N. Y. 11377

We invite
your inquiry



New — just off the presses . . .

our full color brochure which describes all of the services available at Capital. We solicit people who want customized service . . . who demand top quality. Our expanded laboratory and production facilities are at your disposal 24 hours a day.

Professional motion picture laboratory with complete in-house capabilities from script to screen all under one complex. Complete photo processing and printing service with the most modern, up-to-date equipment available.

Comprehensive recording and re-recording facilities to fit every need.

We'll be pleased to tell you our complete service story. Just drop us a line and our brochure will go out to you return mail.

No obligation, of course.



A SYSTEM OF CAPITAL FILM SERVICES, INC.

CAPITAL FILM SERVICES INC.
1001 TERMINAL ROAD
LANSING, MICH. 48906

with extensive references. The references are also collected in a final general bibliography at the end of the book.

The reader may encounter a few irritations in the course of using the book. There is no general tabulation of the rather extensive notation (and frequent multi-letter abbreviations). This hampers dipping into the book for a specific subject, by requiring much paging around to hunt out the meaning of the notation. Also, with the emphasis on the practical, some items are described rather glibly, but a more precise knowledge is really needed for a later discussion involving them. As a single example, the Petzval curvature is noted (in a formula given only in words) on p. 55. But there are a number of important logical steps missing before it can be applied as in pp. 275-276. The really knowledgeable reader can possibly fill these in himself, or can find them by hunting in the references. But this is very hard on the student trying to understand the subject by reading the book.

Nevertheless, the work can serve as a very handy reference in the field of optical engineering, both for the student and for the engineer who is encountering optical problems in his work.—*Pierre Mertz*, Consultant, 66 Leanington St., Lido Beach, L.I., N.Y. 11561.

Farbfernsehen, Vol. II

By Dr. Helmut Schönfelder. Published (1966) in German by Justus von Liebig Verlag, Gagerstrasse 9, Darmstadt. Brochure, 249 pp. Illus. Diagrams. 8½ by 5½ in. Price DM 14.80.

The subject of color television can be very broad and cover a wide range of material. The present work is Volume II of a series of three, and restricts itself to color television scanning and signal encoding and decoding. By limiting his field in this way, the author can manage to present a more thorough treatment of the subject matter. He follows each description of apparatus with a fairly detailed account of the testing procedures to check its functioning. The discussion is limited to the additions to a television system resulting from the introduction of color, with the reader assumed to be familiar with monochrome television. The equipment described generally centers around that manufactured by Fernseh GmbH, who helped in preparing the book.

The subject matter starts with the spectral and colorimetric characteristics of scanning devices and cameras, and various methods of measuring them, using spectrometers, monochromators and colorimeters. It goes on to consider spectral energy distributions in the incident light accepted by the three color channels and the influence which these have on ultimate signal-to-noise ratios (with a comparatively simplified theory of the effects). The author continues with a discussion of amplifiers for color television, with aperture, gamma, electronic masking and other corrections; and the various oscilloscope tests for distortions in transmission.

At this point the author enters the subject of signal encoding and decoding. This has two aspects. The first is the general colorimetric one, common to most of the modern systems, which uses a luminance channel, modified by a chrominance channel that

operates on three standard primaries through a matrix translator. The second aspect lies in the specific signal codification of the chrominance channel. The author discusses the NTSC signal used in the United States for a number of years, and the PAL signal (and its successive variations) being studied in Europe; with a brief mention also of the European SECAM signal. The general mechanisms and the tests (particularly with a polar oscilloscope display using color bars) are described. The final choice on the system is not made, although the author, because of his background, leans toward some variation of the PAL signal. (The front and back covers of the book illustrate in color enlargement a PAL field, with optical integration to overcome horizontal pattern.)

The author naturally quotes mostly German references; however about a third of the references are American, and some are from this *Journal*.

With the coming of satellite relays and the interchange of television programs between the continents American engineers will want to become familiar with European developments, for which this booklet can be very helpful.—*Pierre Mertz*, Consultant, 66 Leanington St., Lido Beach, L.I., N.Y. 11561.

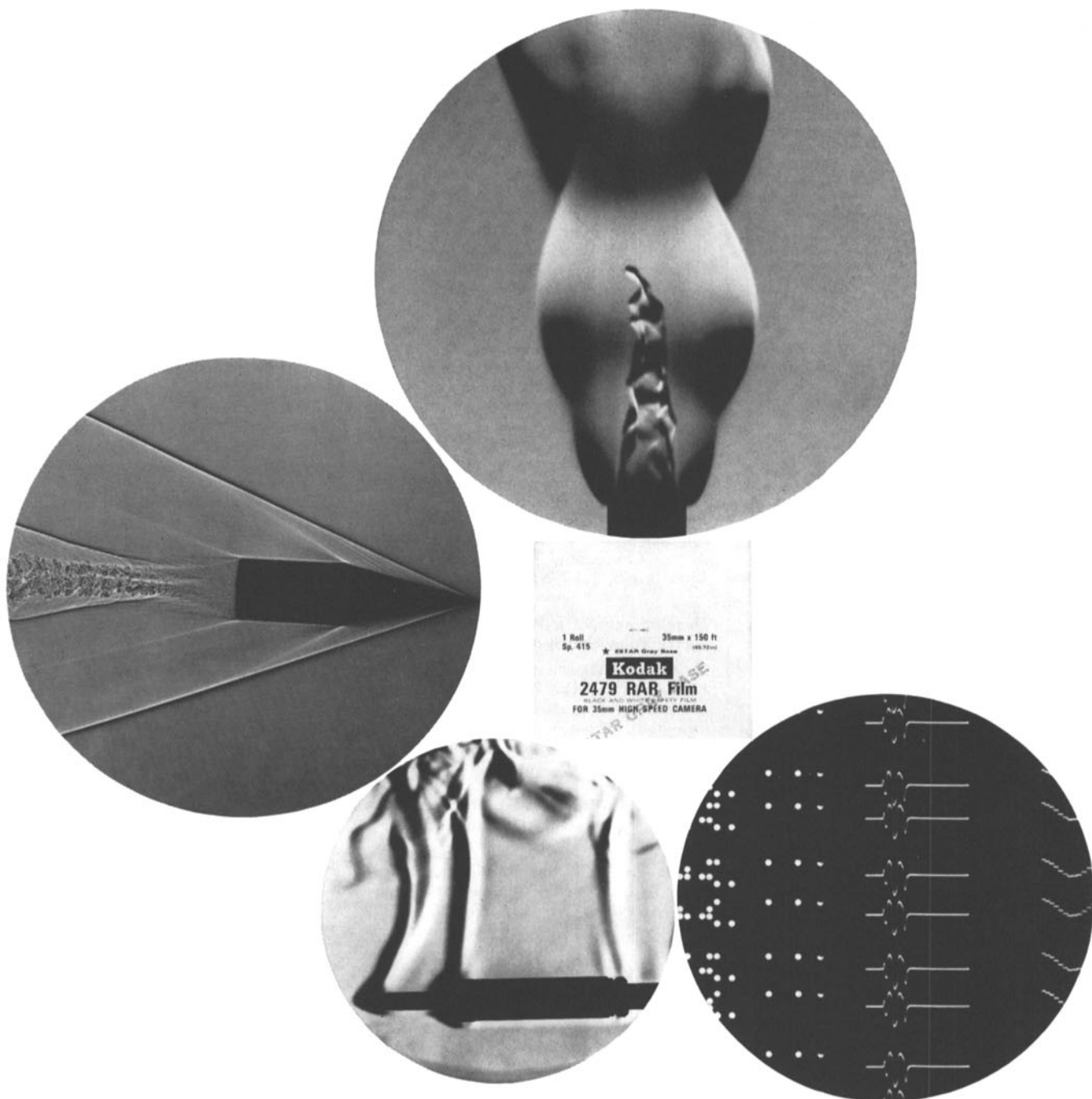
Noise and Its Effect on Communication

By Nelson M. Blachman. Published (1966) by McGraw-Hill Book Co., 330 W. 42 St., New York, N.Y. 10036. 212 + ix pp. incl. Index, Diagrams. 6 by 9 in. Price \$13.50.

There has recently been much interest in electrical noise, and its influence on communications. Noise, from its nature, is erratic and unpredictable, but a considerable knowledge about it has been gained through the techniques of probability and statistics. This of course has been done largely by mathematicians and statisticians. The mathematical viewpoint emphasizes logic and rigor—sometimes, one thinks, more than the result achieved—and this makes such literature very difficult reading for the engineer, whose primary interest is in the end product and its application to his design. Thus the great mass of mathematical literature on noise, scattered through a wide variety of journals, is not generally accepted as an important factor in the design of practical operating communications systems (although this is tending to change).

The aim of the author is stated in his introduction: "The mathematical exposition is mainly heuristic, developing and exploiting physical insight and geometrical methods as fully as possible in order to avoid needlessly complicated calculations, whose results might be difficult to interpret and to apply."

The book is divided into three parts, entitled: Statistical Properties of Noise and Random Signals; Demodulation, Detection, and Other Nonlinearities; and Information Theory. Under these topics are summarized from the extensive mathematical literature, in the simplified form which has been suggested, the processes of solution of many noise problems encountered in the various communication fields. The engineer must be cautioned, however, that in spite of all efforts, the simplification does not reach the point where the reading



It gets around

KODAK 2479 RAR Film is a fast (ASA 400) panchromatic film that's at home in virtually *any* photo-instrumentation application. It's one of a baker's dozen of Kodak black-and-white films designed to fill your instrumentation recording needs.

2479 Film gives sharp, detailed records in a hurry. And like the complete RAR Film family, takes 130 F processing easily. An improved, clear backing lets 2479 get along with any type of processing—automatic, high-temperature, or conventional.

2479 RAR Film is on 4-mil ESTAR Gray Base (Kodak's

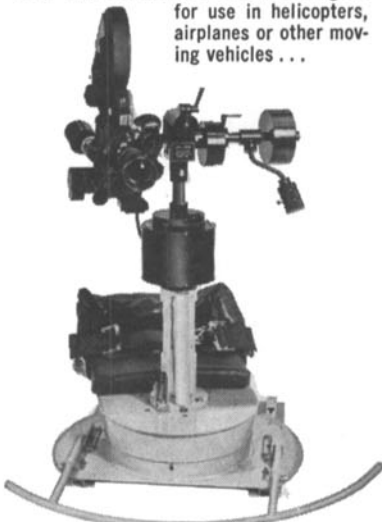
improved polyester material). This means fast drying, fast readout, high footage per roll diameter. It has excellent dimensional stability—temperature and humidity have minimal effect on its measurements. It also solves pesky halation and light-piping problems.

Word's getting around—about KODAK 2479 RAR Film. Let us get the word to you. Contact your local Kodak representative or get in touch with Instrumentation Sales, Eastman Kodak Company, Rochester, N. Y. 14650.

Kodak
TRADEMARK

AERO-VISION

... a new anti-vibration mount designed for use in helicopters, airplanes or other moving vehicles ...



Available immediately for sale or rent.
Call or write for brochure

F & B/CECO

MAIN OFFICE:
315 West 43rd St., New York, N. Y. 10036
Phone (212) JU 6-1420—Cable CINEQUIP
Telex 1-25497

Branches in: Hialeah, Fla./Washington,
D.C./Atlanta/New Orleans/Cleveland

NEW! PROFESSIONAL MAKE-UP KIT

Specially Prepared For
**COLOR MOTION PICTURE &
STILL PHOTOGRAPHY**

By The
RESEARCH
COUNCIL OF
MAKE-UP
ARTISTS,
INC.



Complete New Color Process kit contains over 65 items of foundation bases, eye color, lip color, mascara, lotions, brushes, puffs, etc., plus attractive carrying case and step by step instructions. Includes all make-up required for Ektachrome ECO 7255, EMF 7256, EF 7257 and EF 7258, color negative 5251 and Ansco 242 film stocks. Also ideally suited for color television and theatrical make-up applications.

For free brochure listing over 250 individually priced items and SMPTE technical paper reprint, write or call Exclusive U.S. Distributor:

F & B/CECO

(212) JU 6-1420 Telex: 1-25479

Branches in: Hialeah, Fla./Washington,
D.C./Atlanta/New Orleans/Cleveland

will be easy for him; but, once accomplished, it will give him an insight into how to solve many teasing problems. In order to help in the teaching of the material, the author has included numbers of classroom exercises throughout the book.

The reader may possibly be surprised at not seeing the name of Gumbel, nor reference to his studies on the statistics of infrequent occurrences, such as might characterize large noise peaks that cause errors. He may be even more surprised at the lack of an attempt to correlate the still rather elaborate mathematically deduced expectations of noise effects with experimental observations of what actually happens in real communication transmissions. Thus there is no mention of the classical report of 1960 of Alexander, Gryb and Nast, nor of the more recent one of Fennick and N&sell, nor of others. And yet these have been found important in readjusting some of our conventional ideas.

The book will be of importance to those engineers who seek an introduction to the extensive and difficult mathematical literature on electrical noise and to the solution of many noise problems.—*Pierre Mertz*, Consultant, 66 Leamington St., Lido Beach, L.I., N. Y. 11561.

Development of a High Resolution Research Television System

By John H. Harshbarger. Reproduced by U.S. Dept. of Commerce Clearinghouse for Federal Scientific and Technical Information, Springfield, Va., 22151; AD 630 941, December 1965. 27 pp., 8½ by 11 in. Price \$1.00 (microfiche \$0.50).

Research in the Use of Light Amplification by Stimulated Emission in Energy Transfer

By R. N. Griffin and B. Linder. Reproduced by U.S. Dept. of Commerce Clearinghouse (address above); AD 631 973, January 1966. 46 pp., 8½ by 11 in. Price \$2.00

Active Acoustic Devices

By W. H. Brendecke, N.G. Sakiotis and F. S. Hickernell. Reproduced by U.S. Dept. of Commerce Clearinghouse (address above); AD 628 450, February 1966. 67 pp., 8½ by 11 in. Price \$3.00 (microfiche \$0.75).

The high resolution television system of the first report uses 1029 scanning lines and is meant for monochrome image generation in visual simulation training. The system components included a Dage 1½ inch vidicon camera, and a 32 megahertz video bandwidth camera system with special synchronization signal generator (Dumont) and distributor, two monitors (previously designed and constructed), and various auxiliary equipment. Some simple tests with a test chart showed the resolution to be "at the 1200-line level." Recommendations are given for further tests. Possibly noise tests could be added. The whole report is rather brief.

The investigation in the second report covers a study of the excited states of seventeen organic compounds deemed promising for laser action. Essentially this means measurement of the absorption spectra and their variation with time, and of the phosphorescence decay, including study of

exponential and non-exponential decays. The report does not link this tutorially with the laser functioning. The major results summarize to a somewhat better understanding of the processes, including the matter of the exponential vs. non-exponential decay and the influence of triplet energy levels. The report recommends, for further work, extension of the studies to rare earth chelates.

The active acoustic devices considered in the third report are piezo-electric thin-film transducers, used as low-level, power, and transceiver amplifiers. The high frequency range between 1 and 1000 megahertz is generally explored. Cadmium sulphide, zinc sulphide, and cadmium selenide are studied, but the first is preferred for adequately reproducible quality. An important problem is the electrode bonding, without short-circuiting through pinholes in the thin-film transducer. The quantities studied are noise, acoustic gain, and acoustic power input and output, as functions of various parameters such as sample size, signal amplitude, etc. The specific uses to which the amplifiers are to be put are not mentioned, and the report is relatively sophisticated and not meant to be tutorial.—*Pierre Mertz*, Consultant, 66 Leamington St., Lido Beach, L. I., New York 11561

The Technique of Television Announcing

By Bruce Lewis. Published (1966) by Hastings House Publishers, Inc., 151 E. 50 St., New York, N. Y. 10022. 264 pp. incl. Index. Illus. 8½ by 5½ in. Price \$10.00.

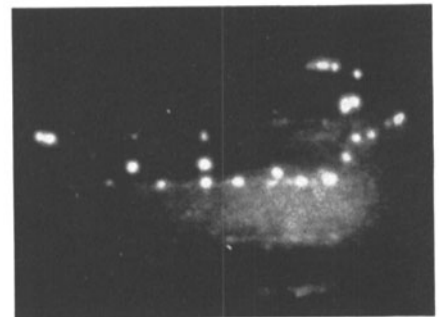
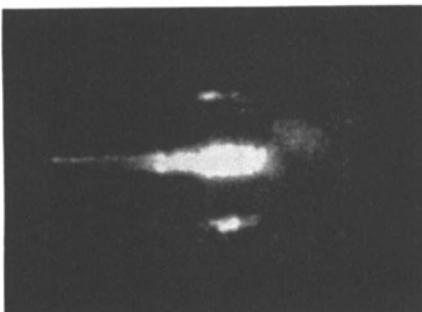
The persuasive "on camera" delivery of any kind of message (outside of dramatic acting) raises technical questions that are discussed with pertinence and expertise in this comprehensive manual. Its usefulness to professionals active in the announcing craft and to those aspiring at such work stems from the thoroughness of the book's coverage and its style of writing which avoids whenever possible over-emphasis on technical terms.

Opening on a chapter dealing with the personal qualities necessary to a would-be announcer, the volume first outlines the psychological requirements of the job, as well as the kind of background and experience most suitable for a successful career. This is a particularly significant section, since the personality of an announcer tends very often to be the primary factor of his effectiveness.

Following chapters cover the various technical aspects of the job, as well as the functions, skills, art and responsibilities of announcing. Its various facets—newscasting, emceeing, interviewing, commenting, selling, etc.—are fully discussed in separate sections, with an experienced hand leading the reader through the specific problems of each assignment. The announcer's relationship to working studio personnel is defined as it concerns the show's producer, director, cameraman, floor manager and other technicians. His make-up needs are also discussed.

A glossary of technical terms concludes this serviceable and practical book dealing with a hitherto inadequately covered field. It is the 11th volume to appear in the Library of Communication Techniques

HOW TO CUT THE "CHATTER" AND FREEZE THE FLASH.



Frames from FASTAX high-speed camera show flash during interruption of the circuit in low-voltage circuit breaker. Film was shot without illumination to accentuate flash.

Undesirable "chatter" or bounce can create problems in low-voltage circuit breakers. So can excessive flash or display given off during interruption of the circuit. But Allis-Chalmers solved these problems when they designed a new line of circuit breakers. How did they do it? With a FASTAX high speed motion picture camera.

In the detection of "chatter" and behavior of the contact assembly, Allis-Chalmers filmed the circuit breaker in action. By stopping the

motion with high speed photography, they could study the problem in detail and come up with an answer. Then they made a high speed film of the amount of flash during interruption of the circuit. By freezing the flash on film, Allis-Chalmers evaluated the interrupting capacity of the circuit breaker.

FASTAX cameras are available in 8mm, 16mm, 35mm sizes with speed range of 18,000 frames per second. (3M also has a full line of precision optics. Everything from

prisms and zoom lenses to tracking telescopes.) For more information about Fastax Industrial Photographic Products, see your authorized dealer, or write: 3M Company, Dept. FMH-37, St. Paul, Minn. 55119.

Look to 3M for imagination in image-making!

Fastax[®] 3M
COMPANY
INDUSTRIAL PHOTOGRAPHIC PRODUCTS
WOLLENSAK OPTICAL PRODUCTS

FAST "LENS-BANK" SERVICE!



WORLD'S LARGEST
OFF-THE-SHELF
SELECTION



EXPERT
CONSULTATION



MOST MODERN
LAB FACILITIES

PROTOTYPE SAMPLES

Select from the world's largest and most diversified inventory—Finest domestic and foreign Manufacturers

- Expert Performance Analysis!
- Satisfaction and Performance Guaranty! (15-day trial period.)
- Matching or creating unusual Optics!
- Optical Services for Laser—Schlieren—Fibre Optics!
- Precision Optical Flats available!
- Modern fully equipped Optical Lab.-Lenskoting!

SMPTVE
3/67

Write for FREE Lens Performance Guide

1977 **Burke & James, Inc.**
333 W. Lake St., Chicago, Ill. 60608



series, whose high standards have consistently contributed to a wider understanding and appreciation of the mass media of information.—George L. George, Administrator, Trust Fund of the Screen Directors International Guild, 250 W. 57th St., New York, N. Y. 10019

Professional Photography in America

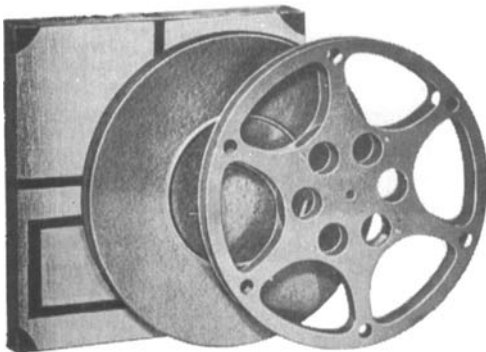
Oscar Katov, ed. Published (1966) by Professional Photographers of America, Inc., 1090 Executive Way, Oak Leaf Commons, Des Plaines, Ill. 60018. 124 pp., incl. 32 color plates and 71 black-and-white photographs, plus 19 advertisements. 8½ by 11 in. Hard cover in sleeve, \$7.95; paper bound, \$4.95.

For motion-picture and television engineers and their professional interests there is in this publication little of specific interest or instruction. It does give some highlights of general interest and provides pleasure in coursing over the various chapters: A Conversation With Edward Steichen, Down the Years With the Professional Photographers of America, by Beaumont Newhall; 50 Years of Portrait Photography, by Bradford Bachrach; Photography in the Fine Arts, by Ivan Dmitri; Karsh on Portraiture, by Yousuf Karsh; New Photography, from *Life Magazine*; Photographing Professionally in Color, by William Reedy; and The New National Headquarters and Photography Hall of Fame.

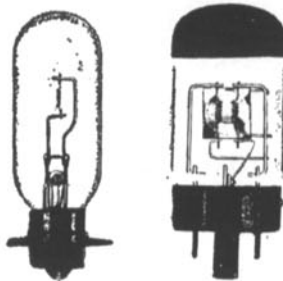
The printing by lithography is of interest, especially the success with a full range of color photographs. The history and descriptions of the Professional Photographers of America and of the Photography Hall of Fame will interest the organization-minded; 19 pp. of advertisements complete the volume.—*Edit.*

REELS CANS CASES

VISIT US AT BOOTH 78



PROJECTION
LAMPS
ALL LAMPS ALL MAKES



BOOKS
BOOKLETS AND BROCHURES

The publications listed below are available from Clearinghouse, U.S. Department of Commerce, Springfield, Va. 22151.

AD-636 414, *Design Problems in Visual Displays, Pt. I. Classical Factors in the Legibility of Numerals and Capital Letters*, D. A. Shurtleff. 114 pp. Price \$4.00 (microfiche 75 cents). Discusses the effect of classical factors upon the legibility of numbers and capital letters, such as symbol geometry, brightness and contrast.

AD-640 571, *Design Problems in Visual Displays, Pt. II. Factors in the Legibility of Televised Displays*, D. A. Shurtleff. 72 pp. Price \$3.00 (microfiche 75 cents). Evaluates the literature on legibility of numerals, capital letters, and words on television displays, dating from the late 1940s to the present. Makes recommendation for display design and applications.

AD-636 441, *Modules (Integrated Circuits) for Communications*. Price \$2.00 (microfiche 50 cents). Evaluation of the final assembly demonstrated positive improvements in these criteria over the conventional design.

More than 500,000 in stock at all times . . .
Immediate shipment!
No order too big or too small!
Send for Price List.



MOTION PICTURE ENTERPRISES, Inc.

TARRYTOWN, N. Y. 10591
New York City Warehouse phone: (212) 245-0969