Advance Program

The Advance Program is as complete and accurate as possible, but it is tentative because there are some papers received at deadline which have to be handled editorially only by adding arbitrarily to sessions. Also, there may be other papers for which the Program Chairman has found time in certain sessions and these will appear in the Final Program. Members who can attend only part of the Conference and plan for only certain sessions should inquire a week before the Conference by telephoning Society Headquarters in New York (212 TN 7-5410) or Program Chairman Arthur L. Foster, U.S. Dept. of Agriculture, Washington (202 DU 8-6747).

Tentative Outline of Program

Sunday

2:00–8:00 Registration

Monday

8:00 Registration
8:45 Laboratory Practice
12:15 Get-Together Luncheon
2:00 Laboratory Practice
3:30 New Materials and Processes
5:00 Exhibit Open House
8:00 New Materials and Processes

Tuesday

8:45 Instrumentation and High-Speed Photography
1:45 Instrumentation and High-Speed Photography
3:00 Panel Discussion: Lens Design
7:45 Historical Report

Wednesday

9:00 Equipment Papers and Demonstrations
1:30 Report on the 7th International Congress on High-Speed Photography
6:30 Cocktail Party, Banquet and Dance

Thursday

9:00 CONCURRENT SESSIONS 7th International Congress
Instrumentation and H-S Photography
Television
1:45 Television
7:45 Education

Friday

9:00 Application of Motion Pictures and Television in Medicine
1:30 Tour of Goddard Space Flight Center

(See page 234 for Committee Meetings)

Association of Cinema Laboratories

Spring Meeting, April 29–30, 1966
Sheraton-Park Hotel, Washington, D.C.

Friday evening

6:30 Board of Directors Dinner — Franklin Room

Saturday

10:00 Meeting of ACL Members — Franklin Room
12:30 Luncheon — Continental Room
2:00 Techniques and Equipment Forum — Franklin Room

SUNDAY—MAY 1

2:00–8:00 REGISTRATION

MONDAY MORNING—MAY 2

8:00 REGISTRATION

8:45 LABORATORY PRACTICE I

Photometer for Color Printers

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

The color photometer for printer control applications has a compact probe fitting into the jaw of Bell and Howell and Peterson printers. It has an adapter for use with optical printers; and it uses selenium photo-voltaic cells, selected for minimum fatigue. The position of a five-aperture filter slide is indicated by a coded disc. Readings are taken either with portable microammeters, or meters mounted on the printer.

Electric Motor Drive Systems for Motion Picture Sound

WILLIAM V. STANCIL, Stancil-Hoffman Corp., Hollywood, Calif.

One of the most important phases in motion pictures is combining the many soundtracks (e.g., dialogue, sound effects, music) into one final soundtrack, synchronized with the action on the film. Interlock motors are used to accomplish this. Two types of synchronous motors (hysteresis and salient pole) for providing the power are also described.

Application of Aerospace Clean Room Techniques in the Photographic Industry

BOYD AGNEW, Agnew-Higgins, Inc., Garden Grove, Calif.

Particle accumulation in clean room atmospheres can be prevented by Laminar/Flow Clean Air Handling Systems which make it possible to circulate much larger quantities of clean air through working chambers (clean rooms) than was previously possible. Existing darkrooms or other areas can be converted into clean rooms by applying laminar/flow in photographic industries equipment.

A New Continuous Additive Color Printer for High-Speed Production

HANS-CHRISTOPH WOHLRAB, Bell and Howell Co., Chicago, Ill.

To increase efficiency and reliability, a new high-speed continuous printer with additive color control has been developed. This printer prints picture and sound in forward and reverse directions. A new type of reader with solid-state circuitry makes light changes possible in less than half the scene length of the model C printer, despite the new, higher printing speed of 240 ft/min. Several safety devices are provided to prevent film losses due to operator errors in film threading or tape handling.

High-Speed Magnetic Sound Transfer to 8mm Films

WILLIAM N. FITZGERALD, ROBERT C. LOVICK, HOWARD F. OTT and PHILIP A. RIPSON, JR., Eastman Kodak Co., Rochester, N.Y.

A technology has been developed for transfer of magnetic sound at 150 ft/min, making possible the economical production of 8mm sound prints on prestriped print film. An experimental printer, which can accommodate any current or proposed 8mm format with magnetic sound, has been designed and built to operate at 7½ times projection speed. This inertia-controlled printer will in one pass print from a

16mm magnetic sound master two separate records simultaneously onto a double Super 8 film at 150 ft/min. Amplifiers and compensating circuits have been constructed which make possible rerecording of magnetic records at this high speed. An earlier report on this subject was given at the SMPTE 97th Technical Conference.

A Systematic Approach to the Mass Production of Commercial Super 8 Prints

C. LOREN GRAHAM, WILLIS L. STOCKDALE and ALLAN L. WILLIAMS, Eastman Kodak Company, Rochester, N.Y.

In order for the industry and the public to benefit fully from the potentialities of the future markets for 8mm prints in the audio-visual field, a system needs to be developed for producing prints at the lowest possible cost. This requires a system of extremely high efficiency, in which there are no waste operations. The system proposed uses prestriped 35mm/Super 8 film in which all operations are streamlined and high speed. This optimum system takes into consideration windings, image orientation, optical and contact printing, lubrication, slitting, and packaging. Film handling with respect to registration and transport is discussed. A similar system applicable to 16mm/Super 8 film is proposed.

Production Processing of 16mm Type 7270 Color Internegatives Using Viscous Processing Techniques

WILLIAM D. HEDDEN and JAMES DUFFY, Calvin Productions Inc., Kansas City, Mo.

Viscous processing techniques have been applied to production processing of Eastman Kodak color internegatives, Type 7270. The application of viscous techniques to a production processing machine and the results achieved are discussed.

MONDAY AFTERNOON

12:00 GET-TOGETHER LUNCHEON

Guest Speaker:

Senator George Murphy

2:00 LABORATORY PRACTICE II

An Investigation of Agitation in a Continuous Immersion Film Process

WALTER C. SNYDER, Photographic Technology Div., Eastman Kodak Co., Rochester, N.Y.

A successful agitation system in deep-tank film processes must cause the solution to move uniformly at a desired energy level and must adequately and uniformly supply fresh solution to the emulsion surface. A theoretical and practical investigation of a film strand moving through a processing solution has shown that the boundary layer between the film and the solution is laminar for all practical processing speeds. Laboratory tests have indicated that density nonuniformity caused by poor or insufficient agitation can be improved by the proper use of submerged nozzles. By a newly developed technique, the by-products of development were observed as they were formed. Hydroquinone sulfonate, a principal by-product of development, fluoresces when excited by ultraviolet light, producing a fluorescent layer of material on the emulsion surface, which visually shows the effect of any disturbance caused by the agitation mechanism.

Calvin Workshop Laboratory Presentation

WILLIAM D. HEDDEN, Calvin Productions, Inc., Kansas City, Mo.

Since 1947, the Calvin Workshop has offered a program of instruction in motion-picture production. Films of the Laboratory Problems Session are shown with an explanation of how the films are used with the Workshop audience.

Quality-Control Testing Service on Color-Film Processing and Printing

LEROY M. DEARING, L. M. Dearing Associates, Inc., Studio City, Calif.

A quality-control testing service designed to assist laboratories in improving and processing of stabilized reversal motion-picture color films, such as Ektachrome MS, is in the planning stages. Experience gained during the past two years with color photofinishing plants indicates that such a service contracted for on an individual and confidential basis with each plant has had substantial success in improving the quality of Kodacolor film processing and printing.

Thin-Probe Pulsed-Light Photometer

LEROY M. DEARING, L. M. Dearing Associates, Inc., Studio City, Calif.

A highly sensitive pulsed-light photometer, which has three states of solid state amplification, measures the intensity of tiny pulsed-light sources which occur in camera timing markers on high-speed cameras. It measures the relative intensity of a 20-mil diameter pulsed-light spot, but is not affected by direct sunlight. One form of the light probe which fits between the sprocket teeth of a 16mm camera is suitable for checking the reliability of camera timing out on the range. The thin-probe mount which carries only one stage of amplification is connected by a cable to a case containing the other stages, the meter and range switches.

Pan and Scan Step Printer

WALTER EGGERS, C. L. LUTON and ROBERT GYORI, M.G.M. Laboratories, Inc., Culver City, Calif.

An Oxberry printer has been modified for 35mm to 16mm or 35mm to 35mm printing from squeezed CinemaScope to flat 16mm or 35mm. Preselected and programed with binary code, it accommodates any of ten positions and pans left or right.

35 to 70mm Panavision Blowup Step Printer

WALTER EGGERS, C. L. LUTON and ROBERT GYORI, M.G.M. Laboratories, Inc., Culver City, Calif.

MGM release on *Dr. Zhivago* in 70mm Panavision was printed on a modified Oxberry printer, using a binary code tape control for programmed dissolves with A and B printing, scene-to-scene light control and color correction subtractedly. A wet gate is used. The printer is prewired and constructed to accept tape controlled edited light source.

MONDAY AFTERNOON

3:30 NEW MATERIALS AND PROCESSES I

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

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

A new high-speed black-and-white reversal film, Eastman 4X Reversal Film, Type 7274, 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 Eastman Plus-X and Tri-X Reversal Films, Types 7276 and 7278. An increase in the first development time in the process doubles the normal speed with little loss in quality.

A Shorter, Higher Temperature Process for Eastman Color Print Film

K. D. FOWLER, R. A. MORRIS and F. J. O'BOYLE, Eastman Kodak Co., Rochester, N.Y.

The total processing time for Eastman color print film, with all solutions and washes at 75 F, has been reduced from 45 min to 28 min with no sacrifice in image quality. No changes in formulas are required. The shorter times for each solution step permit an approximate 30% increase in machine speed.

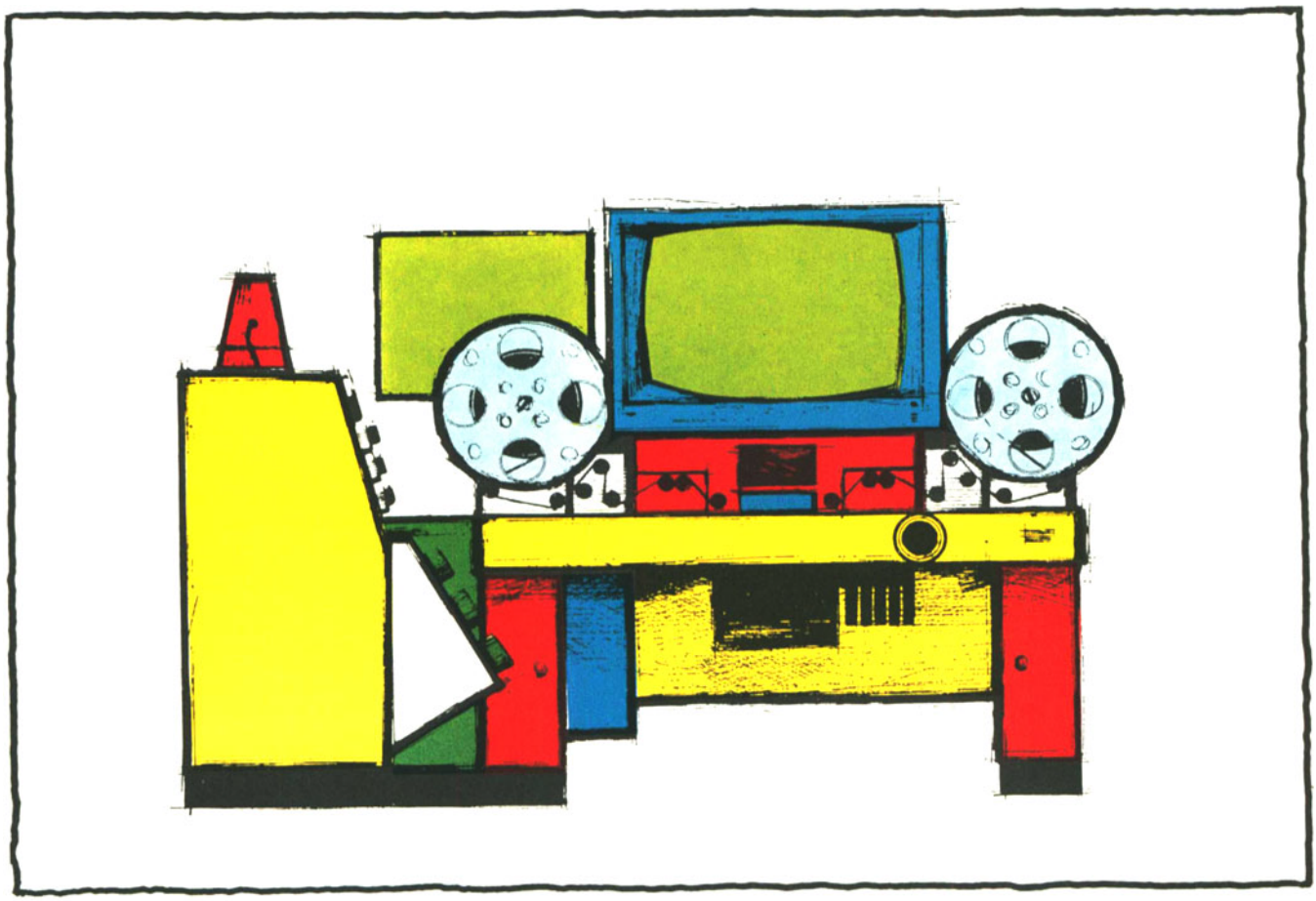
A Fully Automatic Super 8 Rear-Screen Sound Motion-Picture Projector for Audio-Visual and Educational Purposes

F. C. MATHIEU, Cameca, Courbevoie, France

The Camescope is a new approach to an automatic loading projector without expensive film cartridges. A slightly modified common plastic transport spool with a patented clip acts as the cartridge. The user merely fits the spool on an axle, after which the operation is entirely automatic and by remote-control pushbutton. Start, stop, partial quick rewind to show a sequence again, and total rewind are accomplished by pushbutton.

see proof of color before you print . . .

Hazeltine has taken the guesswork out of color film processing (b & w, too).



ELECTRONIC COLOR FILM ANALYZER

- Balance the color and density as you wish
- The range of color corrections is almost limitless
- See results displayed instantly and precisely
- Read the printing data directly from 3 panel controls

35 mm or 16 mm negative or positive film is power transported in either direction with smooth, continuous and gentle motion. Compatible automatic tape punch attachment is available which reads and translates the exposure control settings and punches the appropriate code in a paper tape.

The analyzer design can include preview capability. The fully color-corrected film can be shown in cine-motion permitting a final recheck and correction of scene-to-scene continuity before committing the film to processing.

For more details or to arrange for a demonstration, write or phone:

HAZELTINE

Customer Liaison Department
HAZELTINE CORPORATION
Little Neck, New York 11362
Area Code 212 FAculty 1-2300
Cable NEUTRODYNE • Telex 0126166

MONDAY EVENING

5:00 EXHIBIT OPEN HOUSE

7:45 NEW MATERIALS AND PROCESSES II

Design of a New 8mm Camera and Projector Accepting Various Kinds of 8mm Film

HARUO TESHI and FUMIO SAKAKI, Elmo Co., Ltd., Nagoya, Japan

The technical background is given in detail for the design and construction of an 8mm multipurpose motion-picture camera which can accept Kodak's Super 8, Fuji's Single 8 and regular 8mm films with a change of the camera back unit. The new camera relates to a new 8mm projector which can also take the Super 8-size films and regular 8mm film.

An Electronic Control for Programing an Animation Table

JACK BEHREND, Behrend's Inc., Chicago, Ill.

Using digital counters, stepping motors and a unique linear control device coupled to a joy stick, faster and more accurate control is obtained in positioning an animation stand compound.

Motion Picture Prints from Thermoplastic Original

HARRY SOMBOR, General Electric Co., Schenectady, N.Y.

The production of quality motion-picture prints on commercial equipment, from an electronically recorded thermoplastic original, is described with reference to the optical system, choice of film types, and test signals.

Instrumental and Industrial Uses of Fiber Optics

JOHN T. FERRIS, Bausch & Lomb Inc., Rochester, N.Y.

The practical uses of fiber optics, its potential and its limitations are discussed. The flexible fiber devices of the image carrying type are compared in some detail as to their costs, availability and probability of various fiber configurations.

Ultra Semi-Scope System for Motion-Picture Photography and Projection

SHIGEO YOSHIDA, Toyo Koki Co., Ltd., Tokyo, Japan

The Ultra Semi-Scope (USS) system projects a one-frame picture image with two perforations on 35mm regular film instead of the four perforations (4-p) in the conventional CinemaScope film. Cumbersome anamorphic lenses are not necessary for photographing or projecting the CinemaScope format picture. The USS system uses the following alterations: the camera mechanism must be remodeled, as does the projector mechanism, for compatible use with the 4-p and 2-p process films. The equipment for optical sound recording must run with half the film speed. There must be a new sound reproduction system of monoaural or multichannel magnetic sound reproduction system which can easily be combined, and also a specially designed optical printer to make a non-squeezed 2-p frame print from the squeezed original negative picture or vice versa.

Tentative Committee Meeting Schedule

SMPTE Engineering and Administrative Committees will meet during Conference week. The schedule for Engineering Committee meetings follows. All meetings will be held in the Franklin Room.

Monday, May 2

2:30 p.m.	Instrumentation and High-Speed Photography

Tuesday, May 3

10:00 a.m.	Laboratory Practice
2:00 p.m.	Color

Wednesday, May 4

10:00 a.m.	Film Projection Practice
2:00 p.m.	Television

Thursday, May 5

10:00 a.m.	16 and 8 mm
2:00 p.m.	Film Dimensions

Any last-minute changes in the schedule will be listed in the Final Program and posted on the bulletin board in the registration area.

The following Editorial activities have also been scheduled.

Wednesday, May 4

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

TUESDAY MORNING—MAY 3

8:40 INSTRUMENTATION AND HIGH-SPEED PHOTOGRAPHY I

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.

High-Speed Photographic Investigation of Gun-Launched Projectiles

JOHN CLAYTON, Space Research Institute of McGill University, Montreal, Que.

The Space Research Institute is engaged in two major projects: the gun-launching of vehicles to carry out scientific studies of the upper atmosphere, and the design of a protection system to minimize the chances of the failure of a space vehicle due to meteoroid impact. High-speed photographic equipment, including smear, framing, image converter and X-ray cameras, and its applications to these projects are described.

Surface Irregularity Tracking System

MYRON J. ROSENBLOOM and STEVEN R. CROOPNICK, M. I. T. Instrumentation Laboratory, Cambridge, Mass.

In the Surface Irregularity Tracking System described, a sensor receiving radiation from a remote surface is used to detect the position or velocity relative to the surface. The device uses modulation of an image from a target surface by optical gratings. System accuracy in both the time and frequency domain is analyzed and correlated with experimental results. The system's applications include tracking the local vertical; tracking a stationary or moving point, or the ground from a vehicle in motion; stabilizing with respect to the star field; and controlling attitude relative to an orbited body.

Direct Ciné Micrography with the Electron Microscope

W. C. MACE, JR., and J. L. DANIEL, Battelle-Northwest, Richland, Wash.

The dynamic study of chemical and physical reactions by electron microscope is particularly valuable when combined with ciné micrography, using techniques such as time-lapse photography and continuous magnification changes. Direct use of the imaging electron beam for photographic exposure gives maximum photographic quality, but presents problems of slow speed of emulsions to electrons, outgassing and embrittlement of film in the microscope vacuum, and static discharge fogging. Several types of commercial 16mm film have been evaluated in microscopy experiments. Techniques for effective ciné recording have been used with special electron microscope reaction methods for application to nuclear fuel ceramics.

Coherent Light in Photographic Applications

EDMUND L. BOUCHE, Technical Operations Research, Burlington, Mass.

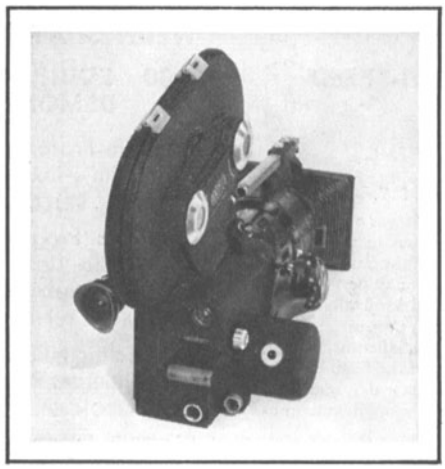
The general availability of laser light sources has provided the photoinstrumentation engineer with a powerful new tool for use in image-recording and image-reproducing systems. Because of its high degree of spatial and/or temporal coherence, the radiant field produced by laser sources can cause unexpected image effects to occur if the system is envisioned as a conventional incoherent linear optical system. Examples of some of the resulting nonlinear image effects are treated for the case of contact printing, projection printing and holography, and compared with the incoherent situations.

Multicolor Wavefront Reconstruction

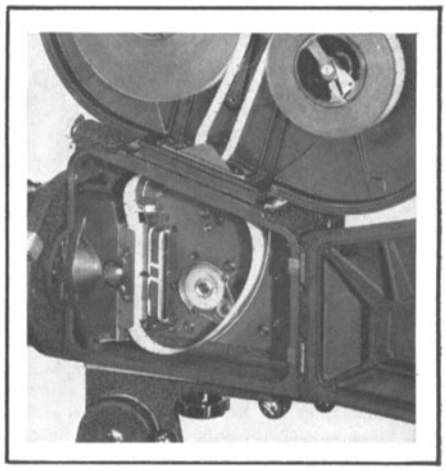
K. S. PENNINGTON and L. H. LIN, Bell Telephone Laboratories, Inc., Murray Hill, N.J.

A hologram is a record of the pattern of light waves reflected from an object as that pattern exists on a plane of space at a particular moment. The hologram records not only the brightness at each point on the object, but all the information that can be conveyed by light scattered and reflected from the object. Two-color pictures produced by lensless photography have been achieved by use of two different lasers as the source of coherent light required to make a hologram. A demonstration will follow the paper.

Arriflex 16BL is compact and lightweight (20 lbs.). Classical configuration provides complete handling ease—shoulder-pod mounted as shown or tripod mounted.



Uncompromised design includes professional tachometer and frame/footage counters.



Arriflex 16BL simplified film path and gear-driven, sprocketed magazine system combines speed, accuracy and maximum reliability.

THE **NEW** COMPACT LIGHTWEIGHT **SELF-BLIMPED** CAMERA

...for the age of location sync sound

SEE US AT SMPTE SHOW, BOOTHS 102–103

TUESDAY AFTERNOON

1:45 INSTRUMENTATION AND HIGH-SPEED PHOTOGRAPHY II

Photographic Problems of Sealab II

GEORGE T. CHAPMAN, United States Navy, Washington, D.C.

Sealab II was an experiment in underwater living. It was a part of the Navy's Man-in-the-Sea program. Twenty-eight men in three team relays spent 45 days living and working in and out of the Sealab on the ocean bottom. The basic purpose was to measure human performance in cold water and low visibility during long period saturation dives. The photographic problems encountered were from pressure, toxicity (of equipment which could contaminate the artificial atmosphere), visibility, cold sea water temperature, humidity (in the Sealab), corrosion and electrolysis due to long exposure to the sea water, and communication and logistics underwater. Helium voice made communication very difficult.

Underwater Photography

L. E. MERTENS, Radio Corp. of America, Patrick Air Force Base, Fla.

Outstanding underwater pictures are now possible with recently improved equipment, material and techniques. The physical properties of water as a transmission medium and the problems they introduce are analyzed. By careful consideration of these factors in the choice of lens, emulsions, filters, supplemental lighting, pressurized cases, etc., high-performance systems can be obtained economically. Subjective considerations of the desired color balance are also explored.

3:00 A PANEL FOR DISCUSSION ON SOME AUTOMATIC METHODS OF LENS DESIGN

Chairman: J. S. Courtney-Pratt

E. W. Bechtold	E. Elsner	C. A. Lehman
H. F. Bennett	J. H. Hett	A. B. Meinel
B. Brixner	J. C. Holladay	J. Merlon
W. Brouwer	R. E. Hopkins	R. R. Shannon

TUESDAY EVENING

7:45 HISTORICAL REPORT

The Work of the SMPTE Historical Committee

GLENN E. MATTHEWS, Retired, Kodak Research Laboratories, Rochester, N.Y.

The Historical and Museum Committee has served for many years as a clearinghouse for authors of historical papers. Since the early twenties, about fifty articles have appeared in the *Transactions* and *Journal*. These papers have documented many important events in the early developments of motion-picture engineering and more recently, in television engineering and photo-instrumentation. Historical papers appearing in the *Journal* are useful references for researchers and writers. The origin and early work of the Historical Committee, a review of some of the problems faced in securing historical papers, and some of the leading historical papers published by the Society are discussed. A classified bibliography of historical papers published in the SMPTE *Transactions* (1916–1929) and in the *Journal* (1930–1965) is presented.

Preserving Our National Heritage on Film: The Role of the National Archives

JAMES B. RHOADS, National Archives and Records, Washington, D.C.

The National Archives preserves motion-picture films which have originated in the Federal Government and have enduring informational or other value. Films are made available from holdings of 47 million running feet, covering the period from 1896 to the present. These are a rich source of visual information about all aspects of Twentieth Century American life and are used constantly by producers of documentary and educational films.

Celluloid and Paper: The Preservation Program of the Library of Congress

JOHN KUIPER, Library of Congress, Washington, D.C.

The necessity for preserving historic motion pictures is shown, along with a brief history of copyright deposits of motion pictures at the Library of Congress. The preservation program was begun by the Library of Congress and the Academy of Motion Picture Arts and Sciences in 1948, and has been continued by Congressional Funds. Paper print deposits and nitrate print problems are discussed.

WEDNESDAY MORNING—MAY 4

9:00 EQUIPMENT PAPERS AND DEMONSTRATIONS

Portable Professional Slide Wire Attenuator Mixer for Use With ¼-in. Tape Recorders and Film Recorders (Paper)

WILLIAM H. STUTZ, Amega Corp., Sun Valley, Calif.

Electronic Programmer for Controlling Various Pieces of Audio-Visual Equipment Throughout a Presentation (Demonstration)

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

New Eclair NPR Single System Magazine; New Eclair NPR Shoulder Resting Configuration (Demonstration)

J. P. CARSON, Eclair Corp. of America, Los Angeles

Kinoptik Apochromat New 9mm F/1.5; Carena New Convertible Super 8mm Sound Projector; Astrolux High Intensity Lights and Giant Image Projector (Paper and Demonstration)

JIM HEATLEY, Karl Heitz, Inc., New York

Table Top Model 135 Printer Processor, producing 35mm filmstrips, dailies or rushes in either reversed image or direct image at speeds up to 100 fpm (Demonstration)

NOEL R. BACON, Metro/Kalvar, Inc., New York

Thermal Butt-Weld Splicer, Using No Cements, Splicing Patches or Emulsion Scraping, for 16, 35 and 70mm Film; Mylar Reinforced Butt Splicer for 16 and 35mm Film (Paper and Demonstration)

STANLEY RUDOLPH, Prestoseal Mfg. Corp., Corona, N.Y.

WEDNESDAY AFTERNOON

1:45 INSTRUMENTATION AND HIGH-SPEED PHOTOGRAPHY III

Some Highlights of the Early History of High-Speed Photography

DAVID B. EISENDRATH, JR., D B Eisendrath Jr, Photography, Brooklyn, N.Y.

Historical trends in the field of high-speed photography are closely related to the history of photography itself. In the 127 years since the advent of high-speed photography, the technology has advanced as the complexity of the problems has required. Some of the early practitioners developed techniques of gathering information which is the basis of today's more refined technology.

The 7th International Congress on High-Speed Photography —A Review

MAX BEARD, U.S. Naval Ordnance Laboratory, Silver Spring, Md.

On September 12–18, 1965 in Zurich, the International Congress on High-Speed Photography was held, the seventh in the series of these progressively more important meetings. The technical papers program of the Congress is reviewed by several attendees from the United States. The dissemination of information is important to research, development and engineering groups; the review, however, is not intended to take the place of the proceedings of the Congress but to acquaint nonattendees of the scope of the meeting and the contents of the proceedings, by giving brief highlights of selected papers.

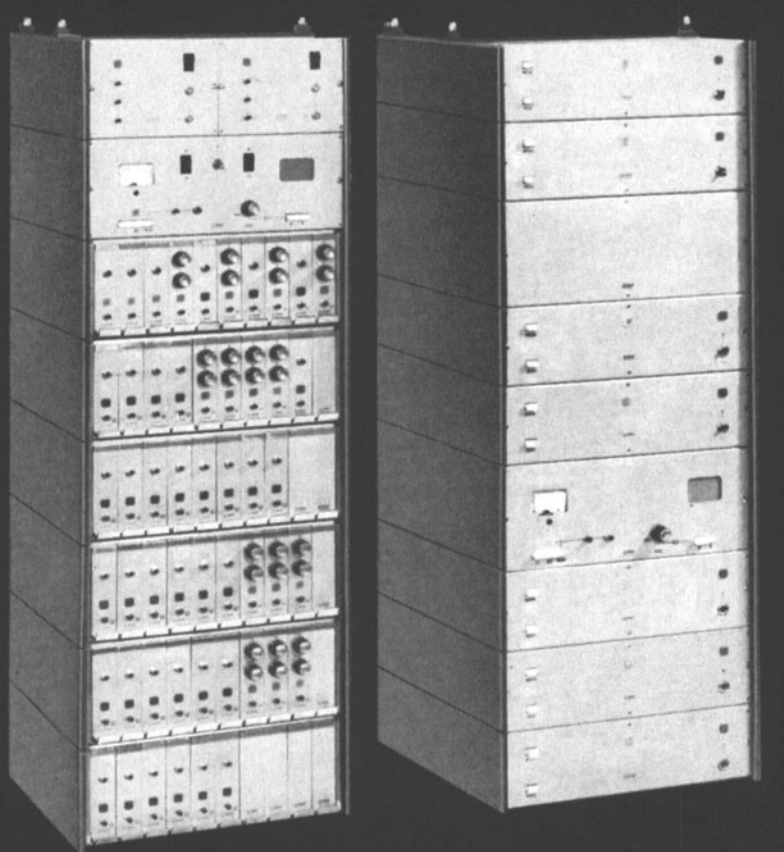
X-Ray Techniques — J. P. BARBOUR, Field Emission Corp., McMinnville, Ore.
Several Light Sources and a Framing Drum Spectrograph — FRANCIS D. HARRINGTON, U.S. Naval Research Laboratory, Washington, D.C.
Dynamic Photoelasticity and Fracture — PAUL D. FLYNN, Frankford Arsenal, Philadelphia, Pa.
Hypervelocity Impacts — P. L. CLEMENS, Von Karman Gas Dynamics Facility, Arnold Air Force Station, Tenn.
Russian Papers — MORTON SULTANOFF, Ballistic Research Laboratories, Aberdeen Proving Ground, Md.
Lasers — J. S. COURTNEY-PRATT, Bell Telephone Laboratories, Murray Hill, N.J.
Explosion Phenomena — BERNARD DRIMMER, Bureau of Naval Weapons, Navy Department, Washington, D.C.
Miscellaneous Selections—WILLIAM G. CHACE, Space Physics Laboratory, Laurence G. Hanscom Field, Bedford, Mass.
Surveys and Applications—WILLIAM G. HYZER, Consulting Engineer, Janesville, Wis.

Continued Thursday morning.

NEW ALL TRANSISTOR SOUND SYSTEM

by Norelco®

- Super compact wall-mounted design!
- Compatible with any projector or speakers!
- Operates with 35mm or 70mm—1 to 6 channels!
- Plug-in units for quick easy replacement!
- Superb sound—individually adjustable channels!



This is the kind of years-ahead sound system you'd expect from Norelco engineering. Capable of *perfect* balance anywhere because each sound source can be individually adjusted to fit the acoustics of a theatre. Lots of other superior features, too. Low hum level. Silent switching. Push button control of each sound source. Preselector switch for change-overs. Long lasting transistors and printed circuits for reliability.

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.

It even has its own built-in testing system. And if anything should go wrong, separate plug-in units save time, money and embarrassment. Spare power amplifier and spare power supply are built in and ready for instant use. All are packed into compact units that are wall hung to save floor space.

New Norelco sound operates with single channel optical 35mm, 4 channel magnetic 35mm, 6 channel magnetic 70mm, plus 3 optional non-sync sources: record players, microphones and tape recorders.

Sound good? It *is*. We know because we've tested it for two years. Not in a lab. But in theatres, where it counts.

For more facts on the new Norelco all transistor sound system, check your authorized Norelco theatre supply dealer or drop us a note today.

Norelco MOTION PICTURE EQUIPMENT DIVISION

NORTH AMERICAN PHILIPS COMPANY, INC. • 100 EAST 42ND STREET, NEW YORK, N.Y. 10017

Today you've got to move faster
So Beckman & Whitley made the

to get all the action!

ultra-compact CM16 sound camera.

At last a truly portable 16mm sound camera for professionals. The CM16 is 15 pounds light with zoom lens and 400 feet of film. It's slim and compact to move as fast as the action. Yet, built into this small, light package are many new performance advantages never before available in a professional 16mm sound camera. For example:

Single System Plus Double System Sound The CM16 is designed to record superior single system sound and at the same time provide double system sound recording capability. Continuous film movement and prealigned record and playback heads ensure top quality magnetic sound on pre-striped film. Wow and flutter are less than 0.3 percent rms from .5 to 250 cps. The low distortion three channel mixer amplifier provides 50 to 10,000 cps response, ± 1.5 db. For double system recording the camera can be operated in sync with tape or film sound recorders when run off either battery pack or 110V AC 60 cycle line power.

New Internal Reflex Viewing and Focusing Unique reflex optics permit internal through-the-lens viewing and focusing at all times. The objective lens iris can always be kept wide open for full brilliance viewing because the camera has its own internal, independent iris to control film exposure.

New Pin-Registered Continuous Moving Film A new, classically simple film movement outmodes the intermittent stop-start mechanism. In the CM16 camera, film flows smoothly, quietly and continuously, obtaining superior sound and picture quality. During operation the film is engaged by a tracking register pin which moves the image in perfect registration with the film edge and perforations. Also, compared to previous movements, there is far less mechanism for lower maintenance and greater reliability.

New Versatile Power Pack The new Model 200D power pack, built exclusively for Beckman & Whitley by Frezzolini, allows the CM16 to be operated on any 50 or 60 cycle power source from 110 to 220V without changing motors or gears. A special crystal frequency control module, accurate to 5 parts per million, permits two or more CM16 cameras to be operated in perfect sync.

Other Advantages Self-blimped—total camera noise 38 db @ 3 feet. Filter slot for three thicknesses of gelatin. Full 180° forward vision. Cameraman sound monitor. Low 20 watt power drain. Standard "C" lens mount. —30° F to 120° F operating range. Quick-change 200, 400 and 1200 foot magazines.

Field Tested for Performance and Reliability Top pros have field tested the CM16 for two years to prove its performance and reliability under the most rugged and difficult operating conditions.

To build the CM16 Beckman & Whitley drew on its experience and technology as the largest manufacturer of ultra high speed cameras for scientific research. The result is a camera for the technical perfectionist—a camera for the pro on the go.

For more information contact: Cine Products, Beckman & Whitley, Inc., 441 Whisman Road, Mountain View, Calif. 94040, Phone (415) 968-6220.

Beckman & Whitley
A SUBSIDIARY OF TECHNICAL OPERATIONS, INC.

VISIT US AT SMPTE SHOW, BOOTHS 11, 12

WEDNESDAY EVENING

6:30 COCKTAIL PARTY, BANQUET AND DANCE

THURSDAY MORNING—MAY 5

CONCURRENT SESSIONS

8:45 INSTRUMENTATION AND HIGH-SPEED PHOTOGRAPHY IV

9:00 THE INTERNATIONAL CONGRESS REVIEW, CONTINUED

Breakup of Liquid Drops

HAROLD E. WOLFE, Aerojet-General Corp., Downey, Calif.

A high-speed photographic study was made to investigate the mechanisms of aerodynamic breakup of liquid drops in the flow behind a plane shockwave. The desired flow conditions were generated in a small shock tube instrumented to measure parameters necessary to determine existing flow conditions and to provide for synchronization of the high-speed events with the photographic equipment. High-speed motion pictures (taken at the rate of 26,000 frames/sec) were made of the deformation and subsequent breakup of free-falling liquid drops in the flow behind the shockwave. The parameters were varied and included the flow velocity, droplet size, and the surface tension, viscosity and density of the liquid. Operation of the experimental equipment and results obtained are discussed.

Photoelastic Studies of Dynamic Stresses in High Modulus Materials

PAUL D. FLYNN, Pitman-Dunn Research Laboratories, Frankford Arsenal, Philadelphia, Pa.

Ultra-high-speed photography is needed to record transient stress patterns in models made from high modulus photoelastic materials. The photooptical system described was used to obtain dynamic photoelastic stress patterns at rates up to 1,000,000 frames/sec. Dynamic values of Young's modulus, Poisson's ratio, and the stress-optic coefficient were determined from simultaneous photoelastic and strain gage measurements of wave propagation in a bar. Comparing the photoelastic results with strain gage measurements demonstrated the usefulness of the oblique incidence method for separating principal stresses under dynamic conditions in a circular disc. Examples of stress wave propagation in transparent, two-dimensional models were studied using these techniques.

Sub-Nanosecond Streak Recording

JOHN K. LANDRE, Beckman & Whitley, Inc., Mountain View, Calif.

Tests on streak cameras equipped with rotating mirrors show that the best time resolution is obtained with the mirror spinning in a vacuum. Contrary to common belief, the next best resolution occurs in air, rather than in helium. Although the mirror can be operated much faster in helium, gas turbulence produces poorer time resolution. These results were obtained by putting a Model 770 Streak Camera in autocollimation.

Characteristics of Exploding Wire Light Sources

ESTHER C. CASSIDY and STANLEY ABRAMOWITZ, National Bureau of Standards, Washington, D.C.

Continuous and time-resolved measurements of the spectral distribution of light emitted by various exploding wires have been obtained by the use of a high-speed drum camera and a rotating shutter, respectively. Results from experiments with several systems show the effects of environment, pressure, energy, and wire material on the spectrum. Various intermediate species, produced by the explosion, are determined spectroscopically.

Some Aspects of Miniaturization in High-Speed Photography

J. S. COURTNEY-PRATT, Bell Telephone Laboratories, Inc., Murray Hill, N.J.

It would be adequate in much of the work in high-speed photography if we had a picture that resolved 200 line pairs across the frame each way. We could then choose the smallest lens aperture and/or the smallest format that would just allow such resolution. Shutters could then be designed to operate in much shorter times than would be possible with large cameras; it would be much easier to design equipment that would move the image or the film by one frame width in a given time; and thus some cameras that take sequences of pictures could be made to operate at higher rates than for conventional-sized pictures. There is a whole variety of problems in camera design that can be more easily tackled if one can keep down the size of the lens and/or the image (or the image element size in image dissection cameras). The application of these ideas to several kinds of camera is discussed.

CONCURRENT SESSION

8:45 TELEVISION I

Long-Haul Television Signal Transmission

PIERRE MERTZ, (Retired, Bell Telephone Laboratories), Lido, Long Island, N.Y.

The need for provision for interconnection of stations was foreseen early in television. The general nature of the steps by which long-haul (particularly wire) communication circuits were adapted to television signals is considered. In a historical survey these points are reviewed: (1) the legacy of telegraph and picture transmission arts, (2) general picture quality, (3) securing the bandwidth, (4) modulation and intermodulation, (5) phase distortion and echoes, (6) noise, and (7) color.

Progress Report on Improvements in Plumbicon Performance

F. W. DE VRIJER, A. L. TAN and A. G. VAN DOORN, N. V. Philips' Gloeilampenfabrieken, Eindhoven, The Netherlands

Much work has been done to improve picture quality in Plumbicon cameras. High definition pictures have been obtained with newly developed focus and deflection coil-assemblies and by operation at increased anode voltage. Methods to increase apparent sharpness include advanced aperture correction and application of anti-halo glass buttons. Techniques to improve color rendition are discussed.

The Norelco Plumbicon Color Camera Chain—Model PC 70

M. FISHER, North American Philips Co., Mount Vernon, N.Y.

The Model PC 70 is a three Plumbicon Camera design featuring zoom-type optics, prism color beam split, transistor circuitry, printed circuit cards and modular construction. The camera control unit, designed to achieve maximum installation flexibility, is of plug-in modular construction for mounting in a standard 19-in. rack. The operating control and registration panels are separate and can be located at a distance from the CCU proper. For normal studio use, either a 10 to 1, 18 to 180mm $f/2.2$ Angenieux lens or a 20 to 200mm $f/2$ Taylor Hobson lens is specified. Both are supplied with servo control of zoom, focus and iris. For field operation, the camera uses either a 12 to 1, 50 to 600mm, $f/4.5$ Angenieux lens or the studio lens with suitable range extenders. The long linear transfer characteristic of the Plumbicon, and absence of shading enable excellent color quality to be obtained from over very wide levels of scene illumination and reflectance factors.

Choice of Aperture in the Image Dissector Camera Tube

R. H. CLAYTON, International Telephone and Telegraph Corp., Fort Wayne, Ind.

The operation of the image dissector is reviewed. The factors determining resolution discussed include aperture size, image magnification, operating field strength, and electron-optical aberrations. Diagrams show signal amplitude attenuation and phase inversion; there are descriptions of on-axis and off-axis video amplitude response. Electron-optical "zoom" techniques are surveyed. The experimental results presented demonstrate many of the concepts discussed. These experiments make use of an image dissector of novel design.

Automatically Controlling the Reference of a Color Film Camera

H. H. MARTIN, General Electric Co., Syracuse, N.Y.

Due to the increased usage of color telecine equipment, considerable effort has been given to removing the need for constant operator attention during film and slide density and contrast variations. Various methods for controlling video level for optimum picture are discussed, and further picture enhancement by controlling contrast is described.

Television Transmitters in Parallel Operation

W. F. GOETTER, General Electric Co., Syracuse, N.Y.

Some of the reasons for parallel operation of television transmitters and the operating principles involved are reviewed. Recent installations which are, or will soon be, in operation are described in detail.

Automatic Video-Tape Editing Devices

KATSUYOSHI MATSUOKA, Japan Broadcasting Corp., Tokyo, Japan

Video-tape recording is very useful in television broadcasting, but editing it is not as easy as editing a motion picture. New equipment has been designed to separate technical splicing work from editing and to show the sequences on tapes rapidly and correctly. By using this equipment, the editing can be done by one program director, and the amount of work involved in editing and dubbing can be reduced to half as compared to the conventional splicing method.

A New Method of Television Waveform Display

GLEN R. SOUTHWORTH, Colorado Video, Inc., Boulder, Colo.

Television waveforms may be displayed directly on the screen of a normally operating picture monitor through use of a combination of sampling and pulse-position modulation techniques. Advantages of this approach include significant reductions in power, size and weight requirements, simplified analysis of the relative brightness of individual picture elements, and the ability to achieve the equivalent of "line-selection" at TV field rates. The same technique may also be used with audio signals, allowing a single picture monitor to simultaneously show audio and video waveforms together with normal program material.

THURSDAY AFTERNOON

1:45 TELEVISION II

Integration of Technical Facilities in Black-and-White and Color TV Programming

EDWARD P. BERTERO, National Broadcasting Co., New York, N.Y.

In a television plant, Technical Operations frequently provides facilities for programs consisting of combinations of film, video tape, live and outside or field program sources. In order to avoid picture disturbances when switching to these various program sources, horizontal and vertical synchronization must be maintained between the sources at all times. Plant timing, genlock, Audlok, frequency standard lock, and standards conversion are used to realize this synchronization both in color and in black-and-white television.

CBS Stop-Action Magnetic Video Disc Recorder

ADRIAN B. ETTLINGER and PRICE E. FISH, CBS Television Network, New York, N.Y.

During its 1965 National Football League coverage, CBS made extensive use of a stop-action effect. Used during recorded replays of sports action, the visual effect of a "frozen" still-frame may be created at will, held for any desired interval, then followed by a resumption of the continuous action. The effect is achieved by a video disc recorder (made by MVR, Inc.) which incorporates a channel capable of 20 seconds of continuous recording, combined with an additional single frame storage channel. The unit incorporates appropriate video switching logic to provide smooth transitions between the modes of operation and to insure transmission of a standard composite video and synchronizing signal.

Laser Television System

ROBERT S. ROWLEY, Perkin-Elmer Corp., Norwalk, Conn.

A new television system which requires no studio lights or other external illumination sources is described and demonstrated. Scanned by rapidly moving lines of light from a CW Helium-Neon Laser, subjects in complete darkness appear on the TV screen as if in daylight. The line rate, frame rate and resolution are all comparable to commercial television. Also discussed are the potential uses of the system, including military and commercial applications.

New Make-up Materials and Procedures for Color Mediums

VINCENT J-R KEHOE, Research Council of Make-up Artists, Inc., New York, N.Y.

A revised system of make-up for color mediums has been developed through researches by The Research Council of Make-up Artists in the field of compatible color. Old black-and-white principles have been discarded; an entirely new concept based on *color* has been devised along with new materials for use with the newest film or color television methods and equipment.

Spectral Distribution and the Control of Color Appearance in TV Studio Lighting

ROLLO GILLESPIE WILLIAMS, Century Lighting, Inc., New York, N.Y.

Spectral distribution and color temperature ratings of different types of lamps, including quartz iodine lamps, in relation to the control of color appearance in TV color studio lighting are discussed. Additive color mixing and some methods of controlling the spectral distribution of incident light are presented along with the need for a new method of measuring incident light in studio illumination. Some of the physiological and psychological factors involved in the evaluation of color appearances are considered.

A One-Man-Portable Television Recording Camera

W. H. BUTLER, Westel Co., Redwood City, Calif.

The development and the general configurations and operation of the world's first one-man-portable TV tape-recording camera are described. Internally powered by batteries, the unit produces tapes containing both video and audio information of broadcast quality. A development long awaited by the industry, it is expected that the device will find extensive use in news coverage, to record sports and other events, to produce documentaries and on-location commercials, and in other applications.

THURSDAY EVENING

7:45 APPLICATIONS OF MOTION PICTURES AND TELEVISION IN EDUCATION

Motion Pictures and Education in Eastern Europe

HERBERT E. FARMER, University of Southern California, Los Angeles, Calif.

Motion pictures are playing an ever increasing role in the educational scene in the USSR and in Poland (as in the rest of the world). Photography, photographic instrumentation and instructional motion pictures now have an important place in higher education; there will probably be significant increases at all levels. Although the training of professional film makers follows a quite separate path, many trained individuals become involved with the production of information and education films.

Motion Pictures in Science Education

WILLIAM H. MACCALLUM, Modern Talking Picture Serv., Inc., Los Angeles, Calif.

In the last decade the majority of high schools have integrated 16mm motion pictures into their physics and chemistry courses. These films show concepts which are too large, too small, too difficult, too remote or too expensive to show otherwise. This program presents a challenge to the motion-picture engineer and an opportunity to meet the educational demand for projection which is easy, convenient and foolproof. The uses of motion pictures are constantly increasing.

CINE—Council on International Nontheatrical Events

WILLIS H. PRATT, JR., American Telephone and Telegraph Co., New York, N.Y.

CINE, a nonprofit, tax-exempt organization, is now in its ninth year. It was established to coordinate the selection of non-theatrical motion pictures, short subjects and television documentaries to represent the United States in film festivals abroad. It is a volunteer organization consisting of twenty-seven directors and almost three hundred jurors functioning in regional juries throughout the country. In its relatively brief existence CINE has contributed significantly to insuring an orderly representation of the best films in the more than one hundred foreign festivals now in existence.

Development of Instructional Television in the Public Schools of Rochester, N.Y.

THOMAS L. RUSSELL, Graflex, Inc., Rochester, N.Y.

In 1962, the city of Rochester began experimenting with instructional television with a two-camera operation in one building. Now the city has a complete live/videotape television production center and one of the first 2500 MHz instructional television systems in the country. In Rochester and other communities, television and education have been combined, making the development of new television equipment necessary.

Two-Way CCTV

JOSEPH BOHMER, International Business Machines, Poughkeepsie, N.Y.

Teaching new programers and keeping others informed through a teaching schedule covering three locations (Poughkeepsie, Kingston and New York City) has been made possible by CCTV. A two-way CCTV was installed to allow teaching from any of the three places and to permit students to address the instructor regardless of his location. The instructor and the students are in effect in one classroom even though they are more than 100 miles apart.

Automatic Cartridge 8mm Sound Film Loop Applications in Education: A Progress Report

NAT C. MYERS, JR., Fairchild Camera and Instrument Corp., Plainview, L.I.

Automatic cartridge loading 8mm sound film equipment specifically designed for application in education became available in early 1963. Applications of this equipment at the elementary, secondary and university level are reviewed, with reference to national distribution of professionally-produced and government-sponsored films, as well as

to local production and utilization of sound film loops. Important factors are the reaction of educators, the availability of the material, domestic and foreign applications and markets, the relation of film to other media used in education, and future developments in equipment.

Ultrarapid Film Systems for Data Display and Computer Interlock

MAXWELL A. KERR, General Electric Co., Cape Canaveral City, Fla.

Film systems can greatly reduce computer memory and operations in automatic checkout equipment. They can also carry a binary code interlock between the test step description on film and the test routine in a computer. The five dry-process film systems outlined can record, process and project individual frames in less than two seconds. Three of the films are erasable. Some applications to computer-operated checkout systems shown are for educational technology. A narrow-band (240-kHz) audio-visual transmission and sound filmstrip record is proposed as an alternative to educational television.

8mm and Education

ALBERT J. ROSENBERG, McGraw-Hill Book Co., New York, N.Y.

McGraw-Hill's concern is for providing new and better audio-visual media for education. John Maurer's breakthrough on 8mm optical sound is described. A discussion follows of McGraw-Hill's cooperation in developing the sound films with John Maurer, the 8mm sound projector with Viewlex, and the printing of 8mm optical sound with the laboratories. The release and promotion of the 8mm package, experiences to date, and plans for the future are also discussed.

FRIDAY MORNING—MAY 6

7:45 APPLICATIONS OF MOTION PICTURES AND TELEVISION IN MEDICINE

Dynamics of Transcapillary Transfer

EDWARD H. BLOCH, Western Reserve University, Cleveland, Ohio

The walls of small blood vessels in living animals react variously to the passage of selected dyes. In this film, these responses are illustrated by direct cinephotomicrography and television cinephotography. The experiments illustrate that the usefulness of the television system exceeds the securing of images per se: television can be used as a microphotometer. When the television system is used in this way, quantitative data can be secured in milliseconds at repetition rates of 1/30 s.

Proctoscopic Photography

JACK BEHREND, Behrend's Inc., Chicago, Ill.

To simplify the process of taking motion pictures through a proctoscope, a new type of camera support was designed to make the camera virtually weightless and free-moving in the doctor's hands. A fiber-optics bundle is utilized to bring the light from the light source to the proctoscope tube.

Myocardial and Transvenous Cardiac Pacemaker Electrodes: A Cineradiologic Study of Mechanical Stress by Body Motion

DORIS J. W. ESCHER, SEYMOUR FURMAN, NORMAN SOLOMON, BERTA RUBINSTEIN, and JOHN B. SCHWEDEL, Montefiore Hospital and Medical Center, Bronx, N.Y.

When the normal electrical impulse that triggers the heart beat is lost, surgical implantation of an artificial pulse generator, connected to the heart by wire electrodes, restores cardiac action. The mechanical stresses on these electrode systems during body motion have been studied by use of television-displayed, image-intensified x-rays. Selected sequences have been taped or filmed. The sequences presented in this film demonstrate stress-induced electrode breaks and displacements and several safe and unsafe types of installations.

The Use of Television in Medical Research: A Review

LLOYD E. MATTER, U.S. Navy, Edgewood Arsenal, Md.

Television systems have been used for many purposes by medical research personnel. Characteristic television assets, such as magnification, inobtrusive observation, seeing the unseen (microscopy or x-ray), time-scale modification (slowing down or speeding up of action), image superimposition and instant viewing and reviewing, are described. Actual installations, using television for research, are cited to show how each of these methods is applied.

Research Applications of Cinema: Studies of Voice and Speech Actions

JAMES F. BOSMA, National Institute of Health, Bethesda, Md.

Commonly available cinephotographic facilities are necessary in documentation of the rapid, complex and briefly seen motions of the mouth and pharynx. Cinema clips show malformations, local paralysis and incoordinations which probably would not be detected in standard clinical inspection. Details of these abnormalities are made available for patient records or demonstrations by frame printing, tracing or sketching.

Cinefluorographic Control of Super Selective Coronary Occlusion in Experimental Animals

G. G. GENSINI, A. PALACIO, C. BUONANNO and A. E. KELLY, St. Joseph's Hospital, Syracuse, N.Y.

Experimental coronary occlusion formerly depended on either open chest techniques or dissemination of minute foreign particles in the blood stream. In the new method, a radiopaque sphere is placed in the coronary artery of intact dogs, under cinefluorographic control. The occlusion of this vessel is performed under anesthesia by way of selective catheterization of the left coronary artery. Following a preliminary visualization, the catheter is removed and a sphere of the appropriate size is impaled on its tip. This instrument is then guided under image intensifier fluoroscopy into the coronary artery and lodged in place. Coronary arteriograms are performed immediately after the occlusion. This method has already demonstrated its value in acute and chronic studies of coronary vasomobility, in the serial observation of collaterals development and is being utilized in detecting the influence of various surgical and/or medical therapy upon the natural history of acute coronary occlusion.

Designing a Phase-Contrast, Time-Lapse Cinemicrographic Unit

HERBERT A. FISCHLER, Isaac Albert Research Institute, Jewish Chronic Disease Hospital, Brooklyn, N.Y.

The problems of time-lapse cinemicrography of cell cultures differ greatly from those of still photomicrography of fixed preparations. The cost of commercial equipment for a complete set up is too high for the small laboratory. Therefore, utilizing existing equipment augmented by some purchased components and some equipment constructed by our engineering department, a time-lapse unit was assembled. Available components and the repetitive electronic flash unit, incubator and pump which were specially designed are discussed.

FRIDAY AFTERNOON

1:15 VISIT TO GODDARD SPACE FLIGHT CENTER

Goddard Space Flight Center Field Trip

The Goddard Space Flight Center which occupies a 600-acre tract about 10 miles north of Washington has the NASA responsibilities of developing and operating the manned space and scientific satellite tracking networks, and of the development, applications and orbiting of scientific satellites. Here the Echos, Syncoms, Orbiting Solar, Geophysical and Astronomical Observatories and other satellites have been developed. There also are the CCTV and data displays in the Operations Control (OPSCON); the CCTV itself, the complete xenon arc projection rooms with centralized audio taping facilities and the giant environmental testing chambers with high-speed instrumented camera installations.