Advance Program

This Program is as complete and accurate as possible at press time but it may contain errors and some changes may be made before the Final Program is printed for the Convention. If very brief Convention attendance has to be planned to hear only one session or a specific paper, or papers, members are advised to inquire during the week before the Convention by telephoning the Society Headquarters in New York (LOngacre 5-0172) or to the Program Chairman, *Dr. Henry N. Kozanowski* at Radio Corp. of America, Bldg. 10-3, Camden, N.J., WOodlawn 3-8000, Ext. PC 6193.

Outline of Program

Sunday
10:00-4:00 Registration

Monday
9:00 Registration
10:00 Laboratory Practice
12:15 Get-Together Luncheon—Guest Speaker
2:30 8mm & 16mm Film
8:00 Fundamental Concepts Are Still With Us

Tuesday
9:00 Motion Pictures and Television in Outer Space
2:00 Instrumentation and High-Speed Photography
8:00 Instrumentation and High-Speed Photography

Wednesday
9:00 Equipment Papers and Demonstrations
12:45 Optional Tour
2:00 Television Circuit Development

Thursday
9:00 Color TV, Monochrome TV and Automation
2:00 Motion Pictures for Television and Video Tape
8:00 Motion Pictures and Television in Education I

Friday
9:00 Motion Pictures and Television in Education II
2:00 Motion Pictures and Television in Education III

SUNDAY—APRIL 21

10:00–4:00 Registration

MONDAY—APRIL 22

8:30 Registration

9:00 LABORATORY PRACTICE

Conversion of Black-and-White Motion-Picture Processing Machines to Viscous-Layer Development

LESLIE I. EDGCOMB, Color Technology Div.; and GERALD M. SEELEY, Film Testing Div., Eastman Kodak Co., Rochester, N.Y.

A system has been devised to demonstrate the principle of adapting conventional processing machines for viscous-layer development. Equipment modifications were confined to the developer system and to controlling the temperature of the developer chamber. The viscous developer was supplied by an accurate metering pump through a specially designed heat exchanger to an extrusion-type applicator which coated a uniform layer on the emulsion. A temperature-controlled, water-saturated atmosphere was maintained in the developer chamber by recirculating water sprays to prevent heat loss from the viscous developer by evaporation. The developer was removed by a water spray between the developer chamber and the fixer section. Demonstration films will show the comparison with a normal immersion process.

Association of Cinema Laboratories

Spring Meeting, April 21, 1963

The Traymore, Atlantic City, N. J.

Held in Conjunction With the 93rd SMPTE Convention and Equipment Exhibit

Sunday, April 21

8:00 Breakfast Meeting—ACL Board of Directors, Pine Room
10:00 Meeting of ACL Members, Skyline Terrace
12:15 Luncheon, Belvedere Room
1:30 Equipment and Techniques Forum, Skyline Terrace
Presentations on new and modified equipment and techniques of interest to film laboratory personnel. (This Forum is open to SMPTE members.)
4:30 Adjournment
6:30 SMPTE Reception-Buffet

Monday, April 22

10:00 Preview Opening of SMPTE Equipment Exhibit

Controlled Modification of Color Rendering

L. B. K. HAPPE, Technicolor Ltd., London, England

In printing feature films modification of the normal color reproduction is sometimes called for to enhance the dramatic value of special sequences. In the case of *Moby Dick* a special "style" of color rendering was used throughout the film. Previously, such modifications of reproduction have involved the expense of duplicate negatives and once a particular characteristic has been selected it has not been easy to alter it during grading. Technicolor has developed a printing technique which can provide wide variations in color saturation and character without the use of color duplicate negatives. Examples are shown.

Time-Delay System for Sound-Picture Syncing

HENRY DUSSAULT, St. Zotique, Que., Canada

A device called Disc-O-Sound Delay System, for which a patent is pending, has been developed as a solution to the problem of developing sound and picture together in single-system production. The purpose of the new time-delay system is to eliminate the gap between the motion-picture frame and its corresponding sound. By means of this system, picture and sound are recorded adjacently directly into a conventional single-system camera (or even a silent camera). The sound film may then be completely edited immediately after filming and normal processing. This system is also used for projection.

Rejuvenation of Motion-Picture Film

STANLEY GITNER and JULES LENI, Comprehensive Filmtreat, Inc., New York

In the course of normal usage and handling, film encounters various hazards which inevitably result in the accumulation of scratches and abrasions. This paper analyzes and illustrates the effect of these physical blemishes on the photographic image. Four possible methods to neutralize or eliminate these undesirable effects are described in terms of long-range as well as immediate results.

Operating Experience With The Pilot-Tone Synchronization System

R. R. EPSTEIN and L. O'DONNELL, National Film Board of Canada, Montreal, Que.

The application of ¼-in. magnetic tape with low-frequency control-track signal for synchronous motion-picture recording is described. An outline of the Pilot-Tone location and studio equipment used at the National Film Board of Canada is given, with performance data based on two years field experience. Cost comparisons are made between Pilot-Tone operations and conventional perforated magnetic film.

A System for the Recovery of Film Cleaning Solvent Vapors

E. H. REICHARD, Consolidated Film Industries, Hollywood

A system has been designed to recover exhausted film cleaning solvent vapors, and to treat the reclaimed solvents in such a way as to render them completely reusable in the film cleaning machines from which they were generated. Installation and operation of the system is described.

Improved Printing Density Filters for Densitometry of Eastman Color Negative, Intermediate, and Internegative Films

ORAN E. MILLER and STANLEY A. POWERS, Color Technology Div., Eastman Kodak Co., Rochester, N.Y.

A new set of filters designated "Status M" for use in electronic color densitometers permits readings that give a better approximation of true printing densities when printing onto Eastman Color Print Film or on print materials used with Kodacolor and Ektacolor Films. The design of the new filters is described and some of its advantages are illustrated by comparison of Status M readings with true printing densities. The meaning and the use of printing density are reviewed. The importance of printing density standardization both within and among laboratories is emphasized.

An Electronic Previewer and Exposure Analyzer for Black-and-White Motion-Picture Printing

GUSTAVO ANDERSON, Hazeltine Corp., Plainview, L.I., N.Y., T. J. GASKI and JOHN J. KOWALAK, Movielab Inc., New York

Electronic equipment has been developed with a capability of scanning individual frames of motion-picture negatives and presenting positive pictures on a television display. The operator is given control over five distinct gammas of the print film and fine control of exposure (increments of 0.050 log E) for producing the observed positive pictures.

12:15 Get-Together Luncheon

Guest Speaker — "Horizons in Electronics"

Dr. Elmer W. Engstrom
President
Radio Corporation of America

MONDAY AFTERNOON

2:30 8MM & 16MM FILM

Simplicity in 8mm Sound Projection Equipment

LEE H. SCHANK, Fairchild Camera & Instrument Corp., Yonkers, N.Y.

During the past five years the need for a simple cartridge-loading sound projector for educational and industrial applications has been the subject of considerable discussion. A new 8mm sound projector, the Fairchild Mark IV, has been designed to answer this need by removing the fear factor in equipment operation. The technical approach and design parameters are discussed; equipment operation is demonstrated.

Features of TOEI 8mm Optical-Sound System

KAZUYUKI OKADA, TOEI Co., Ltd., Tokyo, Japan

An 8mm optical sound projector, called the TOEI Talkie 8, has been developed. The Toei Standards are: frame size — printer frame, 4.16 mm by 3.10 mm; projector frame, 3.80 mm by 2.86 mm; sound — 52 frames ahead of picture (same as ASA Standard). The projector can be put to practical use, both in picture projection and for added sound effect. In 1962 an optical/magnetic combined sound system was adopted. Principal reasons for addition of an optical system include consistent quality, ability to produce prints in quantity; stability of soundtrack, durability, and less defacement of optical sound pickup.

A New Battery-Powered, 8mm Camera with Cassette Loading

MORRIS E. BROWN, WILLIAM A. MARTIN O. SCHMITT, Camera Works, Eastman Kodak Co., Rochester, N.Y.

Historically many solutions to the problem of how to simplify the loading and operation of 8mm motion-picture cameras have been proposed, and a variety of cassettes or camera compartments as well as several preloaded magazines have been marketed. The Kodak Electric 8 Automatic Camera, a battery-powered camera employing a spool-loaded cassette, is described and the engineering decisions involved in the design are reviewed.

Development of a Simplified Automatic Projection System for 8mm Motion Picture

JOHN D. MITCHELL, Camera Works, Eastman Kodak Co., Rochester, N.Y.

8mm projection equipment for amateur use is described in terms of simplification and automation. Development of an automatic system for rapid rewinding of films immediately after projection is discussed. This automatic rewind has been used in the design of the Kodak Automatic 8 Projector.

A Portable Self-Blimped Professional 16mm Camera

A. COMA, Eclair International Diffusion, Paris, France

A portable self-blimped professional 16mm camera has been designed with complete new features to meet actual picture shooting conceptions. General features such as mechanism, magazines, viewfinder system, the motor and its regulation, and the synchronizing system are described. Requirements considered in the design of the camera are set forth.

A Technical Program for 8mm Educational Sound Films

JOHN A. MAURER, JM Developments, Inc., New York

The writer's developments of 8mm photographic soundtracks, printers for producing 8mm sound films in quantity, and projectors for reproducing them are the first steps in a comprehensive program directed specifically toward meeting the needs of educational and industrial users of sound films. Since this project as a whole calls for much more than can be accomplished by any one organization it is presented at this time in its broader aspects in the hope that there will result either general agreement and cooperative action within the industry and/or the presentation of better concepts by others. Part of the presentation is on 8mm color film to demonstrate results already obtained.

MONDAY EVENING

8:00 FUNDAMENTAL CONCEPTS ARE STILL WITH US

Optical Measurements on Telstar

J. S. COURTNEY-PRATT (who will make the presentation), Bell Telephone Laboratories, Inc., Murray Hill, N.J.; J. H. HETT, Hett Associates, Inc., Cresskill, N.J.; and J. W. McLAUGHLIN, Bell Telephone Laboratories, Inc., Murray Hill, N.J.

Basically the means for determining the orientation of the spin axis of Telstar and examining how this is moving in time consists of a special arrangement of mirrors attached to Telstar and, on the ground, a photoelectric telescope mounted on a radar antenna. The telescope, a 12-in. aperture Cassegrain photoelectric telescope, was pointed at the satellite directly from prediction tapes. With the equipment and techniques described in this paper it has been possible to detect flashes of sunlight reflected from the mirrors on Telstar at slant ranges up to 3,700 miles. Photographs of the glints have been made, and a study is now being made of the feasibility of combining precise photoelectric observation of the time of the flashes with high-precision photographic observation of the instantaneous position of the satellite relative to the fixed star background.

Quantum Yield, Noise Equivalents, and Resolving Power of the Photographic Process

OTTO H. SCHADE, SR., Electron Tube Div., Radio Corp. of America, Harrison, N.J.

The quantum yield of the photographic process is determined from measured signal-to-noise ratios and the overall transfer-function $D = f(\log E)$. Results are presented in the form of characteristic curves showing the noise-equivalent grain number as a function of the number of incident photons and the optical density of the developed film. Number and size of the grains are shown to be functions of exposure and/or amplification (development), which explain the nonlinear relation between optical density and total noise power obtained with emulsions containing a wide range of grain sizes. It is shown finally that the resolving power can be calculated for any lens-film combination and test-object contrast from the three basic characteristics of the system and a threshold signal-to-noise ratio expressing the probability of detection.

The Search for Steadiness of Speed

W. R. ISOM, Radio Corp. of America, Camden, N.J.

A comprehensive review is given of the progress that has been made in the art of reproducing recorded signals without distortion, due to irregularities of motion of the medium. Solutions for the particular problems of sound, video, and pulse recording are examined. Generally, this paper may be regarded as updating "The Quest for Constant Speed" by E. W. Kellogg, published in the *Journal* in April, 1937.

TUESDAY MORNING—APRIL 23

9:00 MOTION PICTURES AND TELEVISION IN OUTER SPACE

Infrared Tracking Mounts for Missile Ranges

BERNARD D. PLAKUN, Barnes Engineering Co., Stamford, Conn.

The job of an infrared tracking mount is to keep an array of optical instruments pointed accurately at a missile as it streaks across the sky. This job can be performed during day or night, for either launch or re-entry operation, when the control system has been planned accordingly. A system which utilizes the combined capabilities of a human operator and an infrared tracking sensor is described. Television viewing of the target area is shown to be of assistance to the operator.

Cameras and Techniques Used in Photographing Atlas Booster Separation

CHARLES N. DE MUND, General Dynamics/Astronautics, San Diego, Calif.

The limitations of present-day tracking cameras and the difficulties involved in telemetering certain kinds of data created the need for missile-borne motion-picture cameras. One such application and its associated problems are explained in detail. Although this paper explains only one application, much of the information can be applied to any similar problem. Accompanying illustrations show the equipment used and the results obtained.

New Missile Borne 16mm Intermittent Camera for High "G" Environment

T. H. TRUESDELL, D. B. Milliken Co., Arcadia, Calif.

Acceleration loads up to 180 G's are experienced during the flight of some small, rough-burning solid fuel research rockets. This has posed new problems for present on-board photographic equipment. A new 16mm motion-picture camera has been developed with a design operating capability of 220 G's. Other general specifications are: 50-ft film capacity; speed range, 16 to 64 frames/sec; 12-v operating current, 3 amp; size $5\frac{5}{8}$ in. long by $2\frac{15}{16}$ in. wide by $2\frac{15}{16}$ in. high; weight, 3 lb less lens and film. Presentation includes slides and films of previous on-board photoinstrumentation as well as slides and model of the new camera.

Automatic Picture Transmission From Nimbus

R. A. STAMPFL and W. G. STROUD, Instrumentation Branch, NASA/GODDARD Space Flight Center, Greenbelt, Md.

Nimbus, successor to Tiros, is a stabilized platform designed to provide global coverage of Earth's cloud cover. A three-camera TV system stores pictorial data on magnetic tape (for later command readout) during daylight, and at night an infrared scanner is used. An additional camera system has been designed for automatic continuous real time picture transmission during daylight.

The camera makes use of an electrostatic storage vidicon which is exposed for 40 msec, and read out during the succeeding 200 sec. The 800-line resolution and the 0.25-sec scanning time per line are compatible with standard 240-rpm facsimile equipment which can be used for ground display. Full compatibility is achieved by 2,400-cps subcarrier amplitude modulation and by transmitting a phasing and turn on signal during 8 sec preceding the actual picture transmission. The subsystem is independent of the spacecraft except for power and a frequency reference. A 5-w transmitter broadcasts the signal in the 136-mc space telemetry band. FM is used, making a large variety of mobile communication equipment readily adaptable.

The value of the system lies in its simplicity both in the spacecraft and on the ground. No command links are required, nor is storage necessary. On the ground, a manually tracked or even fixed 12-db helix, with commercially available receiver and facsimile, is all the equipment that is required.

Improved High-Resolution Electron Gun For Television Cameras

S. GRAY, P. C. MURRAY, O. J. ZIEMELIS, Radio Corp. of America, RCA Laboratories, Princeton, N.J.

As in other imaging systems, the resolution performance of a television camera is determined by the cascaded response of a number of stages, each one of which is optically equivalent to a low-pass filter. One component which is common and important to all cameras is the aperture presented by the scanning electron beam. The image-orthicon electron gun design has been modified so as nearly to double the intrinsic resolution capability of the beam. Descriptions of processing and experimental results are included.

Design of Satellite Tape Recorders — After Tiros I

A. D. BURT, S. P. CLURMAN and T. WU, Astro-Electronics Div., Radio Corp. of America, Princeton, N.J.

The video-tape recorder developed for the Tiros satellite (described by Zenel in the Society's *Journal* in November, 1960) fulfilled its system requirements completely, and acquired an impressive record of performance. Since then, however, more advanced satellite programs have imposed demands for increased information storage, improved quality of reproduction, lower power drain, less weight for a given storage capacity, and increased reliability under the rigorous conditions of rocket launching and space environment. Specific programs have required additional, special characteristics, such as angular momentum compensation and dual-speed operation. A series of different recorder designs has been developed for Nimbus and OGO satellite programs, as well as a number of classified programs. The space-saving features of the Tiros recorder have been retained and new developments incorporated in the new recorder designs to meet more stringent requirements.

TUESDAY AFTERNOON

2:00 INSTRUMENTATION AND HIGH-SPEED PHOTOGRAPHY

Simulating the Moving Perspective View From an Aircraft

P. M. CAREY, Central Dynamics, Ltd., Pointe Claire, Montreal, P.Q., Canada.

A system has been developed to provide the same visual cues to a pilot in a flight trainer as he would receive when flying an actual aircraft. The system continuously computes a perspective view of simulated terrain. An optical model of the terrain is created by projecting an image of a photographic slide onto a screen. This image is converted, optically, to a perspective image which is formed on a TV camera tube such that the computed view is analoged correctly. The system is servo controlled in two 3-dimensional axis systems.

Masks to Pack Circles Densely

E. N. GILBERT, Bell Telephone Laboratories, Murray Hill, N.J.

Some schemes for taking fast motion pictures photograph each frame as a pattern of circular dots. The dots are several diameters apart so that similar patterns from many frames fit together without overlapping. To crowd as many frames as possible onto the film each dot must touch six dots from other frames. This puts certain geometrical restrictions on the dot pattern for a single frame.

A New Fast-Opening, Large-Aperture Shutter for High-Speed Photography

ESTHER C. CASSIDY and DONALD H. TSAI, National Bureau of Standards, Washington, D.C.

This shutter consists essentially of a metallic foil in a capacitor discharge circuit. Opening action is obtained when the foil is buckled by electromagnetic forces created when a heavy surge current is passed through the foil. A shutter with two foils in a loop arrangement may be opened to a 1 by 3 in. area in 45 μsec. Design and operating conditions are discussed, and some experimental results are given. (This work was sponsored by the Advanced Research Projects Agency under Order No. 20–61.)

A Programed Kerr-Cell Framing Camera

SUMNER ACKERMAN, Edgerton, Germeshausen and Grier, Inc., Boston, Mass.

A new high-speed framing camera has been developed, based on a single programed Kerr-cell shutter coupled to a wide-field, rotating-drum streak camera having a maximum writing speed of 12,000 in./sec and a relative aperture of $f/5$. The programed Kerr-cell camera (PKCC) can take more than 100 discrete exposures of 10^{-7} to 5×10^{-7} sec duration at frame rates greater than 5,000,000/sec. A number of subjects have been photographed with the developmental PKCC to determine and demonstrate its capabilities. An overall resolving power of better than 35 lines/mm has been measured at writing speeds up to 6,000 in./sec and it is expected that a resolution of at least 30 lines/mm will be realized at the maximum writing speed.

Shadowgraph of Bright Objects

M. A. LEVINE, W. G. CHACE, C. V. FISH and J. C. HEGARTY, Air Force Cambridge Research Laboratories, Bedford, Mass.

Shadowgraphs of exploding wires reveal detail of size and motion that cannot be gleaned from self-emission photographs. In order to obtain these shadowgraphs it is necessary to override an already bright light. To accomplish this an optical system which optimizes the backlighting has been combined with an exploding wire blast shutter. Smear pictures with 0.1 μsec resolution can be obtained using this system.

TUESDAY EVENING

8:00 INSTRUMENTATION AND HIGH-SPEED PHOTOGRAPHY

Engineering Through Motion Pictures

ROBERT L. BEARD, Scientific Laboratory, Ford Motor Co., Dearborn, Mich.

In carrying out numerous sensitive and involved projects and studies, the motion picture is an invaluable tool of the Engineering and Research Staff of Ford Motor Co. Recent studies requiring the use of this technical photography are discussed in detail: *Vehicle crashes* – data obtained by motion pictures and electronics are compared and advantages and disadvantages of each method are discussed. *Copper rubbing surfaces* – this particular film was used to illustrate a technical talk given by Ford scientists. *Flame propagation* – data obtained are shown and exposure considerations discussed. *Levitation melting* – illustration of new metallurgical melting technique. *Microscope studies* – optics, lighting and camera speeds required for various types of research are discussed. *Glass research* – photographic media are used to obtain data for both medical and automotive studies. *Carburetor studies* – motion pictures tell inside story of a carburetor operating under normal road conditions in a vehicle. *Electrostatic effect* – set-up problems, lighting and optics are discussed. *Match head igniting* – this study was conducted with available light photography, and illustrates the importance of color balance in terms of information obtained.

Also discussed are film stocks, equipment and filing system.

The Use of Photographic Triangulation in Determining the Positions of Objects in Large-Scale Experiments

DONALD E. PHILLIPS, U.S. Naval Ordnance Laboratory, Silver Spring, Md.

The positions of objects relative to the point of an explosion are often determined by means of photographic triangulation. A computer program has been developed to locate the positions of these objects in terms of their coordinates in a rectangular grid system. The experimental program for which the computer program was developed is discussed, and a discussion of the principles of phototriangulation, the computer program, and the results obtained are also presented.

Photographic Studies of Mode and Polarization Phenomena in Ruby Lasers

C. M. STICKLEY, Air Force Cambridge Research Laboratories, Bedford, Mass.; D. W. LIPKE, NASA Goddard Space Flight Center, Greenbelt, Md.; and T. J. HEALEY, STL Products, New Hyde Park, N.Y.

Results of high-speed photographic studies of mode patterns and output polarization of ruby lasers using the STL image-converter camera are discussed. High optical quality ruby rods produce complex mode patterns in every spike and they may change within a spike. These patterns are always located in the center of the rod. A similar study using the STL camera of a ruby rod with the c axis at $1\frac{1}{2}°$ to the rod axis shows that it does emit with a preferential polarization.

WEDNESDAY MORNING—APRIL 24

9:00 EQUIPMENT PAPERS AND DEMONSTRATIONS

Camart Pressure Roller Adapter Plate for Moviscope Viewer; Camart Add-A-Unit Extension Plates for Moviolas *(Demonstration)*

CHARLES LIPOW, The Camera Mart, Inc., New York

16-35, 35-32, 70mm Repair and Splicing Machine *(Demonstration)*

SHELDON KAPLAN, Hollywood Film Co., Hollywood

Oxberry 16mm Inspection Projector *(Demonstration)*

EDWARD WILLETTE, Animation Equipment Corp., New Rochelle, N. Y.

F&B Mini-Monitor; F&B Cine-Voice Conversion *(Demonstration)*

ARTHUR FLORMAN, Florman & Babb, Inc., New York

New Transistorized Video Distribution Amplifier *(Demonstration)*

ELLIOTT R. KURTZ, CBS Laboratories, Stamford, Conn.

New Angenieux 10:1 Zoom Lens, Remote-Controlled for Image-Orthicon and Vidicon Cameras *(Demonstration)*

WALTER STEUER, Zoomar, Inc., Glen Cove, N. Y.

New Levitron and Super Levitron Film Processing Systems

GUNTER SCHMIDT, Houston Schmidt Ltd., Toronto, Canada

CF-2 Solvent Vapor Recovery System

EPHRAIM WERNER, Lipsner-Smith Corp., Chicago

Bolex 8/16 Reflex Cameras With Matte Box; 18-5 Slow-Motion Projector; S-221 16mm Magnetic Sound Projector *(Demonstration)*

ERNEST WILDI, Paillard, Inc., New York

Arriflex 35 With New Factory-Installed Signal Generator and Automatic Electric Startbox System (*Demonstration*)

VICTOR JAMES, Arriflex Corp. of America, New York

New ColorTran Quartz-King Dual Lights and Electronic Dimmers (*Demonstration*)

HERBERT A. HOLLANDER, ColorTran Industries, Inc., Burbank, Calif.

Introduction of SG-63 and Related New Items

EDWARD A. GILCHRIST, Photolamp Div., Sylvania Electric Products, Inc., New York

WEDNESDAY AFTERNOON

12:45 OPTIONAL: TOUR, National Aviation Facilities Experimental Center, Federal Aviation Agency

2:00 TELEVISION CIRCUIT DEVELOPMENT

Video Circuits for Transistor Television Cameras

D. BRAY and G. E. HAYDEN-PIGG, EMI Electronics Ltd., Hayes, Middlesex, England

It is desirable that the next generation of broadcast-quality television cameras should use semiconductors exclusively. The latest user specifications for television cameras demand a high standard of performance and facilities which presents a particularly difficult problem with regard to the video processing chain. A general design approach is outlined and particular design solutions are given.

Power Supplies for Image-Orthicon Transistor Television Cameras

R. MATCHELL, R. B. HALE, and G. E. HAYDEN-PIGG, EMI Electronics, Ltd., Hayes, Middlesex, England

The exclusive use of transistors considerably reduces the total power required by a broadcast quality image-orthicon TV camera. However, the high electrode potentials and considerable scanning and focusing powers required by a 4½-in. image-orthicon tube present difficult problems in efficiently supplying power to the camera when used at some distance from its control unit. The nature of the problems is described and some solutions given.

A Crispener for Television Images

E. F. BROWN, Bell Telephone Laboratories, Murray Hill, N.J.

When the resolving power of the eye is not limiting, and the resolution of an image is fixed, the steepness of the brightness transitions determines to a great extent the subjective quality of the image. The sharpness of an image may be improved by increasing the contrast, i.e. the magnitude, of the brightness transitions and/or increasing the steepness of the transitions. In television images, crispening of the video signal performs both of these operations simultaneously. To meet the increasing needs for crispening in low resolution television systems, a simple and easily adjusted circuit has been devised which generates a crispening signal in linear circuits. In addition to the crispening of video signals, the application of this circuit for the contour outlining of television images and for the reduction of filter overshoot and ring in television images is illustrated.

A New Method of Marking the Safe-Title Area on Television Preview Monitor Screens

JOHN L. BOOR, EON, Seattle, Wash.

Problems relating to cropping losses are briefly discussed and a description given of a unique method of simultaneously marking an identical safe-title area on all preview monitors in a television system. Using an electronic generator, marking signals are fed to preview monitors along with video. Advantages of this system are outlined.

Pulse Distribution Amplifier With New Pulse Re-Forming Technique

A. J. BANKS, Radio Corp. of America, Camden, N.J.

A new method for re-forming pulses to steepen their leading and trailing edges is described. This method preserves the timing between the leading corners of the two edges of a pulse. It also makes the input-to-output delay — measured between leading corners of the leading edges — independent of input pulse rise time. A two-output pulse distribution amplifier, using solid state components exclusively and incorporating the new pulse re-forming technique, is described.

An Overview of Video Amplifiers for Television Camera Tubes

K. SADASHIGE, Radio Corp. of America, Camden, N.J.

Performance criteria on video preamplifiers for use with image-orthicon and vidicon camera tubes are formulated. Recent developments in transistors have produced units having a noise figure sufficiently good and a gain/bandwidth product sufficiently high to be useful in the design of all-solid-state TV cameras. Where the best possible signal-to-noise performance is essential, vacuum tube input circuits are still superior to transistors. A hybrid tube-transistor cascode circuit offers advantages. Recent advancements in high-transconductance tubes are discussed. Applications of such tubes in high-performance amplifier designs are reviewed.

WEDNESDAY EVENING

6:45 COCKTAIL PARTY, BANQUET, DANCE

THURSDAY MORNING—APRIL 25

9:00 COLOR TV, MONOCHROME TV AND AUTOMATION

Operational Stability and Color Fidelity of Broadcast Color Television Monitors

K. SADASHIGE and WALLACE J. AUSTIN, Radio Corp. of America, Camden, N.J.

Theoretical and experimental work has been carried out to formulate the stability and color-fidelity criteria for long-term continuous operation and short-term "on-and-off" operation of color TV monitor circuits. Such monitors are used as primary standards for high-quality color broadcasting control. Solutions developed to meet the requirements of high-quality color operation are discussed, both from the standpoint of practical engineering approaches and more sophisticated possibilities.

Analysis of Color Errors in Color Television Cameras

I. C. ABRAHAMS, General Electric Co., Syracuse, N.Y.

Color television camera configurations have been proposed which make use of a color filter having a response equivalent to luminance, in place of, or in addition to, one of the primary colors. An analysis is made of the color errors which result from this type of design. An analysis is also made of the color errors due to improper balance or shading errors, for color in the vicinity of white.

Color Television Matching Techniques

E. P. BERTERO, National Broadcasting Co., New York

In the matching of color television cameras, the intent is to realize equal colorimetric performance between cameras as well as to achieve a pleasing reproduction of the scene to be televised. During a television production, however, a difference in spectral transmission between lenses used on a camera, or a change in spectral distribution of illumination on the subject causes a change in color balance which requires a change in balance to maintain matched cameras. In "Stop and Go" color video-tape recording where segments are recorded at different times and edited at a later date in a sequence other than the order recorded, it is imperative that a camera match be maintained during each recording and the same camera match be realized at each recording date.

Considerations in the Design of a Transistorized Processing Amplifier

A. J. TROST, Ampex Corp., Redwood City, Calif.

Semiconductors have great potential advantages when used in the design of a piece of modern video equipment. Their use is included in a description of a final product, a transistorized processing amplifier, for use in the Videotape Recorder and also to replace the stabilizing amplifier in terminal equipment.

A Vidicon Camera for Studio Application,

F. A. SACHS, General Electric Co., Syracuse, N.Y.

With the extensive use of tape and film material, the type of studio television camera programing is such that many of the requirements can be met by vidicon cameras. The approach taken in the design of a vidicon camera channel to meet the needs of broadcast and educational TV studios is discussed.

An Approach to the Automation of Television Studio Program Production

MINORU HAYASHI, SAKAE HOSOI, TAKAO UMIUCHI, and KENICHI HARA, NHK, Tokyo, Japan

The automation of the television studio equipments which should meet the severe requirements of various kind of programs requires overcoming numerous difficulties. An automatic equipment controlled by punched-cards permits, during the studio program presentation, alteration of picture angle and framing, and switching of picture and sound signals by a single pushbotton operation. The equipment employs the newly developed automatic remotely controlled image-orthicon studio cameras.

THURSDAY AFTERNOON

2:00 MOTION PICTURES FOR TELEVISION AND VIDEO TAPE

Factors Affecting the Determination of Monochrome Television Film Exposure

HAROLD WRIGHT, Canadian Broadcasting Corp., Ottawa, Canada

Significant monochrome telefilm exposure-determining factors are examined relative to exposure research literature, the basis for U. S. and German still photography film speed standards, and typical multiplexed telecine systems. Theoretical, graphical and pictorial evidence is offered to indicate that neither the "fractional gradient criterion" nor the "fixed density above fog" concept fits the telefilm situation, due to the interjection of the telecine transfer characteristic into the chain of processes between the scene and its TV reproduction. A systems analysis method for determining telefilm exposure requirements is described and the effects of flare light are considered.

Drawbacks of the Traditional Exposure Meter and Techniques for Using Spot Photometers

HAROLD WRIGHT, Canadian Broadcasting Corp., Ottawa, Canada

Some of the drawbacks of the traditional exposure meter are examined and weaknesses in the design of some currently manufactured spot photometers are considered. Simple, tested techniques for calibrating and using some of the better spot photometer types of exposure meters are described. Methods for relating this experience to film speed are given and some recommendations are offered.

Effective Film Production With Electronic-Cam

FRITZ LEHR, Arnold & Richter K.G., Munich, Germany

The Electronic-Cam system, now basically eight years old, has become a revolutionary and effective method of producing motion pictures especially for television. This has come about by careful development of operating techniques and of the equipment itself. The input of three motion-picture cameras is under central supervision and control. The three pictures are transmitted from associated TV cameras to the control-room monitors, giving the director views identical with live TV practice. Precise control, mixing, and communication facilities make possible the recording of scenes up to 1½ hr long, with a great reduction in film stock required and in production time. Cues recorded on film and soundtrack simplify later editing.

Electrical Installation Techniques for a Large Film Production Center

J. ROBERT MANN, JR., E. J. Electrical Installation Co., New York and A. NORMAN LEIGH, MPO Grand Central Studios, New York

The Film Center for MPO Videotronics, designed for economical, flexible production of TV commercials, and films for industry, is the largest of its kind in the world. The electrical system installed for the Film Center uses the most up-to-date techniques to provide either a-c or d-c power through remotely controlled contactors for multistage operation. The use of bus duct, circuit breakers, voltage regulators, remote indicating panels, plug-in boxes, silence system, public address system, supervisory control, fire alarm system and other modern electrical equipment and methods of installation form the nerve center of this project.

Progress In Video Tape Standards, A Committee Report

ROBERT M. MORRIS, American Broadcasting Co., New York, member of SMPTE Video-Tape Recording Committee

A Recently Developed Magnetic Film With Wide Dynamic Range

ALFRED H. MORIS, Minnesota Mining and Mfg. Co., St. Paul, Minn.

One of the inherent limitations in magnetic film recording is the dynamic range obtainable. A newly developed low-noise magnetic film has increased the signal-to-noise ratio at least 6 db over conventional magnetic films. The magnetic properties of this magnetic film as well as their measurement are discussed.

THURSDAY EVENING

8:00 MOTION PICTURES AND TELEVISION IN EDUCATION I

Motion Pictures and The Defense Industry

L. A. SHAFFER and H. N. COLLINS, Motion Picture Products, Radio Corp. of America, Camden, N.J.

The evolution of military systems from the simplicity of a single weapon to the complexity of integrated electronic subsystems has created contractual requirements to produce motion-picture report films. Film reports have increasing value as systems become more complex. Motion-picture clips from various film reports are shown. The various methods that defense industries have chosen to meet these contractual film requirements are briefly outlined.

Design Factors of an Educational Television Program Production Center

SOL CORNBERG, Sol Cornberg Associates, Inc., New York

An Educational Television Program Production Center is now being constructed for the Board of Education of New York City. The planning of space relationships and the specifying of equipment to meet projected program requirements are discussed. One requirement of the integrated audo-video system is that of making stored information easily accessible to teachers, lecturers and students.

New Techniques in Closed-Circuit Television for Dental Teaching

S. A. DI SANTO, University of Pennsylvania, Philadelphia, Pa.

In many of the nation's dental schools, closed-circuit TV provides large groups of students with close-up views of the face and oral cavity undergoing professional treatment. The television medium is particularly useful for this purpose, since the camera reveals more than the view afforded the handful of students that can be grouped around a dental chair for the traditional "live" demonstration of technical procedures. The University of Pennsylvania has used television as a teaching adjunct for the past seven years and recently has upgraded its facilities by installing broadcast-quality equipment. This paper discusses the University's work with television in dental teaching, and the techniques developed to capitalize on TV's advantages to the student and to the teacher.

Proposal for a 16mm Nontheatrical Leader

CHARLES O. PROBST, Cinefonics, Cook Technological Center, Morton Grove, Ill.

A new type of leader is proposed for use in nontheatrical showings. It is compared to the Academy Leader and to the SMPTE Standard Leader, both of which are designed for use by professional projectionists. Demonstrations show the advantages of providing a suitable focus leader with sufficient black leader to permit shutdown after focus and then energizing the projector for the actual showing without encountering "wow" or "flutter" as the sound system stabilizes. Compatibility with standard SMPTE leaders is maintained.

FRIDAY MORNING—APRIL 26

9:00 MOTION PICTURES AND TELEVISION IN EDUCATION II

A Systems Engineering Approach to Educational Facilities

JOHN W. WENTWORTH, Broadcast and Communications Products Div., Radio Corp. of America, Camden, N.J.

The full benefits of modern technology can be realized more effectively in education if the skills of the systems engineer are permitted to guide the design of specific new devices. In this systems study, the basic communications problems in education are identified, guidelines for the development of improved technological aids are suggested, and the possible influence of technology on teaching and learning opportunities is examined from an engineering point of view.

Development of the Educational Single-Concept Film in Great Britain

L. B. K. HAPPE, Technicolor Ltd., London, England

With the introduction of a magazine-loaded projector using 8mm film in loop form the development of a self-contained daylight projection unit for use by teachers under classroom conditions to provide motion-picture illustrations in the course of their own lessons became a practical possibility. The development and demonstration of this idea in Great Britain and the production of the first films are described. This visual aid is now in production and more than two-hundred single-concept films are now available for teachers' use. The equipment and number of typical films are demonstrated.

Are Sound **Motion** Pictures Necessary!

MAXWELL A. KERR, General Electric Co., Syracuse, N.Y.

In teaching and training situations the use of audio-visual aids to show *motion* may not be necessary. The ability to halt the sound and discuss or examine any picture in detail may be more important to the learning process. Sound-slide and sound-filmstrip programs with automatic control of picture advance have particular advantages in such situations. Available systems are surveyed, and problems of program interchangeability between different equipments are examined. Some desired operating capabilities (from an educator's point of view) are also presented.

FRIDAY AFTERNOON

2:00 MOTION PICTURES AND TELEVISION IN EDUCATION III

Motion Pictures for Education — Should They Be Tied to Amateur Movies?

CLYDE R. KEITH, Board of National Missions, New York

Recent improvements in 8mm films and projectors have been hailed as opening the way for extensive use of this size of film for educational purposes. Many claims, such as economy and reduced size and weight, appear very attractive to school authorities. However, other important features such as adequate picture quality, convenience of operation, and suitability for classroom, as opposed to home or industrial use seem to have received too little attention. The author suggests that before adopting an entirely new line of equipment and films, more consideration should be given to the possibility of obtaining equipment in the not too distant future which more nearly meets educational needs.

Experimental Instructional Facilities and Systems for College Teaching and Academic Research

MORTON C. GASSMAN, ALAN C. GREEN and WILLIAM L. MILLARD, Rensselaer Polytechnic Institute, Troy, N.Y.

Studies and research projects designed to gather data on the design and operation of instructional facilities and systems appropriate for science and engineering education are being conducted. The design features, construction details, and technical systems now operational in special classrooms on the Rensselaer campus are described. Special attention is given to features of a new experimental classroom facility, including lighting, seating, space configuration, display surfaces, projection systems, controls, and television.

The Film Today: Renascence of a Medium

HAIG P. MANOOGIAN, Communications Art Group, New York University, New York

Through the growing fusion of the areas of film writing and film directing, significant gains in craft technique are evident. However, much of the practice in U.S.A. film-making is still along the lines of the routine and the pedestrian. Five instances of the differences in technique lie in the use of the master scene, matched shots, reverse angles, cutaways, and screen direction. The unimaginative or obligatory use of these techniques forces the film script into commonly accepted story patterns. Where used imaginatively, craft elements support and develop the basic artistic statement of the creator and do not force the "story" into a preconceived mold.

The newly developing writer-director, in contrast to the Hollywood multi-writer team which finally resulted in stereotyped films, is a modern counterpart of Edwin S. Porter and D. W. Griffith. Though famous as directors, they were essentially their own script writers and each stamped his work with his own mark. The writer-director today is beginning to translate his own personality and integrity into a total filmic concept.

A Film Program for College Chemistry: A New Approach

DAVID G. ANDERSON and ANDREW PATTERSON, JR., Yale University, New Haven, Conn.

A film program for college chemistry is being conducted at Yale University. The project directors (the authors of this paper), aided by a grant from the National Science Foundation, will produce about sixty films over a three-year period. Beyond this objective, the program is serving as a testing ground for a new approach to educational film, that of structuring film material to fit in with the traditional methods of classroom teaching. While several types of films are being produced, the mainstay of this approach is the short, silent "single concept" film. In addition to film production, experiments are being conducted on new ways of making use of the film medium.