Advance Program

This program is as complete and accurate as possible at press time—but there may be errors and there probably will be some changes for the Final Program. If attendance at a session is now being planned for only a specific paper or two, members are advised to inquire during the week before the Convention by telephoning to SMPTE Headquarters in New York (LOngacre 5-0172) or to Dr. C. Loren Graham, Program Chairman, in Rochester, N.Y. (GLadstone 8-1000, Ext. 3621 or 3929).

SUNDAY—OCTOBER 1

10:00–5:00 Registration

MONDAY—OCTOBER 2

8:30 Registration

9:00 SPACE PHOTOGRAPHY AND IMAGE SENSING

The Operational Aspects of Image Transmission Systems

JOHN MANNIELLO, CBS Laboratories, Stamford, Conn.

The operational use of image transmission systems, wherein radar, infrared and photographic intelligence is transmitted from an airborne vehicle to a command post, is intended to provide military commanders sufficient decision-making time in situations where reaction time is limited to seconds rather than days. Operational aspects of specific systems are discussed.

A High-Resolution Ground Station Recorder With Direct Film Exposure by Electron Beam

JOHN A. STUMPF and W. K. BERTHOLD, Radio Corp. of America, Hightstown, N.J.

The technique of exposing photographic film by means of an electron beam in order to obtain high-quality recording of TV-type picture information is discussed. The application of this system to the recording of high-definition TV-type signals received from satellites appears to be especially attractive. The results of exploratory experiments made with preliminary apparatus are presented. Details of the construction of a feasibility model are outlined together with typical results obtained from operational tests.

The Interpretation of Cloud Pictures From the Tiros Meteorological Satellites

JOHN H. CONOVER, Geophysics Research Directorate, Air Force Cambridge Research Laboratories, L. G. Hanscom Field, Bedford, Mass.

Interpretation of the Tiros cloud pictures, which were taken from an altitude of 725 km above the Earth, depends on the cloud brightness, texture, structure, pattern, shape and the dimensions of the patterns and shapes. Methods of determining the location of the pictures and rectifying them to a suitable scale to obtain dimensions, patterns and shapes are discussed. Transmission to the weather services, the use of grid overlays, the production of rectified photographic mosaics, and a cloud identification guide are described. Methods of automatically obtaining brightness, which may prove feasible for routine use, are shown.

A Theory for Visual Detection and Recognition of Blurred Images on Grainy Film

ROBERT E. HUFNAGEL, Perkin-Elmer Corp., Norwalk, Conn.

A mathematical model has been developed which predicts the ability of humans to detect or recognize the images of simple objects as recorded through limited resolution systems on grainy film. The model is based on the assumption that a human observer behaves as a mathematically perfect device except for some limitations and imperfections which can be simply and objectively described. Comparisons between theory and experiments show good agreement.

See page 748 for Tentative Schedule of Committee Meetings.

Application of Sine-Wave Response Techniques to Image-Forming Systems

ROBERT LAMBERTS, Research Laboratories, Eastman Kodak Co., Rochester, N.Y.

Sine-wave response has proved to be a powerful tool for appraising systems using lenses, photographic emulsions, television systems, and other image-forming devices. This paper describes techniques for such analyses of various components of optical systems.

A Versatile Tracking Mount for Systems Evaluation

GEORGE G. SILBERBERG, RICHARD W. MACE and JULIAN L. THOMPSON, U. S. Naval Ordnance Test Station, China Lake, Calif.

In the past, tracking mounts have been fabricated to meet definite data gathering requirements. Now, a tracking mount has been specifically designed to be used to evaluate all the components of various tracking and data gathering systems. The tracking systems include tracking loops composed of various electrooptical displays and control mechanisms, whereas the data gathering systems include photooptical and electronic sensing devices and recorders. Human factors problems are being considered in evaluating tracking systems compatibility.

12:15 Get-Together Luncheon

Guest Speaker:
"Electronic and Motion-Picture Systems in the Space Age," BARTON KREUZER, Division Vice-President and General Manager, Astro-Electronic Products Division, Radio Corporation of America

MONDAY AFTERNOON

2:00 BUSINESS MEETING

2:15 INSTRUMENTATION AND HIGH-SPEED PHOTOGRAPHY

Optical Instrumentation at Vandenberg Air Force Base

CHARLES P. BRADLEY, 1352d Photographic Squadron, Lookout Mountain Air Force Station, Los Angeles

The work that the 1352d Photographic Squadron, Air Photographic and Charting Service, is accomplishing in the field of photographic instrumentation for missile tests at Vandenberg Air Force Base, Calif., is described and illustrated by a 35mm sound motion picture.

The Design and Operational Philosophy of the Ballistic Camera Systems at the Atlantic Missile Range

A. E. GLEI, RCA Service Co., Patrick Air Force Base, Fla.

General background information on the use and philosophy of the ballistic cameras used at Atlantic Missile Range in a new but proven science, Photogrammetric Triangulation, is presented. The techniques and equipments used have proven to be the only means of providing the accuracy required for evaluation and calibration of the sophisticated electronic guidance and tracking systems required for our space and missile programs. The performance of the system has already demonstrated a sound instrumentation and engineering approach, and the system is recognized throughout the missile industry as the "Range Standard."

A Study of Explosive Flash Components for Enhanced Light Output

DAVID C. OAKLEY, Lawrence Radiation Laboratory, University of California, Livermore, Calif., and HOWARD G. HANSON, Physics Department, University of Minnesota, Duluth, Minn.

Some possible gas enclosures for explosive flash units are compared to give the optimum white light output. Facing materials are compared for transmission vs. time. Argon gas purity requirements are described. Comparison of argon and xenon gases is made. Use of spectral shifters to make use of the energy in the ultraviolet is considered.

Role of Fiber Optics in High-Speed Photography

N. S. KAPANY, Optics Technology, Inc., Belmont, Calif.

Recent developments in the field of fiber optics have made possible scanning and dissection of images with high spatial and temporal resolution. Such fiber optical configurations in the form of image dissectors can be used for high-speed photography, cathode-ray-tube photography, and other optical scanning systems. Experiments using the fiber optics image dissector with a rotating-drum high-speed camera are described; photographs yielding time resolution of 10^{-7} and higher have been achieved.

New Optics for High-Speed Photography

CARLOS H. ELMER, Traid Corp., Encino, Calif.

Several types of new optical systems for use with high-speed rotating prism cameras have been developed during the past year. These include periscopes with 1:1 magnification in both right-angle and straight-through configurations, 165° wide-angle optics for 16mm coverage, and illuminated fiducial marker systems.

New 500-fps Pin-Registration Intermittent Camera With Mechanical Servo Control

ROBERT L. RODGERS, D. B. Milliken Co., Arcadia, Calif.

The design principle of the unique rotational pin-register intermittent movement used in other cameras made by this company has been combined with advanced technology in the development of a new basic camera mechanism, capable of 500 frames per second with extreme reliability under abusive circumstances. New materials and techniques have permitted increasing operating efficiency and minimizing power requirements and maintenance. A newly developed mechanical servo control system facilitates a fully automatic movement. The adaptability of these mechanisms to specialized applications is demonstrated by reference to the recent operation of two cameras. Performance characteristics and potential applications are discussed.

MONDAY EVENING

8:00 SYSTEMS OF VISUAL PRESENTATION

The Midwest Airborne Television Experiment

JAMES S. MILES, Purdue University, Lafayette, Ind.

A New Approach to Classroom Films

DAVID G. ANDERSON, Yale University, New Haven, Conn.

Integrated Projection

A. TERLOUW, N. E. SALMONS and R. S. BEELER, Eastman Kodak Co., Rochester, N.Y.

Projection outside of the theater is taking place with increasing frequency; the conference, the seminar, the assembly line, the office and the library are examples. In most instances the projected image must be used as a reference when engaged in either clerical or manipulated activities. In other instances the projected image is consulted simultaneously with other modes of display. Requirements of brightness, field characteristics, image size, and equipment control are quite different from those of the theater. These situations are described, demonstrated and analyzed.

Model equipment to illustrate these concepts and principles will be set up and demonstrated. The presentation and demonstration will last about 90 minutes.

TUESDAY MORNING—OCTOBER 3

CONCURRENT SESSIONS

9:00 LABORATORY PRACTICE

Use of Split-Frame Technique in Motion-Picture Investigations

DAAN ZWICK and CHARLES OSBORNE, Research Laboratories, Eastman Kodak Co., Rochester, N.Y.

The split-frame technique consists of exposing the two halves of a negative or print in separate exposure operations. By means of this technique, many of the unwanted variables of photographic tests can be eliminated. In tests of lighting, make-up, filters or cameras, for example, exposing the negative split-frame permits common negative process, printing and projection operations. Split-frame printer tests permit common print stock, print process and projection, thus minimizing these variables. The final convenience is the side-by-side comparison without special projection equipment.

Examples from a negative filter test, various printer variations and a graininess investigation are demonstrated.

Screen Quality and Its Relationship to Process Control

ROBERT O. GALE, Color Technology Div., and ALLAN L. WILLIAMS, Film Testing Div., Eastman Kodak Co., Rochester 4, N.Y.

Screen quality is directly related to the control exercised in the processing of the negative, intermediate, and print films. Some of the more common chemical and mechanical processing conditions that must be maintained under control to avoid inferior screen quality in the system using Eastman Color Films are described. To demonstrate the effects of some of these variables, a side-by-side picture comparison is presented, using the split-screen technique described in the previous paper.

Ultrasonic Splicing of Polyethylene Terephthalate Films

F. P. ALLES, Photo Products Dept., E. I. du Pont de Nemours & Co., Parlin N. J.

A systematic study covering six variables shown by preliminary tests to be most important in splicing "Cronar" polyester base by the application of ultrasonic energy showed complex interactions. However, a good operating range was found which yielded useful splices, without scraping of the emulsion, with as little as 0.010 in. overlap and splices as strong as the base itself at an overlap of 0.030 in. The splicer designed and used in these studies could handle 8, 16, 35 and 70mm films and hence permitted tests covering a wide range of conditions of use.

Transistorized Control System for Printer Light Change

MARIO CALZINI and MASSIMO CATURELLI, Tecnostampa, Rome, Italy

The position of the light-changing notch on negatives may not be standard, which may result in a problem if a negative is printed in more than one laboratory. To overcome this problem, a device has been designed that detects the notch and produces a delay adjustable to 1/36 of a frame by means of a transistorized binary counter without relays. The solenoid operating the light changer is actuated by a power transistor. The unit is in a small housing containing several plug-in modules on printed circuit cards for easy replacement and interchangeability.

Automatic Additive Color Printing—A New Concept

HANS CHRISTOPH WOHLRAB, Bell & Howell Co., Chicago

Among the many improvements of a redesigned automatic additive color printer are a faster acting memory device with a new type of light valve incorporating 74 steps of 0.025 log E, a six-speed tape controlled fader, a zero light cutoff, automatic torque control of tight winds, a new lamp source, and plug-in type relays. Safety of operation and ease of servicing were prime design specifications.

A Programming Device for Automatic Color Printers

HANS CHRISTOPH WOHLRAB, Bell & Howell Co., Chicago

Using a standard-width business tape the programmer punches the code for 50 steps of light in each of the three color beams, controls six fade lengths and a zero light plus start and stop. The same device can be used for monochromatic printing.

A Method of Printer Cuing by Removable Aluminum Patches on Film

HANS CHRISTOPH WOHLRAB, Bell & Howell Co., Chicago

An aluminum patch on the film damps the radio-frequency oscillations in a probe by induced eddy currents. This effect is amplified and triggers a cuing relay. The probe does not touch the film. The patches are easily removable.

CONCURRENT SESSION

9:00 INSTRUMENTATION AND HIGH-SPEED PHOTOGRAPHY

A True Kerr-Cell Framing Camera

S. M. HAUSER, D. MARLOW, H. QUAN, R. SILVER and P. BUTTON, Electro-Optical Instruments, Inc., Pasadena, Calif.

This paper describes a Kerr-cell framing camera incorporating a multifaced prism which directs a portion of the energy collected by a primary objective lens through each of six separate Kerr-cell shutters. Separate images of the same event from the same aspect and through the same set of optics are thus possible. Using established triggering techniques, framing rates to 10^8/sec are achieved at exposure times in the range of 5 to 10,000 nsec. Exposure time and resolution are independent of framing rate.

Kerr-Cell Photography in Plasma Physics

STANLEY L. LEONARD and EUGENE B. TURNER, Aerospace Corp., Los Angeles

A Kerr cell shutter (made by Electro-Optical Instruments, Inc.) has been used in this laboratory for the photography of high-temperature, transient deuterium plasmas confined by magnetic fields. The inherent advantages of high resolution, short exposure durations, and reliability are valuable for this type of work. Photographs of plasmas produced by both linear and theta-pinch devices are shown.

A Photographic Recording Technique for Measuring High-Speed Motion-Picture Camera Image Steadiness

A. E. QUINN, Eastman Kodak Co., Rochester, N.Y.

A method of evaluating both vertical and horizontal high-speed motion-picture camera image steadiness using a double exposure technique on high-speed camera film is described. The first exposure is made in a conventional pin-registered camera to record a latent image reference exposure. The film is then re-exposed in a high-speed motion-picture camera to record the identical target somewhat displaced from the first image. After processing, the 100-ft test film is projected through a slit onto a slowly revolving drum containing a 35mm strip of photorecording material. A double trace results which shows the relative differential between the reference camera and the high-speed camera.

Universal Timing System for Photoinstrumentation

G. H. HEARON and L. H. REED, Benson-Lehner Corp., Washington, D.C.

This system is comprised of a central control, distributor unit, and camera display. It allows time to be recorded on all cameras in an instrumentation system simultaneously and with a time resolution of one millisecond. It utilizes computer counting techniques and Nixie display tubes. Time is presented in Arabic decimal on the frame at the frame being exposed.

Thirty-Nanosecond Radiography

W. P. DYKE, F. J. GRUNDHAUSER, F. M. COLLINS and N. W. STUNKARD, Field Emission Corp., McMinnville, Ore.

The newly practical field emission electron source has considerable radiographic significance in view of its very large current density, up to 10^8 amp/cm^2, or about a million times greater than that of the thermal emitter (heated wire) used in conventional x-ray tubes. As a result it is now possible to obtain high resolution radiographs (e.g., 2 mil) in very short exposure times (30 nanoseconds). In one application, a sharp radiograph was obtained of 7-mil particles traveling at a velocity of 16,000 fps. The present paper describes a new, small portable x-ray system which was developed for very high radiographic information rates; it also reviews briefly the recent, but earlier, development of higher voltage equipments based on the T-F emission cathode which operates at intermediate current densities (e.g., 1000 amp/cm^2) and information rates.

TUESDAY AFTERNOON:

2:00 8MM PROFESSIONAL PRINTS; AUDIO-VISUAL TECHNIQUES

The 8mm Movie Film System

A. C. ROBERTSON, Manufacturing Experiments Div., Eastman Kodak Co., Rochester, N.Y.

The present scope and rate of growth of the 8mm industry is discussed, as well as the history of standardization in the amateur field. The fundamentals of design which lead to economy of film and simplicity of operation of the camera are described with special reference to the problems brought in by the large number of manufacturers now making equipment. Because of improvements leading to bigger and brighter screens, a faster projection rate is needed to minimize flicker, and greater steadiness is needed as well. Cancellation is described briefly, and considerable attention is given to the problems imposed on the industry by the current activity in the field of amateur magnetic sound recording. The new standards proposals under consideration are discussed briefly.

Utilization of the 35/32mm Method for the Production of 8mm Prints

FRED J. SCOBEY, General Film Laboratories, Hollywood

The production of 8mm release prints using four rows of 8mm across 35/32mm as presently in use at General Film Laboratories is considered. Use of existing printing and developing equipment and the economy of handling the products four at a time, as well as new equipment for release printing, striping and recording, is discussed, with emphasis on the importance of the professional approach to the 8mm print.

Commercial Systems for Making 8mm Prints

GEORGE T. KEENE and JAMES D. CLIFFORD, Color Technology Div., Eastman Kodak Co., Rochester, N.Y.

Many printing systems leading to 8mm release prints were critically examined, and a few selected systems are illustrated with motion pictures. With conventional printers, satisfactory 8mm release prints can be made only from originals 16mm or larger. A comparison is made between a camera original on 8mm Kodachrome II Film and 8mm prints derived from both 16mm Ektachrome Commercial Film and 35mm Eastman Color Negative Film.

Teaching Machines: A Challenging Market for 8mm

HAWLEY A. BLANCHARD, Intellectronic Systems Laboratory, Ramo-Wooldrige, Canoga Park, Calif.

Teaching machines are a relatively new development offering much promise in improving educational practices. Using a variety of presentation modes and immediate reinforcement of appropriate behavior, they can be programmed to teach using the best educational and psychological principles. One estimate of the potential market, including programs and machines, is $100,000,000 for the period through 1965. 8mm film seems to offer the most promise for use in the more advanced teaching machines. An idealized 8mm film system, its functions and cost are discussed.

8mm "SOF" as a Professional News Medium for Television

RICHARD B. RAWLS, Meredith Broadcasting Co., KPHO Div., Phoenix, Ariz.

KPHO utilizes 8mm sound on film and equipment to supplement other picture media now being used in TV news coverage. The advantages of the 8mm medium, its limitations, and the methods which KPHO has developed in using 8mm successfully are discussed.

We Move the Earth in 8mm

WILLIAM C. DIETER, Dow and Co., Rochester, N. Y.

An effective 8mm sales film with sound and color was made to demonstrate the use of heavy earth-moving equipment. Problems peculiar to photographing such equipment as well as problems of shooting, editing, and dubbed-in musical background are discussed. The use of the film in sales presentation, including changing the sound commentary to meet requirements of a particular audience, is described.

8mm as a Means for Learning Motion-Picture Production

ROBERT S. BEELER, Sales Service Div., Eastman Kodak Co., Rochester, N.Y.

Current 8mm cameras and sound projectors offer a practical answer to problems of mastering motion-picture planning and production procedures. Beginners can use simple 8mm equipment to develop ability, whereas production practice with 16 or 35mm equipment may be prohibitively expensive, or require technical skills the beginner does not possess. Techniques learned with 8mm can be transferred to the planning and production of 16mm and 35mm motion pictures.

8mm? You're Kidding!

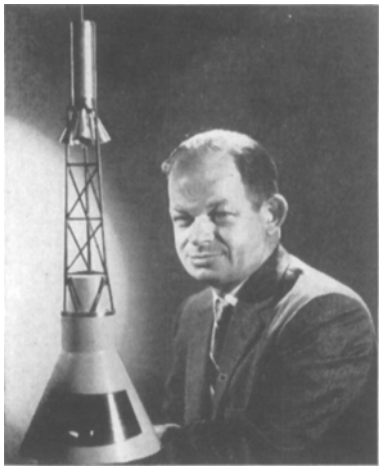
WILFRED SHAW, Jr., The DoALL Co., Des Plaines, Ill.

The use of 8mm film in a sales program is described. The development of the program, including problems of production, projection and use in sales promotion, is described and the future of the program predicted.

TUESDAY EVENING

8:00 PRESENTATION OF AWARDS

Guest Speaker:



Lt.-Col. JOHN A. POWERS, Public Affairs Officer, Space Task Group, NASA

The Astronaut: Space Flight From the Viewpoint of Man Inside the Vehicle

The speaker will discuss the historic flights into space with special reference to communication techniques and the combination of engineering and psychological problems involved in space navigation.

WEDNESDAY MORNING—OCTOBER 4

9:00 SOUND REPRODUCTION

"Motor-Boating"—A Laboratory Problem in 16 mm Sound Release Printing

GEORGE BOVA and ARNOLD SCHIEMAN, National Film Board of Canada, Montreal, Que.

An Electronic Indexing System for ¼-in. Magnetic Tape Use

W. D. HEDDEN and ROGER J. SNOWDALL, Calvin Productions, Inc., Kansas City, Mo.

In using a ¼-in. magnetic tape library in sound motion-picture production, the location of particular musical selections on ¼-in. materials is often time-consuming and tedious. A simple electronic indexing system that eliminates the necessity of listening to audible cues is described. Desired selections may be located in the high-speed modes of the tape deck. This system, with presently available tape decks, automatic threading and complete remote control, further enhances the musical scoring process.

The Case for Split 16mm

D. J. WHITE and A. N. BROWN, Magnasync Corp., North Hollywood, Calif.

In an era of constant progression toward ultimate miniaturization of equipment, the splitting of standard films for sound recording is normal and consistent. Improved head gap to magnetic film contact and greater compliancy in the medium make possible more compact film transport components. These and other advantages of split 16mm are discussed.

A Multiple 8mm Magnetic Sound Printer

E. A. CUNNINGHAM and GEO. W. COLBURN, Geo. W. Colburn Laboratory, Inc., Chicago

A machine to transfer sound from a 16mm magnetic master to four 8mm magnetic sound release prints at double speed is described.

Testing Magnetic Striping

ROBERT C. LOVICK, Color Technology Div., Eastman Kodak Co., Rochester, N.Y.

The characteristics of magnetic stripes that influence sound reproduction capabilities are discussed, particularly as they apply to 30-mil strips used on 8mm films. Tests to determine potential performance are described and test equipment preparation reviewed.

Progress Report on Photographic Sound for 8mm Film

JOHN MAURER, JM Developments, Inc., New York

The projector and 8mm photographic soundtrack described in the paper which appeared in the August *Journal* of the Society will be demonstrated, and further progress up to the time of the Convention will be reported.

WEDNESDAY AFTERNOON

2:00 PANEL DISCUSSION: SUBSCRIPTION TV

Panel Discussion: The Engineering Aspects of Subscription TV

GENTRY VEAL, Moderator, Research Laboratories, Eastman Kodak Co., Rochester, N.Y.

The engineering equipment and methods used in four systems of subscription TV are presented as a panel discussion. The speakers and their affiliations are:

ERWIN M. ROSCHKE, Engineering Research Div., Zenith Radio Co., Chicago
CHARLES L. TOWNSEND, TelePrompTer, New York
AXEL JENSEN, Consultant
PATRICK COURT, International Telemeter Co., Div. of Paramount Pictures Corp., Los Angeles

The discussion will emphasize engineering; the economic and business aspects will not be included.

WEDNESDAY EVENING

6:45 COCKTAIL PARTY, DINNER, DANCE

THURSDAY MORNING—OCTOBER 5

9:00 TV EQUIPMENT AND TECHNIQUES

Stabilization of Monochrome and Color TV Cameras

K. SADASHIGE and HENRY KOZANOWSKI, Radio Corp. of America, Camden, N.J.

Television cameras and systems which are electrically stabilized to produce optimum picture quality with a minimum of operator attention have been developed. Such cameras have short warm-up time and long-term precision re-cycling characteristics. In this way, excellent resolution, registration, deflection linearity, and signal-to-noise ratio of the video signal are maintained. The approach has found broad application to stabilization of monochrome and color cameras, monitors, and film reproduction chains. It represents a growing trend to provide "black box" equipment to operate at peak performance with minimum attention.

Operationally Simplified Camera Channels

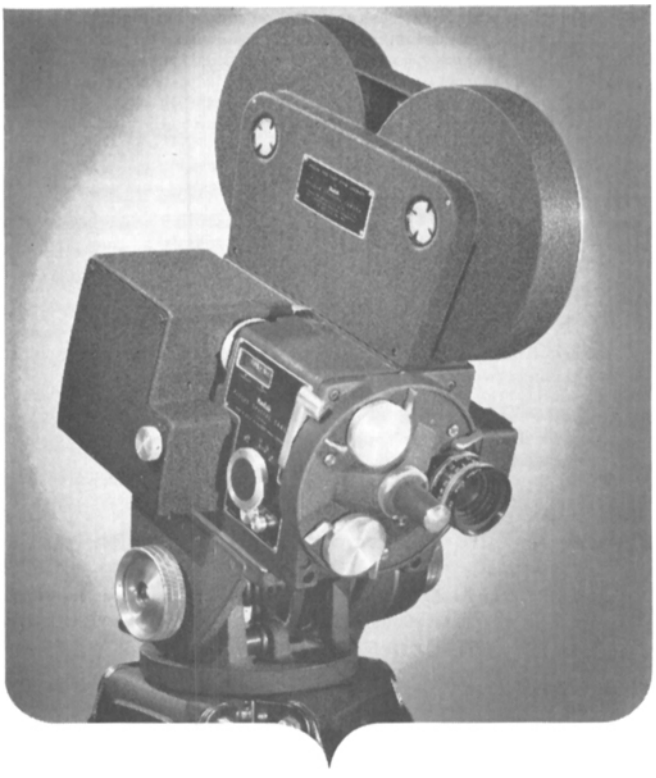
GEORGE E. PARTINGTON, Broadcasting Div., Marconi's Wireless Telegraph Co. Ltd., Chelmsford, England

The development of camera tubes and channels having improved performance and stability make possible a considerably simplified vision operating technique: the so-called "hands off." This leads to economy in operating costs as well as improvement in picture quality. The influence of this concept on camera channel design is illustrated by reference to an image orthicon channel and a telecine vidicon channel; its implementation at several studio centers is briefly outlined.

Image-Orthicon Exposure Control

ALBERT CHEVALIER and VICTOR FERRY, Canadian Broadcasting Corp., Toronto, Ont.

CBC methods of image-orthicon exposure control, for both 3-in. and 4½-in. tubes, are described. Calibrated test objects and their problems and shortcomings are considered. Results obtained in controlled experiments are described as well as those obtained in daily operations. Methods of lighting by reference to a fixed set of lens apertures are considered with reference to the problems of evaluation of results with current monitoring techniques.



NEW KODAK REFLEX SPECIAL CAMERA (16mm)

At a price barely out of the amateur class, its combination of cinematic instrumentation features is unique.

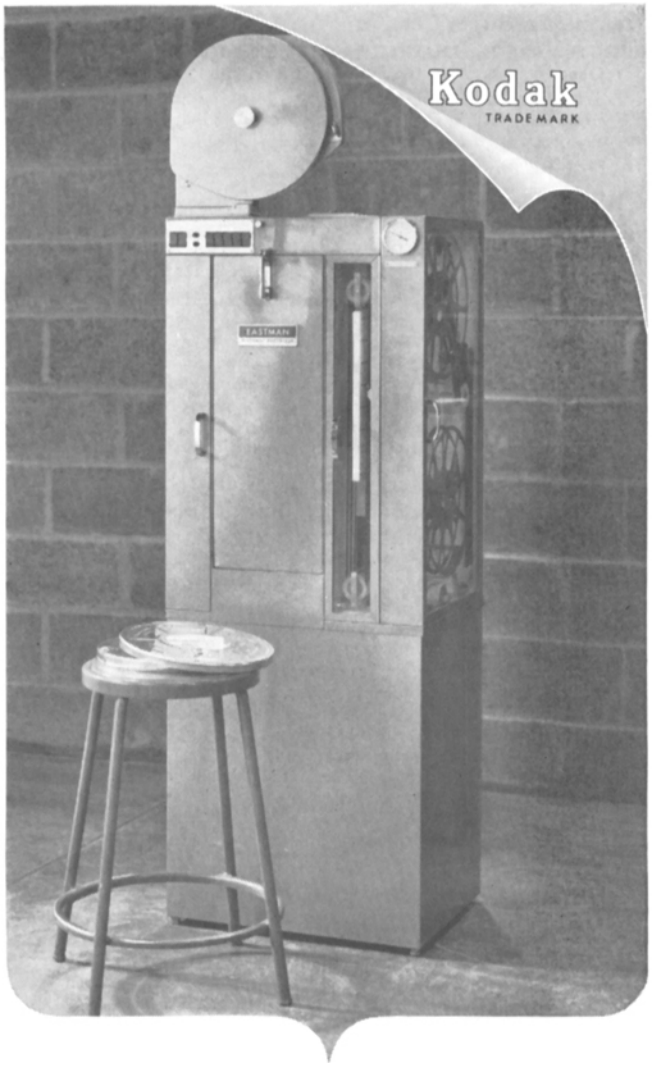
$1,895

Kodak has put 10 years of work into creating this modern successor to the old "Cine-Kodak Special." Those who work professionally with 16mm film loved that old camera.

The successor has direct, continuous reflex viewfinding through all nine of its available taking lenses (all in R-mounts, including a really first-class new 17.5-to-70mm *f*/2.2 zoom lens). It has a variable-angle shutter for achieving special effects. It accepts the usual complement of attachments that professionals need. Synchronous motor drive is removable to let the camera accept time-lapse or variable-speed motor drives (both available). Comes with 400′ magazine to supplement 100′ internal capacity: 1200′ magazine also available. With the Kodak Magnetic Sound System (transistorized), the camera has all facilities for recording and monitoring a sound track.

This camera holds register properly for the newer kinds of film as well as the older ones.

Interested persons should call or write Eastman Kodak Company, Motion Picture Film Department in Rochester, New York City, Chicago, or Hollywood. We will suggest an arrangement to permit your thorough scrutiny of camera, accessories, and/or processor.



NEW EASTMAN VISCOMAT PROCESSOR

At the same speed as a projector runs, it processes 16mm film to super-fussy Eastman standards.

$12,500

One minute is all the film spends inside. It is treated by viscous chemicals, emerges at 36 feet per minute, even lubricated, ready for immediate projection.

No replenishers. No chemical testing, adjusting, or compensating. Just insert a new cartridge. Incoming water and outgoing exhausted chemicals flow through flexible hose.

Stop or start processing at will. Run reels up to 1200′, hour after hour. Press a button to stop. Press another button to re-start after a minute or a week. No loss of quality. No dust, no dirt.

Prices are F.O.B. Rochester, N.Y. and subject to change without notice.

EASTMAN KODAK COMPANY
Rochester 4, N.Y.

Transistorized Film Camera

HUGH H. MARTIN and HARRY T. TRAVERS, Studio & Industrial TV Eng. Sec., General Electric Co., Syracuse, N.Y.

Telecasting of film material requires stable operation of the electronic equipment and rugged mechanical construction. Electrical and mechanical design parameters of equipment designed for film transmission are discussed.

A High-Definition Vidicon Film Camera Chain

L. L. POURCIAU and C. E. TAGGART, GPL Div., General Precision, Inc., Pleasantville, N.Y.

GPL has reported previously the considerable improvement in resolution that can be obtained by operating the standard 1-in. vidicon with higher than normal magnetic focus field (80 gauss) and correspondingly higher focus voltage. Since less aperture correction is required, and since signal current can be higher than normal, improvement in signal-to-noise ratio results. Problems entailed in fitting this method of operation into a reliable high-quality film playback equipment are described. The resulting camera chain has a novel automatic exposure control device with very fast response and a wide control range, and has other automatic functions.

CBS-KNXT Hollywood Television Broadcasting Center

ROBERT B. MONROE, WILFRID B. WHALLEY and A. PIERCE EVANS, CBS Television Network, New York

The Columbia Broadcasting System recently completed and inaugurated television program service for the Los Angeles area from its new KNXT headquarters, a compact and efficient local station studio plant, located at Columbia Square, Hollywood. It incorporates many new engineering developments, improved equipment, and automation features to improve program quality, simplify operation, and reduce operating errors. Equipment includes highly stable vidicon film cameras, which require a minimum of operating adjustment, and a digital computer for automatic switching of audio and video program material. The audio, video and communication facilities of the plant are described.

Closed-Circuit Television System for X-ray Inspection

JAY P. MITCHELL and MERLE L. RHOTEN, Engineering Experiment Station, Ohio State Univ., Columbus, Ohio

The use of a closed-circuit television system as the imaging device in conjunction with X-rays as the radiation source has made possible an instantaneous, in motion, inspection system for studying materials and structures. The television camera uses a small area x-ray sensitive pickup tube as a sensing device. The x-ray image, displayed on the TV monitor picture tube, is enlarged approximately 30 times. The system performance is equal to results obtained from x-ray film radiographs of material thicknesses up to $\frac{1}{4}$-in. of steel.

THURSDAY AFTERNOON

2:00 TV RECORDING

A New All-Transistor Television Tape Recorder

A. H. LIND, Radio Corp. of America, Camden, N.J.

Although the transverse track TV tape recorder is a complex machine containing a wide range of electronic circuits, transistors and transistor circuit developments have reached a point where it is feasible to utilize transistors and semiconductor diodes exclusively in the design of a new recorder. In addition to being an all transistor design the new recorder contains a number of innovations in operational facilities and advances in circuit technology that result in a new attainment in performance for TV tape recorders.

Pixlock—An Advanced Servo System for Television Tape Recorders

A. C. LUTHER, Jr. and J. R. WEST, Radio Corp. of America, Camden, N. J.

A new servo system allows a TV tape recorder playback to be synchronized accurately with a local TV system. Both the headwheel and the capstan of the tape recorder are controlled from the video information played back from the tape so as to provide highly stable and reliable operation. With this system it becomes possible to perform the same types of transition effects between tape signals and local signals as have been customarily used with local signals only. These include lap dissolves, wipes, keyed inserts and other special effects.

A Signal Processing Amplifier for Television Tape Recorders

R. N. HURST, Radio Corp. of America, Camden, N. J.

A signal processing amplifier has been designed to process a substandard video signal with noisy sync, severe baseline disturbances,

insufficient set-up, etc., to eliminate these deficiencies and deliver at its output a signal with regenerated horizontal sync, cleaned and re-inserted vertical sync, completely clean baseline, and proper setup. In the case of color signals, the burst is also regenerated and re-inserted. Special circuits, systems, and a modular construction method developed specifically for this unit are also described. The device was designed basically for the RCA-TV Tape Recorder, but is expected to have wider application.

A Broadcast-Quality Non-Studio Instructional Television System

KEN WINSLOW and AL ISBERG, Educational Television Office, University of California, Berkeley, Calif.

An extremely sophisticated television system is used at the University of California, Berkeley, to solve problems of increasing student enrollments. At this stage of development, the key purpose is to originate regular lectures for larger numbers of students under existing classroom conditions. Working with available light (20 to 50 ft-c illumination) and using a stabilized 4½-in. image-orthicon camera, a video-tape recorder and a wireless microphone, broadcast-quality pictures are produced for use in regular academic instruction to ease the pressure of faculty, student and classroom scheduling. This non-studio television system is both economical and efficient since only one and a fraction man hours are required for each hour of instructional television use.

A New Approach to Electronic Film Recording

HENRY BALL and LEWIS A. BRIEL, Radio Corp. of America, Hollywood

A new instrumented electronic film recording system featuring automatic exposure and contrast controls is described. The development of a new double-aperture camera employing a twinning optical system, a high definition cathode-ray display tube and other features designed to produce high-quality motion-picture film (kinescope) recording is also presented.

Novel Shutter and Intermittent for Video Recording Camera

W. A. PALMER, W. A. Palmer Films, Inc., San Francisco

A new video recording camera has been designed incorporating a shutter design which spreads the "picture splice" over a time interval of about 40 video lines, resulting in elimination of shutter-bar problems. An extremely rapid pulldown, required by the shutter design, is achieved by releasing energy stored in a spring. A fixed register pin locks the film during exposure to insure vertical steadiness.

Electronic Editing of Video-Tape Recordings

NORMAN F. BOUNSALL, Ampex International, Redwood City, Calif.

Hitherto, it has been possible to edit TV programs recorded on magnetic tape only by conventional cutting and splicing techniques. A fundamental advance in the state of the art now makes it possible to assemble program material or to insert scenes or commercials electronically into existing tapes, without physically cutting or splicing the tape. The equipment described enables the recorder to be started and stopped at random, allowing recordings containing costume changes, animation effects, etc., to be made on the Videotape (TM Ampex) Recorder.

FRIDAY MORNING—OCTOBER 6
9:00 CINEMATOGRAPHY

Advantages in Single-System Film Production

JOSEF BOHMER, Technical Film Program, IAM, Poughkeepsie, N. Y.

Practical solutions to the inherent drawbacks of single-system production have been developed. The sensitometric disadvantages can be overcome by adjusted exposure of the picture and soundtrack, and the composite print editing need not present a problem if transitions are carefully planned. The desire to release live action film reports of current computer engineering developments necessitated single-system production at IBM's Poughkeepsie Laboratory. Samples of these films will be used to demonstrate successful single-system production.

A Nonstandard Use of 16mm to Meet the 8mm Print Cost Challenge

HENRY C. MENGERINGHAUSEN and WILLIAM R. WITHERELL, Jr., Video Films, Detroit

The use of 16mm release prints in large-scale business and educational film distribution has been challenged by the apparent savings offered by

*How to select a recorder to start your MAGNASYNC-MAGNAPHONIC SOUND SYSTEM

Sound Equipment Checklist

		SPLIT 16 MM FILM	16 MM FILM	17½ MM FILM	35 MM FILM	REWIND	FOOTAGE COUNTER	POWER AMPLIFIER	MONITOR SPEAKER	TORQUE MOTORS	PLUG-IN AUDIO	PUSH BUTTON CONTROL	REMOTE CONTROL	SLIDE-WIRE POTS	FILM MONITOR	SYNKINETIC MOTION	PLUG-IN HEADS
Nomad MARK 1	 A versatile 7-lb. professional quality recorder/reproducer all transistorized and positively sprocket-hole interlocked with your 16mm camera or projector . . . CANNOT GET OUT OF SYNC! Can be hand held or tripod mounted. Wide selection of accessories available. Basic System $675.	X													X	X	
Nomad MARK 11	 The 12-lb. featherweight Mark 11, a professional double-system recorder/reproducer is completely transistorized, self-contained, and highly reliable with maximum recording qualities and operating economy. Power consumption is only 20 watts. From $985.	X													X	X	
X-400	 When lightweight portability is a **must** the 27 lb. X-400 Type 1 is the answer! Another reason so many producers choose this machine is that it is genuinely professional, and yet, surprisingly economical! From $985.		X			X	OPTIONAL	OPTIONAL	OPTIONAL						X	X	OPTIONAL
TYPE 1	 The Type 1 is a miniaturized version of the Type 5. Low power consumption and extreme portability has made this 39 lb. unit a popular selection for remote location production by leading professional motion picture studios. From $1430.		X	X		X	X	X	OPTIONAL		X				X	X	OPTIONAL
TYPE 15	 The X-400 Type 15 is designed for the man who wants everything in one case . . . playback amplifier, monitor speaker, footage counter and torque motors. You can be proud to have this machine represent you on any sound stage! From $1385.		X			X	X	X	X	X					X	X	OPTIONAL
TYPE 5	 The most popular magnetic film recorder in the world is the Type 5! With this unit and all its operational conveniences, you are definitely in the "major league." The Type 5 owner always starts his pictures with a special feeling of confidence in the realization that he has allowed no compromise in the selection of equipment. From $1650.		X	X	X	X	X	X	X	X	X				X	X	OPTIONAL
MARK 1X	 There is nothing on the market that compares with the remarkable Mark 1X. This unit is in a class by itself . . . with push-button remote controlled relay functions, plug-in audio elements and all the "extras" that make for flawless recording under the most adverse conditions. From $2145.		X	X	X	X	X	X	OPTIONAL	X	X	X	X	OPTIONAL	X	X	X

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8mm release prints. The authors propose a nonstandard use of 16mm compatible with most existing sound and picture equipment to effect considerable economies in shooting, printing and shipment, when such costs are a major consideration. The proposed system retains the use of the full 16mm frame and its inherent image quality.

A New Reflex 16mm Camera

WILLIAM A. MARTIN, Apparatus and Optical Div., Eastman Kodak Co., Rochester, N.Y.

A new Reflex 16mm Professional Camera manufactured by the Eastman Kodak Company is described. It is intended to serve the nontheatrical field of industrial, commercial and TV photography. The description covers drive units, film chambers, sound system and other accessories to be used with the camera.

Improved Automatic Exposure Control

DAVID MacMILLIN, Bell & Howell Co., Chicago

Coincidence of the fields of view of the photocell and film is important in automatic exposure controlled cameras for certain types of scenes. The sensitivity of selenium photocells makes this difficult to achieve. The use of different focal length lenses and zoom-type lenses can aggravate the problem seriously. An 8mm zoom-type motion-picture camera is described as a solution to this problem.

A Test of Video Tape to Film in Educational TV

REID H. RAY, Reid H. Ray Film Industries, St. Paul, Minn.; JOSEPH T. McDERMOTT and WAYNE A. MAYER, KTCA-TV, St. Paul, Minn.

Educational TV stations have a problem of economically producing program material available within their area. This paper briefly outlines the methods used to produce, with portable-type equipment, three half-hour programs and the transfer of the edited video-tape material to 16mm projection prints.

The Motion Picture as a Tool in Medical Education

WARREN STURGIS, Sturgis-Grant Productions, Inc., New York

Those long associated with audio-visual education in the medical sciences have seen a tremendous growth in film production and utilization in the two recent decades. Better, more practical equipment has been made available, and—equally important—workable principles have evolved. Ideas that result in an understanding of the ingredients of a good film, theoretical, personal, and mechanical, are discussed and various film samples are projected.

The Use of Motion-Pictures in an Analysis of the Masticating Cycle

JUDSON C. HICKEY, M. WOELFEL and M. FRIEND, College of Dentistry, Ohio State University, Columbus, Ohio

A frame-by-frame projection of motion-picture film is used in an analysis of the human masticatory cycle. The position of the jaw on each frame is digitized on IBM cards and the information from the cards is plotted electronically to form a graphic tracing of the jaw movement. A knowledge of jaw movement during mastication is important in determining the tooth form for both fixed and removable dental restorations.

FRIDAY AFTERNOON

2:00 PROJECTION

Liquid Gate for the Projection of Motion-Picture Film

JOHN R. TURNER, PHILIP A. RIPSON, Jr., FREDERICK J. KOLB and ERIC A. YAVITZ, Eastman Kodak Co., Rochester, N. Y.

A liquid immersion gate for the projection of 35mm motion-picture film is designed to be attached for demonstration purposes to a Model XL Simplex Projector. The auxiliary equipment required is contained in a separate portable service unit. The frame being projected is held in sharp focus from center to edge in contact with thin layers of methyl chloroform liquid between glass plates. Drift out of focus is thus prevented resulting in improved sharpness of the projected image. The appearance in the projected image of support scratches on the film is also greatly reduced. The liquid used is contained completely in a closed recirculation system except for the escape of vapor to the exhaust pipe.

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A New All-Transistorized Sound Projector for 16mm Motion-Picture Film

R. J. ROMAN and J. M. MORIARTY, Eastman Kodak Co., Rochester, N.Y.

A new 16mm motion-picture film projector featuring an all-transistorized sound system has been developed. Details of the sound system are discussed, and the expected contribution of transistorized sound systems to the future of audio-visuals is commented upon. Significant features of the overall projector system are described. The projector is an overhead-reel, 2000-ft capacity, machine with single-lever control, representing a major advance in ease and sensitivity of operation. Color slides are used to illustrate the description of the system.

Motion-Picture Projection Lenses

JOHN D. HAYES, Bausch & Lomb, Inc., Rochester, N.Y.

Improvement in the quality of motion-picture systems has required a re-evaluation of the optical characteristics and performance requirements of motion-picture projection lenses. Characteristics such as high contrast, balanced illumination and balanced aberrational correction are indicative of current projection requirements; rather than the more traditional requirements of high resolution, high speed and axially highly corrected lenses. Comparisons of design data and performance characteristics of 35mm and 70mm lenses corrected to these parameters are discussed.

A New 16mm Sound Projector for General Use

GEORGE F. KRTOUS, Bell & Howell Co., Chicago

A new 16mm sound projector has unusually high light output, high performance, rugged construction and light weight as features of the design. Special consideration was given to convenience of operation and to satisfying the requirements of the broadest possible group of equipment users.

A High-Quality f/1.0 Projection Lens for 8mm Use

W. H. VAN GRAAFEILAND, Eastman Kodak Co., Rochester, N.Y.

The introduction to the 8mm movie world of improved color films in the past year has raised the problem of providing new optical systems capable of realizing the full potentialities of these emulsions for high-quality, large screen projection. Traditionally the "Petzval" type of lens has been used for 8mm projection and has provided satisfactory performance at relative apertures up to *f*/1.4. For large screen projection of the new films, the screen brightness and image quality requirements demanded a new design approach. The new *f*/1.0 projection lens answers this demand in providing a quality of 8mm performance heretofore unequaled.

A Front-Projection System—An Easy Approach to Process Photography

JOSEPH L. ANDERSON and ROBERT W. WAGNER,
Ohio State University, Dept. of Photography, Motion Picture Div., Columbus, Ohio

This is an inexpensive, space-saving substitute for travelling mattes and standard back projection. The plate is projected from the camera side but foreground subjects are self-matting because the axes of projector and camera lenses are made exactly coincidental. A reflex reflector screen of high efficiency permits slow emulsions and lower wattage incandescent projection light sources. In addition to the common process setup of foreground and plate in two separate planes, this method allows an actor to "go into the plate" through practical architectural pieces set in the screen.

See page 751 for the roster of Topic Chairmen who developed the subjects of this Program under Chairman C. Loren Graham.

Tentative Schedule of Committee Meetings

Wednesday, May 4

10:00 A.M. Papers Committee
11:00 A.M. Board of Editors
12:15 P.M. Editorial Luncheon
1:45 P.M. Publications Advisory Committee

Engineering Committees heard from by press time and tentatively scheduled to meet during the week are listed below. The final schedule will appear in the Convention Program. Committee members of all Engineering Committees scheduled to meet during the Convention will also be notified by mail.

Instrumentation and High-Speed Photography
Laboratory Practice
Sound
Standards
Television

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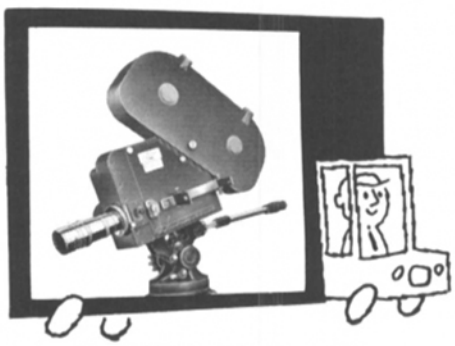

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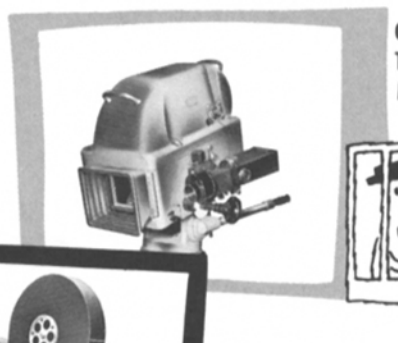

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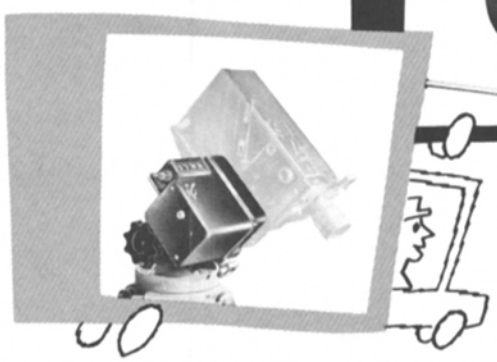

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- ☐ MAGNASYNC 602 Type 13 Dubber
- ☐ NOMAD Transistorized Sound Recorder-Reproducer
- ☐ OXBERRY Unistand Model TE
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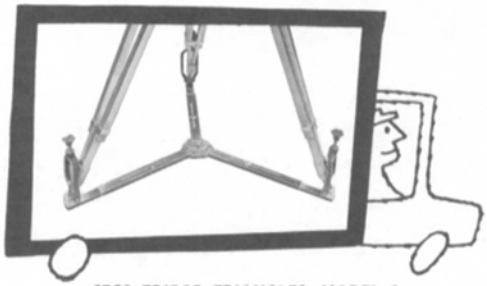

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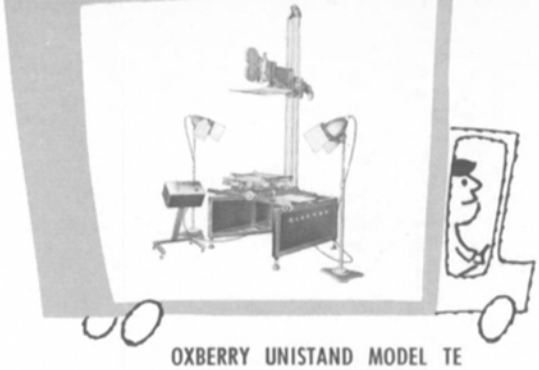

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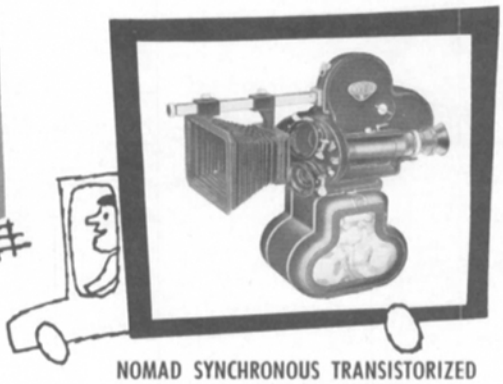

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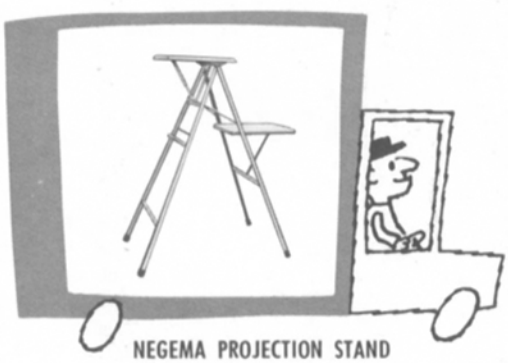

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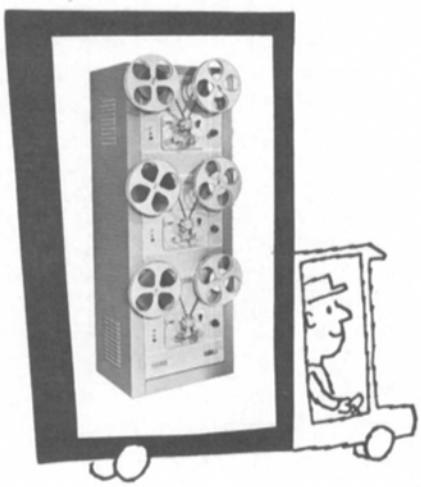

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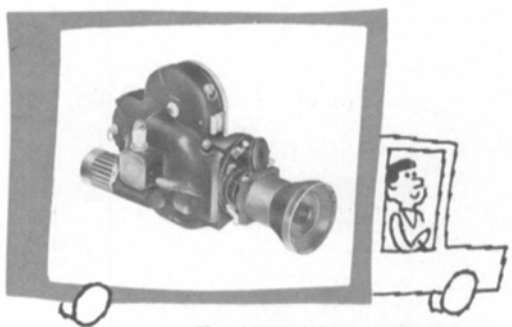

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Topic Chairmen for Lake Placid Convention

Space Photography and Image Sensing: RICHARD CALLAIS, Radio Corp. of America, Astro-Electronic Products Div., Princeton, N.J.

Instrumentation and High-Speed Photography: WILLIAM C. GRIFFIN, U.S. Naval Ordnance Test Station, China Lake, Calif.; *Co-Chairman*, MORTON SULTANOFF, Ballistic Research Lab., Aberdeen Proving Ground, Md.

Systems of Visual Presentation: ADRIAN TERLOUW, Eastman Kodak Co., 343 State St., Rochester, N.Y.

Laboratory Practice: GEO. W. COLBURN, Geo. W. Colburn Laboratory, Inc., 164 N. Wacker Dr., Chicago.

8mm Professional Prints; Audio-Visual Techniques: NEAL KEEHN, General Film Laboratories, 1546 North Argyle Ave., Hollywood, Calif.

Sound Reproduction: JOHN L. FORREST, Ansco, Binghamton, N.Y.

Subscription TV, Panel Discussion: *Moderator*, T. GENTRY VEAL, Eastman Kodak Co., Research Laboratories, Kodak Park, Rochester, N.Y.

TV Equipment and Techniques: RICHARD S. O'BRIEN, Columbia Broadcasting System, Inc., 485 Madison Ave., New York, N.Y.

TV Recording: NORMAN OLDING, Canadian Broadcasting Corp., P.O. Box 10, Snowdon, Montreal, Quebec.

Cinematography: WILLIAM D. HEDDEN, The Calvin Co., 1105 Truman Rd., Kansas City, Mo.

Organization and Operation of a Chain of Color Film Processing Laboratories

By ELDON E. BAUER

In 1955 the Eastman Kodak Company agreed to sell amateur Kodachrome films without including the cost of processing, and to issue licenses to independent firms equipped to process Kodachrome film. At present some twenty companies hold such licenses, among them Dynacolor Corporation of Rochester, N.Y., which operates on a national scale, with laboratories in Los Angeles, Dallas, Chicago, and Washington, D.C., as well as in Rochester. In 1960 this firm processed more than 10 million rolls of color films.

This firm was founded in 1949 and a few years later had developed a reversal color film of the Kodachrome type, marketed under the names of Dynacolor and McGregor Color, with sales eventually amounting to several hundred thousand dollars per year. By 1955 considerable experience had been gained in the operation of a process similar to that used by Eastman for Kodachrome film.

It was decided at that time that all available capital should be invested in increased processing capacity, and the manufacture of film was temporarily discontinued. Processing operations were moved to a larger plant in Brockport, N.Y., near Rochester, and five new processing machines were designed and built to meet the exact specifications of Eastman's Kodachrome process. In 1956, when Kodachrome film became available in quantity, Dynacolor was well prepared to handle it.

At that time it was decided that the firm would deal only through local photofinishers, who would serve as distributors for the company's processing service. By 1957 plans had been made for an East Coast station in Philadelphia and a Midwest station in the Chicago area, and since then plants have been established in Dallas, Tex., serving the Southwest, and in Los Angeles, serving the West Coast. The Philadelphia operation has been moved to Washington, D.C., because of the excellent airline service to the Southeast from that point. With the Rochester area plant serving the Northeast, Dynacolor is now in a position to give overnight color film processing service from one of its plants to a photofinisher customer in virtually any city in the United States.

It soon became apparent that it would be impossible to recruit sufficient experienced personnel at the supervisory and management levels to staff the new outlying operations. It was found, partly as a result of trial and error, that first and second echelon supervision could be supplied largely from within the organization by means of careful selection and the applica-

Presented on May 11, 1961, at the Society's Convention in Toronto by Eldon E. Bauer, Dynacolor Corp., 1999 Mt. Read Blvd., Rochester 15, N.Y.
(This paper was received on April 3, 1961.)