Advance Program

The arrangement of papers shown here is final insofar as is practicable, but between now and Convention time there may be a few last-minute changes.

Since the postal announcement was mailed, the Industry Milestones session scheduled for Monday evening has had to be postponed. The Videotape Recording session is now on Monday evening. Other Television sessions are on Tuesday and Thursday evenings.

Anyone wishing to be sure about the timing of specific papers should inquire a week before the Convention by telephoning either to Joseph E. Aiken, Program Chairman, 116 N. Galveston, Arlington 3, Va. (Washington tel: Ludlow 4-2400, Ext. 355), or to SMPTE headquarters (LOngacre 5-0172).

SUNDAY — APRIL 28
2:00 Registration opens in the West Foyer, Shoreham Hotel

MONDAY — APRIL 29
9:00 Registration
12:00 Get-Together Luncheon

MONDAY AFTERNOON
2:30 STANDARDIZATION

Report on the Activities of the Standards Committee With an Analysis of Product Emphasis Presently Existing in Standardization
GLENN DIMMICK, *Chairman*

Do Standards Inhibit Progress?
M. W. McNAIR, *American Standards Association*

International Standardization Organization
DEANE R. WHITE, *E. I. du Pont de Nemours & Co., Parlin, N.J.*
Plans of the International Standardization Organization with reference to the selection of items suitable for standardization. How I.S.O. actions will affect American equipment manufacturers and film products, and what safeguards exist.

Some Practical Considerations in the Drafting of Standards in the Interest of Reducing *Interpretive Confusion*
Dr. E. K. CARVER, *Eastman Kodak Co., Rochester, N.Y.*

The Society's Test-Film Standards
BOYCE NEMEC, *Management Consultant, New York*
Uniqueness of content sets one motion picture apart from any other. Yet to reach its audience at all, that same motion picture must be precisely standardized, a rigorous condition not imposed upon any other creative product. One of SMPTE's jobs is to determine "how standard." How this is done through test films is the subject of this paper.

Standardization — A Dynamic Key to Economy
HERBERT RUCKMICK, *U.S. Naval Photo Center, Washington, D.C.*

Department of Defense Photographic Standardization Plans
PHILIP M. COWETT, *Navy Dept., Bureau of Ships, Washington, D.C.*
The 82d Congress enacted Public Law 436, known as the "Defense Cataloging and Standardization Act," requiring that the Armed Forces standardize to the maximum extent practicable. Public Law 1028 of the 84th Congress reaffirmed the intent of the previous Act. Under this direction by Congress, the Department of Defense is exerting every effort in the direction of standardization. Department of Defense plans and methods of accomplishing the desired standardization with examples in the projection equipment field are discussed.

MONDAY EVENING
7:30 VIDEOTAPE RECORDING

Prospective Advances in the Art of Videotape Recording
CHARLES P. GINSBURG, *Ampex Corp., Redwood City, Calif.*

The Video Processing Amplifier of the Ampex Videotape Recorder
RAY M. DOLBY, *Ampex Corp., Redwood City, Calif.*
Due to the stringent requirements of network television, especially with regard to the shape and transient noise content of synchronizing pulses, a special "processing amplifier" has been developed to insure acceptable video waveform at the output of the Videotape Recorder. Similar in concept to a stabilizing amplifier, the new device represents a significant extension of usual stabilizing amplifier techniques. In addition to

the usual stabilizing amplifier functions, the Processing Amplifier provides for complete reblanking of the video waveform, with controllable pedestal height and precise gating of the sync pulses, ensuring that noise transients in the black direction will not project beyond reference black level during active portions of the horizontal cycle.

Factors Affecting the Splicing of Videotape
KURT R. MACHEIM, *Ampex Corp., Redwood City, Calif.*

Signal Translation Through the Ampex Videotape Recorder
CHARLES E. ANDERSON, *Ampex Corp., Redwood City, Calif.*

Impact of Videotape Recording on TV Management
ROBERT A. MINER, *Ampex Corp., Redwood City, Calif.*

TUESDAY MORNING — APRIL 30

9:00 Buses leave the Shoreham Hotel for the Walter Reed Army Medical Center

9:30 CLOSED-CIRCUIT COLOR TELEVISION, Armed Forces Institute of Pathology

General Description of the Walter Reed Army Medical Center Television Division
PAUL W. SCHAFER, M.D., *Television Div., Walter Reed Army Medical Center, Washington, D.C.*
This presentation will consist of general briefing concerning the background and mission of the Walter Reed Army Medical Center Television Div. The organization of the facility will be presented from a functional perspective. Administrative policies will be outlined together with a general survey of programming potential.

Color Processing Facilities in the Armed Forces Institute of Pathology
JULIUS HALSMAN, *Medical Illustration Service, Armed Forces Inst. of Pathology, Washington, D.C.*
A description will be given of the color processing facilities of the Photography Div., Medical Illustration Service, Armed Forces Institute of Pathology. The type of equipment used for roll film and sheet film will be illustrated. A brief résumé will be given of processing requirements and quality-control methods that are being used in color processing.

The Technical Facilities Television Division, Walter Reed Army Medical Center
RALPH W. CURTIS, *Walter Reed Army Medical Center, Washington, D.C.*
This presentation will consist of a description of the technical characteristics of the Walter Reed Army Medical Center Television Div. Particular attention will be paid to those unusual equipment items which are involved in television originations from microscopy, surgery and autopsy.

Color TV as a Tool for Medical and Scientific Research
GEORGE A. BAKER, *Television Div., Walter Reed Army Medical Center, Washington, D.C.*
This presentation will concern programming plans and activities of the Walter Reed Army Medical Center Television Div. Particular emphasis will be placed on differences encountered between closed-circuit professional programming and commercial broadcast work.

Demonstrations of the closed-circuit color-television system will show its applications in medical science.

Guided tours of the television installation and the color-film processing laboratory will be conducted following the presentation of the papers.

TUESDAY AFTERNOON
2:00 AUDIO-VISUAL USES OF MOTION PICTURES

The Economic Impact of the Audio-Visual Field

JOHN FLORY, *Eastman Kodak Co., Rochester, N.Y.*

The audio-visual market has grown to the extent that over $1,500,000,000 has been spent for non-theatrical motion pictures and other audio-visual production, release prints, and equipment since World War II. The annual rate is now exceeding $180,000,000. The rapid growth of this little-known facet of the motion-picture industry is of particular significance in view of the startling future growth predicted for the film as an informational medium.

Low-Cost Projection Materials and Techniques

HARVEY R. FRYE, *Indiana University, Bloomington, Ind.*

This article presents a brief discussion of four areas important to those persons interested in the production of low-cost visual materials. Emphasis is placed upon the four areas of mounting, lettering, coloring and photography as the basis upon which most production of visual material depends. A knowledge of these four areas permits the producer to develop any kind of transparency he might desire.

Preparation and Presentation of Low-Cost Projectable Materials

ALLAN FINSTAD, *Ozalid Div., General Analine & Film Corp., Alexandria, Va.*

This paper introduces the subject with a historical treatment that relates the requirements for low-cost projectable materials to the evolution of the "overhead projector." It describes engineering efforts and design which have given this medium certain advantages of versatility. It further projects engineering goals for overcoming existing limitations. Low-cost projectable types are exemplified with reference to styles of presentation and methods of production.

A Self-Contained 16mm Post-Synchronization Studio

J. P. SEABORNE, *Organization for European Economic Co-operation, Paris, France.*

Because of a multiplicity of languages in Europe, stripe recording has many obvious applications. However, with existing equipment it would be very expensive and complicated to install key centers for high-quality recordings and copy breeding. The paper describes a self-contained recording studio designed to meet these needs but which might have many applications in TV for the post-synchronization of foreign-language versions.

A Foreign-Language Dubbing Conversion

ARTHUR RESCHER and JACK CLINK, *Capital Film Labs., Inc., Washington, D.C.*

A description of the modifications and new equipment necessary to convert a normal studio recording system to the more specialized requirements of the foreign-language dubbing methods. Construction details are supplied. Additionally, a new dubbing studio, now nearing completion, is described.

New Methods of Recording 16mm Magnetic Lip-Sync Sound Using a Magnetic-Optical Sound Projector

LEE T. ASKREN and RAYMOND J. DWYER, *Eastman Kodak Co., Rochester, N.Y.*

Professionally, sound motion pictures traditionally are made by the "double system," affording flexibility in shooting, processing and editing. The methods described open to the amateur and the semiprofessional simple means to accomplish lip-sync 16mm sound using standard available cameras and the Kodak Pageant Magnetic-Optical Sound Projector.

Television — Technological Revolution in Education

HARVEY ZORBAUGH, *New York University, New York*

Television promises the first major technological revolution in education since the invention of movable type. Within the past six years 136 closed circuits have been installed in educational institutions. Few events have engendered the educational interest and controversy than has the intrusion of television into the halls of learning.

Technical and Production Problems in Military TV Recordings

Lt. Col. NORMAN GRAY, *Army Pictorial Service Div., Office of the Chief Signal Officer, Washington, D.C.*

The U.S. Army is producing a series of TV kinescope recordings which will be released to TV stations throughout the United States approximately 15 May 1957. The series is being produced for U.S. Army Recruiting and consists of a 30 minute variety type production. The integrating of stock footage with TV kinescope recordings, editorial, laboratory processing, and production problems will be discussed. a comparison will be drawn between producing the series by standard motion picture techniques versus TV "kinescope" recording. A representative kinescope recording will be shown.

TUESDAY EVENING
7:30 TELEVISION

The Color Television System at the Walter Reed Army Medical Center

ANDREW F. INGLIS, *Radio Corp. of America, Camden, N.J.*

A New Color TV Camera for Medical Applications

NORMAN L. HOBSON, *Radio Corp. of America, Camden, N.J.*

Some Theoretical Aspects of Storing Color Television Information on Black-and-White Film

WILLIAM L. HUGHES, *Engineering Experiment Station, Iowa State College, Ames, Iowa.*

In the past few years at least three systems for recording color television information on black-and-white film have been proposed. It is the purpose of this paper to discuss some of the fundamental problems connected with all three systems irrespective of the relative merits of one to another. Basically, the problem is to replace the color television camera with a piece of film. The film must fulfill the colorimetric requirements of the electronic camera and the film spectral characteristics must be interpreted in that sense. This interpretation of film spectral sensitivity will be discussed. Further, a method of determining the sensitivity function will be presented and examples for typical films will be given. Film processing requirements will be discussed and effects of inherent gamma errors will be considered. Some aspects of the optimum choice of taking primaries will be discussed and film and Wratten filter combinations will be presented for two sets of taking primaries which seem to be most feasible. The relative advantages of each primary system from the registration and noise viewpoints will be presented with emphasis on the reproduced picture in the color television receiver.

Television Line Structure Suppression

F. T. THOMPSON, *Westinghouse Electric Corp., Westinghouse Research Labs., Pittsburgh, Pa.*

Experiments indicate that television viewers select a viewing distance at which the line structure begins to disappear. The advantages and disadvantages of eliminating the line structure are discussed. Several methods of eliminating it are described. The results of an experimental comparison of television pictures with and without structure suppression are given. A photographic comparison is also given.

Advanced Performance and Stability in Color Film Channel Amplifiers

M. H. DIEHL, *General Electric Co., Syracuse, N.Y.*

The use of three-channel automatic gain control, precision gamma circuits, and high-level black clipper, yields long-time stability of the critical parameters affecting color-balance. With large amounts of negative feedback in the monitoring section, drastic reduction in the number of controls, and built-in calibration features, set-up and adjustment can be accomplished very rapidly when necessary.

New Variable-Color Luminous Studio Wall

ROLLO GILLESPIE WILLIAMS, *Color Lighting Dept., Century Lighting, Inc., New York.*

Important developments in studio color techniques that are possible through use of a new high-intensity variable-color luminous wall will be discussed. This wall can be provided with means for instant control of hue, chroma and brightness and for areas up to 3000 sq ft need be only 12 in. deep. A luminous background of this type can immediately produce important color shifts in appearance of foreground objects, enabling color defects to be remedied. Group colors in a foreground arrangement can be harmonized and specific colors emphasized. Dramatic possibilities include mobile color effects, luminous skies, design patterns, scenic effects, silhouettes and color contrasts. Technical information concerning brightness values, color range, current consumption and control methods will also be discussed.

WEDNESDAY MORNING — MAY 1
9:00 LABORATORY PRACTICE I

Exposure Nonuniformity Produced in Continuous Motion-Picture Printers by Powering Lamps With Alternating Current

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

A theoretical equation relating exposure to printer variables is used in conjunction with experimental data to show the amount of log E ripple produced by 100, 200, 300, 500, 750 and 1,000-w lamps at varied printer conditions. The a-c illuminance modulation effects are found to virtually disappear for all lamps when the film speed through the printer produces an exposure time which is a multiple of the a-c illuminance cycle time. Lamps above 500 w appear to produce a minimum amount of flicker. Exposure nonuniformity is slight at *any* exposure time if 750- or 1,000-w lamps are used.

A "Go – No Go" Gauging Method for Visual Inspection of Release Prints

MAXWELL A. KERR, *Melpar, Inc., Falls Church, Va.*

A method will be explained and demonstrated for using a 16mm projector with a special picture aperture plate as a "Go – No Go" projection gauge for checking several print characteristics while viewing the projected film. This includes checking soundtrack center ring; modulation of variable-area tracks; width of variable-density tracks; variations in width of film stock; blackness and freedom from scratches of soundtrack septum strips; placement and blackness of printed frame around pictures; percentage jump and weave in the projected picture; percent shrinkage of the film stock.

Printing Motion-Picture Films Immersed in a Liquid: Part I — Contact Printing

JOHN G. STOTT, GEORGE E. CUMMINS and HENRI E. BRETON, *Color Technology Div., Eastman Kodak Co., Rochester, N.Y.*

A printing method is described that gives high-quality motion-picture prints from badly scratched negatives. Both the negative and print film are completely immersed at the printing aperture in a liquid having an index of refraction close to that of gelatin and acetate support. The process nearly completely eliminates the printing effect of scratches and other surface irregularities on the negative, and improves the definition of positive prints by providing a continuous optical medium through which the exposing light passes from the negative to the print film. Demonstration films will be shown.

Printing Motion-Picture Films Immersed in a Liquid: Part II — Optical Printing

JOHN R. TURNER, DUANE E. GRANT and HENRI E. BRETON, *Color Technology Div., Eastman Kodak Co., Rochester, N.Y.*

A method is described for optical printing of motion-picture film by the use of a projection gate which immerses the film in a liquid of matching refractive index. This permits highly specular printing illumination since scratches and surface irregularities on the film have relatively little optical effect under these conditions. Experimental trials of this method have been carried out on Eastman Color Film at a speed of 90 ft/min. Demonstration films will be shown.

Multiple-Head Reduction Printer

JAMES L. CARLTON and JAMES W. KAYLOR, *Movielab Film Labs., Inc., New York.*

The greatly increased demand for rapid production of 16mm prints from a 35mm original negative has resulted in the development of a multiple-head optical reduction printer capable of simultaneously producing eight 16mm prints with a single pass of the 35mm negative through the projector movement. This printer has been in regular production of black-and-white prints for approximately three years and has now been adapted for additive color printing for the production of 16mm Eastman Color prints.

A Color Timing Calculator for Subtractive Motion-Picture Printers

GEORGE T. KEENE, *Color Technology Div., Eastman Kodak Co., Rochester, N.Y.*

The advantages of using gray card negative density information to predict color printing packs are discussed. A comparison is made with the use of full-frame integrated density readings as a prediction technique. The design requirements and construction of a slide-rule type calculator are described, and its use in predicting subtractive printer balances from gray card densities is explained. A timing accuracy of ±0.03 log E was attained on the first trial in an Eastman Color Negative-Print system. Equations are included for use of a matrix calculator for this purpose.

A Film on Fader Control for Continuous Printers

GARO W. RAY, *Cine-Video Productions, Stamford, Conn.*

A Means of Preventing Newton's Rings During Contact Printing of Motion-Picture Film

CHARLES E. OSBORNE, *Research Laboratories, Eastman Kodak Co., Rochester, N.Y.*

Certain film structure and processing conditions may result in smooth-surfaced processed negatives and intermediate films which cause Newton's rings when contact printed to smooth-surfaced print films. An application of a fine, evenly dispersed spray of a commercially available printer's non-offset solution to such a film, before printing, effectively prevents these print-

ing defects. The equipment and method of application are described and the resulting print quality is shown by projection demonstration.

A New Motion-Picture Color Laboratory
JAMES W. KAYLOR, *Movielab Film Labs., New York.*
A modern motion-picture color film laboratory planned for the processing of 16mm and 35mm Eastman Color has been completed by Movielab Film Labs., Inc. The Laboratory occupies a block-long floor of a midtown Manhattan building. This 25,000 sq-ft, completely air-conditioned area houses all of the Color film handling facilities together with the necessary auxiliary equipment.

WEDNESDAY AFTERNOON
2:00 LABORATORY PRACTICE II

A Modern All-Purpose Laboratory
R. W. PAYNE, F. J. QUINN and A. H. VACHON, *National Film Board of Canada, Montreal, Can.*
The National Film Board of Canada has recently occupied its new headquarters in Montreal. The laboratory is planned to handle production and release work in 35mm and 16mm black-and-white for theatrical, nontheatrical and television distribution and 16mm negative-positive and reversal color for the nontheatrical field. The layout, functions and auxiliary services are described. Features of the new plant are the 16mm negative-positive color developing machine, the first of its kind built in Canada and a 16mm black-and-white developing machine designed by the Board.

A 16mm Portable Processor
RALPH D. WHITMORE, JR., *Du Art Film Labs., Inc., New York.*
A major TV network is now using a specially designed 16mm processor for their Newsfilm and Public Affairs section. It is 36 in. long, 36 in. high on a removable wheeled dolly, and 20 in. wide. Yet it will develop high-quality 16mm negative by friction drive at 40 ft/min at 80°F. Power requirements are supplied by two 110-v 15-amp connections. Water is supplied by hot- and cold-water hoses. Included in the machine are: temperature controls for solutions, water and drying air; drying air blower; squeegee compressor; drain pump; circulation agitation; water blender; replenisher system; waxer; torque motor take-up; and film magazines for daylight operation.

A New High-Speed Spray Processor for 16/35 mm Black-and-White, Negative or Positive Film
EDWARD VICTOR LEWIS, *Houston Fearless, Los Angeles, Calif.*

The New ARRI Bottom Drive, an Ideal Construction for Film Developing Machines
ROBERT RICHTER and HERBERT LECHNER, *Arnold & Richter K.G., Munich, West Germany.*
Film-developing machines transport film either by sprocket or friction drive. The advantages and disadvantages of both systems will be discussed. A twelve-minute 16mm color motion-picture film will then be shown of the overall function and detail features of a new ARRI Film Developing Machine which incorporates a completely new ARRI bottom drive. ARRI Machines of this type are already in operation at Pavelle Division of Technicolor in New York, and at Berkey Photo Service in New York, where they are used for processing 16mm and 35mm Kodachrome.

Washing of Color Motion-Picture Film
JOHN R. TURNER, EINAR W. JENSEN and GARETH N. WALL, *Color Technology Div., Eastman Kodak Co., Rochester, N.Y.*
Factors affecting the design of film-washing systems are discussed with particular reference to special considerations involved in the washing of some color films. Washout curves are shown for several black-and-white and color films at various water temperatures. The effects of agitation, and wash-water contaminant level, on washout rate are also shown. The correct design of spray washes requires that careful consideration be given to time, temperature, contaminant level and agitation as related to the specific film type and processing conditions.

A Silver-Recovery Apparatus for Operation at High-Current Densities
NICHOLAS J. CEDRONE, *Hi-Speed Equipment Inc., Waltham, Mass.*
Silver-recovery systems operating at the higher current densities require thorough solution agitation at the cathode surface in order to deposit metallic silver continuously. In the apparatus described, agitation is provided by an external pump. With the solution nozzles located tangential to a cylindrical cathode, high surface velocity is attained and mass flow held to reasonable value. Thus, the problem of excessive mechanical energy input is avoided, while the scrubbing velocity provided permits current densities as high as 10 amp/per sq. ft.

The Preparation or Regeneration of a Silver Bleach Solution by Oxidizing Ferrocyanide With Persulfate
BERNARD A. HUTCHINS and LLOYD E. WEST, *Color Technology Div., Eastman Kodak Co., Rochester, N.Y.*
Ferricyanide, the oxidizing agent of a silver bleach, is prepared by adding potassium persulfate to a solution of a ferrocyanide. The method

may be applied for the preparation of a fresh bleach or for the regeneration of a used bleach. The preparation is simple and the ferricyanide may be produced at a substantial saving over purchasing potassium ferricyanide. Methods are included for analyzing the bleach constituents.

Concentrated Developer Replenishers for Eastman Color Film Processing
GEORGE E. CUMMINS, JACK A. COGAN, and WILLIAM R. WELLER, *Color Technology Div., Eastman Kodak Co., Rochester, N.Y.*
By means of concentrated developer replenishers and reduced replenishment rates, substantial savings have been effected in the processing of Eastman Color films through a reduction in the quantity of tank developers overflowed to the sewer. This paper describes the methods used in deriving the concentrated replenisher formulas and the reduced replenishment rates.

A 16mm Process Control Sensitometer
GEO. W. COLBURN, *Geo. W. Colburn Lab., Inc., Chicago, Ill.*
This report describes a sensitometer of the intensity-scale type which exposes a full 16mm frame for each density step. The light source is modulated by a series of apertures giving log E steps of 0.10. The unit is capable of exposing a single strip of 24 frames or a continuous roll of strips 200 ft in length.

Xenon Electronic Flash Sensitometer
CHARLES W. WYCKOFF and HAROLD E. EDGERTON, *Edgerton, Germeshausen & Grier, Inc., Boston, Mass.*
An electronic xenon-flashlamp sensitometer is described for use in black-and-white or color process control. It is an intensity scale instrument with three different exposure durations. The longest exposure, 0.01 sec, is useful for normal picture-taking control. The two other durations of 0.001 and 0.0001 sec allow the laboratory technicians to study film and development characteristics falling in the range of high-speed photography. Color of the light approximates daylight quality without the use of filters and the quantity of light is remarkably constant.

WEDNESDAY EVENING
6:45 Cocktail Party
8:00 BANQUET AND DANCE

THURSDAY MORNING — MAY 2
9:00 THEATER OPERATION — CONCURRENT SESSION

An Improved Heavy Duty 16mm Projector
EDWIN C. FRITTS, *Apparatus and Optical Div., Eastman Kodak Co., Rochester, N.Y.*
The Eastman 16mm Model 25 Projector has been on the market for seven years. It is being revised to give more light and accommodate the reproduction of magnetic sound. The presimplifier is common to this, the Model 25B, and the television adaptation, the Model 275. It handles both the optical and magnetic reproduction. The main amplifier is redesigned to current practice for quality equipment.

Magnetic Playback Head for Heavy Duty 16mm Motion-Picture and Television Projector
EDWIN C. FRITTS, *Apparatus and Optical Div., Eastman Kodak Co., Rochester, N.Y.*
The Eastman 16mm projectors Model 25, and Model 250, are being revised to current standards and practice. The Model 25 becomes Model 25B and the Model 250 is replaced by the Model 275. Both provide for the later addition of a playback from magnetic sound tracks. With additional work, projectors already in use may be altered to receive this magnetic playback mechanism.

Improved 16mm Projector for Research Films
J. S. WATSON, G. H. RAMSEY, and S. A. WEINBERG, *Univ. of Rochester School of Medicine and Dentistry, Strong Memorial Hosp., Rochester, N.Y.*
The flicker-free, slow-motion and single-frame projector described in the November 1954 issue of the SMPTE Journal has been completely redesigned to give more reliable and smoother operation. Cine projection can now be slowed to 3 frames/sec. Single-frame transport has been quieted and speeded up to 0.01 sec with a single shutter blade occultation. Transition between cine and single-frame operation is positive and noiseless.

Balcold Reflector
H. H. SCHROEDER and A. F. TURNER, *Bausch & Lomb Optical Co., Rochester, N.Y.*
An infrared transmitting elliptical reflector for use in motion-picture arc lamps has been developed. The evolution of this optical device, which reduces total radiation by 40% without appreciable light loss, is traced. Engineering aspects of the development of this reflector are discussed. A demonstration emphasizing the properties of the mirror will be given.

Some Comments on Procedures Used to Compare Theater Screens
YORICK G. HURD, *20th Century-Fox Film Corp., New York*
The paper describes ways of comparing the reflecting and light-distribution properties of several theater screen surfaces. Comments are made on instruments (integrating spheres, goniophotometers, spectrophotometers and brightness meters) used in comparing screen surfaces. Lenticular screen design and "gain" formulas are presented with examples of their use in estimating a screen's performance. Data on white, "silver" or aluminum, beaded, pearl, and lenticular screens are included. A screen composed of several screen surfaces will be demonstrated.

Modern Theater Service Procedures
EDWARD STANKO, *RCA Service Co., Inc., Camden, N.J.*
With the development of improved theater sound and projection equipment, the professional theater sound service engineer must keep pace with the technical and engineering developments by constantly improving and, when necessary, revising service procedures. The subject paper deals with the requirements of modern theater service procedures, the methods and equipment used and their overall results.

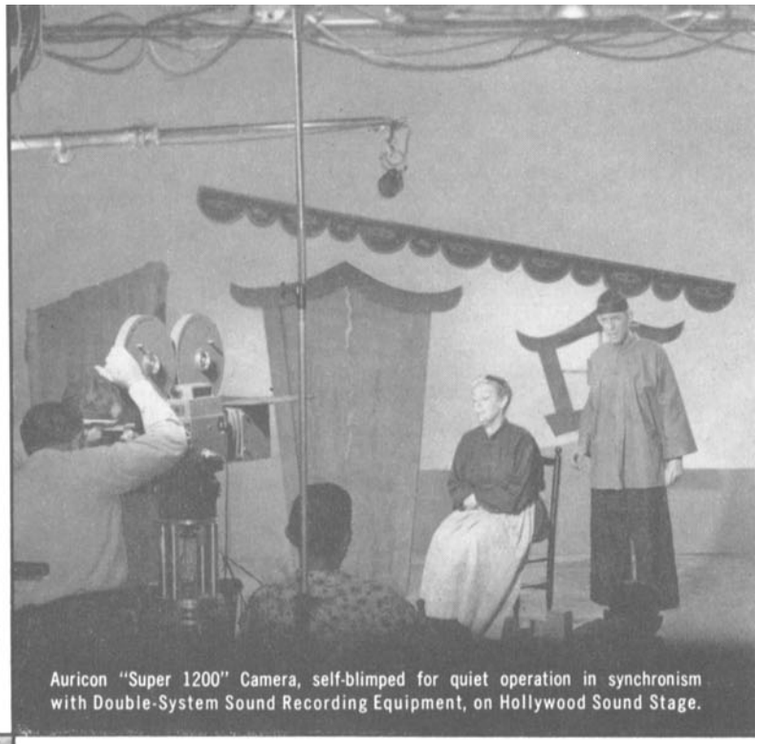
Equipment Replacement in Army and Air Force Theaters
W. D. SHEPARD, *Army and Air Force Motion Picture Service, St. Louis, Mo.*
The Army and Air Force Motion Picture Service is a self-supporting agency of the Department of Defense. Its mission is the presentation of entertainment motion pictures for morale purposes. The recent innovations in the industry necessitated a major replacement program which largely determines the existing policy. Methods of test, bases of design and the determining effect of military operating conditions on choice of equipment are briefly described.

9:00 INSTRUMENTATION — AND HIGH-SPEED PHOTOGRAPHY — CONCURRENT SESSION

Some Practical Considerations in the Analysis of High-Speed Motion-Picture Data
WILLIAM G. HYZER, *William G. Hyzer & Associates, Janesville, Wis.*
Fidelity of motion-picture images for both visual and quantitative analysis depends upon several factors including optical resolution, image blur, image contrast, image shape characteristics and

Auricon Hollywood

Designed for the QUIET of the Hollywood Sound Stage...



Auricon "Super 1200" Camera, self-blimped for quiet operation in synchronism with Double-System Sound Recording Equipment, on Hollywood Sound Stage.

Clete Roberts, with Cameraman Tex Zeigler, shoots 16mm Single-System Sound-On-Film newsreels and industrial films all over the World, using Auricon "Super 1200" Cameras.

...yet RUGGED enough for Top Newsreelers 'round the World!

Clete Roberts, World Reporter and famous CBS-Television News Commentator, films international events with Auricon "Super 1200" 16mm Sound-On-Film Cameras. His "World Report," by Clete Roberts Productions, Inc., Beverly Hills, California has brought television viewers millions of feet of film, made under the most rugged shooting conditions in the World's trouble spots, from Suez to Hungary, and back to Streetcorner, U.S.A.!

★ *Why not own the Best?* Auricon Cameras are preferred by Professionals for Single-System 16mm Sound-On-Film or Synchronous Double-System Studio Recording. Choose Auricon for dependability! Write for your free Auricon Catalog describing the many quality features of these Cameras. Always sold with a money-back guarantee, you must be satisfied!

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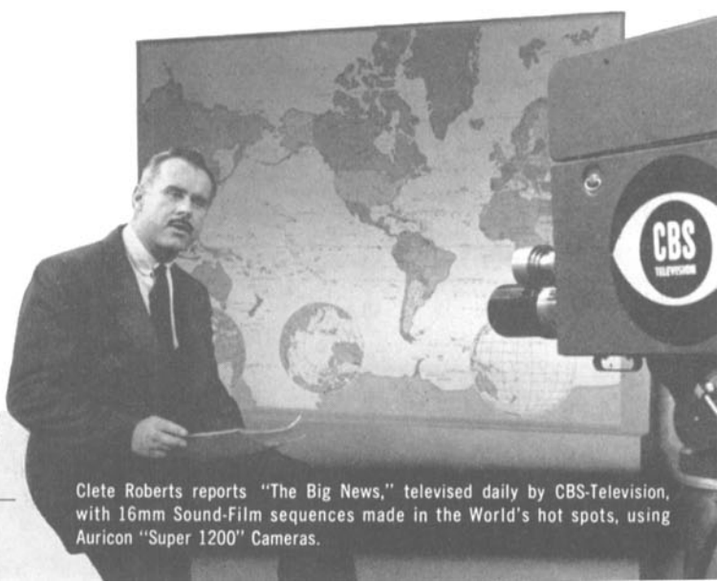

Clete Roberts reports "The Big News," televised daily by CBS-Television, with 16mm Sound-Film sequences made in the World's hot spots, using Auricon "Super 1200" Cameras.

differential movement of the image from frame to frame. These various factors were considered in a series of practical tests using standard analytical techniques and equipment to determine the contribution of each factor to the overall accuracy of 16mm film evaluation.

Photographic Instrumentation at the Air Force Armament Center
H. C. SCHEPLER, *Air Force Armament Center, Eglin AFB, Fla.*
Precise spatial position of airborne test objects such as rockets, bombs and missiles is recorded photographically on the Air Force Armament Center Test ranges. The instrumentation employed, the use of triangulation in determining spatial position and the accuracies obtained are discussed in this paper.

Lenses Used in Mapping
CLARICE T. NORTON, *Fairchild Camera & Instrument Corp., Syosset, L.I., N.Y.*
There are two orders of so-called distortionless lenses. One type reduces distortion to controllable values, the other, to negligible values. The image and mensuration characteristics of such lenses are discussed and the modern objectives of distortion-free lens design are enumerated. Some of the camera tests and controls which assure high precision mapping are discussed.

Flying Camera Stations
FLOYD A. KINDER, *U.S. Naval Ordnance Test Station, China Lake, Calif.*
This type of instrumentation is based upon the principle of determining aircraft position and attitude by photographing surveyed ground markers with one aerial camera. To obtain attitude, trajectory and documentary data of missiles launched from aircraft at high altitudes, an airborne cinetheodolite based upon this principle has been proposed. Factors affecting the accuracy will be presented.

"Table 210"
GLENN E. MILLER, *Lockheed Missile Systems Div., Van Nuys, Calif.*
This nonclassified 16mm color film with narration explains the making of Documentary Motion Pictures as required under "Table 310" of a Military Contract. It covers the procedures from signing the contract through the film outline as prepared by the Producer, Writer, Project Engineers and Management. The script stresses company policies and sales approach as well as document tests and developments. It shows filming of the picture under all conditions; instrumentation motion-picture techniques and uses, which include on board camera mountings, camera recovery, processing, editing, narrating and dubbing the picture. Uses of the films — both documentary and instrumentation — are also included.

THURSDAY AFTERNOON
2:00 MISSILE PHOTOGRAPHY — A SYMPOSIUM

Atmospheric Optics
H. C. SCHEPLER, *Air Force Armament Center, Eglin AFB, Fla.*
The factors affecting the visibility and photographability of distant objects through the atmosphere are presented. The manner in which each factor deteriorates the visual or photographic image is described. Means are suggested for reducing the effects of these factors to a minimum in the photography of airborne test targets.

Atmospheric Limitations on Missile Photography
S. Q. DUNTLEY, *Scripps Institution of Oceanography, Univ. of California, San Diego, Calif.*
Optical data taken from an aircraft in flight as well as data secured at ground level have enabled the obscuration of high-flying missiles by the atmosphere to be ascertained, and the requirements to be met by telescopic finders and cameras to be specified for several typical weather and lighting conditions.

Optical-Photographic Tracking Instrumentation
A. H. SCHENDEL, *Range Instrumentation Development Div., Integrated Range Mission, White Sands Proving Ground, New Mex.*
Photographic recording of fast-moving objects by means of optical-photographic tracking instruments plays an important role in missile test work. The basic requirements for such instrumentation systems are outlined and a survey is given of the instruments presently in use or under development. Possibilities for future development to meet the increasing demands for highly accurate information on the events going on in space are discussed.

Some Optical Techniques for Determining Rocket Flight Characteristics
WALTER L. HALES, *U.S. Army Ordnance Corps, Redstone Arsenal, Huntsville, Ala.*

A Design and Operational Philosophy for an Ultra-Precision Tracking Mount System for Missile Test Ranges
JOHN A. CLEMENTE, *U.S. Naval Ordnance Test Station, China Lake, Calif.*

Aerodynamic Features With a 16mm On-Board Missile Camera
B. BENJAMIN, *Sandia Corp., Albuquerque, N.M.*

A New Shoulder-Mounted Tracking Camera
A. M. ERICKSON and C. G. GROVER, *Naval Ordnance Laboratory, White Oak, Md.*

THURSDAY EVENING

7.30 TELEVISION

Devices for Making Sensitometric Exposures on Embossed Kinescope Recording Film
EDWARD M. CRANE and C. H. EVANS, *Research Laboratories, Eastman Kodak Co., Rochester, N.Y.*
The use, discussed in an article by Evans and Smith in the July, 1956 SMPTE *Journal*, and densitometry, described by Brown, Combs and Smith in the December, 1956 SMPTE *Journal*, of Eastman Embossed Kinescope Recording Film, Type 5209, require flexible but reproducible sensitometric exposure. Whether the exposing condition matches the practical application, or attempts to avoid any electronic contribution to image degradation, certain sensitometer features are generally useful. These features are described, and their application to sensitometers with kinescope and high-intensity flash sources is pictured.

An Operational Method of Checking Colorimetry in Color TV Systems
S. L. BENDELL and H. N. KOZANOWSKI, *Radio Corp. of America, Camden, N.J.*

Black Level — The Lost Ingredient in Television-Picture Fidelity
R. G. NEUHAUSER, *Tube Div., Radio Corp. of America, Lancaster, Pa.*
This paper outlines television-system improvements instituted in recent years which produce and maintain the ability to reproduce proper black level (or dc restoration) in the television receiver. The necessity for proper black-level control in the production of television pictures having good fidelity is discussed, and factors which caused its importance to be minimized in the past are described. Specific equipment and instrumentation advances which have resulted partly from the advent of color television are also described. The entire television system, from the studio to the television receiver, is considered. A suggested waveform standard that can be used to achieve day-to-day and station-to-station uniformity of black-level reproduction is illustrated.

A 16mm Television Projector for Use With a Vidicon Camera
EDWIN C. FRITTS, *Apparatus and Optical Div., Eastman Kodak Co., Rochester, N.Y.*
The Eastman 16mm Television Projector, Model 250, has been in use with the iconoscope for six years. It has also been used with a 2-3-2 mechanism to accommodate the Vidicon. A much simpler modification of the basic Model 25 projector for use with the Vidicon is described in this paper.

Automatic Gain Control in TV Automation
W. H. HOFFMAN, M. H. DIEHL and W. L. SHEPARD, *General Electric Co., Syracuse, N.Y.*

Automatic Program Control for TV Broadcasting
A. C. ANGUS, *General Electric Co., Syracuse, N.Y.*

Transistors
B. R. LESTER, *General Electric Co., Syracuse, N.Y.*

Wide-Screen Television
SEYMOUR ROSIN and MADISON CAWEIN, *Grimson Color, Inc., New York.*
A television system known as "Scanoscope" has been developed in which the aspect ratio has been changed from the conventional 4 × 3 format into an 8 × 3 presentation. Advantages are analogous to those in wide-screen motion pictures. The process is based on the Scanoscope lens described elsewhere. This lens squeezes the image on the camera focal plane, from which it is transmitted with the required megacycle bandwidth. The image is unsqueezed electronically in the monitor. The optical and electronic features are described.

FRIDAY MORNING — MAY 3
9:00 CINEMATOGRAPHY — CONCURRENT SESSION

A New Canadian Government Film Center
GERALD GRAHAM, *National Film Board of Canada, Montreal, Que.*
During the past four years the National Film Board of Canada has undertaken a project to design and construct a new headquarters for all of its operations including production, distribution and technical facilities. This paper describes in general the building and its functions. Problems of overall planning, site selection, layout and construction are covered in some detail.

New Studio Design Features for Commercial Production
JAMES E. LARSEN, *Pres. Academy Films*
The newest soundstage on the West Coast is here described. It incorporates the latest in studio design features. This plant is intended for the production of commercial & educational films as well as TV and theatrical pictures.

Some Considerations of Eastman Color Print Film Dye Stability
PAUL HOROWITZ and WILLIAM R. WELLER, *Color Technology Div., Eastman Kodak Co., Rochester, N.Y.*
The dyes in Eastman Color Print Film are quite satisfactory for stability when the film is processed according to recommended procedures. However, their stability under conditions of high-temperature and high-humidity keeping can be seriously affected by retained hypo and/or abnormal *p*H of the processed emulsion. These conditions can be prevented by following recommended processing procedures, particularly the final wash. A simple method of measuring the emulsion *p*H directly on the processed film, and emulsion *p*H control parameters are described.

A New Automatic Iris Control for Motion-Picture Cameras
MERVIN W. LA RUE, JR., *Bell & Howell Co., Chicago, Ill.*
The Bell & Howell Company's new Design 200 EE camera incorporates a self-powered compact automatic iris control. Mechanical power to drive the lens iris originates from a small d-c permanent-magnet motor driven by mercury batteries. A photovoltaic cell deflects a relay meter according to average scene brightness, and opening or closing the motor-battery circuit causes the lens iris to be properly positioned.

Ultra Cold Weather Photography
RICHARD R. CONGER, *Photographer, U.S. Navy, Asst. Photo Officer, Task Force 43 (Operation Deep Freeze)*

An All-Electronic Counter for Film Uses
DON V. KLOEPFEL, *General Film Labs. Corp., Hollywood*
This paper describes an all-electronic footage frame or scene counter having no electromechanical parts, and capable of counting in wide speed ranges. A brief description of beam-switching tubes is given, and construction details noted. Slides of components and slides of functional diagrams accompany the paper.

Anamorphic Lens System
SEYMOUR ROSIN, *Scanoptic, Inc., New York.*
An anamorphic lens known as "Scanoscope" has been developed for use in motion pictures and television. The optical design is described, showing how the aberrations are controlled over a field angle of 80° or more. A unique coupling arrangement allows this lens to be used interchangeably with camera lenses of different focal length in a unit focus arrangement. Application of this system to the Mitchell NC and BNC cameras is described.

9:00 INSTRUMENTATION — AND HIGH-SPEED PHOTOGRAPHY — CONCURRENT SESSION

FRIDAY AFTERNOON
2:00 SOUND RECORDING AND REPRODUCTION

Sound Recording Facilities in Canada's Newest Film Studio
NORMAN F. BOUNSALL, *National Film Board of Canada, Montreal, Que.*
The National Film Board of Canada has just completed a move into a new studio in Montreal. The Sound Division's facilities, which include Re-recording Consoles, a Music Recording Channel, Magnetic Loop Recorders and a new concept in Interlock Motor Control Equipment, are described and illustrated. The engineering methods used to integrate existing recording equipment into a new, enlarged and more flexible system are discussed.

Striped Magnetic Sound in CBS Television News Production
R. C. RHEINECK, *CBS News, New York*
Prestriped magnetic sound on 16mm film as compared to 16mm single-system photographic sound provides the quality advantages of an extended high-frequency response, improved signal-to-noise ratio and lower harmonic distortion. Operating experiences with striped magnetic sound in relation to film striping, camera photography, laboratory processing, editing, film cleaning, printing, projection and library storage are described.

Magnetic Recording Media Considerations for Improving Masters and Dupes
R. J. TINKHAM, *Ampex Corp., Redwood City, Calif.*

Transparent Magnetic Tracks
GEORGE LEWIN, *Army Pictorial Center, Long Island City, N.Y.*
Most of the problems which arise when magnetic and optical tracks are combined on the same film would vanish if the magnetic track could be made transparent, so that both could be superimposed for either simultaneous or independent reproduction. Full-width tracks could be used and head wear would be uniform. The author shows that this goal can be substantially achieved under certain conditions, and will demonstrate several recordings.

Erasing Magnetic Film for Pop-Free Splices
CARL SHIPMAN and CARL HITTLE, *RCA Film Recording Section, Hollywood*
When magnetic soundtracks are edited and then reproduced for motion-picture re-recording or other purposes, the splices in the track frequently cause audible pops to be heard in the reproduced program material. Among the causes of pops is improperly erased magnetic film or tape. Pop elimination from this cause is achieved by use of eraser which does not produce "spokes."

Adapting 16mm Television-Film Projectors for Magnetic Sound Reproduction
W. F. FISHER and R. E. MAINE, *Radio Corp. of America, Camden, N.J.*
The means used to reproduce magnetic sound from film with the RCA line of 16mm television projectors are described. The problems introduced by the necessity of working within the boundaries established by existing designs are discussed; solutions are presented which make the field installation of this feature a simple task.