

Advance Program

This Advance Program is a preliminary and tentative schedule of papers and sessions. It is as accurate and complete as possible. Before the Conference, however, papers may be added, removed, or rearranged into other sessions; entire sessions may be rescheduled. It is therefore recommended that persons who can attend only part of the Conference inquire a week before the Conference by telephoning Society Headquarters in New York (212 TN 7 5410) or Program Chairman LeRoy M. Dearing, L. M. Dearing Associates, Studio City, Calif. 91604 (213 769 2521). The Final Program booklet will be available ten days before the Conference from Society Headquarters, and during Conference week at the Ambassador Hotel.

Tentative Program Outline

Sunday

2:00-8:00 Registration

Monday

8:00 Registration
8:30 CONCURRENT SESSIONS
Photographic and Allied Sciences
Instrumentation and High-Speed Photography
I
12:15 Get-Together Luncheon
1:00 Awards Presentation
3:00 Laboratory Practice I
5:00 Exhibit Open House

Tuesday

8:30 CONCURRENT SESSIONS
Instrumentation and High-Speed Photography
II
Laboratory Practice II
12:15 President's Luncheon
1:45 CONCURRENT SESSIONS
Photo-Sensitive Materials for Motion Pictures
and Television
Instrumentation and High-Speed Photography
III
7:45 Aerospace Specials

Wednesday

9:00 Equipment Papers and Demonstrations
12:00 High-Speed Photography Luncheon
1:45 CONCURRENT SESSIONS
Instrumentation and High-Speed Photography
IV
Sound I
6:45 Cocktail Party, Banquet and Dance

Thursday

8:30 CONCURRENT SESSIONS
Education
Studio Practices
1:15 CONCURRENT SESSIONS
Television I
Projection
8:30 ASC Review of Motion-Picture History
Milestone Awards Presentation

Friday

9:30 Sound Special (II)
1:45 Television II: Studio Practices
8:30 Special #5 - Pre-Release Motion Picture

Tentative Schedule of Committee Meetings

Wednesday, October 5

8:00 (Breakfast) Publications Advisory
9:00 Board of Editors
10:30 Papers Committee
12:30 Editorial Luncheon

The following Engineering Committees will meet during this week:

Color
Film Dimensions
Film Projection Practice
Instrumentation and High-Speed Photography
Laboratory Practice
16 & 8mm Motion Pictures
Sound
Television

The schedule will be listed in the Conference Program; and meeting notices will be mailed to Committee members.

Ladies Program

Ladies Program Chairman Flora Hall has planned a stimulating week of activities for ladies attending the Conference, as follows.

Monday: SMPTE Get-Together Luncheon; Surprise Trip.

Tuesday: Tour of 20th Century Fox Studios; Luncheon at famous Hollywood restaurant; A visit to the Pacific Ocean and the Getty Museum.

Wednesday: Visit to Busch Gardens; Cocktail Party, Banquet and Dance.

Thursday: Day at Disneyland.

Friday: Trip to Los Angeles Music Center; Luncheon at Music Center. Return to hotel.

Association of Cinema Laboratories

Fall Meeting, September 30-October 1
Ambassador Hotel, Los Angeles

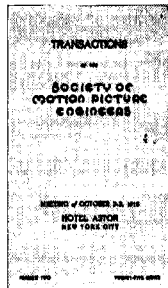
Friday evening

6:30 Board of Directors Reception and Dinner — Regency Room

Saturday

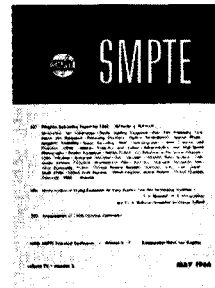
10:00 Meeting of ACL Members — Grove Lounge
12:30 Luncheon — Lautrec Room
2:00 Lab Equipment and Techniques Forum — Grove Lounge
6:30 Reception and Dinner — Venetian Ballroom

A SALUTE TO THE SMPTE



50
YEARS

1916 — 1966



Today, in the 50th anniversary year of the Society of Motion Picture and Television Engineers, the purposes and objectives of the Society remain the same as originally set forth in 1916: "The advancement in the theory and practice of motion picture engineering and the allied arts and sciences, the standardization of the mechanisms and practices employed therein, and the maintenance of high professional standing among its members." These objectives have been prominent in the advancement of the motion picture industry for half a century and have led directly to standardization in motion pictures throughout the world. To ship a print from Hollywood to Hong Kong or New York to Nagasaki for projection in standard projectors is a common occurrence today. But it was the work of the SMPTE in standardization and related activities that made it possible. It is for these reasons we salute the SMPTE.

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General Film Laboratories, A Division of De Luxe Laboratories, Inc.
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SUNDAY—OCTOBER 2

2:00—8:00 REGISTRATION

MONDAY MORNING—OCTOBER 3

8:00 REGISTRATION

CONCURRENT SESSIONS

8:30 PHOTOGRAPHIC AND ALLIED SCIENCES

A Specular Photographic Sensitometer

BERNARD L. MANN, Hycon Manufacturing Co., Monrovia, Calif.

A highly precise photographic sensitometer of the specular illumination type has been designed and planned for construction to meet the need for a sensitometric standard with which to relate high-altitude, low-contrast photography associated with atmospheric contrast attenuation studies. The successful use of contrast attenuation studies has been hindered by the unavailability of precise sensitometry with which to correlate the test data. Two problems have been identified: an insufficient degree of precision available with commercial sensitometers; and a measurable deviation in photographic efficiency between diffuse and specular light sources. The sensitometer must provide illuminance or radiance of purely specular content restricted within a precisely calibrated f /number. In addition, the absolute total illuminance and irradiance must be calibratable within $\pm 1\%$.

Laser Displays

HENRY R. SENF, Hughes Research Laboratories, Malibu, Calif.

Potential advantages of lasers for displays are defined. There are technical problems requiring solutions before practical laser displays are feasible. The performance objectives being sought in some current research and development studies are outlined. Potential uses for laser displays include the projection on a large screen of data which can be displayed in symbolic or line-drawing form, projection for the theater, and projection for home use. A laser display can offer increased total usable light output for the instantaneous display of dynamic data. The status of existing devices and techniques for generating, intensity-modulating and deflecting high-power visible laser beams is described, and the current research and development progress in these areas is discussed.

Fiber Optics in Photography

N. S. KAPANY and B. G. PHILLIPS, Optics Technology, Inc., Palo Alto Calif.

The application of fiber optics components to conventional lens systems have been the subject of considerable research and development. Significant photometric gains can be realized in combination with improved resolving power for such systems using fiber optics field flatteners and Focons. It is possible to relax certain design criteria such as that on field curvature when conventional lenses are developed for use with fiber optics. High performance fiber optics plates and field flatteners are available, but, to fully realize high performance in optical systems, further developments in Fresnelized field flatteners, conical condensers and distortion correctors are required. Efforts directed toward developing the improved fiber optics field flatteners and conical condensers are described, and data on the modulation transfer function, vignetting and T-number obtained using the components in representative fiber optics systems are presented. Charts used to design optical systems show how Fresnelization of the elements improves their performance.

Assessment and Synthesis of Optical Images

N. S. KAPANY, Optics Technology, Inc., Palo Alto, Calif.

A method has been developed by which the cumulative influence of various image deteriorating parameters can be accounted for and related to the detection and recognition probability of a complete electrooptical system. Such an assessment technique is required at the design state as well as during the construction and assembly stages. Recent advances made to provide this information at the appropriate stages are discussed in detail, including a description of a modulation transfer function analyzer, advances in the image synthesis technique and recent studies on the effect of air turbulence on image quality. Experiments performed and results obtained are described.

CONCURRENT SESSION

8:30 INSTRUMENTATION AND HIGH-SPEED PHOTOGRAPHY I

Early Use of Refocus Principle in High-Speed Cameras

C. D. MILLER, National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio

High-speed cameras of two types, invented by the author in the 1930's, are described and illustrated in principle. These cameras were invented and reduced to practice while the author was a member of the technical staff of the National Advisory Committee for Aeronautics (now a part of the National Aeronautics and Space Administration). These cameras are the prototypes in the use of a primary and secondary focal plane, with moving optical elements at the primary plane and film at the secondary plane. This principle has made possible the highest attainable speeds in mechanooptical cameras up to several million frames per second.

Lenses for Scientific and Engineering Use — A Critique

JOHN H. WADDELL, Douglas Aircraft Co., Inc., Santa Monica, Calif.

Lenses for photographic use are manufactured to various standards, ASA being typical. These standards do not take into consideration precise engineering and scientific uses such as mensuration and photometry. They are manufactured with rather broad limits since they have to be made inexpensively. Present American standards are reviewed and experiences with lenses of foreign manufacture are related. Recommendations are made, including the addition of the effective focal length to all lenses used for mensuration, and the use of T-stop rather than f -stop so that the true light transmission for the lenses is known. Methods of determining and correcting for errors in lenses of unknown quality are also discussed.

Professional Standards in Photography

RICHARD L. OLIVER, Douglas Aircraft Co., Inc., Huntington Beach, Calif.

The definition and standards of professionals are discussed from several viewpoints: within the framework of professional organizations, within current state and federal legislation, and within goals and objectives of business and industry. There are certain inconsistencies in approach and standardization and there are identifiable and meaningful similarities which may assist an organization to develop academic standards, ethical precepts and experience requirements which will be consistent with current diverse approaches. Hopefully, this information will serve as a guideline for future ad hoc committees working toward definitive standards for a "professional" instrumentation photographer.

High-Resolution Aerial Photography

EARLE B. BROWN, Perkin-Elmer Corp., Norwalk, Conn.

At the close of World War II, attainable levels of resolution in aerial photography were of the order of 20 lines/mm. This level has now increased to better than 100 lines/mm, which provides a ground resolution of 1 ft for an 18-in. focal-length camera operating at an altitude of 40,000 ft. This improvement permits better ground resolution, smaller, lighter cameras and higher operating altitudes. Four factors contributing to this growth are better films, improvements in lenses, more sophisticated camera systems and improvements in methods of analysis.

Catadioptric vs. Refractory Lenses

RICHARD M. WALTERS, American Optical Co., Pittsburgh, Pa.

Optical systems can be divided into two basic groups: reflector and catadioptric lenses and refracting lenses. Each has advantages and disadvantages. The parameters to be considered when choosing a system are relative aperture, field focal length, spectral range, transmission, relative illumination, resolution, space envelope and thermal and mechanical environment. The influence of the parameters on the choice of system is discussed.

Time Bases for Photographic Instrumentation

JAN TOBOLSKI and JOHANNES K. NOTTHOFF, Douglas Aircraft Co., Inc., Santa Monica, Calif.

The relative merits of I.C., RC, magnetic- and crystal-controlled oscillators as applied in photographic instrumentation systems are compared. Sine and square wave generating clocks including power-line synchronized operation, frequency dividing and pulse-width controlling circuitry are discussed. A particular time base may be selected by considering its frequency stability (drift and temperature dependence), frequency accuracy, amplitude stability, power output and adaptability for frequency selection. Nuclear radiation effects in the components utilized in time base design and resultant

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Academy Award winning Norelco AAI 70/35mm projectors were the obvious choice for projection. But the new Norelco sound system gives the Sack Cheri all the benefits of superior Norelco sound as well as sight. Benefits such as six individually adjustable channels capable of attaining perfect acoustical balance anywhere. Pushbutton sound selection of 3 non-sync sources and every type of

Norelco also manufactures a complete line of 16mm, 35mm and 70/35mm motion-picture projection and sound equipment for theaters, studios, TV stations, laboratories and production uses.

film track from single channel optical to 6 channel magnetic. All transistor plug-in amplifier units. A built-in self-testing system. And the remarkable achievement of compacting this entire ultra-versatile system into two 15" wide wall-mounted cabinets.

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system performance under steady-state or pulsed radiation are surveyed briefly. Recommendations for the design of radiation-hardened time bases are made.

Pattern Recognition Systems

S. S. VIGLIONE, Douglas Aircraft Co., Inc., Newport Beach, Calif.

The design of pattern recognition systems can conveniently be divided into four functional operations. Signal conditioning or pre-processing provides a convenient input format, provides invariance, provides a reduction in the amount of input data and emphasizes important aspects of the input. A universal approach to pattern recognition is to extract features from the conditioned signal, and to perform the recognition by correlating the features with the input pattern. The extraction of pattern features is performed in two parts. The designer may enumerate the features he knows or suspects are important, and statistical techniques may be used to select features from a sample set of patterns. The final step is the design of the decision mechanism which evaluates the enumerated features by correlating them against prototypes of the various pattern classes. Self-organizing or adaptive design procedures are used to perform this correlation. The sample sets of previously classified patterns are input to the system and the internal configuration of the system continually adapted to correctly identify all the pattern samples. These techniques have been applied to the identification of patterns in scientific satellite photographic imagery indicating that complex patterns can be identified in relatively high-resolution imagery.

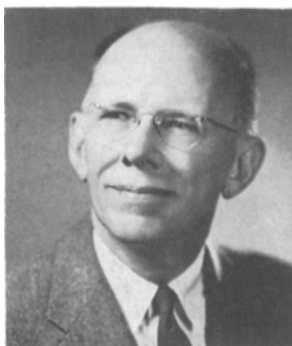
Lens Focusing Theory

NATHAN RICKLESS, Argus Optics, Ann Arbor, Mich.

There are problems inherent in determining the best focus position for a lens system including the limitations imposed by aberrations and field curvature, and limitations of the instrument used to view the image. The elements of error theory are applied to indicate the nature of the problems encountered when setting a focal distance on a precise image plane. The level of precision to be expected under production conditions is analyzed, including the factors of operator fallibility and environmental conditions affecting instrument adjustments. Some methods are indicated for reducing errors to predictable minima, and questions of depth of focus and depth of field are also discussed.

MONDAY AFTERNOON

12:15 GET-TOGETHER LUNCHEON



Guest Speaker:
C. L. A. Wynd,
Vice President,
Eastman Kodak Co., Rochester
Manager, Kodak Park

1:00 AWARDS PRESENTATION

3:00 LABORATORY I

Additive Color Scene Tester for White Light Operation

IRVING J. LIEBERMAN and FRANK P. HERRNFELD, Hernfeld Engineering Corp., Culver City, Calif.

The scene tester, which was designed as a companion piece to the new additive color printers, utilizes four interference filters to break up and recombine the red, green and blue portions of the spectrum of a single light source. The scene tester prints a fifteen-frame color-corrected test of a single 35mm negative frame. It is designed for use in a normally lit room. The scene tester consists of three distinct parts: the light source, the negative film-handling facilities and the camera. All three are interconnected to form one complete unit.

The camera uses a Mitchell magazine for film transported by a claw movement and transports sixteen frames for each test — fifteen of which are color-corrected prints of a single frame. One test, fifteen exposures, takes three seconds.

Additive Color Scenetester

GARLAND C. MISENER, Capital Film Laboratories, Washington, D.C.

The printer optical system employs a dichroic beam splitter, rotating aperture wheels for frame-to-frame color balance modulation, adjustable trimmers in each color beam, and intensity controls for various exposure levels. A selected color negative frame illuminated by this system is projected to a camera on the printer, in white light operation. Exposure lamp and camera clutch controls are in a separate cable-connected unit. The printed test for each scene consists of a normal balance frame and a ring of six color balances at each of five density levels. Two higher exposure levels may be added by switch control.

Design Considerations for a High-Efficiency Contact Motion-Picture Printer With Magnetic Sound Transfer and Monitoring

A. BALINT, Bell & Howell Co., Chicago, Ill., R. C. LOVICK and W. L. STOCK-DALE, Photographic Technology Div., Eastman Kodak Co., Rochester, N.Y.

A high-efficiency contact printer, which takes advantage of the economic potential of prestripped color print film, has been designed with flexibility to permit utilization of 16mm or 35mm prestripped film. In its present form as a 35mm/super 8 printer, it can, in a single pass, print four identical rows of pictures and the corresponding four identical magnetic sound records. The pictures are contact-printed from a 35mm/super 8 internegative and the sound records are reduction-transferred from a 16mm magnetic sound master. Continuous monitoring of the four magnetic sound records is featured in order to increase printer reliability. Operation is at 200 linear ft/min, yielding 800 ft/min of super 8 sound prints.

A New High-Speed Step Optical Reduction Printer

MANFRED MICHELSON, Procedures Service Co., Hollywood, Calif.

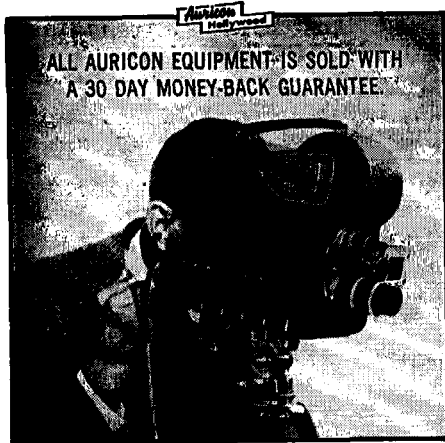
From the original idea a new high-speed step optical reduction printer has been developed as a simple device which does not damage the original negative. Some of its other features are that it has a 35mm to 35/32mm format, prints at the rate of 200 ft/min on the 35mm side (in color), incorporates a Bell & Howell additive lamphouse with Talley solid-state reader and is equipped with dissolving shutter with variable length fades for A and B printing. The printer automatically starts and stops within 1 1/4 ft. It accommodates a four-foot loop on the 35mm side and has the ability to accept a longer loop facility. Also, there is provision for readily framing and viewing during printing.

Dichroic Safelights

DAVID J. DEGENKOLB and JACK P. HALL, DeLuxe Laboratories, Inc., Hollywood, Calif.

The majority of laboratories handling color positive films use a filter in their printing and processing areas which has a bandwidth that overlaps areas of high emulsion sensitivity; therefore the light intensity must be kept low. Some laboratories have tried sodium vapor lamps, with filters to absorb unwanted side radiation. This provides high-intensity monochromatic light at wavelengths where the film has low light sensitivity. Unfortunately, this lamp has a high initial cost and a relatively high maintenance cost, making it impractical. A special fixture using a dichroic filter and a prefocused lamp has been designed. The output of this lamp successfully matches the filtered sodium vapor lamp and provides the illumination in a more efficient method requiring lower initial cost and considerably lower maintenance expense.

AURICON 16mm Sound-On-Film for Professional Results!

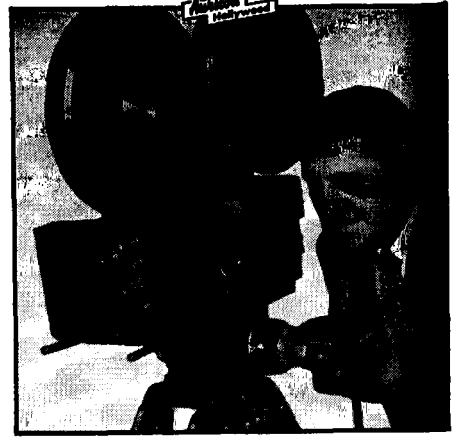


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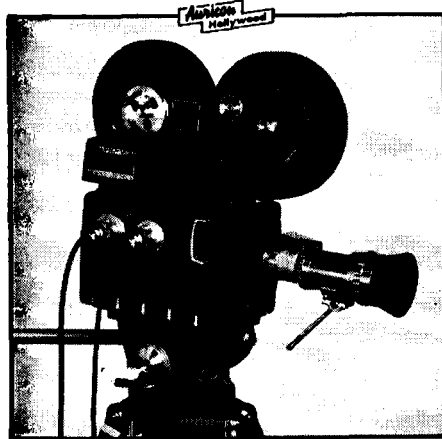
"CINE-VOICE II" 16mm Optical Sound-On-Film Camera.
 * 100 ft. film capacity for 2¾ minutes of recording; 6-Volt DC Converter or 115-Volt AC operation. * \$967.00 (and up).



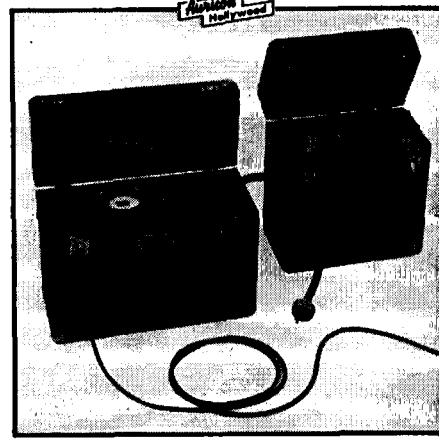
"AURICON PRO-800" 16mm Optical Sound-On-Film Camera.
 * 600 ft. film capacity for 16½ minutes of recording. * \$1871.00 (and up) with 30 day money-back guarantee.



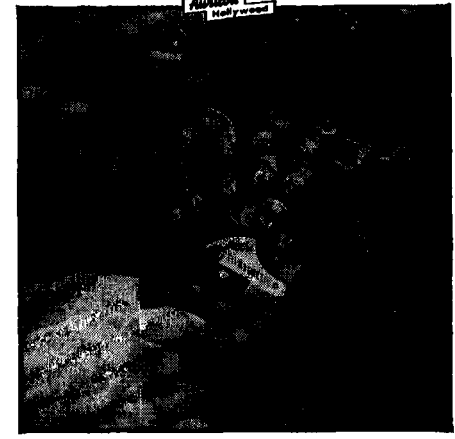
"SUPER 1200" 16mm Optical Sound-On-Film Camera.
 * 1200 ft. film capacity for 33 minutes of recording. * \$5667.00 (and up) complete for "High-Fidelity" Talking Pictures.



"PRO-600 SPECIAL" 16mm Light-Weight Camera.
 * 400 ft. film capacity for 11 minutes of recording. * \$1,295.00 (and up).



PORTABLE POWER SUPPLY UNIT — Model PS-21... Silent in operation, furnishes 115-Volt AC power to drive "Single System" or "Double System" Auricon Equipment from 12 Volt Storage Battery, for remote "location" filming. * \$269.50



FILMAGNETIC — Finger points to Magnetic pre-stripe on unexposed film for recording lip-synchronized magnetic sound with your picture. Can be used with all Auricon Cameras. * \$960.00 (and up).



TRIPOD — Models FT-10 and FT-10S12... Pan-Tilt Head Professional Tripod for velvet-smooth action. Perfectly counter-balanced to prevent Camera "dumping." * \$406.25 (and up).

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If it's profit you're after in the production of 16 mm Sound-On Film Talking Pictures, Auricon Cameras provide ideal working tools for shooting profitable Television Newsreels, film commercials, inserts, and local candid-camera programming. Now you can get Lip-Synchronized Optical or Magnetic Sound WITH your picture using Auricon 16 mm Sound-On-Film Cameras. Precision designed and built to "take it."

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MONDAY EVENING

5:00 EXHIBIT OPEN HOUSE

TUESDAY MORNING—OCTOBER 4

CONCURRENT SESSIONS

8:30 LABORATORY II

Some Notes on the Early Reversal Processing of 16mm Film

HARRIS B. TUTTLE, SR., Retired, Eastman Kodak Co., Rochester, N.Y.

The author had the privilege of working under the supervision of John G. Capstaff from January 1919 to October 1925 on the early development of the 16mm program. While the author did participate in the experimentation with both the Cine Kodak and related equipment, as well as the Kodascope, his major effort was devoted to standardizing the reversal process, the development of processing equipment and the duplication of reversal originals by the reversal process. Some of the experiences and problems encountered during this period were difficult to anticipate and to solve because of the lack of previous experience in this field and the general knowledge and conditions which prevailed at that time.

Technicolor Triple-Rank Super 8

HAROLD A. MAYER and F. P. BRACKETT, Technicolor Corp., Hollywood, Calif.

The Technicolor Triple-Rank super 8 film format for use in the mass production of commercial super 8 prints by the Technicolor imbibition process is described. The use of this format results in the need for a very minimum amount of special processing equipment. Much of the processing can be done on existing 35mm equipment.

Turbine Fluid Drive—An Innovation for Film Processing Machines

EVERETT L. HANSON, DeLuxe Laboratories, Inc., Hollywood, Calif.

Little has been done in the past thirty-five years to improve the conventional transport devices for film processing machines; these devices are the sprocket drive and the various types of tendency drives, including electric clutch, felt disc clutch and bottom-roller drives. Recently, a new method for transporting film, Turbine Fluid Drive, has been used to equip a negative processing machine. These drive units are incomplex and comparatively small—4 in. in diameter and 5 in. long. The drive functions with a fluid action. The ratio between film being fed into the machine vs. the constant 3% to 5% overdrive of the driven roller results in a progressive, smooth pull. Film is processed at speeds in excess of 400 ft/min, and the turbine unit requires no replacement of parts and little or no maintenance.

Liquid Cement for Splicing Cronar Polyester Cine Films

A. WASY D'CRUZ, E. I. Du Pont de Nemours & Co., Inc., Parlin, N.J.

The work exploring possible ways to splice Cronar (registered trademark) to Cronar using conventional splicing techniques is described. Cronar polyethylene terephthalate film support is chemically inert, presenting major obstacles to conventional splicing. Standard liquid cement splicing technique was used. Poly-urethane mixed with hexafluoroisopropanol and methylene chloride is one typical composition of the splicing cement. Satisfactory splices were achieved, which, while somewhat slow in attaining full strength, remained strong and pliable over a range of humidity and temperature conditions. Practical tests made for the bond are also described.

Sliding Flange Sprocket

EVERETT L. HANSON and JACK P. HALL, DeLuxe Laboratories, Inc., Hollywood, Calif.

Most sprocket-driven machines are used to transport film with particular sprocket-size perforations of one-pitch dimension. The sliding flange sprocket is constructed to accommodate two sizes of perforation pitch, while still being able to use the same width of thread-up leader. By use of this sprocket, any piece of motion-picture equipment can be converted into a dual-purpose machine. The sliding flange sprockets are not limited to use on motion-picture equipment, but may be used on any type of machine that can be sprocket driven.

CONCURRENT SESSION

8:30 INSTRUMENTATION AND HIGH-SPEED PHOTOGRAPHY II

Telephoto vs. Ordinary Lenses

R. KINGSLAKE, Apparatus and Optical Div., Eastman Kodak Co., Rochester, N.Y.

Long-focus lenses are often called telephoto lenses, but this name should be restricted to those objectives which comprise a positive front component spaced apart from a negative rear component, such that the total length from front vertex to film plane is less than the focal length of the whole objective. In 1891, telephoto lenses were made by mounting a negative achromat behind a normal objective, making possible a very long focal length even with a relatively short camera bellows extension; however, the low aperture, field curvature and distortion were such that by 1905 manufacturers started making fixed-focus telephoto lenses with a moderate aperture and field. The simple thin-lens theory of the telephoto lens shows that the negative lens will be as weak as possible if it is situated midway between the positive lens and the focal plane. Telephoto lenses are currently popular for the longer focal lengths on single-lens reflex cameras. A survey of the principal types of telephoto lens is given, with examples of some actual lenses currently available.

Glass as a Material for Refractive Space Optics

RICHARD F. WOODCOCK and MASON C. COX, American Optical Co., Southbridge, Mass.

Two proposed areas in the design of optics for use in space are discussed: solarization due to ultraviolet and its affect on optical parameters and athermalization of glass to make optical parameters independent of temperature gradients. Consideration is given to color balance, the refractive index shift and partial dispersion shift resulting from solarization. Preliminary experiments and plans for future work to relative restrictions on the availability of material are presented.

The Application of Kinematics to Instrument Design

E. B. MOSS, Douglas Aircraft Co., Inc., Santa Monica, Calif.

Kinematical principles of machine design characterized by open and non-redundant constraints enable mechanical precision to be attained with simple designs easily fabricated with a minimum of skill and simple machine tools. Modern machine tools enable precision to be attained commercially in other ways, but circumstances formerly justifying kinematical design in commercial instruments are encountered in the laboratory workshop today. The advantages and techniques involved, and the use of many high-precision commercially available components are described. An examination is made of compromise designs offering economical means of overcoming some of the limitations of truly kinematical constructions.

Frame Camera Development for High-Speed Photography

BERLYN BRIXNER, University of California, Los Alamos Scientific Laboratory, Los Alamos, N.M.

The history of frame cameras which can produce serial photographs to measure velocities of physical phenomena is traced. In numerous ways advances in one area have been interlaced with advances in others, e.g., in film transport, mechanical shuttering, intermittent light sources, image-film motion compensation, optical shuttering, image sampling, and electronic image converters. Reasons for the interlacing and the results therefrom are suggested.

Image-Quality Criteria for Data Recording and Storage

J. H. ALTMAN, Research Laboratories, Eastman Kodak Co., Rochester, N.Y.

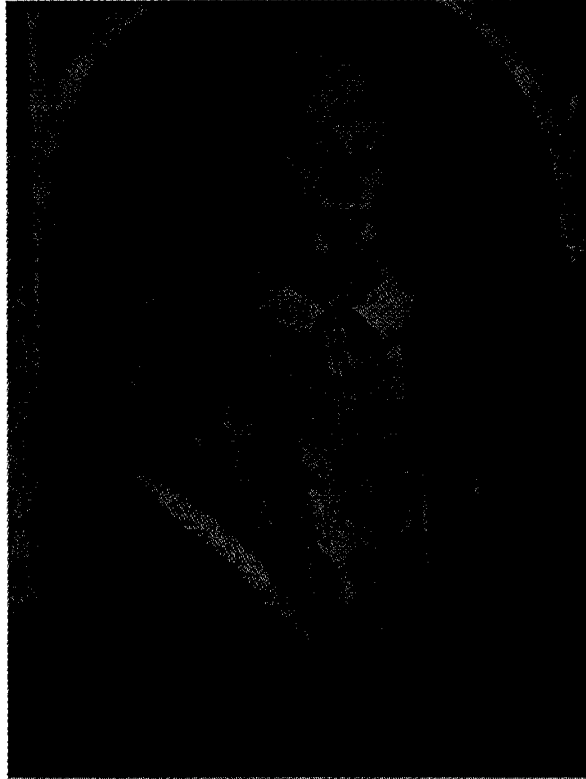
Any measures of photographic image quality must take into account the intended use of the image; therefore it is expected that criteria developed for pictorial photography are not necessarily valid for the recording of information. Quality criteria for the recording of information are reviewed on the basis of the SNR of the image, which is defined and illustrated. Concepts discussed include resolving power from the standpoint of SNR, the minimum detectable increments of both density and exposure, errors produced in the readout by film granularity, the information capacity of the emulsion, informational sensitivity and detective quantum efficiency.

Sweeping Image Instrumentation Development

JACK M. PATTERSON, Beckman & Whitley, Inc., Mountain View, Calif.

Present optical devices provide the means for recording fast transient events which approach theoretical limits. Quantitative information at extremely high bit rates can be obtained by streak cameras which sacrifice frame dimension in the direction of scan of the swept beam or image by eliminating the time necessary for frame separation. In

The man that hath no music in himself, Nor is not moved with concord of sweet sounds, Is fit for treasons, strategems and spoils.—SHAKESPEARE

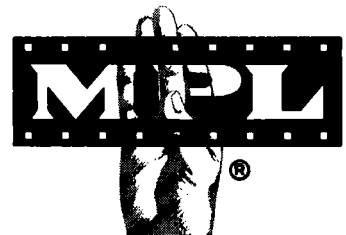


SPEAKING OF MUSIC

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practice, this amounts to the image of occurrences in a very narrow frame or slit continuously scanning a stationary film, or a similar image continuously scanned by a moving film. The development to the present state of the art has encompassed drums and roll film cameras as film carriers and beam deflection by electromagnetic and mechanical means. The evolution and characteristics of these devices are compared.

Ultra-High-Speed Electronic Shutters

A. M. ZAREM, G. L. CLARK and J. V. PARKER, Electro-Optical Systems, Inc., Pasadena, Calif.

The requirements of time-resolved photooptical instrumentation in scientific research have far exceeded the capabilities of mechanical cameras. The time resolution must be achieved while maintaining satisfactory performance in other shutter characteristics, such as aperture, transmittance, extinction ratio, optical quality, color rendition and synchronizability. Although many experimental high-speed shutters have been developed, only two types have proven practical for exposures of a few nanoseconds duration: the Kerr cell shutter and the image converter. These may be compared meaningfully only with respect to a particular application.

The Mars Facsimile Camera

DANIEL N. TOMPKINS, Aeronutronic Div., Philco Corp., Newport Beach, Calif.

A panoramic facsimile camera providing infrared and visible spectrum imagery has been under development for NASA since 1961. Designed for unmanned space operation, it responds over a wide dynamic range and has angular resolution down to 0.01°. It weighs less than 10 lb and models have been shocked at 4000 g. Camera electronics require neither warm-up time nor stand-by power, and the sensor is not destroyed by direct solar radiation.

TUESDAY AFTERNOON

12:15 PRESIDENT'S LUNCHEON

CONCURRENT SESSIONS

1:45 PHOTO-SENSITIVE MATERIALS FOR MOTION PICTURES AND TELEVISION

The Autochrome Color Plate of 50 Years Ago

J. L. WESTHAVER, Xenon Projection Co., San Diego, Calif.

A French patent of 1868 by Ducos du Hauron describes how a screen of fine colored lines could be placed upon a glass plate with an emulsion on top and exposed and reversed to obtain a color transparency. The screen could be of many substances. Lumière used starch grains from potatoes and was successful in producing the Autochrome plate that was used from 1908 until about 1935 when the modern color films made the Autochrome plate obsolete. The process for producing this type of plate is discussed, as well as two masters of the Autochrome, a commercial photographer named Taylor and a doctor of laws from Zurich named Schneider.

A Study of the Technology of Color Motion-Picture Process Developed in the United States

RODERICK T. RYAN, Motion Picture and Education Markets Div., Eastman Kodak Co., Hollywood, Calif.

The first attempts to produce color in motion pictures were crude and far from realistic. Many color systems were invented, developed and used, only to be abandoned. Each of these has contributed to the technological advancement of motion pictures through photographic chemistry and/or optics. The laboratory aspects of color motion-picture processes in the U.S. from 1900 to 1965 are discussed. Color processes are classified into two categories: additive and subtractive. In general, the subtractive processes have been the most successful commercially.

Starting and Operating Inplant Film Processing to Meet Color Television News Requirements

OSCAR F. WICK, National Broadcasting Co., Burbank, Calif.

Color processing has been brought inplant in order to better control the availability of these facilities and to shorten the lead time necessary for meeting color newscasting requirements. The system is designed to provide less than a one-hour turnover when necessary — from the time the film is delivered until it is transmitted. This includes a period for editing after processing. Considerations are the selection of suitable machinery; the training of personnel in the new process; the establishment of simple but adequate methods of quality control; and the establishment of proper operating, main-

tenance, and safety routines. Maximum efficiency and economy are obtained by working closely with newfilm crews and news editors in adjusting film speed, planning runs and arranging laboratory schedules.

Filming High-School Football in 8mm Formats and 16mm Black-and-White Reversal Film

DAN H. RYAN, Sportfilm Processing, Downey, Calif.

The method of shooting a football game is discussed. Framing the various plays, field goals and the scoreboard, method of shooting, allowance for poor light, and films, lenses and cameras to be used, as well as setting up of equipment are described.

A New High-Speed Black-and-White Reversal Film

C. M. KRETCHMAN and C. M. WALL, Film Testing Div., Eastman Kodak Co., Rochester, N. Y.

A new high-speed black-and-white reversal film, Kodak 4X Reversal Film, Type 7277, which has excellent grain and sharpness characteristics, has a normal exposure index of 400. It includes special provisions for antihalation protection. The process for this new film is the same as that for the Kodak Plus-X Reversal Film, Type 7276, and Kodak Tri-X Reversal Film, Type 7278. The effective speed of the new film can be doubled by an increase in first development time with little loss in quality.

A New Low-Contrast Reversal Color-Print Film

H. L. REES, H. W. VOGT and J. W. ZUIDEMA, Film Testing Div., Eastman Kodak Co., Rochester, N. Y.

A new low-contrast reversal color-print film is described. This film, called Eastman Ektachrome R Print Film, Type 7388, is designed to be handled in the ME-4 process. It is intended for making prints from reversal color camera films with very nearly 1:1 reproduction of contrast, and is expected to be especially useful in making prints from Kodak Ektachrome EF Film, Type 7241 (Daylight), Kodak Ektachrome EF Film, Type 7242 (Tungsten), and Kodak Ektachrome MS Film, Type 7256.

The Sharpness Characteristics of a New Black-and-White Positive Fine Grain Film

J. JESPER, Gevaert-Agfa N.V., Mortsel-Antwerp, Belgium

Visual contrast is largely dependent upon the sharpness of the photographic reproduction. This sharpness can be characterized to a certain extent by the modulation transfer function of the materials involved. It appears that the modulation transfer functions of modern commercial black-and-white print films all have at least one common aspect: the modulation transfer at low frequencies does not reach the 100% level. Therefore, a loss of contrast is introduced in the system by the printing material. The relative importance of the reproduction of these details in the whole of the reproduction varies in inverse ratio to the enlargement scale. The modulation transfer function of an experimental positive fine-grain film called Type 562 E has been improved so that the visual contrast is increased.

CONCURRENT SESSION

1:45 INSTRUMENTATION AND HIGH-SPEED PHOTOGRAPHY III

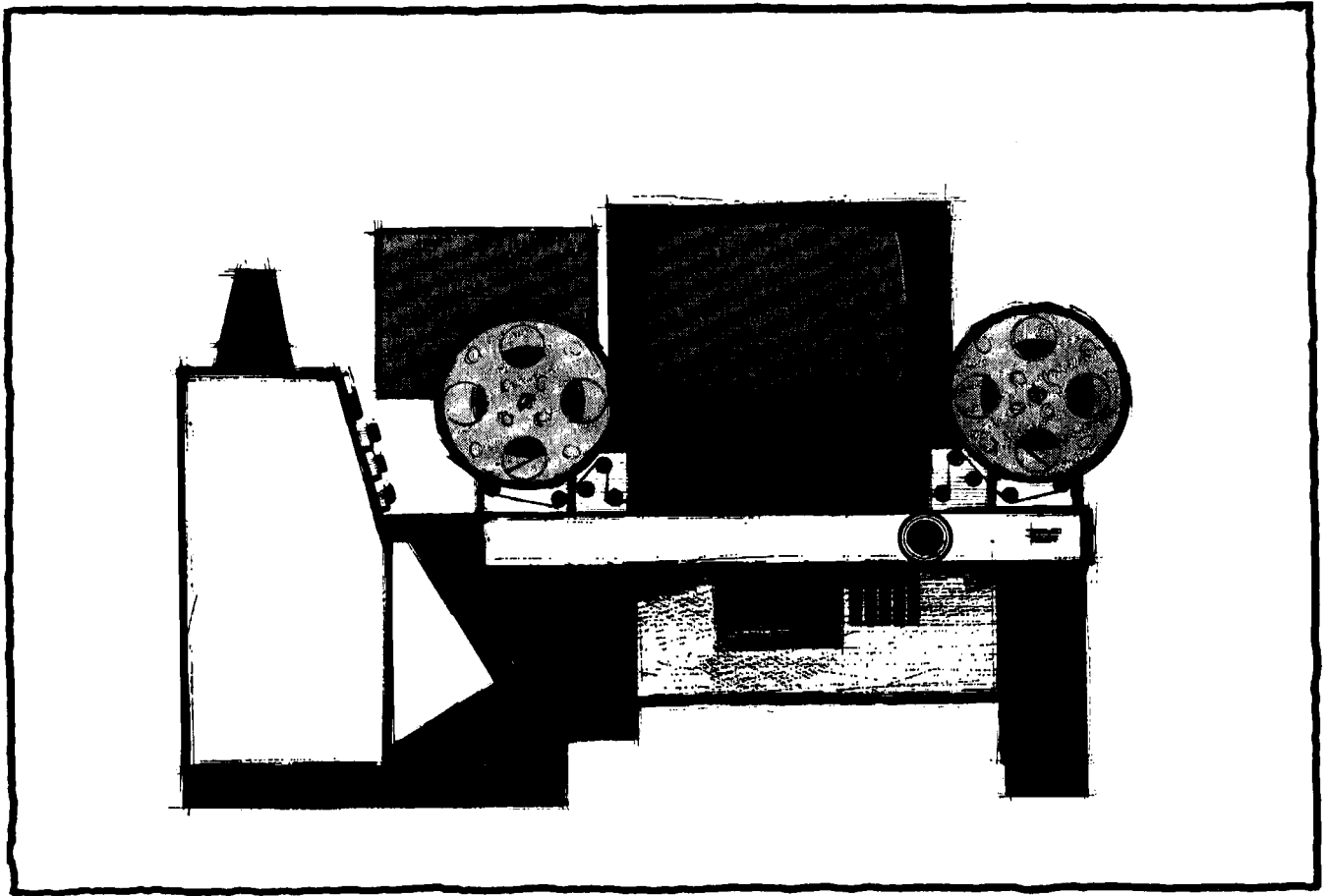
Photographic Instrumentation at the U.S. Naval Ordnance Laboratory, White Oak

MAX BEARD, PAUL H. CORDS, JR., CHARLES G. GROVER, ROBERT L. KAPLOW and ALLEN M. ERICKSON, U.S. Naval Ordnance Laboratory, White Oak, Silver Spring, Md.

Photographic instrumentation, as applied to research, development and engineering programs at the U.S. Naval Ordnance Laboratory, White Oak, is illustrated. The problem area is explained, with an outline of methods of solution such as image detection, recording and measurement. Exploratory development for new techniques is described.

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Photooptical Instrumentation at Stanford Research Institute

ZEV PRESSMAN, Stanford Research Institute, Menlo Park, Calif.

In the broad range of photographic instrumentation used at Stanford Research Institute, emphasis is placed on the proper combination of optics, lighting, photosensitive materials, processing procedures and information retrieval, rather than on camera devices alone. Instances are cited ranging from high-speed ballistics subjects to macroscopic investigations in physiological research. Photographic instruments are used to study a shock wave, a mechanical motion or a bit of living matter through a microscope. Photographic engineers, chemists, photographers, physicists, biologists and others throughout the large organization merge their efforts, providing effective research instrumentation.

High-Speed Photography in the United Kingdom

K. R. COLEMAN, Atomic Weapons Research Establishment, Aldermaston, Berkshire, England

High-speed photography in the United Kingdom has made steady progress in industry and education using mainly imported equipment. Ultra-high-speed photography, on the other hand, has advanced rapidly and British cameras for this area are equal to any in the world; in one or two cases they surpass all others. Time samples of less than one nanosecond give such a small amount of information about objects of reasonable effective temperature that an extension of the normal procedures of photography to shorter exposures appears pointless. Future work giving sub-nanosecond time resolution will presumably use a more sophisticated approach to the handling of the data emitted from the object in photon form.

Solar Research Through Photography

JEROME T. LOOMIS, Sacramento Peak Observatory, Sunspot, N.M.

At Sacramento Peak Observatory, photography is an important tool in solar research. By using films with various emulsion characteristics in cameras mounted on coronagraphs and other telescopes, physicists are able to determine the composition, direction and velocity of materials on and near the sun. By means of time-lapse photography, studies of the development of such solar phenomena as sunspots, flares, prominences, and filaments are possible.

South in Search of Snow and Science

HARRY K. BOURNE, United Kingdom Scientific Mission, Washington, D.C.

The scientific research being carried out in the American Antarctic bases of McMurdo Sound, Byrd, and at the South Pole has much of photographic as well as scientific interest. The significance of the IGY and the recent IQSY programs and the desirability of continuing international geophysical programs of this type are discussed. Some of the special scientific projects in the North and South Islands of New Zealand, such as the generation of electrical power from geothermal energy, are also discussed.

Photography's History in Antarctica

RICHARD R. CONGER, Lt., U.S. Navy, U.S. Naval Air Station, Norfolk, Va.

The U. S. Navy has been involved in exploration, mapping and various other scientific ventures in both the Antarctic and the Arctic, since the U.S. Exploring Expedition in 1838-1842. The lessons learned about operations, equipment and habitability have been great. These findings apply to present photographic and cinematographic techniques in the ultra-low temperature regions found at the earth's poles and in extremely high altitudes.

Naval Photography at Vietnam

W. R. FRASER, Cdr. United States Navy, San Diego, Calif.

Photographic coverage of Vietnam from the most sophisticated supersonic jet photo reconnaissance aircraft is being obtained on a routine daily basis. The combat photographer is also documenting amphibious landings by the U.S. Marines on the beaches of South Vietnam. These are only two examples of what the Pacific Fleet Combat Camera Group is doing in Vietnam.

TUESDAY EVENING

7:45 AEROSPACE SPECIALS

Supersonic Track Testing for Weapon Programs

H. R. ROGLIN and C. JOHN DI POL, U.S. Naval Ordnance Test Station, China Lake, Calif.; WAYNE MELTON, Test Track Facility, Holloman Air Force Base, N.M.; and TERRY D. HERTHER, Sandia Corp., Albuquerque, N.M.

Supersonic track testing has become of major importance in research and development testing of missile and aircraft components and equipment. In the few years in which track-type testing has been developed into a major means of research, high-speed test tracks have demonstrated their usefulness as vital laboratories in the expansion of knowledge in many scientific fields. This unclassified presentation, made by the Instrumentation Working Group, Inter-Station Supersonic Track Conference (ISTRACON), by representatives of Air Force Missile Development Center, Naval Ordnance Test Station and the Sandia Corp., includes a discussion of the history of supersonic test tracks, facilities at the major missile ranges of the country and the test work which is being performed with rocket sleds. Slides and 16mm motion pictures are shown.

Photooptical Instrumentation at the Launch and Test Ranges

Eastern and Western Test Ranges, White Sands Missile Test Range and Pacific Missile Range; Inter Range Instrumentation Group (I.R.I.G.)—Optical Systems Working Group.

WEDNESDAY MORNING—OCTOBER 5

9:00 EQUIPMENT PAPERS AND DEMONSTRATIONS

New 12.5-75mm Vario Sonnar; New Universal Matte Box (Paper)

VICTOR JAMES, Arriflex Corp. of America, Woodside, N. Y.

Atlas Professional Projection Equipment (Demonstration)

WALTER R. MCCORMICK, SR., Atlas Projector Corp., Culver City, Calif.

A High-speed Reader for use on the Bell & Howell Model "C" Printer (Paper)

DOUGLAS FLETCHER, Bell & Howell Co., Chicago

Hydraulic Crab Dolly; Quartz-Iodine Scoop Light; 30-V Battery-Operated Quartz-Iodine Lights (Demonstration)

JACK HORNE and JOHN L. MURRAY, ColorTran Industries, Inc. (A Berkley Photo Co.), Burbank, Calif.

The DuKane Supermatic 8, a new 8mm Optical and Magnetic Sound Projector (Demonstration)

HOWARD V. TURNER, DuKane Corp., St. Charles, Ill.

Flickerless Stop-Motion Television Projector With Camera and Monitor for Closed-Circuit Applications (Demonstration)

R. H. LAWRENCE, L-W Photo, Inc., Van Nuys, Calif.

Hycam Model K2S20E, 16mm High-Speed Camera, 2,000-ft Capacity, 10 to 5000 Pictures/sec (Paper)

ROBERT D. SHOBERG, Red Lake Laboratories, Inc., Santa Clara, Calif.

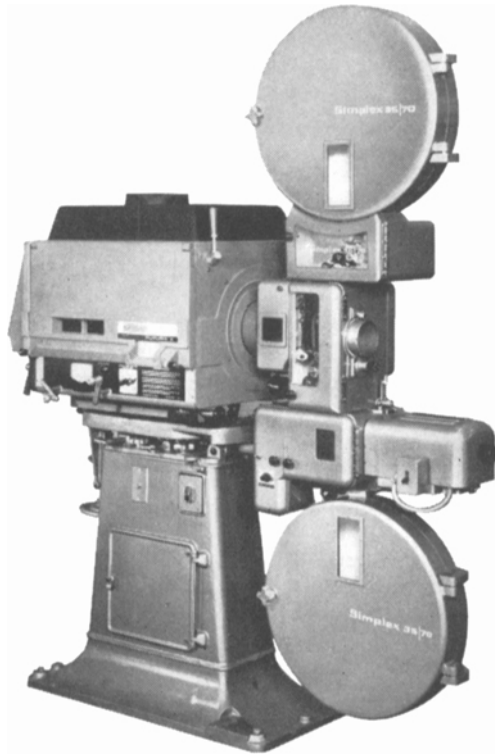
New Type Nagra Resolver (Demonstration)

RONALD R. COGSWELL (Ryder), Magnetic Sales Corp., Hollywood

Northridge Model 16N Selecta Frame Stop-Motion Sound Projector (Demonstration)

RICHARD D. FREEBOG, Traid Corp., Glendale, Calif.

New Simplex 35/70



Only the industry's most experienced projector manufacturer could have built this new baby. Here, at last, is the one 35-70 mechanism combining brilliant new design features with the same great precision engineering and ruggedness that have put more Simplex projectors into theatres than any other make.

Operation is simple, reliable and familiar. Any projectionist who has worked with Simplex 35 (and who

hasn't?) is already at home with its basic systems and components. Change-overs between 35mm and 70mm take just seconds.

This is a mechanism that can take the scare out of emergencies. Not only is it American built from top to bottom, but it's backed up by the largest and most readily available supply of parts. Many of the components are actually interchangeable with Simplex 35mm

parts. The new 35-70 accommodates all American lamp houses without shims or adapters. And for extra boxoffice insurance, the new mechanism features unitized construction permitting complete sections to be quickly and individually replaced.

Is your theatre ready for the future? Before you spend one penny for projection equipment, check your National man for all the facts about the new Simplex 35-70.



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Simplex 35/70 Projector (Paper)

JACK HESSICK, National Theatre Supply Co., Paramus, N.J.

The Vidifilm System of Motion-Picture Production (Paper)

ALAN J. LEVI, Vidifilm, Inc., Los Angeles

The Palmer Interlock Projector (Demonstration)

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

Atlas Professional Projection Equipment (Demonstration)

WALTER R. McCORMICK, Sr., Atlas Projector Corp., Culver City, Calif.

WEDNESDAY AFTERNOON

12:00 HIGH-SPEED PHOTOGRAPHY LUNCHEON

Photography and Missiles

C. S. PERRY, Douglas Aircraft Co., Inc., Santa Monica, Calif.

Photography has been extremely valuable for the analyzing of missile behavior. Photographic techniques which have been used are high-speed, multiple-image still, time-lapse and on-board motion-picture photographs. Economic benefits and savings in engineering time obtained from the photographic data result in improved missile performance. Typical examples of the uses of photography are Thor and its derivatives, Nike and Saturn. A short motion picture is shown.

CONCURRENT SESSIONS

1:45 SOUND I

Time Factor Alteration of Recorded Sound While Maintaining Frequency Constants

AUSTIN GREEN, Cinesound Co., Inc.; and WAYNE GRAHAM, Discerned Sound, Hollywood, Calif.

"Sampling" recorded information is done for the purpose of varying the time constant of that information without changing its frequency response. Recently, new equipment has been brought to what is considered a commercially acceptable standard of efficiency. The track and the picture of a four-minute interview filmed in Rome, due to low battery voltage or some other cause, proved to be badly out of sync. With simple arithmetical calculations and one transfer of the original sound through the equipment, the track was brought into such perfect sync with the picture that its slight variation is commercially acceptable. The equipment is described and demonstrated.

A Pilot-Tone Playback Preamplifier and a Sync Track Frequency Converter for the R.C.A. Unilock Synchronizer

LEO H. O'DONNELL, National Film Board of Canada, Montreal, Canada

A preamplifier for adapting a neo-pilot playback head to the R.C.A. Unilock Playback Synchronizer features a transformerless low-impedance input and a 70 Hz low-pass active filter. For the same equipment, a system which provides synchronous playback of 50 Hz pilot-tone recordings with 60-Hz line operation has been designed around inexpensive integrated circuits. These two auxiliary devices are built on one circuit board and installed in the spare plug-in module provided with the Unilock.

CONCURRENT SESSION

1:45 INSTRUMENTATION AND HIGH-SPEED PHOTOGRAPHY IV

Explosive-Noble Gas Light Sources

JOHN K. CROSBY, Stanford Research Institute, Menlo Park, Calif.

The historical and technical background of high explosive-noble gas light sources is given, including reasons for their development and the physics underlying their configuration. The known emission characteristics of these sources are reviewed and related to some current applications in instrumentation. Suggested future work connected with explosive light sources includes improvements in the sources themselves in their applications, and in knowledge about their behavior.

Environmental Factors Affecting Airborne Photography

J. DON CLARKE, Douglas Aircraft Co., Inc., Santa Monica, Calif.

Compared with ground-based observatories, astronomical observations from high-altitude flying observatories have definite advantages; easy access to difficult locations, little or no weather problems, decreased light attenuation and improved astronomical "seeing." There are some new and different factors affecting photography of celestial objects from the airborne observatory, such as instrument stability, vibration, temperature and pressure difficulties. The viewing ports of the flying observatory must be designed with regard to wavelengths, position of the target, temperature and pressure differentials and turbulence effects.

Experiences in Arctic Photography

KENNETH CAMPBELL, Campbell Productions, Peterborough, Ontario, Canada

Some experiences in Arctic photography are described. The equipment used, transportation in the Arctic, living conditions, shooting subjects in these locations in sub-zero temperatures, communications and crews are discussed.

WEDNESDAY EVENING

6:45 COCKTAIL PARTY, BANQUET AND DANCE

THURSDAY MORNING—OCTOBER 6

CONCURRENT SESSIONS

8:30 EDUCATION

Multi-Media for Individualized Instruction

MARTIN FASS and J. W. BARR, Xerox Corp., Rochester, N. Y.

The demonstration features a sequence from an instructional unit. Still frames, audio and sound film sections are integrated. Rapid cues from the student cause the film to start, stop and repeat, as they alternate with presentations of audio and slides. Several alternatives are available, based on the cue from the learner. The subject matter in an instructional unit may include printed materials, slides and filmstrips, audio portions, animation, sound film and special graphics. There are certain requirements for shooting and editing motion-picture sequences for use in the projection system. Editing procedures are based on the requirements for obtaining multiple copies of footage. The film has to be prepared so that later revision can be made rapidly. Contributions made by specialists in psychology, communications and electronics have helped to develop an efficient system.

Aerospace Instruction—Extended Through an Automated Instructional System

ARTHUR M. SUCHESK, North American Aviation, Inc., Downey, Calif.

The modular multimedia audio-visual programming concept and related equipment have been used to solve the problems of presenting highly specialized training to aerospace personnel at off-site locations. These are described and examples given. There are technical requirements for implementing and maintaining the system in the field. The administration of the program and the end results with students are evaluated.

A Look Into the Future of Automated Instructional Devices in Aerospace Training

ARTHUR M. SUCHESK, North American Aviation, Inc., Downey, Calif.

When we become involved in deep-space activities, the training requirements on the ground and in deep-space may be foretold by sketches of media and technological advancement requirements. On the basis of a review of the lunar and deep-space program, projections are made for new requirements and how training may be presented with equipment modes, space and earth devices.

Film Book Publishing in the United States

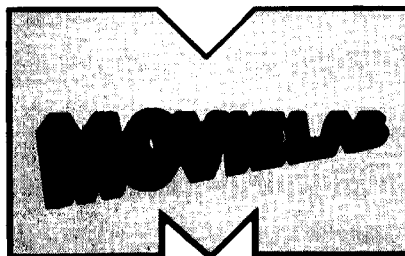
ERNEST CALLENBACH, University of California Press, Berkeley, Calif.

Publishing of serious books about the motion picture is now becoming firmly established despite certain limiting factors: the number of valuable manuscripts being written, the potential market, both in the general public and in the more specialized areas of schools and the professions, the ability of the overall cultural system to absorb books on film topics, and the individual interests of publishing firms, both the commercial and university presses. Prime necessities to be considered in film publishing are: original historical research, notably upon developments in film style and technique, and studies relating film art to other cultural developments and to the social, economic and legal context in which films are made.



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Film History Research at the University of Iowa

RAYMOND FIELDING, University of Iowa, Iowa City, Iowa

Within the last ten years the motion picture has become respectable as a subject for historical and critical study in American colleges. Of the few universities now offering graduate degree programs in areas of film history, criticism and theory, one of the oldest is the program at the University of Iowa where graduate studies in the field of film have been pursued for the last fifty years. Today's program of graduate studies provides for work in both the theory and practice of film. All students must take production workshops, and each year 25 sound films are produced by the students, some of which have been awarded prizes. The faculty believes that an individual is not qualified to teach or write about the film until he has produced films which demonstrate a minimal technical proficiency and a creative grasp of the medium's artistic potential.

Considerations Leading to the Development of Guidelines for the Specification and Selection of a Video-Tape Machine for Educational Applications.

KEN WINSLOW, University of California, Berkeley, Calif.; and HOWARD STUCKER, California State College, Los Angeles, Calif.

Although the video-tape machine was introduced as a record/play-back device for television broadcast applications, there are economic and operational advantages from using video-tape techniques in the educational field. Besides machines for educational and instructional broadcasts, machines are needed for exchange libraries and educational CCTV systems which supply programs for distribution. There are now more than ten working technical video-tape systems, with more to come. The 1966 conference of the Western Radio and Television Association brought together persons in the field who have written a set of guidelines for individuals who select video-tape machines for educational applications. The objective of "VT Guidelines" is to avoid setting standards, and to develop an impartial reference format designed to be applied to the determination of specific characteristics of video-tape machines as used in a variety of educational applications.

CONCURRENT SESSION

8:30 STUDIO PRACTICES

History of Motion-Picture Set Lighting Equipment

M. A. HANKINS, Mole-Richardson Co., Hollywood, Calif.

Images are reproduced on the motion-picture screen by processes made possible by the reflection of light from the subjects on the set to the film in the camera. The lighting equipment available for attaining dramatic and artistic effects is an important factor contributing to the success of a motion-picture production. Studio set lighting equipment over the past forty years has been influenced by ever-changing associated factors such as film characteristics, sound and various production techniques. Current equipment and considerations for future equipment are discussed.

Evolution in Tungsten Lamps for Television and Film Lighting

C. N. CLARK and T. F. NEUBECKER, General Electric Co., Cleveland, Ohio

There is a continuing shift from using "conventional" incandescent tungsten lamps toward the new "tungsten-halogen" lamps. The new lamps impose some restraints on lighting equipment designers and have some performance limitations, but they allow new directions in luminaire design and application. Tungsten-halogen lamps have the advantages of excellent maintenance of light output and color temperature during life, increased luminous efficiency and lower cost per operating hour. The color temperature and spectral energy distribution of tungsten-halogen lamps are nearly the same as from conventional lamps, and are slightly affected by the halogen used. At least seventy different ratings and shapes of tungsten-halogen lamps are now available for television and film lighting.

Spray Foam — Application for Set Construction

ROY E. LONG, Desilu Productions, Inc., Hollywood, Calif.

The spray foam machine constructs rocks, rock walls, mountains, caves and large cut stone walls by the method of building lightweight frames covered with cloth or builders paper and then spraying them with the foam. This method has cut down the weight 90% in some projects, and the construction time 80%. The cost has also been lowered as compared with the former method of mold making and casting the items, then applying them to frames.

Plastics, Materials and Technologies for Use in Motion-Picture Production

HERBERT MEYER, Electro-Optical Systems, Inc., Pasadena, Calif.

There are various forms and modes in which plastics play an important function in motion-picture production. Reasons making it necessary and practical to confine the fabrication of stage set struc-

tural units and props to relatively simple processes are explained. The basic differences in the use, purpose and processing of plastic materials between the general plastics industry and a motion-picture studio are treated in some detail, with illustrations. Polymeric materials are not only useful by themselves in the fabrication of stage set units, props and effects items but they also play an equally important part when formulated into functional and decorative coatings, such as paints, lacquers and adhesives. Plastics have a practically unlimited range of studio production applications. Polymeric materials can now be tailored to fit specific desired application or engineering requirements.

Design of a New 65mm Handheld Camera

DOUGLAS FRIES, Mitchell Camera Corp., Glendale, Calif.

Mitchell Camera Corp. and Todd-AO Corp. cooperated to determine the requirements of a handheld 65mm camera to meet all the unusual demands of motion-picture production. There were special problems in designing a new, all-purpose camera that would be versatile and have professional motion-picture quality. Four major requirements were: mobility, flexibility, ease of operation and reliability. The basis for establishing these requirements and their effect on the design of the camera are explained in detail.

An Historical Survey of the Professional Motion-Picture Camera

E. DIGIULIO, E. MANDERFELD and G. MITCHELL, Mitchell Camera Corp., Glendale, Calif.

The past 45 years of professional motion-picture camera design are reviewed by the authors whose personal participation spans this period which started with the hand-cranked cameras. There were cameras that punched perforations, and the motor driven and silent-sound-stage cameras, including many wide-screen processes. Many of the failures as well as successes are discussed, including three-dimensional and wide-screen anamorphic photography. The influence that our defense and space efforts have had on the design of motion-picture cameras can be seen in the development over the past decade of high-speed cameras of both the pin-registered and rotating-prism type. Miniaturization and rugged construction requirements have influenced motion-picture camera design. Developments in optics, film manufacture and electronics are influencing the design of cameras already on the drawing boards, and work now being done in electronic beam recording promises revolutionary camera designs.

Reflexing the BNC

FRANKLIN J. DAVIO, Mitchell Camera Corp., Glendale, Calif.

Reflex cameras for professional motion-picture photography are now popular. With the advent of zoom lenses that approach fixed focal-length lenses in resolution capability, the need for reflex viewing has become imperative. While a number of excellent reflex cameras have been developed, reliance by cinematographers on the BNC for soundstage work has prompted the redesign of this camera to permit reflex viewing. The rotating mirror principle is used to assure no loss of the light impinging on the film. A number of serious mechanical and optical problems have been solved to insure retention of the desirable features of the BNC. Comparisons of the performance characteristics of the BNCR (Reflex BNC) and the BNC are made, and new features of the BNCR are discussed.

Workprint Alternatives in Motion-Picture Production

ISAK BEN YEHUDA, TV and Film Co., Ltd., Tel Aviv, Israel

A workprint alternative (W.A.) is a film used temporarily instead of the usual workprint, which can be printed only after the processing of the negative. The W.A. can be exposed simultaneously with the original negative. The film is usually black-and-white which, after the quick processing, can be screened like the rushes and used as a temporary workprint. If time is important, it may also serve for the usual editorial process. The ways of making a W.A., each one serving the appropriate production, are the single-camera system, in which the camera contains the original negative and the W.A. film, and the double-camera system, in which one camera exposes the usual original negative and a second camera, the W.A. Using a workprint alternative saves time and lowers production costs.

Color Coordination for TV and Theatrical Photography—A Function of Shooting Time Savings and Improved Technical Quality

ROBERT BROWER, Universal City Studios, Universal City, Calif.

The characteristic brightness span capability of a color photographic negative requires techniques that bring significant subject brightnesses within this span. Effective pre-camera subject-matter control

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- Accepts daylight load roll film.
- Built-in viewer light trap.
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- Fits 1/4" or 3/8" tripod threads.

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Guidelines for a "sound" investment...

Sync sound filming can be a rough, tough day's work and it requires a camera that can stand up to the "grind." Here are some guidelines to help choose the one right location sound camera for your work.

RUGGED RELIABILITY — Location sound filming takes a rugged, reliable camera. The Arriflex 16BL is that kind of camera. At its heart, it has the same Arri mirror-shutter registration movement and the same heavy-duty construction which has won for Arriflex 16S and 16M cameras their worldwide reputation for quality and reliability. The new Arriflex 16BL is therefore a proven performer right from the start.

TRUE PIN REGISTRATION — For any motion picture camera, the moment-of-truth is the instant a frame of film is exposed. Since there are 40 such "moments" in every foot of 16mm sound film, only a true pin-registration film movement can do the job. The Arriflex 16BL has such a movement. It is the same cam-driven pin-registration movement used in the Arri 16S and 16M cameras. A movement so precise and durable that many of these cameras have turned out more than a million feet of original theatre-quality film—and are still going strong in production after production.

SINGLE LENS REFLEX — It's a fact, that today's best reflex finder design is based on the famous Arri mirror-shutter principle and, while often imitated, it has never been surpassed. The Arriflex 16BL finder uses this proven reflex system. It is unsurpassed for clarity and brightness under all practical filming conditions. The 16BL viewfinder requires no optical relay or image compensator; it provides the ideal condition, in which, at the moment of exposure, there is nothing between lens and film.

COMPLETE SOUND VERSATILITY — For the active professional with all kinds of filming assignments, not one, but two sound systems are often needed. The new Arriflex 16BL provides complete sound capability—single system sound, double system sound, either, or both. The 16BL is convertible anywhere, anytime. The single system sound head module may be quickly and easily installed, or removed, to suit the job. Shoot either, or both types of sound simultaneously. Sixty-cycle signal generator, automatic clap-stick system and cue marker for double system sound recording—quick-change conversion module for single system sound. And either system produces top quality sound with famous Arri picture quality.

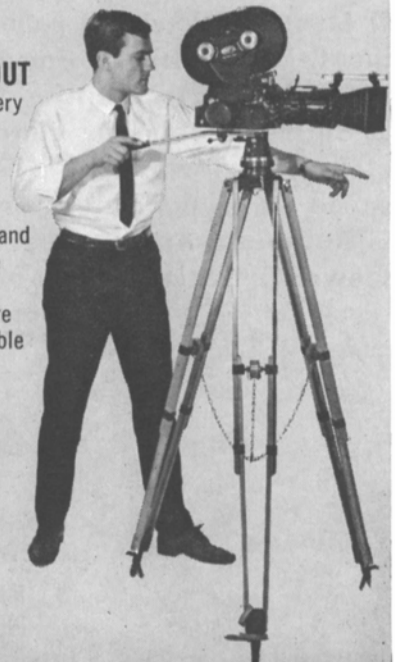
Write for NEW ARRIFLEX 16BL 10 page catalog.

QUICK-CHANGE MAGAZINE SYSTEM — The magazine system of a location camera, must be rugged and fast without sacrificing reliability. Arriflex 16BL Quick-Change Magazines are gear-driven and have speed and take-up sprockets built in. The resulting simplified film path permits magazine changes to be made in seconds. This 16BL Quick-Change Magazine system places the entire film gate safely in the camera head—where it ideally belongs. Thus, the 16BL magazine system provides the right combination of speed and reliability. Important too, Arriflex Quick-Change magazines are economically priced!

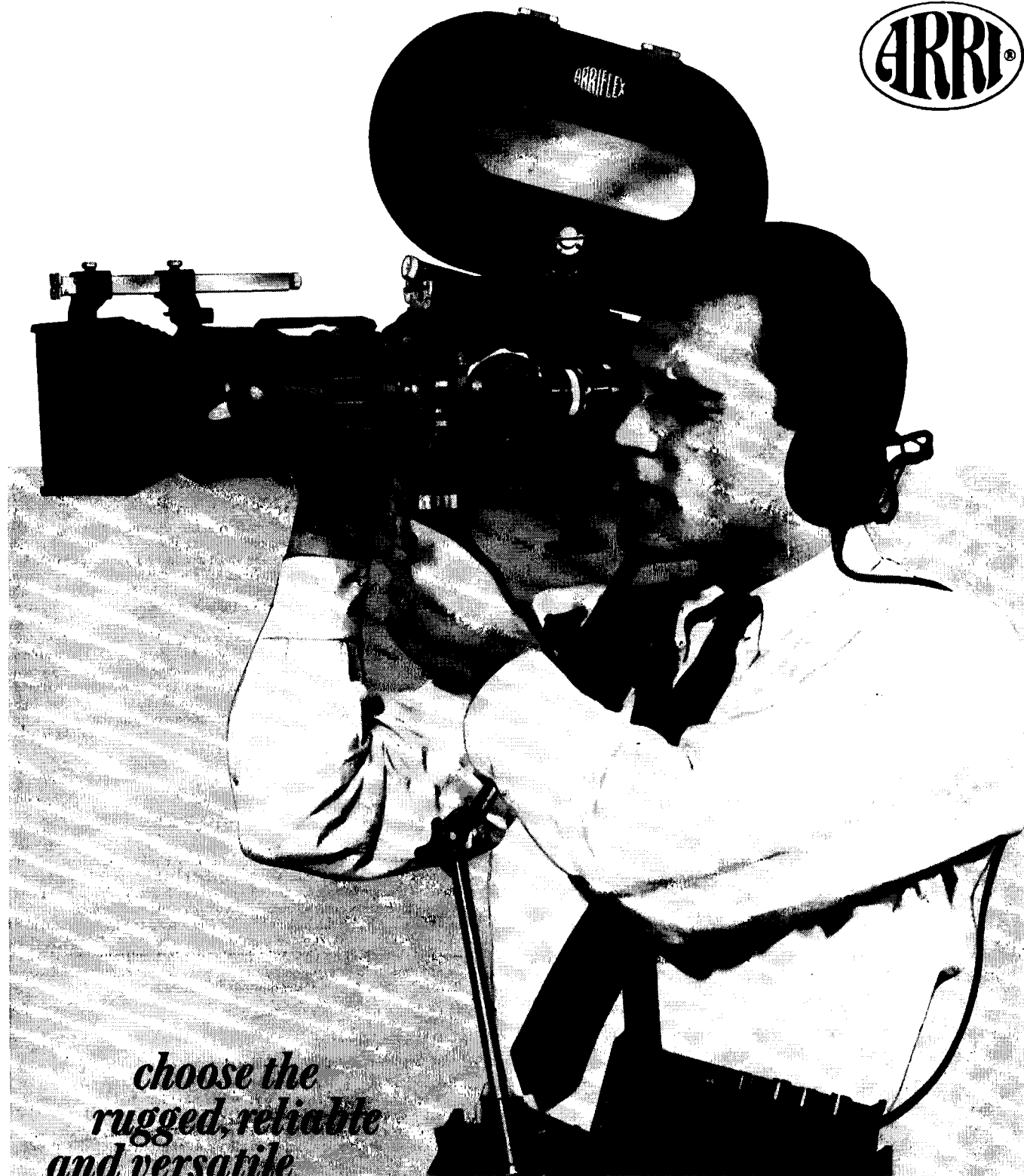
ALL-PURPOSE CONFIGURATION — The filmmaker's technique must never be slave to camera construction. That is why the Arriflex 16BL is built along classical lines. For tripod mounting, the Arriflex 16BL has a substantial flat base, low lens axis and low center of gravity. And with matching Arri Body Brace, the 16BL is well balanced, comfortable handling, fully mobile. Verité or traditional—the Arriflex 16BL lets you choose the filming technique that is best for the job at hand.

PROFESSIONAL FEATURES THROUGHOUT

The Arriflex 16BL has every essential professional feature: Weight of basic outfit, 18 lbs.; Residual noise level, 31 db; Fully professional tachometer, and footage counter; Eyepiece adjustable on two axes and with automatic closure mechanism; Interchangeable motors; Single system/double system sound conversion; and options that include dissolving shutter, and built-in, behind-the-lens exposure meter. The Arriflex 16BL is the one right camera for every professional location assignment.



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for the age of 16mm sync sound location filming

for theatrical photography was introduced many years ago. Photography which yields film prints for color television usage is required to compress the subject-matter brightness span further so that the more restricted span of film print densities suitable for this medium is achieved. The nature of subject-matter brightness control and its relation to lighting is discussed. The use of the off-white standard relationship to film-print density limits, its application to all subject brightnesses as a "pre-lighting" technique and its effect on on-the-set shooting time savings are described.

THURSDAY AFTERNOON CONCURRENT SESSIONS 1:15 TELEVISION I

Early Development of West Coast Television

HARRY R. LUBCKE, Registered Patent Agent, Hollywood, Calif.

The first serious efforts in the development of electronic television on the West Coast were by Philo T. Farnsworth in San Francisco in 1928. The image dissector, image-displaying cathode-ray tube and magnetic deflection of both horizontal and vertical scanning according to a sawtooth waveshape were used in that laboratory by early 1930. Electronic television started with a few lines per image, because high-conductance vacuum tubes with suitable equalizing circuits were yet to be invented. Self-synchronization of the all-electronic receiver was first attempted by filtering out significant horizontal and vertical information from the image signal itself and applied to scanning oscillators having frequency-change inertia. Other early developments in West Coast television are also described.

60 Frames/Second Film and Continuous-Motion Projector for PICTUREPHONE System Testing

J. E. BERRANG and R. L. EILENBERGER, Bell Telephone Laboratories, Inc., Murray Hill, N.J.

A series of 60-frames/s, 35mm black-and-white sound films has recently been made for use in a PICTUREPHONE visual telephone system test and evaluation program. In such a subjective test program, wherein such variables as digital frame repeating, line sample replenishment in various patterns and interlaced vs. noninterlaced operations are being compared and evaluated, a prime requisite is a source of invariant test material for imaging on the vidicon target of the PICTUREPHONE visual telephone set. The film production program, using a Mitchell high-speed camera modified for synchronous operation at 60 frames/s, included the design and fabrication of a continuous-motion film projector and the solving of several electronic problems in maintaining projection synchronism and in recording double-system sound. The film speed of 60 frames/s was chosen to have a 1:1 correspondence to the vidicon scanning rate. Sound has been recorded synchronously at 18.75 in./s, using a 150-Hz recorded pilot tone locked to the 60-Hz power line. The tape, when played back at $7\frac{1}{2}$ in./s, provided the requisite 60-Hz pilot tone to synchronize the optical soundtrack processing equipment.

Continuous Motion-Picture Projector for Television Scanning

J. MULLER and L. DEGEN, Bell Telephone Laboratories, Inc., Murray Hill, N.J.

Color Fidelity in TV Camera Systems

JOSEPH F. WIGGIN, General Electric Co., Syracuse, N.Y.

The fidelity of color reproduction in television pictures originating from a live camera is influenced by such factors as the camera filter characteristics, signal processing, encoding and decoding errors, the characteristics of the phosphors used in the display tube, and the white balance adjustment of the display tube. Assuming an ideal electrical processing system including gamma correction, encoding and decoding, the fidelity of a color camera system is analyzed as it is affected by the camera color response characteristics and the color display device.

Mechanical and Electronic Layout of a Color 16mm Film Scanner with Pneumatic Fast Pulldown

HEINRICH ZAHN and EMIL SENNHENN, Fernseh GmbH, Darmstadt, Germany

The advantages and technique for film transport within the television vertical blanking gap to eliminate color registration requirements are pointed out. This flying-spot color film scanner for 16mm film has a pneumatic fast pulldown advancing the film within 1.14 ms. Picture and sound are ready for transmission 0.2 s after the start. A take-up device provides for constant film traction, even in the run-up and stopping period. Film reversal is possible, for monitoring. A summary of the special advantages and features is given.

Panel I: On-the-Job Color Training for Television Technicians

CONCURRENT SESSION

1:15 PROJECTION

Max Skladanowsky—the Work of a Film Pioneer

ALBERT NARATH, Technical University, Berlin, Germany

Max Skladanowsky of Berlin developed a Bioscope Projector with which he showed motion pictures for the first time on November 1, 1895, as part of the program at the Berlin Wintergarden theater. A biography is given of Skladanowsky's work in the fields in which he was actively engaged.

The Characteristics and Compatibility of Projection Light Sources

DONALD V. KLOEPFEL, DeLuxe Laboratories, Inc., Hollywood, Calif.

Projection light sources are reviewed historically according to the various types of lamphouses, arc controls, power supplies and optics that have been used. The xenon short arc lamp has recently become a popular projection light source in American laboratories and studio review rooms. The compatibility of the high-intensity carbon arc and the xenon short arc lamp sources and the resultant screen light are of importance since there are between them chromatic differences related to the position of each source on the ICI chromaticity curve and the spectral energy within the visible spectrum. Demonstrations are given from examinations of these and other phenomena pertinent to screen light and color and of the ability to reproduce a color print faithfully on a motion-picture screen with available projection light sources. The experiments and presentation confirm that carbon arc and xenon short arc projection light sources are compatible within acceptable tolerances.

360 Degree 3-D Without Glasses

ROBERT B. COLLENDER, Lockheed Aircraft Co., Burbank, Calif.

A system of stereoscopic 360° viewing of scenes in nature includes photographing with nearly conventional techniques and projecting so that the audience can surround the playback viewer and see a smooth change in scene, without the aid of glasses. Three-dimensional views can be represented inside a revolving drum containing a narrow aperture through which the observer sees a scanned 360° rendition of a scene. Observers can walk around the space image and see the scene in depth. The viewer is simple, uses a small number of parts, is not critical in adjustment, and relatively simple camera equipment is satisfactory. A demonstration of the system is given.

Today's Movie Theater

J. W. BANTAU, National General Corp., Los Angeles, Calif.

Recent trends in the construction of motion-picture theaters are related to improvements in screen illumination and screens proper, operating conditions of modern-day theaters, the selection of rectifiers over motor-generator sets and the use of xenon lighting for motion-picture projection, as well as to the habits of the theater-going public and their effect on the design of theaters.

History of Simplex

G. J. HESSICK, National Theatre Supply Co., Paramus, N.J.

Good Projection Practice Through Test Films

JOSEPH R. STIFEL, Society of Motion Pictures and Television Engineers, New York, N.Y.

Projection Development and Automation in the Rank Theater Division

ROBERT PULMAN, Rank Organisation, London, England

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THURSDAY EVENING

8:30 A. S. C. REVIEW OF MOTION-PICTURE HISTORY

MILESTONE AWARDS PRESENTATION

FRIDAY MORNING—OCTOBER 7

9:30 SOUND II: THE CONTROL OF SOUND IN AN AUDITORIUM

Los Angeles Music Center

Architectural Design to Accommodate Acoustical Design

JOHN C. KNIGHT, Welton Becket & Associates, Los Angeles, Calif.

To design a structure which accommodates all the array of technical requirements of a multipurpose auditorium, the architect faces the problems of the volume, shapes and surfaces dictated by acoustical requirements. At the same time the design must be made architecturally appealing. The task is discussed in the framework of the Pavilion of the Los Angeles Music Center.

The Objectives, Challenges and Techniques for Acoustical Design for Large Auditoriums

PAUL S. VENEKLASSEN, Paul S. Veneklasen & Associates, Los Angeles, Calif.

Modern multipurpose auditoriums must accommodate much larger audiences than the older concert halls which established the taste for acoustical excellence. They must have a full stage house and accommodate orchestral music, opera, musical comedy and dramatics; they are expected to be optimized acoustically for all types of performance. Each performance requires a proper blend of clarity, envelopment and reverberance. Methods of achievement are suggested from older rectangular halls. Designs for similar achievement in the wide fan-shaped halls with stage houses are developed using optical and acoustic modeling techniques. A movable orchestra enclosure converts the theater to a concert hall. The results of the acoustical model studies can be correlated precisely with similar tests in the finished hall. Ultimate achievement is measured by the playing ease of performers and the comments of musicians and critics.

An Analytical Study of Acoustic Feedback in Sound Reinforcement Systems

JERRY P. CHRISTOFF, Paul S. Veneklasen & Associates, Los Angeles, Calif.

The physical transduction factors expressing the component and system are quantized to derive a condition for stability. These factors are: efficiency of transducers, frequency response, directivity of both microphones and loudspeakers, acoustic baffling, nearby surface reflections, and general reverberation. The total electroacoustic gain capabilities of simple and complex situations are compared with the performance of complete systems.

Sound Reinforcement for the Large Multipurpose Auditorium

PAUL S. VENEKLASSEN, Paul S. Veneklasen & Associates, Los Angeles, Calif.

The requirement of sound reinforcement in a large auditorium for performance of plays and light opera must be recognized and stressed from the beginning of design. Successful reinforcement must be carefully integrated with good acoustical design. A basic five-channel stereophonic system is used to preserve naturalness, apparent source position and movement, and apparent perspective on stage. Either nondirectional microphones can be used to preserve stage reverberance with musical ensembles, or cardioid-type microphones can be used to accentuate intelligibility. Five loudspeakers are hidden in the proscenium arch. Microphones can be suspended or mounted invisibly in the floor. The degree of coverage over the stage area of a single set of microphones is analyzed. Additional loudspeakers are provided upstage for solo balance or for pit orchestra transfer. Operation can be from the audience area or from the equipment room using CCTV and a binaural transfer. In the latter case the operator has many other monitoring facilities available. Data on available gain are given. The success of natural reinforcement without visible appurtenances has been verified.

FRIDAY AFTERNOON

1:45 TELEVISION II: STUDIO PRACTICES

Panel II: Video-Tape Recording

Ten Years of Video-Tape Recording

C. E. ANDERSON, Ampex Corporation, Redwood City, Calif.

Panel III: Presentation and Playback of Color Film

Panel IV: Live Color Television—Lighting and Camera

FRIDAY EVENING

8:30 PRE-RELEASE FEATURE MOTION PICTURE