

Advance Program: 82d Convention — Philadelphia

THIS PROGRAM was checked for completeness and accuracy at the time it went to press, but a few variations may be expected before the opening date of the Convention. Some expected information on a few authors and papers has not yet arrived, but in general the papers and sessions will be as presented below.

There have been two general changes since the postal announcement was mailed on August 22. The session on Color TV has been moved from Tuesday afternoon to Wednesday morning and a session on Instrumentation and High-Speed Photography has been scheduled for Tuesday afternoon. The number of papers in the category of Laboratory Practice made it advisable to schedule two sessions, the first to begin Friday morning.

Detailed information such as the timing of specific papers or committee meetings will be available from SMPTE headquarters in New York (Longacre 5-0172). It is suggested that interested persons telephone during the week before the Convention.

Besides the information for pre-registration for Convention events, the postal announcement contained a card for conveniently making hotel reservations. Reservations may be made by addressing:

Lloyd B. Carswell, General Manager
Sheraton Hotel
1725 Pennsylvania Blvd.
Philadelphia 3, Pa.

The rates for single rooms range from \$8.50 to \$18.00. Double rooms (two persons) are priced at \$14.00 to \$19.00. Registration for members is \$5.00 and for nonmembers is \$7.50. Ladies Registration is \$5.00. As has been the practice for some time, there will be a discount for early-birds. Members who send the money for luncheon and banquet tickets with their advanced registration are entitled to a discount of \$2.00 on the combined price of the luncheon (\$4.00) and banquet (\$15.00).

The entertainment events were described briefly in the August *Journal* (p. 492) and the "fun" part of the program has not been changed. Sunday will be given over to historical tours and theatrical and sports activities during the day and the evening will include dining and dancing in pleasant places with pleasant company. A buffet supper at wonderful Cherry Hill Inn is still on the "tentative" list, but if the plans are "finalized" a bus will leave the Sheraton Hotel at 6:00 p.m. for the convenience of the merry-makers.

After the Semiannual Cocktail party at 6:45 P.M. on Monday evening, the Banquet and Dance will follow at 8:00 P.M.

The papers sessions will be prefaced with motion-picture short subjects which have been arranged by Jack McCullough and will include outstanding subjects from Walt Disney Studios, UPA, Columbia Pictures, Warner Bros., National Film Board of Canada and the Ford Motor Co. Several of the films scheduled for showing are award winners.

Tentative Schedule of Committee Meetings

Wednesday, October 2

6:00 P.M. Current Convention Arrangements

Thursday, October 3

10:00 A.M. PH3

Friday, October 4

10:00 A.M. Film Projection Practice

2:00 P.M. Sound

Saturday, October 5

8:30 A.M. Association of Cinema Laboratories, Breakfast

9:30 A.M. Closed Circuit TV

2:00 P.M. Laboratory Practice

3:30 P.M. Section & Student Chapter Officers

4:00 P.M. Television

Monday, October 7

10:00 A.M. 83d Convention Papers

10:00 A.M. PH22

2:00 P.M. Board of Editors

3:00 P.M. Publications Advisory

2:00 P.M. Film Dimensions

Tuesday, October 8

10:00 A.M. High-Speed Photography

2:00 P.M. 16 & 8mm

Wednesday, October 9

10:00 A.M. Screen Brightness

Final schedule will be listed in the Convention Program and meeting notices will be mailed to committee members.

If your questions have not been answered here, call Society headquarters — especially if some special item is of paramount importance.

THURSDAY — OCTOBER 3

2:00 Registration opens in the Third Floor Assembly, Sheraton Hotel

FRIDAY MORNING — OCTOBER 4

9:00 Registration

10:00 LABORATORY PRACTICE I

Large-Capacity 16mm Printer Loop Trees
RUSSELL N. JENKINS, VICTOR E. PATTERSON and GARLAND C. MISENER,
Capital Film Laboratories, Washington, D.C.

Improvements in Variable-Density Recording
JOHN A. MAURER, JM Developments, Inc.,
New York

A mirror galvanometer with a suitable optical system gives a recording line of light of constant dimensions and variable intensity. By the use of a suitably designed mask, the variation of intensity with the applied electrical signal can be made nonlinear in any desired way. This nonlinearity can be adjusted to suit the characteristics of any film and method of processing so as to produce a soundtrack in which the relation of light transmission to the original electrical signal is linear over very nearly the entire range of transmission that can be obtained with the type of film and processing in question. The cases of practical interest are recording on "positive" type films for direct playback, normal negative-positive sound recording and printing, recording on reversal stocks for direct playback, and recording predistorted "direct positive" originals which yield linear prints when printed on reversal stocks. In all of these cases the method yields prints having reproduction levels 6 to 8 db higher than have been obtained by previous variable-density recording techniques, with low distortion, and with exceptionally good high-

frequency response when the method is employed for "electrical printing" on either black-and-white or color stocks. A special printer which uses this technique to produce prints carrying optical soundtracks from original newsreel films carrying sound recorded on magnetic stripes is described and illustrated.

Use of a Motion-Picture Printer as a Sensitometer

ROBERT O. GALE and JOHN J. GRAHAM,
Eastman Kodak Co., Rochester, N. Y.

A Bell & Howell Printer, Model D, can be used as a sensitometer for exposing process control strips in small laboratories or for emergency work. The variability in exposure of a printer was only slightly greater than that of a commercially used sensitometer, when the instruments were compared under carefully controlled conditions. The procedure includes the selection and storage of check film stock, printer control, monitoring and control of illumination, and making controlled exposures.

An Electromechanical Light Valve For Motion Picture Printers

FRANK HERRNFELD, Frank Herrnfeld Engineering Corp., Culver City, Calif.

This paper describes a light valve which is actuated from a control tape without use of intervening relays. The average change in intensity will take 10 msec, or less than one sprocket hole, when printer is running at 90 ft/min. The total maximum change obtainable is three stops, which may be divided into 32 or 64 equal logarithmic increments. Flatness of field is that of a projection-type system. Light intensity is limited only by the size of lamp used.

A New High-Speed 16mm Reversal Color Camera Film

HAROLD JONES, Ansco, Binghamton, N.Y.

12:00 Get-Together Luncheon

Speaker: Theodore A. Smith, Executive Vice-President, Industrial Electronic Products, Radio Corp. of America

FRIDAY AFTERNOON

2:15 ANNUAL BUSINESS MEETING— Amendment of Bylaws

2:30 LABORATORY PRACTICE II

Superimposed Titles on Color Films by a Photo-Resist Method

W. I. KISNER and J. J. MURRAY, Eastman Kodak Co., Rochester, N.Y.

A method for adding titles to conventional image-bearing color photographic materials is described. The procedure involves preparation of a black-and-white title positive, coating of the color film with a photo-resist material, exposure and development of the resist, selective removal of the title images by the action of destructive solutions and, finally, removal of the resist. The method has been successfully used with Kodachrome, Ektachrome and Eastman Color Print Films. Applications include titles for motion-picture release prints, slidefilms and individual transparencies.

Glass Filters for Color Printing

RICHARD L. WHITE and ROBERT C. LOVICK, Eastman Kodak Co., Rochester, N.Y.

Narrow-band filters are used to print Eastman Color Negative Film, Type 5248, onto Eastman Panchromatic Separation Film, Type 5235, and for printing these separations onto Eastman Color Internegative Film, Type 5245. Such filters are also used in additive printers for making prints onto Eastman Color Print Film, Type 5382. The gelatin filters used for this purpose can be re-



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placed with glass filters with a great increase in stability and a gain in exposure. All the glass filters recommended are standard stock Corning glass filters with one exception. A unique red-absorbing filter, used in the green filter combination, has been made on special order by the Corning Glass Works and will be supplied by the Eastman Kodak Co.

An Automatic Printer Light Selector for the Bell & Howell Models D and J Printers
L. WARGO, H. M. LITTLE and H. L. BAUMBACH, *Unicorn Engineering Corp., Hollywood*
A device has been designed to bring about the automatic setting of the printer light selection lever on the Bell & Howell Models D and J Printers. Punched paper tape containing the printer light sequence is prepared on a keyboard-perforator and this tape fed into a tape reader. The electrical signals produced in the reader are then decoded by a computer unit which in turn directs a servo unit in its manipulation of the printer lever. The action of the device is considerably more rapid and accurate than manual performance and, of course, it can operate in total darkness. The robot unit is very easily installed on the printing machine and it demands no mechanical alteration of the printing equipment.

A New Color Timer for Motion-Picture Films
J. W. STAFFORD and H. L. BAUMBACH, *Unicorn Engineering Corp., Hollywood*
A new device has been developed for the determination of the correct printing exposures for color films. The device accepts a density range test as exposed under the negative scene with average standard exposure conditions. The viewing field under the test positive may be varied in hue to the desired color balance while a condition of constant brightness is automatically maintained. A built-in analog computer calculates the corrections from the standard condition in terms of red, green, and blue light for additive

printing; and of cyan, magenta, and yellow light for subtractive printing. The variable hue viewing field is surrounded by standard photometric fields to maintain constant eye adaptation. The system enables the color timer to specify correct printing conditions directly from the single test series. In most cases, a fully corrected print is produced directly from the color timing.

A New Automatic Light Control for Additive Color Printing
HANS-CHRISTOPH WOHLRAB, *Bell & Howell Co., Chicago.*

Splitting up a white light beam into the three fundamental colors, red, green and blue, is done by dichroic mirrors. The individual lights are controlled by vanes and then reunited in the printing aperture. The vane setting is controlled by a five-hole code on a commercial control tape. The color informations are fed into a memory system and released by a patch or notch cue to the vanes. Besides this the tape controls the fader as well as the automatic start and stop of the printer. The paper explains the reasons for the adopted solution of the different problems, shows the technical data and describes an application of the light control on an additive color printer.

An Instantaneous Electronic Color Negative Film Analyzer
C. J. HIRSCH, *Hazeltine Research Corp., Little Neck, N.Y.*

This paper describes an analyzer for color negative film which displays instantaneously a positive color picture on a color TV tube when a color negative is inserted in the device. Color balance and density are adjusted by calibrated controls whose settings are used by a printer to produce a positive closely approximating the displayed picture. The device uses TV techniques to simulate additively the subtractive properties of positive film in spectral taking sensitivities, gamma, contrast, and unwanted dye absorptions.

FRIDAY EVENING

8:00 Awards Presentations

Dr. **Filmore Park**, National Research Council of Canada, will present an illustrated lecture on "Photography and the IGY."

SATURDAY MORNING — OCTOBER 5

9:00 GENERAL MOTION-PICTURE

The Optics of the Lenticular Color-Film Process

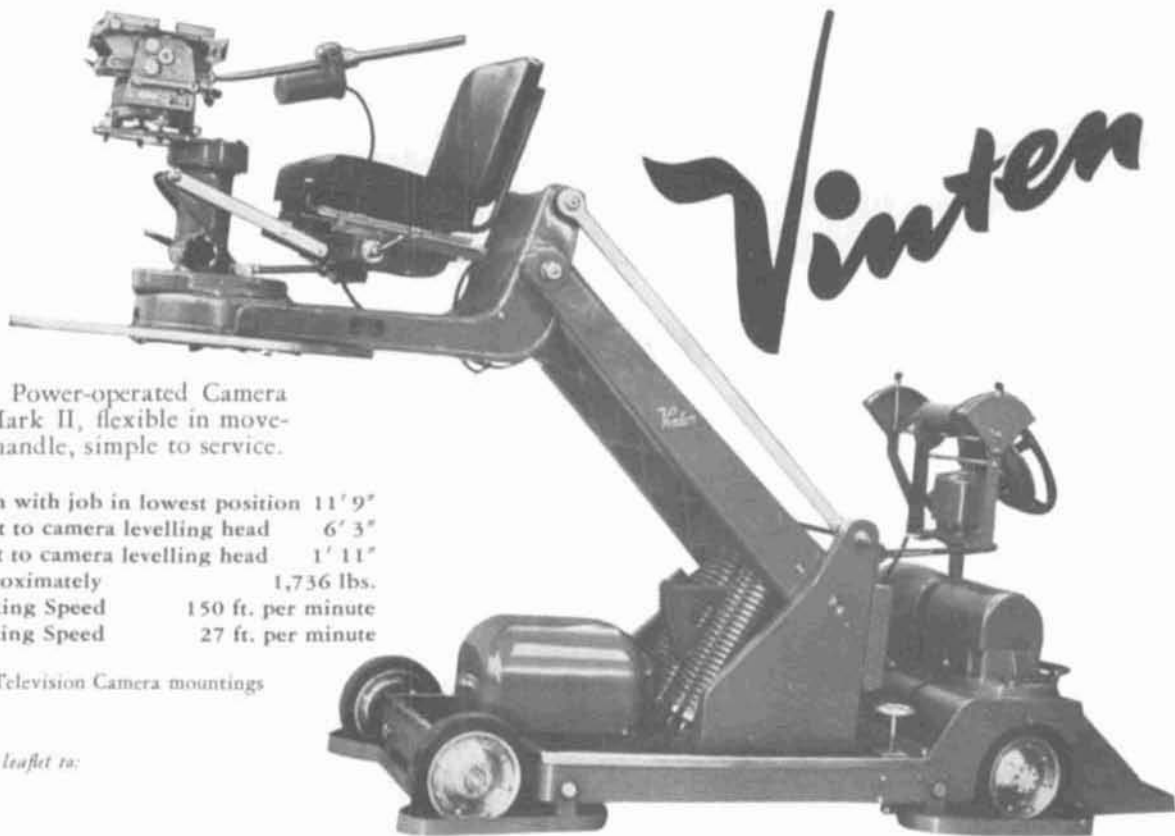
R. KINGSLAKE, *Eastman Kodak Co., Rochester, N.Y.*

In spite of the fact that the lenticular color-film process has been known for fifty years, very little commercial use has been made of it largely because of the lack of suitable lenses. The requirements of the various optical components used in cameras, printers and projectors are discussed, and it is shown that every optical requirement can be met. However, this will often require specially designed lenses, which are likely to be unusually large and consequently expensive.

The Projection Optical Assembly Considered as an Integral System

HAROLD E. ROSENBERGER, *Bausch & Lomb Optical Co., Rochester, N.Y.*

The function of each of the optical components of the projection assembly and the interrelationship between these components are discussed. The true f-number of the system is contrasted with the f-number of the projection lens, considering the effects of going to higher speed systems. The components of an up-to-date optical projection system including the new multilayer light-reflecting, heat-transmitting reflectors are described.



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Can Xenon Arc Lamps Replace Carbon Arc Lamps?

WARREN B. REESE (Prepared Jointly by Macbeth Corp., Newburgh, N.Y., and OSRAM, Munich, Germany)

Xenon arc lamps have inherent properties as to spectral energy characteristics, luminous efficiency, electrical operating characteristics, and geometrical characteristics which make them attractive, from both a technical and an economical point of view, as the first new light source which is feasible as a replacement for the traditionally used carbon arc lamps in motion-picture film projectors. Technical data on xenon lamp operating characteristics, projector optical design, and screen brightness measurements will be discussed fully. Practical experience as a result of xenon lamps already being used in film projectors will also be covered.

Acoustic Considerations in The National Film Board of Canada Studios

R. W. CURTIS, *National Film Board, Montreal.* Special building techniques have permitted the attainment of a high degree of sound isolation in the Montreal studios of Canada's National Film Board. A description is given of these techniques and of the methods whereby the various theaters and recording studios were given suitable acoustic characteristics. The apparatus and procedures used in the acoustic measurements will be described.

Photographic Duplicating of Variable-Area Sound Recordings

J. F. FINKLE, *Eastman Kodak Co., Rochester, N.Y.*

A sound recording quality comparison is made between prints made directly from original variable-area negatives and prints made from photographic duplicate negatives. The relationship of the densities of the master positive and dupe negative to cross-modulation distortion, signal-to-noise ratio, and frequency response of the final print is discussed.

Progress Report on Infrared Transparency of Magnetic Tracks

GEORGE LEWIN, *Army Pictorial Center, Long Island City, N.Y.*

A report on further tests of the infrared transparency effect, including some preliminary work on 35mm reproducers and additional 16mm demonstration material. The first report appears in this issue of the *Journal*.

Use of Multitrack Recorders for Simultaneous Mastering of Single-Channel and Stereo Releases

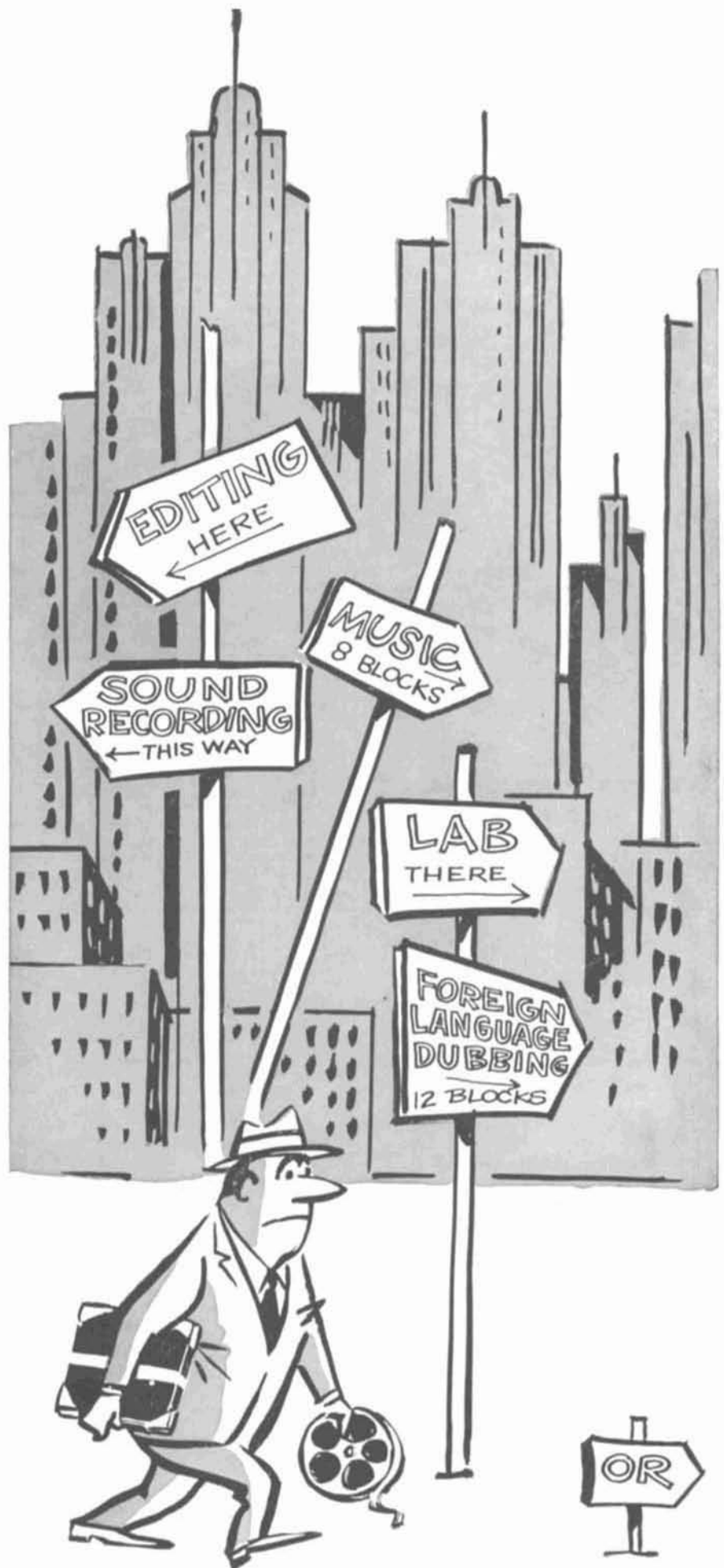
C. ROBERT PAULSON, *Ampex Corp., Redwood City, Calif.*

The single-channel magnetic recorder as a mastering device is giving way to the multitrack recorder for reasons of greater flexibility and economy in the mastering session. Specially designed equipment with as many as eight separated channels is currently in use. Various erase, recording and playback head configurations, and specialized control and inter-record circuits give improved flexibility both in mastering and re-recording. Operational and technical features of such apparatus are described and demonstrated.

Averaging Screen-Illumination Readings

ARMIN J. HILL, *Motion Picture Research Council, Hollywood*

In obtaining the total output of a projector, or the total illumination which falls on a projection screen, it is customary to read the incident intensity at selected points in the illuminated area. These readings are then averaged by a suitable weighting formula to give the average over the face of the screen. This paper discusses some of the more commonly used formulae, considers their relative accuracy and the effects of various screen aspect ratios on the results obtained with them. It also analyzes various types of errors on the basis of an idealized distribution pattern which experience has shown checks closely with practical results.





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SATURDAY AFTERNOON

2:00 CLOSED CIRCUIT TV AND VIDEO TAPE RECORDING

Economic Consideration in Closed-Circuit TV Design

DONALD KIRK, JR., *Jerrold Electronics Corp., Philadelphia*

During the last five years a number of systems for distribution of entertainment-type TV programming via wire to homes of paying subscribers have been successfully installed and operated. This paper considers the economic factors which have led to the systems currently being installed. Areas of greatest possible improvement are outlined. Systems designed to take care of different billing procedures are discussed. Some guesses are made as to what may evolve in the system of the future.

Television in Washington County Schools

JOHN R. BRUGGER, *Board of Education, Hagerstown, Md.*

Teaching by television has been tested in the elementary and high schools of Washington County, Md. The effectiveness of this method is evaluated and the problems encountered, particularly with respect to equipment and facilities, are described.

Visual Amplification

H. J. SCHLAFLY, *Teleprompter Corp., New York*
"Visual amplification" is a specialized application of closed-circuit TV. It is to the sense of sight what studio amplification is to the sense of hearing. This technique, described here in detail, permits the pickup and magnified display of visual details.

The Ampex Videotape Recorder: An Evolution

CHARLES P. GINSBURG, *Ampex Corp., Redwood City, Calif.*

The Ampex Videotape Recorder came as a considerable surprise to the TV industry, when it was demonstrated in April 1956. Behind the machine was a long development project whose story has never previously been told. The approaches which failed, the unexpected solutions which turned up while searching for others, the experiments that succeeded, and the interplay of technical contributions by the staff's creative personalities are described by the head of the project.

Videotape in 1958 — A Discussion of the Production Ampex VTR

ROSS H. SNYDER, *Ampex Corp., Redwood City, Calif.*

During the past year eleven laboratory hand-built Videotape Recorders performed a large part of the local clock time-delay TV programming for the three largest U.S. networks. Planned as intensive field testing, this use dictated extensive revisions and refinements of the original design. Interchangeability of tapes from VTR to VTR, improved dubbing facilities, tape editing, sync source separation, and improved component accessibility are all, in part, contributions by industry users. This paper discusses problems encountered and solved in TV's first VTR year.

Magnetic Tape for Video Recording

R. A. von BEHREN, *Minnesota Mining & Mfg. Co., St. Paul, Minn.*

The new video tape recording systems now in commercial and experimental use require special magnetic tapes differing in design from standard types, and manufactured to a standard of perfection which a short time ago was believed impossible to achieve. This paper discusses some of the unique features of video recording tapes and the problems encountered in their development.

MONDAY MORNING — OCTOBER 7

9:30 MILITARY USES OF TV I

Pickup Tube Performance With Slow Scanning Rates

CHARLES T. SHELTON, *Radio Corp. of America, Camden, N.J.*

For military purposes it is often desirable to operate a TV system at nonstandard scanning rates. This paper reports the result of a Signal Corps sponsored study of the operation of standard image orthicons and vidicons at reduced rates. The resolution, sensitivity and other characteristics of these tubes have been measured and thought has been given to characteristics desired for tubes designed particularly for slow-scan operation.

Control Information by Television — Inaugural Parade 1957

Lt.-Col. HOLLIS DAKIN, *Army Pictorial Center, Long Island City, N.Y.*

This paper is devoted to a detailed explanation of the closed-circuit TV system used by the Army for control of movement of the Inauguration Day Parade, 1957. Control information was available for the immediate use of the parade marshals through complete coverage of the parade route by vidicon (TTV-6 and Tele-Scout) and image-orthicon equipment.

Staff Information by Television — Operation King Cole, 1957

Lt.-Col. HOLLIS DAKIN, *Army Pictorial Center, Long Island City, N.Y.*

This paper explains how the Army used closed-circuit TV to disseminate timely information simultaneously to a Field Army Staff during "Operation King Cole" at Fort Polk. This was the first large-scale attempt by the military to provide necessary staff information via closed-circuit TV.

Airborne Closed-Loop TV System

ARTHUR F. FLACCO, *Radio Corp. of America, Camden, N.J.*

This paper describes a militarized airborne TV system which uses wide-spaced image orthicons (Type 6849) and nonstandard line and field rates. The need for remotely located cameras of reduced size presented deflection circuitry problems. Temperature extremes and vibration and shock effects had to be overcome without exception for any component in the system. The complete system consists of two cameras, a synchronizer, a monitor, a power supply, and an auxiliary field rate unit.

Some Aspects of the Application of TV to the Tracking of Guided Missiles

HOWARD L. ROBERTS, *Denver Research Inst., Univ. of Denver, Denver, Colo.*

An investigation to determine whether television could increase the range of optical tracking devices has been conducted for the U.S. Navy Air Missile Test Center, Point Mugu, Calif., by the Denver Research Institute. Range is limited by loss of object contrast. An expression is developed which indicates that electrooptical devices could detect lower contrasts than can the human eye. The parameters of a TV system for aerial tracking are discussed. Both greater and lesser ranges were obtained in experiments. Other means by which TV performance might be improved are discussed.

TV Viewing of Rocket Engine Test Cells

JAY P. MITCHELL, *Diamond Power Specialty Corp., Lancaster, Ohio*

A remotely operated closed-circuit TV system especially engineered for viewing rocket engines under test conditions is discussed. The TV camera incorporates a zoom lens system, pan and tilt pedestal, and a weatherproof and soundproof camera housing. All camera functions, electrical, optical, and mechanical, are completely controlled from a master control console. The problem of acoustic shielding against noise at levels around 200 db is described.

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MONDAY AFTERNOON

2:00 MILITARY USES OF TV II

The Development of the Navy Transparent Cathode-Ray Tube

Part I

Cdr. G. W. HOOVER, USN, Office of Naval Research, Washington, D.C.

Part II

ROSS AIKEN, Kaiser Aircraft and Electronics

Part III

Dr. CHARLES FELDMAN, Naval Research Laboratory, Washington, D.C.

Part I concerns the establishment of the requirements and the need for the development of a transparent cathode-ray tube to be used in aircraft for data display. It points out the necessity for a transparent medium to be located in the area of the windshield in order to eliminate the

necessity for transition from instrument flight to contact flight and vice versa.

Part II covers the technical aspects of the tube, including a description of the circuitry.

Part III discusses the development and utilization of a transparent phosphor to be used in the flat plate cathode-ray tube. The discussion includes slides explaining the development of the phosphor with actual demonstration of the transparent phosphor.

Television for Use Under Rugged Environmental Conditions

JOHN P. DAY and FRANK R. PIKE, Kintal, a Div. of Cohu Electronics Co., San Diego, Calif.

A variety of applications that have been made of TV equipment under extreme environments is reviewed. The generally desirable characteristics of these equipments are examined, and the sources of present-day difficulties are discussed.

The design features of a system built for rugged usage are detailed.

Army Television Research and Development

WILLIAM A. HUBER, U.S. Army Signal Engineering Laboratories, Ft. Monmouth, N.J., and RICHARD B. LeVINO, Smith-Corona, Inc.

Military TV application requires equipment with technical and operational characteristics that differ from those found in industry. To produce such equipment the U.S. Army Signal Engineering Laboratories conducts a comprehensive research and development program that embraces all phases of the art. A technical survey of this activity is given indicating those technological limitations that now exist and are seriously impeding the military applications of television together with the developed or proposed methods of solution.

Advances in TV Performance to Satisfy Military Requirements

C. L. ELLIS, General Electric Co., Syracuse, N.Y.

Many military uses of television require one or more performance characteristics which are far beyond those of conventional entertainment and closed-circuit television. These characteristics include extremely high resolution, color, high sensitivity, and stereoscopic viewing. These requirements and how they were met for particular applications are discussed in detail. These applications include surveillance, remote handling of hazardous materials, missile observance, and data reporting.

MONDAY EVENING

6:45 COCKTAIL PARTY

8:00 BANQUET AND DANCE

TUESDAY MORNING — OCTOBER 8

9:00 LARGE-SCREEN TV

Survey of Large-Screen TV Projection Equipment

FRANK N. GILLETTE, General Precision Laboratory, Pleasantville, N.Y.

The large-screen equipment available to the industry in the period around 1950 was described to the Society in a number of different papers. Since that period certain changes have taken place in the equipment, but these changes have passed generally unnoticed because of the relatively dormant state of the closed-circuit field. A survey of the equipment now used in this very active field is presented.

A High-Brightness TV Projection System

G. W. ELLIS and C. L. ELLIS, General Electric Co., Syracuse, N.Y.

Of all the types of TV projection systems used today, the Eidophor is unique. Being of the "light-valve" type, it is capable of brightness comparable to film projectors. The principles of operation are reviewed with a description of the methods used to achieve almost completely automatic operation. Some interesting applications are discussed.

Television — Group Viewing

H. J. SCHLAFLY, Teleprompter Corp., New York

The presentation benefits of group viewing of a single visual display screen as compared to localized viewing of multiple screens are discussed. Technical considerations of large-screen TV projection viewing, including audience size and location, screen size and type, screen brightness, equipment location, and other room and viewing factors are discussed.

Medium-Sized Screen Color TV Projection

S. L. BENDELL and W. J. NEELY, Radio Corp. of America, Camden, N.J.

Closed circuit television has created a need for picture display equipment suitable for large groups. Basic engineering and economic factors influencing the design and use of such equipment are discussed. The wide variety of applications for such a unit dictates that special emphasis be put on compactness, mobility and easy operation.

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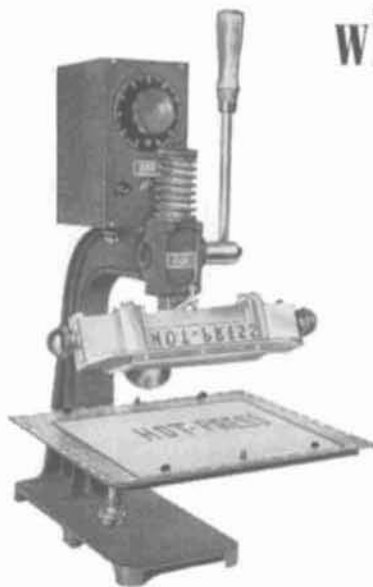
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 MODEL #A2816—16mm
 MODEL #A2870 (on special order)—70mm



PRINTER ROBOT*

Three separate plug-together units comprise Unicorn's Printer Robot: a paper tape reader, a computer-decoder and a servo mechanism. Robot automatically selects and makes light changes from punched tape eliminating human errors. On Bell and Howell printers, models D and J no installation modification is required. Also available (but not shown here) is Unicorn's Keyboard-Perforator, MODEL #A2807, which produces the 8-hole paper tape. MODEL #A2805 for 115V AC 60 cycle operation.



*patent pending

These requirements have resulted in the design of a small inexpensive TV projector suitable for color or monochrome. Its operational features are described.

The Advantages of Using a Controlled Projection Screen With Projection Television

W. T. SNYDER and E. S. JOHNSON, *Universal Screen Co., Clinton, Mass.*

This paper discusses brilliance comparisons and methods of obtaining brilliance results. Comparisons are made using the matte-surface magnesium-carbonate block as the criterion. Brilliance ratings and their ratio to horizontal and vertical controls are discussed. The paper also covers light output of projection TV units and its ratio to screen brilliance and considers light resistance, color rendition, tone graduation and resolving power of lenticular screen material.

Automatic Announcing Techniques for TV Stations

W. H. HARTMAN and R. A. ISBERG, *Ampex Corp., Redwood City, Calif.*

Magnetic tape recordings of local announcements for use with film and network programs can be easily prepared at the convenience of the announcing staff. The equipment used for this purpose at KCRA-TV, Sacramento, Calif., makes it possible to record most of the local announcements for an 18-hour operating day in less than an hour's time. Sub-audible control tones, recorded after each announcement, automatically stop the tape transport. The technician on duty does not need to refer to the announcement continuity once he has started to play an announcement on the air. This technique can also be used with additional control tones to operate projection equipment, thereby eliminat-

ing errors on the part of operators when they are required to switch large numbers of slides during an announcement.

Automatic Cuing of TV Film Projectors

B. F. MELCHIONI, *Radio Corp. of America, Camden, N.J.*

With the advent of automation in TV stations, it has become apparent that methods must be developed to cue the film automatically at the start of each film sequence. This paper describes methods for automatically stopping a projector with a predetermined frame in the gate by adding suitable cuing information to the film and associated reading and control mechanisms to the projector.

TUESDAY AFTERNOON

2:00 INSTRUMENTATION AND HIGH-SPEED PHOTOGRAPHY SESSION I

Mobility in Underwater Cinematography

DIMITRI REBIKOFF and PAUL CHERNEY, *Submarine Research Institute, France*

The need exists for a mechanical device, easily controlled by one man from without or within, which can move as a fish or a swimming diver, unhampered by the limitations of pressure, cold and exhaustion experienced by the diver. The conventional submersible, even when equipped with an atomic power plant, is impractical because of relative fragility, high cost in money and manpower, monstrous size, limited depth and poor maneuverability. The prototypes of the miniature submarine, Pegasus, represent a great step forward toward the solution of underwater photographic problems.

Characteristics of Aquar Correction Lenses

A. IVANOFF, *Submarine Research Institute, France*, and PAUL CHERNEY, *Cinefol International Corp., New York*

It is possible to overcome in some degree the loss of field of view in submarine photography by using wide-angle lenses. Using this method, submarine photography, which demands the largest possible field of view, compares unfavorably with normal photography on land. The aberrations produced by the flat window reduce the quality of the image. The chromatic aberration introduced by a flat window is perceptible at distances greater than 5 mm from the center of the film. Astigmatism is noticeable for distances less than 2 m using $f/4$, and for distances less than 5 m using $f/2$, and, finally, distortion is noticeable when the field of view is greater than 60° . It is desirable, therefore, to replace the plane window by an optical system which does not introduce aberrations and which permits the taking of submarine photographs with the full field of view of a wide-angle lens.

Explosive Studies With an Ultra-High-Speed Reimaging Camera

M. SULTANOFF, *Terminal Ballistics Laboratory, Aberdeen Proving Ground, Md.*

The optical and mechanical features incorporated in the design of a commercially available 25-frame ultra-high-speed "reimaging camera" are described. Techniques for the application of this camera to the study of several explosive events are presented. A motion picture, prepared for cine-playback of the 25 individual frames at time magnifications of approximately 200,000:10 (at standard 16-frames/sec projection speed) which greatly extend the qualitative data available from the individual photographic exposures will be shown as part of this paper.

A New 35mm High-Speed Motion-Picture Camera

ROBERT D. SHOBERG and ROBERT J. MARSHALL, *Sherman Fairchild & Associates, Inc., Yonkers, N.Y.*

From a users point of view, three points are extremely important when considering the functions of a high-speed motion-picture camera.



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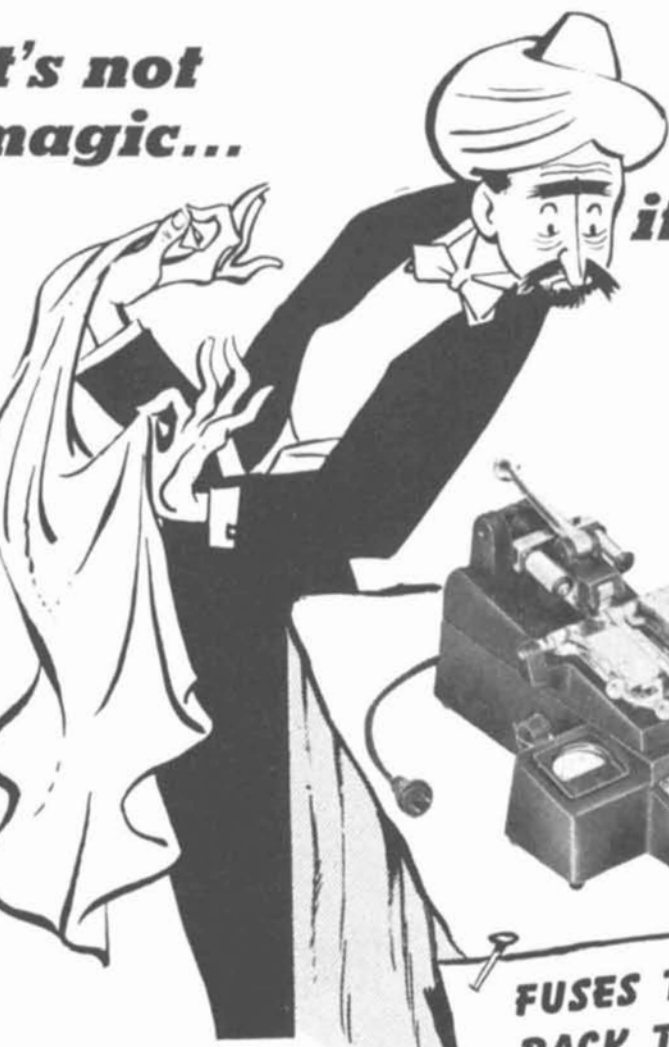
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the first is picture quality; second, the relationship of one picture to the next in time and in position (what kind of a speed characteristic curve does it have and how steady is its film when projected); and third, action-stopping ability (shutter speed). A rotating prism coupled with a rotary disc shutter, an electronic thyatron speed control and the proper arrangement of an assortment of mechanical and optical parts contribute to reaching the optimum condition in these three points.

A New Approach to Aircraft and Missile Tracking by Use of a Negative Color Film
JOHN NIEMEYER, *Eastman Kodak Co., Rochester, N.Y.*

International High-Speed Photography Congresses: 1958 in Germany and 1960 in Washington, D.C.

RICHARD O. PAINTER, *General Motors Proving Ground, Milford, Mich.*

High-Speed Motion Picture of the Defensive Mechanism of Reptiles

HENRY M. LESTER, *Photographic Consultant, New York*

TUESDAY EVENING

8:00 INDUSTRY MILESTONES 1 BILINGUAL FILMS AND INTERNATIONAL TV

Tykociner's Sound Picture Contributions
JOHN B. McCULLOUGH, *Chairman, Historical and Museum Committee*
Professor Joseph T. Tykociner, now 90 years

old, in 1922 demonstrated his system of recording sound optically by means of a variable-density soundtrack with a single-system camera as a result of many years of experimentation. During that year, he made one of the earliest public demonstrations of talking motion pictures. Professor Tykociner's other contributions to the field of electronics will also be described. The paper will be followed by a showing of his first film and attempted reproduction of its recorded sound. Acknowledgment is made to Edward W. Kellogg, Glenn E. Matthews, Joseph E. Aiken and Arthur Wildhagen for their counsel in preparing this milestone tribute to one of our early motion-picture pioneers.

The United States Information Agency International Television Film Network
FREDERICK A. LONG, *Television Manager, Television Unit of the United States Information Agency*

An analysis is presented of the progress being made in various countries toward worldwide use of television. The United States is presently supplying television film in 18 different languages on a scheduled broadcast basis. The essential facilities and problems of maintaining such a program are described in detail.

The Problems of International Television Broadcasting

K. R. STURLEY, *Head of Engineer Training Dept., British Broadcasting Corp., London, England*

Described are the general problems arising from

European International Television Program Interchange, and the current solutions for the problems of noncompatible line structure and frame rate, relay time coordination, language translating, etc. The Eurovision Network has been in operation for some time and the experiences acquired through its operation will be of great value when television is expanded to worldwide status.

The Narcom (North Atlantic Relay Communication System) Plan for Trans-Atlantic Television

WILLIAM S. HALSTEAD, *Unitel, Inc., New York*

Described in detail is the plan which was submitted to the European Broadcasting Union for linking the United States and Canada to Great Britain and Europe. The plan has been some time in the development stage and the subject extensively developed.

The Technique of Matched Time Phonetic Language Translation as Applied to Bilingual Film

MAX G. KOSARIN, *Chief, Foreign Adaptation Branch, Army Pictorial Center, Long Island City, N.Y.*

The problems and methods of language translations, wherein identical lip movement, word matching is achieved, are described. Examples are given of such translation on dual language sound film utilizing the transparent magnetic track technique developed by George Lewin.

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The Newest Spray Processall Units to Automatically Develop, Fix, Wash and Dry Motion Picture Film

Models G-6 and G-12

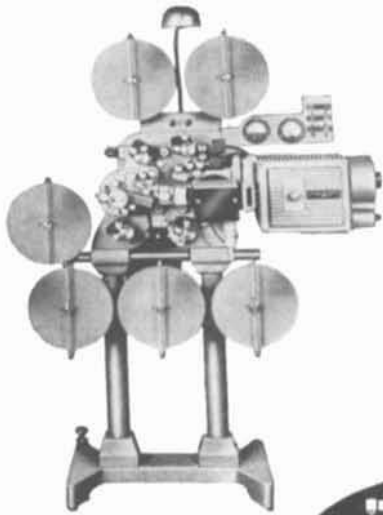
This Fisher Motion Picture Processing Equipment is recognized as the finest in existence. Both units are manufactured to abnormally rigid specifications. Heavy gauge type 316 stainless steel is used throughout. Permanent rust prevention is attained with heliarc welding of all seams. Electrical connections are splash-proofed. Both units are self-threading, operate in daylight, are completely assembled at the factory. Processing times are variable, offering an exceptionally high degree of control of contrast. Temperatures of solutions are also variable and are thermostatically controlled.

Model G-6 (110v, 60 cycle) processes film up to 6" in width. Model G-12 (220v, 60 cycle) processes film up to 12" in width. G-6 weighs 155 pounds, embodies 14 cubic feet, stands 43" long, 13" wide, 66" high. G-12 weighs 315 pounds, embodies 20 cubic feet, stands 43" long, 19½" wide, 66" high. Both units possess positive drive (variable from 3 to 12 feet per minute). The units are designed, engineered and tested to remove human error. The units incorporate the latest developments available on the spray processing of motion picture film. They also incorporate advances made by the Manufacturer, and not available elsewhere.

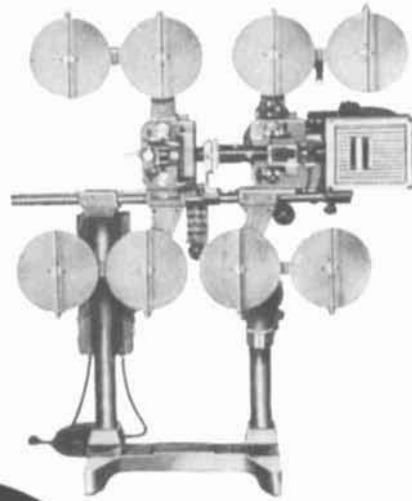
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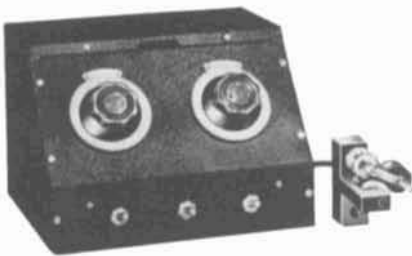
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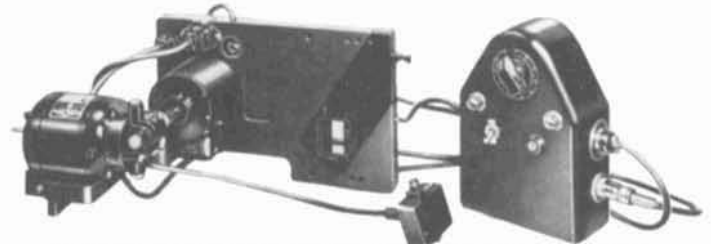
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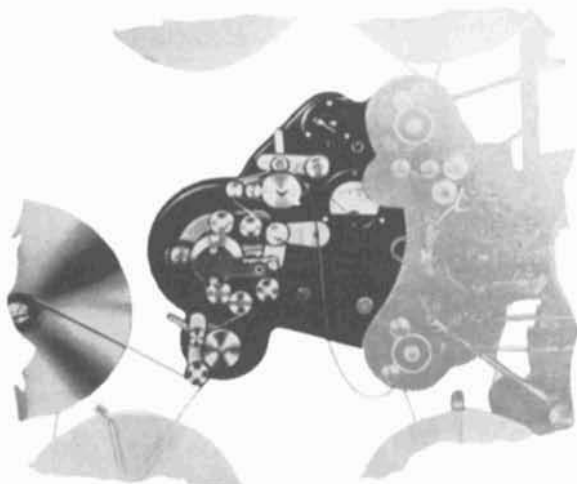
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A Case History of Bilingual Telecasting in Canada

ANDRE QOUMET, *Director of TV, Province of Quebec, Canadian Broadcasting Corp.*

This paper will discuss the methods of operation and special problems of TV broadcasting to French- and English-speaking audiences in Canada.

Future Trends in Multi-Voice Films for International Television

LEON SHELLY, *Shelly Films Ltd., Toronto, Ont., Canada*

The world availability of magnetic sound equipped projectors in TV stations opens up new markets for internationally minded producers. The tools are presently available for producing bilingual films for this market. This paper describes these tools and the preplanning necessary to make such films most effective.

**WEDNESDAY MORNING —
OCTOBER 9**

9:00 COLOR TV

Paris Symposium on Physical Problems of Color Television, 1957

R. E. GRAHAM, *Bell Telephone Laboratories, Murray Hill, N.J.*

This is a review of some aspects of this UNESCO-sponsored symposium which may be of particular interest to the Society.

Performance Objectives for Color Picture Tubes

JOHN B. CHATTEN, *Philco Corp., Philadelphia*
The luminance-chrominance principle of the NTSC color signal is based on fundamental properties of human vision and hence has important implications in the design of color TV

display devices. This paper compares the color-signal processing and electron optical techniques applicable to the three-gun shadow-mask tube and the single-gun beam-index tube, with particular reference to following performance objectives: resolution and picture structure, registration and color fringing, color purity, maximum attainable luminance and saturation, gradation of luminance, gradation of saturation, contrast, and accuracy of hue reproduction. Circuit and tube requirements to optimize these aspects of performance are described and related to current design practice in the two types of color display.

The RCA TM-21 — A Stabilized Color Monitor

E. E. GLOYSTEIN and N. P. KELLAWAY, *Radio Corp. of America, Camden, N.J.*

A new color monitor has been designed to serve both as a high-quality picture display device and as an instrument for judging the quality of color TV signals. It incorporates several significant design innovations, both electrical and mechanical. The highly stabilized circuits provide a picture of excellent quality. The control panel has been designed for simplicity of operation, and the mechanical design provides good accessibility for maintenance. The monitor is designed as a major tool for use in color TV plants.

A Method for Controlling the Gray-Scale Equivalent of Colors Used in Live and Film TV Scenic and Graphic Art

WILLIAM J. WAGNER, *KRON-TV, San Francisco*

This paper describes a solution for some of the major problems encountered by artists working in color television. A color palette, known as the ChromaCHron, has been developed at KRON-TV. The palette reduces the number of paints needed to produce color artwork and catalogues the basic colors, intermixtures of these colors, and desaturation of all these colors. Ninety-one color mixtures are produced from five chromatic and two achromatic paints. Each of these colors is given a number which corresponds to a gray scale of twenty values. It guides the artist as to how his colors will reproduce in black-and-white. The most reflective color adjacent to the most light absorbing color in the ChromaCHron palette will not exceed the color system's 20 to 1 light ratio limitations. Color transparencies have been made of these pigments to obtain the TV gray-scale equivalents through a photographic process.

New Developmental Vidicons for Broadcast TV Use

L. D. MILLER, *Radio Corp. of America*

Anamorphic TV Circuit Requirements

MADISON CAWEIN, *Grimson Color, Inc., New York*

This paper discusses theoretical circuit requirements for anamorphic television, producing a wide-screen image (high aspect ratio) at the receiver. The relation of aspect ratio to pictorial information as regards frequency band, defined by the first elided frequency, is discussed. Pictorial information is defined in terms of contrast and resolution. The anamorphic squeeze and unsqueeze are described. Low-noise video and novel RETMA timing circuits are shown.

WEDNESDAY AFTERNOON

2:00 INSTRUMENTATION AND HIGH-SPEED PHOTOGRAPHY SESSION II

BTL Optical Tracking System for Nike Radar
K. L. WARTHMAN, *Bell Telephone Laboratories, Whippany, N.J.*

This presentation describes the lens design and camera modification to add instrumentation to the Nike radar for missile and target tracking. The tracking lens consists of a 30-in. telescope objective with neutral density filters and a reticle projection system. An optical flat with first surface coating is used for auto-collimation. The

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A High-Resolution Exposure Control
GEORGE ECONOMOU, VLADIMIR W. LUBAN and MORTON H. MEHR, *The Perkin-Elmer Corp., E & O Division, Norwalk, Conn.*

Photography of distant objects requires accurate exposure to achieve maximum contrast with high-contrast emulsions. The auto-exposure unit has been designed for the ROTI Mark II tracking instrument to provide the control required to achieve these factors. A pair of graduated neutral density disks is used in the auto-exposure unit to vary the light level at the film plane. By maintaining full aperture, maximum resolution is achieved for all light conditions.

Feasibility and Preliminary Design Studies for Self-Contained Airborne Camera Pod
EVERETT L. MERRITT, *Photogrammetry, Inc., Silver Spring, Md.*

A requirement exists for a stereo camera system for determining earth-fixed position and orientation coordinates of a bomb during the first 300 ft of fall with special emphasis on the part from 200 ft to 300 ft. This system should be completely contained in a package which can be readily attached to the bomb rack of an aircraft. Specifications for the container and the stereo camera pair for the determination of the bomb coordinates relative to the camera pod are given. On the basis of simplicity of construction, a system is recommended which consists of a stereo camera pod and orientation of the pod relative to earth, and three accelerometers for change in the velocity components of the pod. The average velocity of the pod will be determined from the photo-

graphs of ground control points taken with stereo cameras or from theodolite data. Orientation data will be used to resolve the measured acceleration along the earth's fixed coordinates.

Photographic Instrumentation as Systems Concept

JOHN H. WADDELL, *Fairchild Camera & Instrument Corp., Jamaica, N.Y.*

35mm Framing Camera

FREDERICK P. WARRICK, *Frederick P. Warrick Co., Bloomfield Hills, Mich.*

Some Aspects of Time-Lapse (Stop-Motion) Cinematography in the Research Laboratory and Industry

HENRY ROGER, *Rolab Photo-Science Labs., Sandy Hook, Conn.*

Time-lapse photography is discussed and demonstrated. Applications in medical research, law, industry and agriculture are described. The section on medical research shows studies on normal and malignant cells of tissue and blood; human capillaries and studies on human eyes with an automatic "eye movement camera." Discussion of legal applications shows application to a patent litigation. Microscopic studies at low and high temperatures (freezing of motor oil, baking of bread and cake) are discussed and a study of plant growth by the use of time-lapse photography is shown.

An Image-Converter Tube for High-Speed Photographic Shutter Service

R. G. SToudenheimer and J. C. MOOR, *Radio Corp. of America, Lancaster, Pa.*

A developmental image-converter tube having electrostatic focus, a gating grid, and electrostatic deflection is described. This tube is intended for multiple-frame photography of high-speed events with exposures as short as ten millimicroseconds. The various factors controlling screen brightness are presented so that they relate screen brightness to scene brightness. Actinic brightness of the screen can be greater than that of the scene under proper operating conditions.

High-Speed Films — Some Applications of High-Speed Photography

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SMPTE Test Films

Test films planned by the Society's technical committees and produced under the Society's exact supervision are available from the headquarters office at 55 West 42 St., New York 36. Catalogs containing brief descriptions of each film are obtainable on request.

These films are used by manufacturers for testing the performance of new equipment, by television station technicians for lining up and adjusting film pickup systems, by maintenance men for "in service" maintenance of projectors and sound equipment, and by dealers for testing and demonstrating equipment.

Films are available in the following categories:

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