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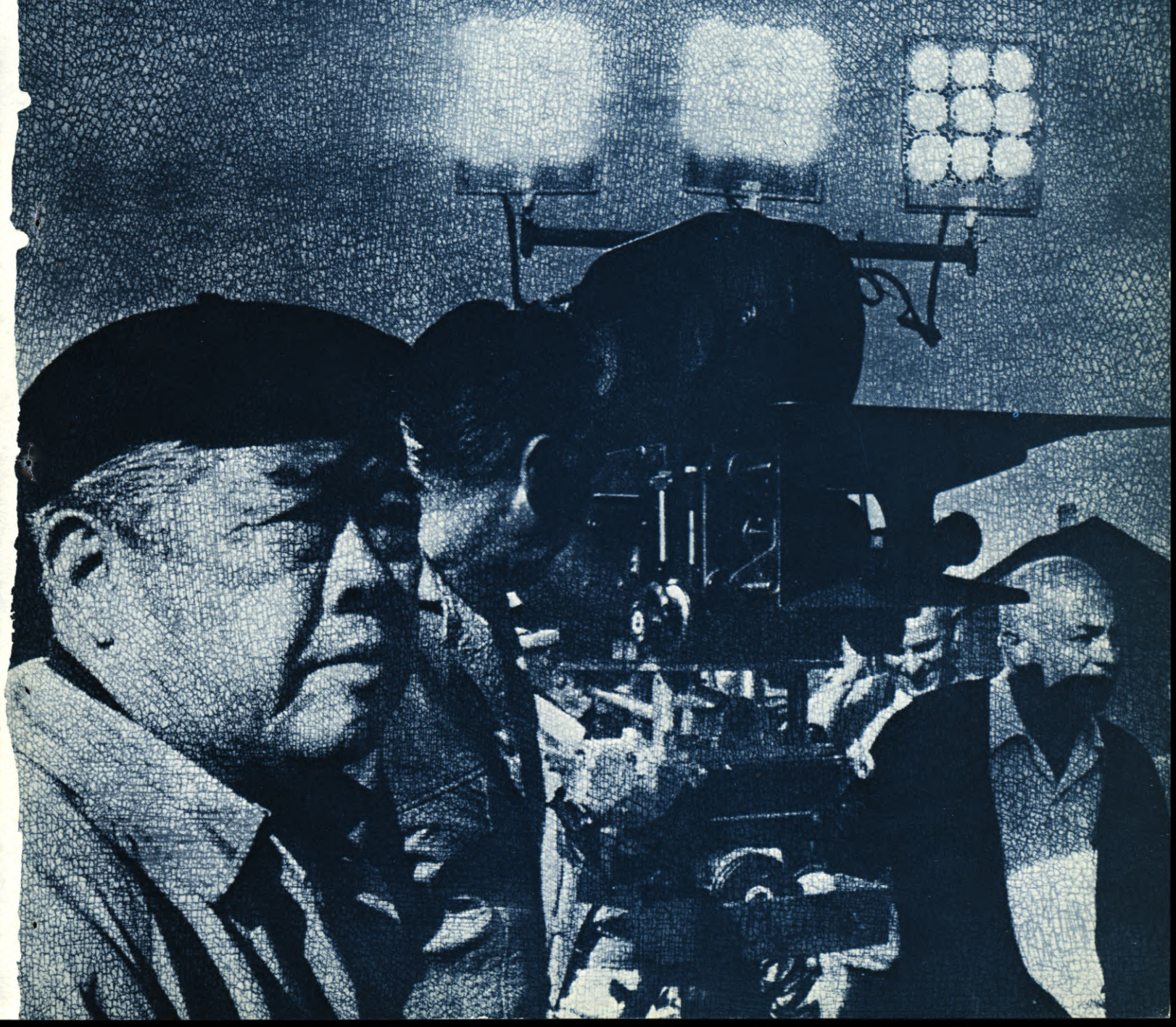
APRIL 1970

AMERICAN Cinematographer

International Journal of Motion Picture Photography and Production Techniques



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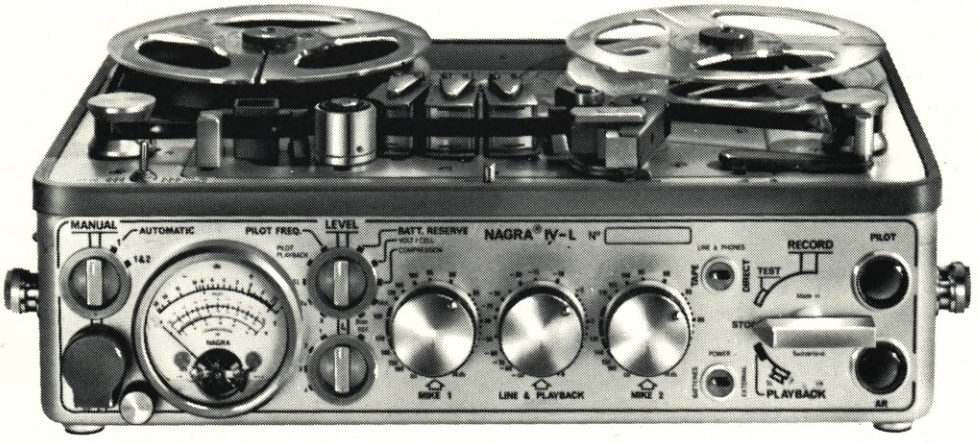

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AMERICAN
Cinematographer

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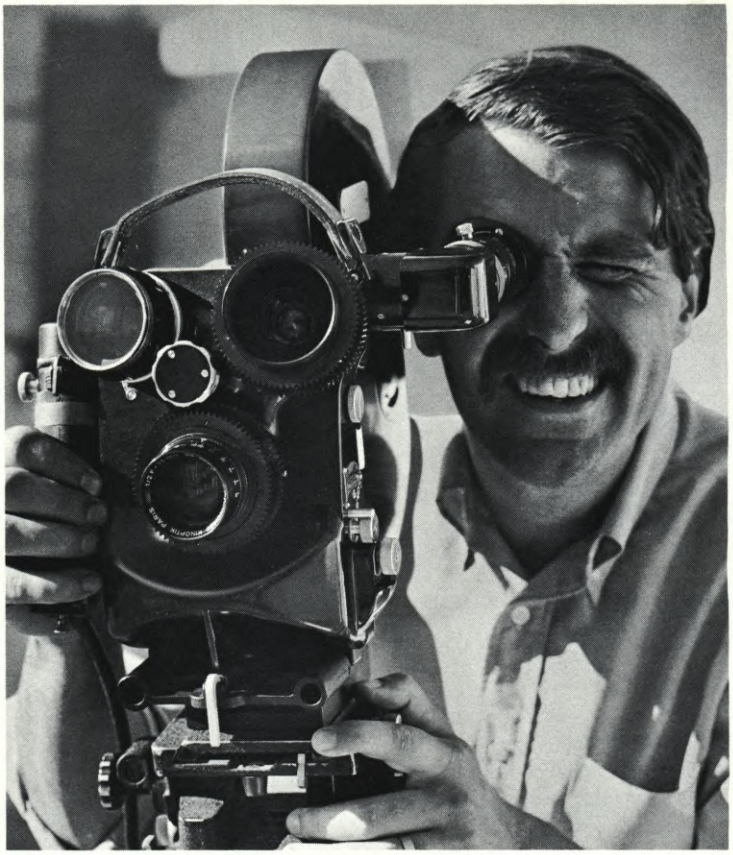
• FEATURE ARTICLES

• DEPARTMENTS

ON THE COVER: JAMES WONG HOWE, ASC, Director of Photography on Paramount's "THE MOLLY MAGUIRES", shown on location in Eckley, Pa., supervises crew as it sets up Panavision camera. In backgound are three Mini-Brute 9 tungsten-halogen "cluster" units which Howe used exclusively in place of conventional Brute arcs for lighting the multi-million-dollar production. Cover design by Don Record.

AMERICAN CINEMATOGRAPHER, established 1920, in 51st year of publication, is published monthly in Hollywood by ASC Agency Inc., 1782 North Orange Drive, Hollywood, California 90028, U.S.A. **SUBSCRIPTIONS**: U.S. and Canada $6.00 a year; foreign, including Pan-American Union, $7.00 a year (remit International Money Order or other exchange payable in U.S.) **ADVERTISING**: rate card on request to Hollywood or New York office. **CHANGE OF ADDRESS**: notify Hollywood office promptly. Second-class postage paid at Los Angeles, California.

A 400 ft. magazine and three lenses are mounted on the CM3 in this photograph.



PRIZEWINNER

The Eclair CM3 has been used in a great many films that won Hollywood Academy Awards. What's more,

the CM3 has itself won an Academy Award.

"A Man And A Woman;" "In The Heat Of The Night;" "Who's Afraid of Virginia Woolf." What do these films have in common? They all won Academy Awards. And they were all shot entirely or in part with the Eclair CM3.

In 1949, the CM3 (then known as the Camerette) won an Academy Award for its design. It was the first reflex camera to win one. Only two other cameras in current use have been similarly honored. We must be doing something right.

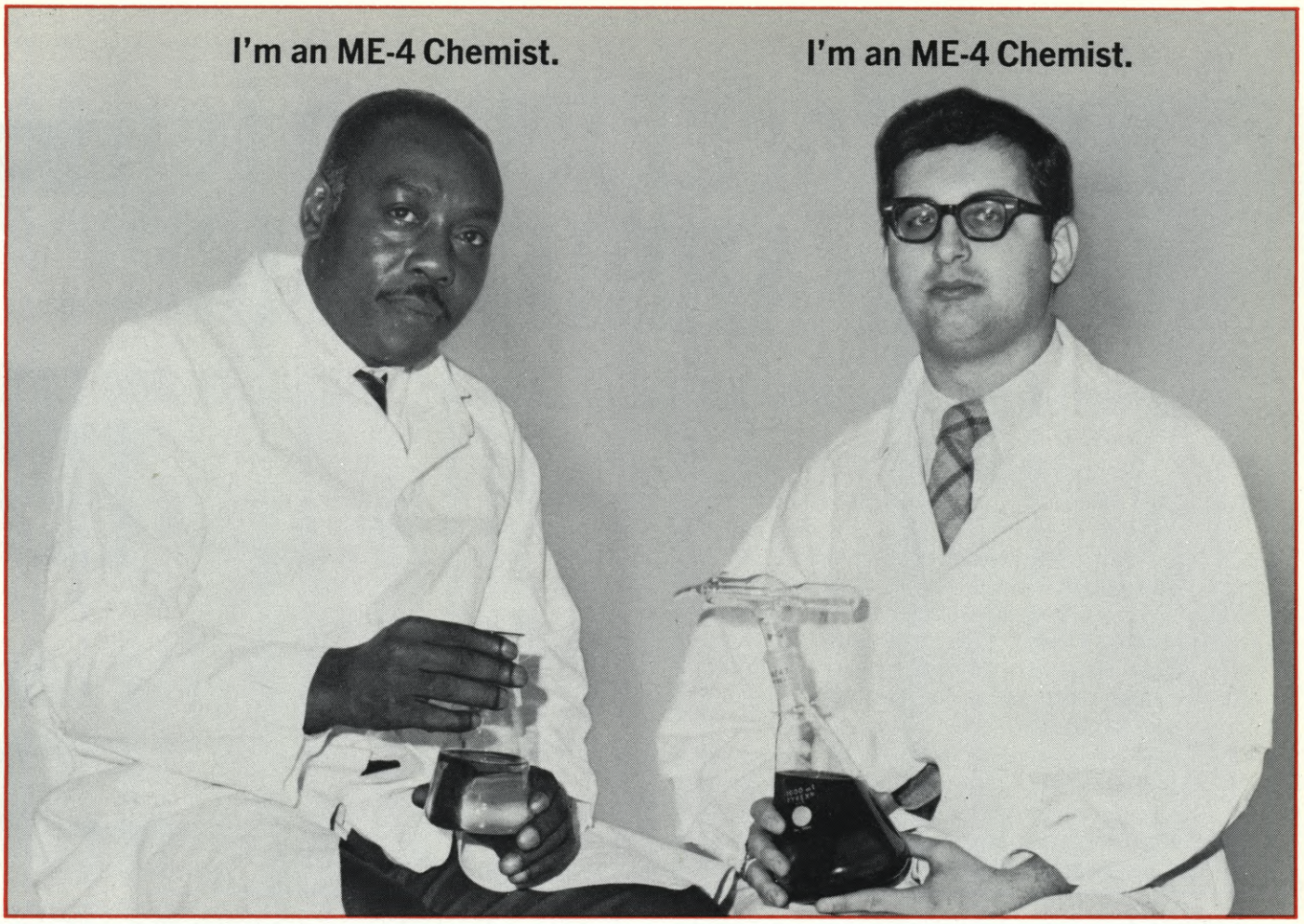
For example: you can change the CM3's magazine in five seconds. No threading; no loop to form. That's all done when you load the magazine, before shooting starts. On the set, you don't lose the mood when you run out of film. It's just another take; immediately. With unrehearsed action, you can shoot right on and cover the lost five seconds with a cutaway later. 100 and 400 ft. magazines, standard equipment. 1,000 foot on special order.

Another example of doing something right: the CM3 is both a 35mm and a 16mm camera. Conversion takes about ten seconds and costs nothing (except that you need different magazines for the two film sizes). Just slide a 16mm aperture into the regular 35mm gate, and it's done. Or you can slide in a Techniscope matte — or one for any other 35mm aspect ratio you choose. Shooting Techniscope, your 400 foot load becomes the equivalent of 800 feet, since the film is advanced two sprocket holes instead of four. Changing the claw stroke to two perfs and the magazine to feed 45 feet per minute also takes seconds and costs nothing. Similar conversions on other cameras take several days and cost around $1,400.00 each way.

The viewfinder's groundglass adapts in seconds to match whatever format you're using, also without tools and at no cost. And the finder and eyepiece both rotate through 360 degrees, independently. Any angle — either eye. The continuous reflex viewing has no baffles, which makes it clearer than the competition's; and it's absolutely accurate. You can clearly see exactly what you're getting.

The rear-mounted magazine helps you balance the CM3 on your shoulder; and you can put the camera's flat base on a tripod *or* on a table top. The divergent three-lens turret accepts still-camera lenses or any others that you choose. What else? Matte box; variable shutter; 12V DC motor with sync-pulse generator. Lightweight aluminum blimp. And more. For information, contact Eclair at 7262 Melrose Avenue, Los Angeles, Calif. 90046.

eclair



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The silent 16BL's versatility in the studio and on location is partly a matter of its basic design, partly its extensive system of accessories . . . and to complete the picture, its large complement of prime lenses. Fast apertures, extreme wide-angles, telephotos, macro lenses with 1:1 focusing capability—they're all part of the BL's armament for demanding shooting conditions, or for creative visual effects.

These superb lenses come from the finest manufacturers in the world—but as part of the Arriflex system, they include something special: the Arriflex lens mount. Strong, quick-acting and precise, this one mount is standardized across the entire Arriflex line—the same lenses you use on the 16BL are interchangeable with the other Arriflex 16's. And the Zeiss Distagons of focal lengths from 16mm up, as well as the longer Planars, all cover the 35mm full fiield of .980″ x .735″—you can mount them on the 35mm Arriflex as well! Thus, standardized Arriflex mounts combine optimum quality with minimum investment.

On the 16BL, the accessory Universal Lens Housing provides the multiple advantages of extended follow-focus handles, filter holder, and general lens protection. Balance is excellent with these lightweight lenses, enhancing the camera's operation in hand-held and shoulder-rested use.

The 16BL is available with a wide selection of 5x and 10x zooms as standard equipment—but when shooting requirements specify additional optical capabilities, the range of prime lenses teams with the camera's well-known reliability to provide the world's most efficient filmmaking system. Write for the full listing of lenses.

choose from a comprehensive range

of the world's finest prime lenses!

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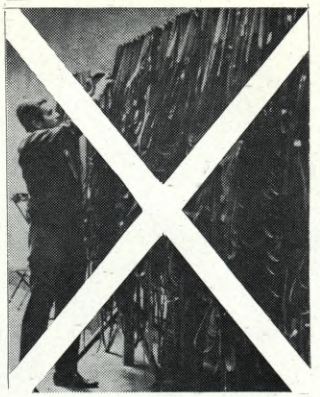


Magna-Tech's electronic method of altering sound tracks makes "looping" obsolete.

If you are still making hundreds of loops for a single feature, then consider a fast, precise and economical method of altering sound tracks that makes "looping" obsolete.

The new Magna-Tech system electronically synchronizes a reel of picture with a reel of full-coat magnetic sound-recording film. Footage and frame "PRESETS" permit the recordist to select the scene to be "dubbed" and to fully control the advance and return of the film as the actor voices the line to be "dubbed."

The system is so accurate it will even permit the change of a single word without danger of erasing an adjacent word.

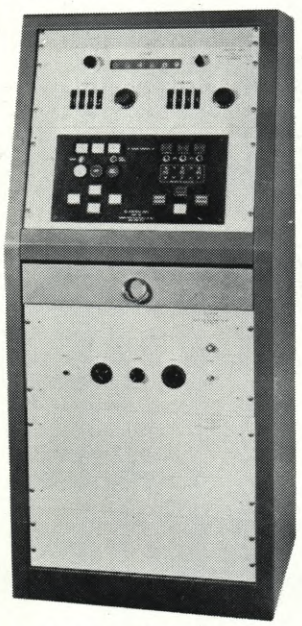
High speed return of the film to "start" saves time and permits new starts without waiting for a "loop" to complete its trip.

Actors, who so often succumb to the rhythm of a loop, are spared this hypnotic interference. Acceptable "takes" can be stored on the 3-track film and replayed for final selection.

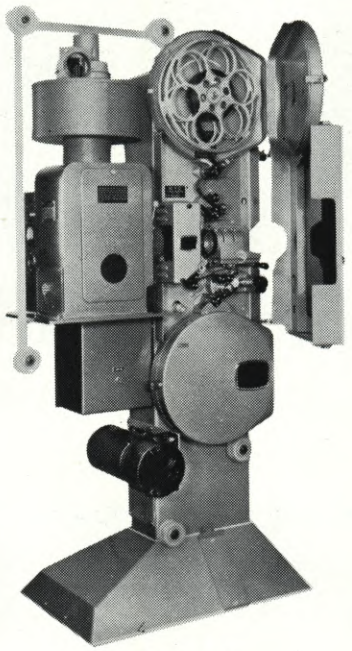
A complete remote control system is provided the director so that, once the recording engineer has preset footages, the director can take over if he wishes and directly control every facet of the recording.

The Electronic Looping System precludes the need for cutting loops and eliminates the need for editing of the track. Complete reels of the motion picture are run in synchronization with the full-coat magnetic film on which the sound track is recorded. Transfer of the best takes is then made to the third track of the same recorder.

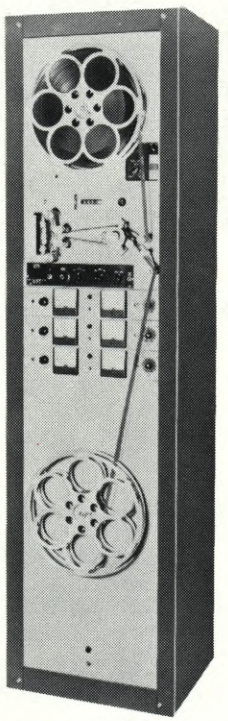
This track now has all of the final takes in sequential position and ultimately permits the screening of the picture and the final edited track in perfect synchronization. From this point the track is ready to go to a mix and no further editing is required.



Electronic Looping Console



35mm Projector



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If you require 16mm color release prints in quantity — of highest quality — at maximum savings, you'll want to check out Southwest Film Laboratory in Dallas, one of the country's most respected film labs. I/P print cost drops to literally half that of color reversal prints. Southwest's computerized processing guarantees superb quality, includes fades and dissolves at no extra charge, and features the exclusive TRIAD® method for additive scene-to-scene color correction. Different types of color original may be intercut so color characteristics will not vary in your final print dupes. Return the postpaid card now for prices and further information.

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Twenty years of successful growth has been made possible by the teamwork of experienced, skillful hands and agile brains of our laboratory technicians. SWFL's staff of highly trained laboratory technicians represent in excess of 300 years of experience gained in the performance of many specialized jobs involved in the processing and completing of 16 mm motion picture film . . . Customers located in every metropolitan area throughout the United States, serviced by SWFL in Dallas, are assured of fast service, with over 500 flights in and out of Dallas' air facilities every 24 hours. Fifteen years ago, SWFL introduced the TRIAD® Additive Control System for Kodachrome Printing. The years of pioneering additive color printing, and the continuing production of custom color prints has earned many awards throughout the industry.

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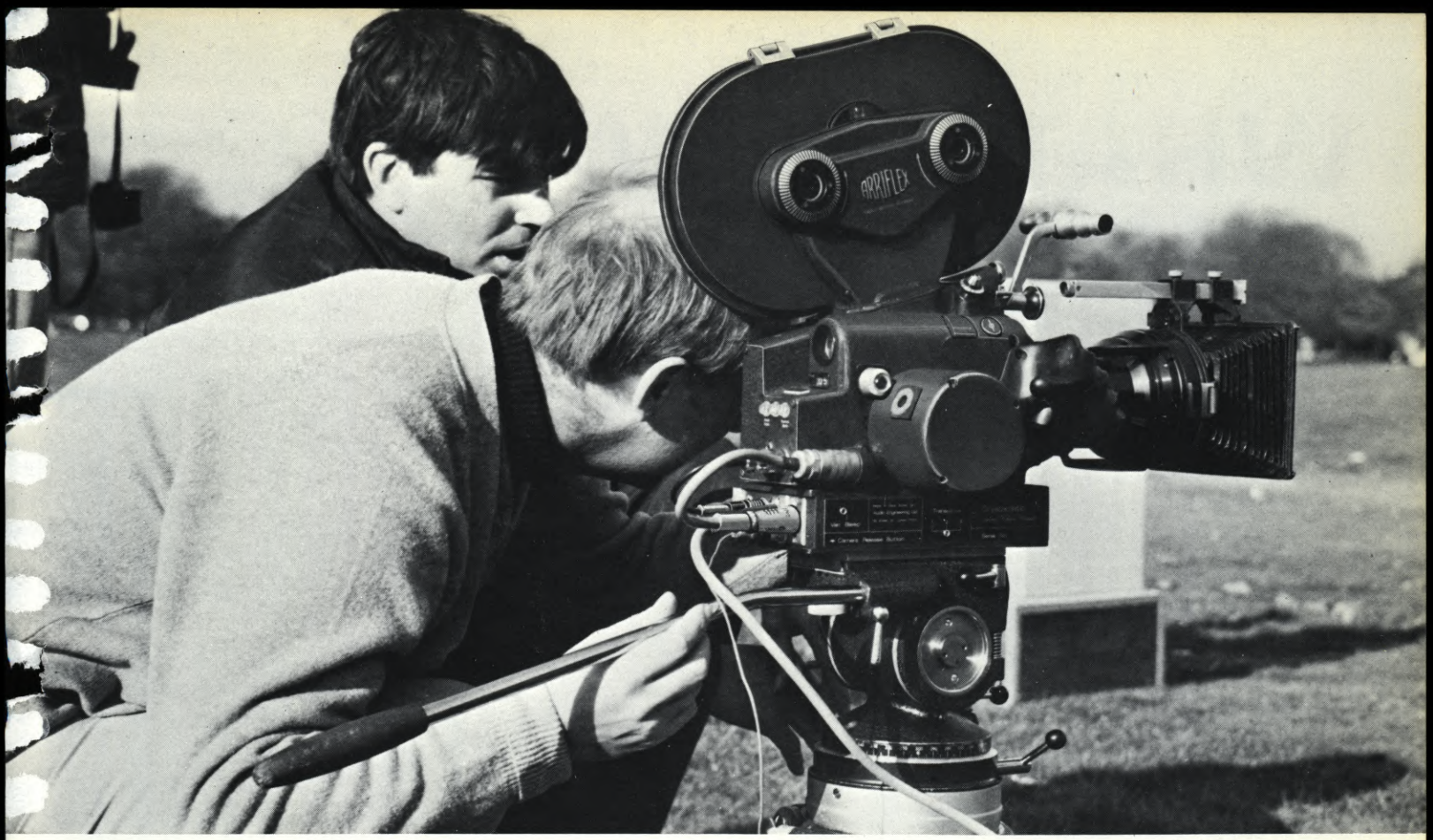


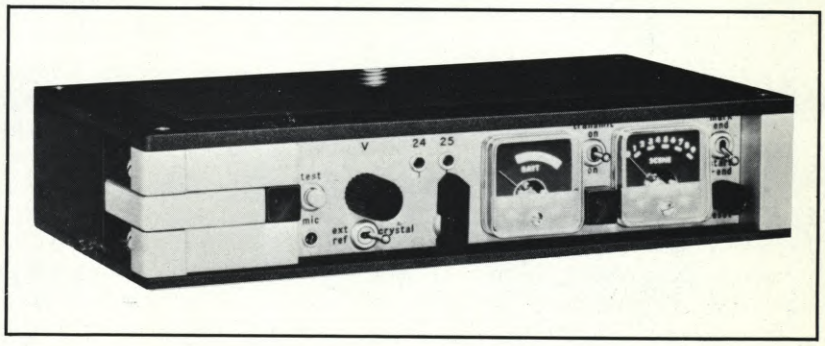
Crystamatic

Computer Camera Control System

The Crystamatic performs three functions which are basic to mobile double system film making.
1. It eliminates the need for a sync cable by precise crystal control of the camera motor speed and by providing an equally precise 50 Hz or 60 Hz pilot-tone at the tape recorder.
2. The computer provides an automatic clap mark on the film and sound track at the start and end of each take.
3. It counts the takes automatically and puts a mark to indicate the take number at the start and end of every shot.

A "no cables" post-sync shooting facility.
A 24/25 fps option at the flick of a switch.
A variable speed 8-50 fps option.
Cameraman to sound man talk back via the built in radio link.
Remote stop-start of the tape recorder in step with the camera.
An audio alarm in the cameraman's ear to indicate a malfunction such as a camera jam or a faulty cable.
Continuous monitor of the state of the batteries.
A complete system check facility and even a crystal check facility for use on location.

The Crystamatic will be exhibited at the SMPTE 107th Technical Conference in Chicago. Visit our suite at the Drake Hotel.



Crystamatic Model E specially designed for Eclair cameras will be available late 1970.

Manufactured by Audio Engineering Ltd Endell St London WC2

WHAT'S NEW

IN PRODUCTS, SERVICES AND LITERATURE

REELA UNVEILS ADVANCED FILM CARTRIDGE LOADING STATION

Reela Film Laboratories, Inc., of Miami, Fla., announces that it has started operation of a "space age" motion picture service facility.

The ultra-modern building, housing the most advanced operation of its kind in the Southeast, will load professionally produced 8mm films into newly developed motion picture cartridges being used in education, industrial training, and field sales.

The opening of the new facility is another step in Reela's continuing expansion to meet the growing demands of the professional 8mm market.

Ted Sack, Vice President and General Manager of Reela, says, "Cleanliness is paramount in our cartridge loading operation, but not at the sacrifice of speed. The facility has been designed so that the film moves from the initial waxing phase through cartridging, inspection, and packaging in a fast, quality-controlled line."

Tons of specialized air conditioning provide a laminar flow air movement in the crucial film loading section; controlled air flow removes minute particles of dust or lint from the film surface before it is placed in a cartridge.

Reela's skilled technicians wear clean-room clothing from the moment they enter work areas. This synthetic outerwear includes a full length smock, special boots and headgear.

Earlier this year, Reela Film Laboratories received a license to load the exclusive Technicolor movie cartridges; the new facility is also capable of loading the cartridges of other major manufacturers such as Fairchild, MPO and Eastman Kodak.

Reela is a subsidiary of Wometco Enterprises, Inc.

•

NEW PORTABLE LIGHTING TRIPODS INTRODUCED

Portable Lighting Tripods by Rig-A-Lite Co., Inc. are a new product line offering ease of transportability and mobility in providing temporary light, plus the extraordinary flexibility of *lighting from* any fixture height from six to 12 feet.

Six standard models are available, ranging from a single 400-watt mercury vapor fixture and lamp to dual 1500-watt quartz-iodine fixtures and lamps.

The tripod base, available with either caster wheels or spikes, is retractable for small-space storage and ease of hand carrying. The extension shaft telescopes up so that any setting up to 12 feet from the six-foot base point is quickly obtained by hand positioning of winged set screws.

The manufacturer states that the tripods are exceptionally durable and well suited for a "wide variety of industrial, commercial and municipal temporary lighting applications."

Electrical outlets on the tripod stands provide for operation of power tools and other auxiliary power equipment in conjunction with utilization of the light source.

For further information, write: Rig-A-Lite Co., Inc., P.O. Box 9464, Houston, Texas 77011.

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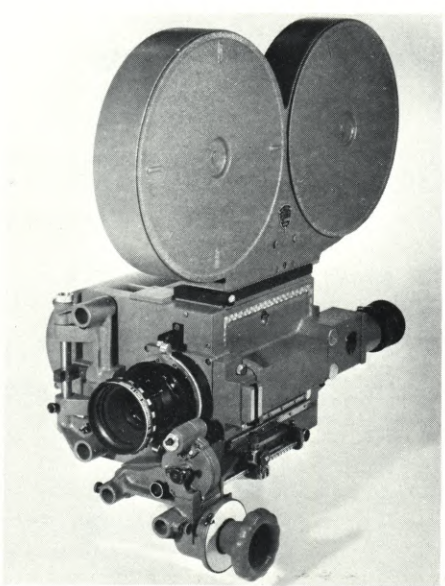

SPR REFLEX CONVERSION TO NC CAMERA

Cinema Product Development Co. announces the availability of a reflex conversion to the NC camera that is functionally identical to their Academy Award winning SPR (silent pellicle reflex) conversion to the BNC.

As with the BNC, the viewing system is redesigned, with coated optics and a large BFC-type eyepiece, to provide a bright, full aperture, flicker-free reflex image. Conventional lens turret is replaced by a BNC-style hard front. The follow-focus mechanism is redesigned so that all lenses, matte boxes, and other accessories will be fully interchangeable between SPR converted BNC's and NC's.

Camera box is deepened below the film transport mechanism to lengthen the lower loop for quieter operation. With a newly-designed soft Barney, also available, the camera is now quiet enough for simultaneous recording of dialogue in almost all exterior shooting situations.

For full details call or write: Cinema Product Development Co., 2044 Cotner Ave., Los Angeles, California 90025, (213) 478-0711. Cable address: Cinedevco.

In Europe contact: Samuelson Film Service, 303 Cricklewood Broadway, London N. W. 2, England.

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CALIBRATION STROBOSCOPE

New Model 10 HFE Cine Shutter Tester is a precision instrument designed for the speedy calibration of motion-picture cameras and projectors. It provides fixed accurate flashing rates of 8, 16, 24, and 32 per second, derived from the 60-hz power frequency by multiplication and division with solid-state integrated circuitry. (Design of the unit is such that alternative fixed frequencies can be supplied to meet other types of application needs.)

The instrument also includes a continuously-variable rate generator and a continuously-indicating rate meter. Mounted with a reflector in a cable-connected probe unit, a xenon flash tube gives an intense white flash of less than one millisecond duration at the chosen rate. For cameras operating at frame rates of 48 and 64 frames per second, synchronization is accomplished by using the 24- and 32-flash-per-second rates.

Inclusion of the rate generator, continuously adjustable from 8 to 35 hz, and the rate meter, which indicates both fixed and variable rates with an accuracy of ± ½ hz, permits self-calibration of the stroboscope without the need for external instrumentation. The unit operates on 108- to 125-v 60-hz 15-watt power. It weighs 4 lb and is priced at

Continued on Page 380

Why are filmmakers switching to CINE 60's POWER BELT?

©U.S. Patent #3274476

Belt shown above is:
UNIVERSAL POWER BELT
with 8.4V-12V-16.8 Volt Output

*Because

CINE 60 OFFERS YOU THE MOST ADVANCED CONCEPT IN BATTERY DESIGN

- Rechargeable Nickel Cadmium Batteries built into a handsome easy to wear belt.
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- Automatic overload switch for protection against short circuit. This switch functions as an automatic fuse, which will reset automatically and will never have to be replaced.

- No awkward battery case to get in your way.
- No bulky weight tugging at your shoulder.
- Designed for comfort and mobility.
- There is a belt for each professional camera ranging in voltage from 6 to 30 volts.
- We also make a powerbelt, 30 volt, for the Sylvania professional sungun

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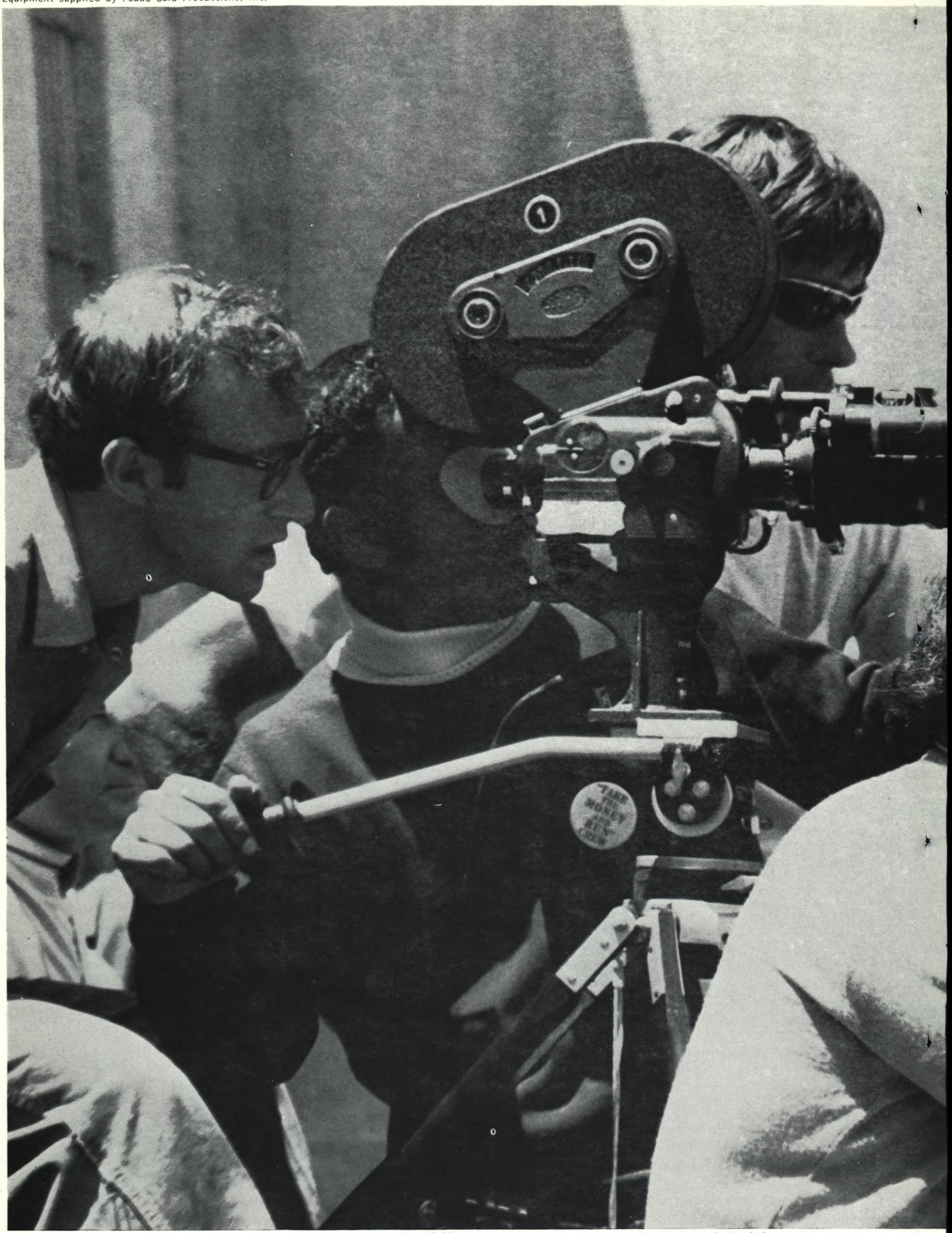
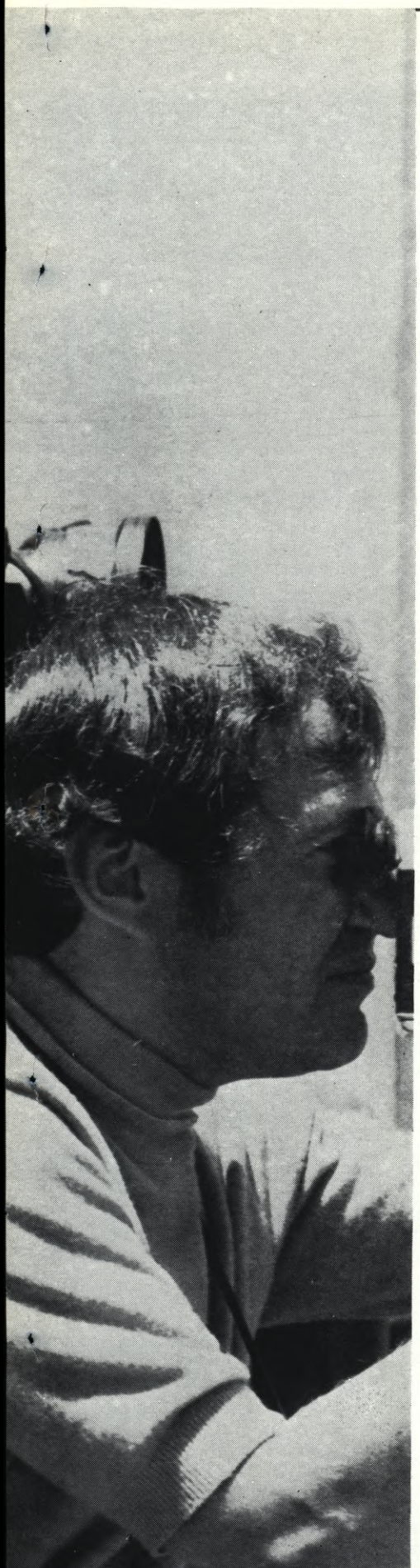
Equipment supplied by Fouad Said Productions, Inc.



Woody Allen Fouad Said Frank Holgate, 1st Ass't Cameraman



Charles H. Joffee, Producer

Woody Allen and ARRIFLEX® 35: the do-everything virtuosi of "TAKE THE MONEY AND RUN"

Don't bother trying to get a straight answer from Woody Allen. Ask him about his life and he'll tell you (as stated in the Playbill of his hit play, "Play It Again, Sam") that he is the son of a Latvian Prince; that he is currently appearing on TV in "Mother Wiltwick's Porridge", a psychological musical spoofing the evils of diabetes; and that he denies being the father of his two children.

One thing he can't deny: he is responsible for the film, "Take the Money and Run". He co-authored it . . . he stars in it . . . . he made his debut as director in it.

Since the Palomar Pictures International feature is set in New Jersey, Ohio, Baltimore and Georgia, it's only natural that the entire production was filmed on location in San Francisco; such seems the logic of Woody's endeavors. His reasons: "It's the only air-conditioned city in the country. Besides, it's a nicer place to spend the summer than Columbus, Ohio".

Playing Virgil Starkwell, a bungling thief whose career begins as a robber of gumball machines, Woody is constantly bouncing in and out of prison. Thus it was that much footage was shot in San Quentin, using real inmates; an advantage over many productions since, as a release on the film puts it, "there was no chance that the extras would wander off the set". The regular cast and crew were identified by day-glo ink to permit them free passage during these scenes; the slogan became, "if you don't glow, you don't go".

It would seem then, that the making of the film was as zany as its script; but real difficulties and challenges were present—of a nature that would threaten even a veteran director, let alone a self-effacing newcomer. Predominant was the shooting schedule . . . eighty-seven moves to be accomplished in fifty days. It appears that Woody's self-proclaimed ineptness is a put-on; he wrapped-up on schedule, often concluding the shooting day at four o'clock.

Helping in this remarkable schedule were cameras whose light weight and versatility paralleled the film's mastermind—Arriflex 35's. Wrote Director of Photography, Lester Shorr, in "International Photography" magazine, "We had five Arriflex cameras—no other type of camera; we were strictly going with this one medium of light weight, mobile, flexible equipment. In my opinion, this is a definite trend towards making films in a contemporary way."

Woody Allen's Virgil Starkwell, with his fictional incompetence, failed to make the Ten Most Wanted List; but Arriflex, with its very real efficiency both in the studio and on location, is the One Most Wanted by many contemporary filmmakers.

INDUSTRY ACTIVITIES

DEATH TAKES ASC MEMBERS

Members of the American Society of Cinematographers recently mourned the deaths of four of the Society's veteran members.

Ralph Hammeras, long recognized as one of the industry's foremost special effects cinematographer, was, for many years, associated with 20th Century-Fox and was a pioneer in the development of miniature and matte work.

Harry Stradling died suddenly on February 14, shortly after returning from New York, where he had been working as Director of Photography on "The Owl and The Pussycat". A two-time Academy Award winner, for "The Picture of Dorian Gray" (1945) and "My Fair Lady" (1965), his most recent pictures included "Funny Girl", "On a Clear Day You Can See Forever" (unreleased) and the opulent "Hello Dolly", for which he received his 14th Academy nomination.

Elmer Dyer, one of the industry's top aerial cinematographers and a pioneer in this special category, died recently after a long illness. He is best remembered for his work on such classics as "Hell's Angels" and "The Dawn Patrol".

Norbert Brodine, a most versatile camera craftsman, achieved his greatest recognition in the film industry as being one of the first cameramen to work entirely on actual locations, with such pictures as "The House on 92nd Street", "13 Rue Madeleine" and "Boomerang".

He was last associated with Loretta Young as Director of Photography on her popular television show.

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107th SMPTE TECHNICAL CONFERENCE

The 107th Technical Conference and Equipment Exhibit of the Society of Motion Picture and Television Engineers will take place April 26—May 1, at the Drake Hotel, Chicago, Ill. A full program of technical papers will be presented for the first three days covering television engineering, video tape, laboratory practices, theater presentation and projection, and education. The program is being organized under the direction of Leonard F. Coleman, Eastman Kodak Co., Dallas, TX.

Papers to be presented in the technical sessions on television have been announced by television topic chairman, Charles M. Eining, NBC News, Chicago. A brief summary of several papers follows:

"STANDARDIZATION IN THE VIDEO-TAPE RECORDER INDUSTRY", by R. N. Hurst, Commercial Electronic Systems Div., RCA Corp., Camden, NJ. A reevaluation of video tape recorder standards will be given with a new look at how the continuing use of standards benefits the industry.

"COMPACT OPTICAL SYSTEM FOR FIELD/LINE SEQUENTIAL COLOR VIDEOTELEPHONE CAMERA", by R. L. Eilenberger, F. W. Kammerer and J. F. Muller, Bell Telephone Laboratories, Inc., Holmdel, NJ. A very compact optical system has been designed to implement a field/line color camera for videophone use which uses a spectral separation prism and dichroic reflectors. Conversion to an electrical signal is via a pickup tube provided with a new form of composite fiber-optics/clear-glass faceplate.

"AN IMPROVED SERVO SYSTEM FOR QUADRUPLEX VIDEO-TAPE RECORDERS", by Harold V. Clark, Ampex Corp., Redwood City, CA. The system is examined theoretically with the practical results of an experimental system presented showing their significance to future designs of video tape recorders.

"AUTOMATIC COLOR PHASE CONTROL SYSTEM", by Y. Itoh and Y. Inoue, Tokyo Broadcasting System Inc.; K. Saitoh, and N. Ideshito, Nippon Electric Co., Ltd., Tokyo. The intention of this system is to maintain automatically color quality by use of a variable-phase voltage shifter installed in the video transmission route.

"A SOLID-STATE MACHINE CONTROL ASSIGNMENT SYSTEM", by R. J. Smith, Commercial Electronic Systems Div., RCA Corp., Camden, NJ. A new control console is described which allows operation of any machine in the TV station from a number of operating positions throughout the station.

These papers and the others on the program will be presented with demonstrations, slides and films to the three-thousand engineers, scientists and executives in the television and film industry expected to attend the Conference.

In addition to the regular conference program a symposium on Production, Control and Use of Color Television Film to be held April 30 and May 1 will feature a number of tutorial papers and discussions covering the entire area of films relating to television. Symposium Chairman, Daan Zwick, Eastman Kodak Co., Rochester, NY, has announced that the papers are nearly complete for the program and titles and abstracts will be published soon.

The Equipment Exhibit scheduled for the 107th Technical Conference of the SMPTE is expected to be a feature of special interest to those who attend. Exhibitor response so far has been enthusiastic for a Chicago Conference which brings the industry together in the center of the country. With an expected Conference attendance of 3,000, exhibitors are making plans to show an exciting array of new equipment.

The latest in projection equipment, motion-picture cameras, processing machines, film printers, video-tape systems and television cameras will be on display. The scientists, engineers and management personnel in attendance at the Conference will be able to inspect and watch demonstrations of the newest types of equipment.

The Exhibit will open Monday evening April 27, with an open house sponsored by the exhibitors, following a ribbon cutting ceremony by SMPTE officers. Everyone bearing Conference registration and exhibit passes will be welcome.

An Equipment Papers and Demonstration Session will be held Wednesday, April 29, when many exhibitors will present detailed descriptions and demonstrations of their new products. The session will be conducted in the same manner as the regular topic sessions on the Conference Program.

•

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A national student film competition, a film festival and institute, in honor of silent film pioneer D. W. Griffith, will be held at the University of Louisville, Louisville, Ky., the week of May 11.

The announcement was made on the anniversary of the 95th birthday of the late Griffith, the internationally famous filmmaker who was a Louisville native. The joint announcement was made by Dr. William C. Huffman, Dean of the University College at the University of Louisville, and Lee Browning, Vice Pres-

Continued on Page 381

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The magazines themselves are versatile. When you run out of film, you simply snap off the old magazine and snap on a new one. No film to thread; no loop to form. That's all done inside the magazine when you load it, before shooting starts. Reloading the magazine is fast and easy, too; and you can do it in daylight if you want to. Both the 400 foot and the 100 foot magazines accept core wound film and daylight loading spools. They both use 16mm film, of course.

The 400 foot magazine measures 17 x 8 x 1½ inches, and weighs 5 pounds. It mounts on the *back* of the GV16's body, which balances the camera and gives it a low profile. The super-compact camera body, (without motor or lens), weighs only 3 pounds and measures 4¼ x 4¼ x 2 inches. The motor weighs another 3 pounds. Stop motion to 250 frames per second with the same gears. 27 volt DC battery operation.

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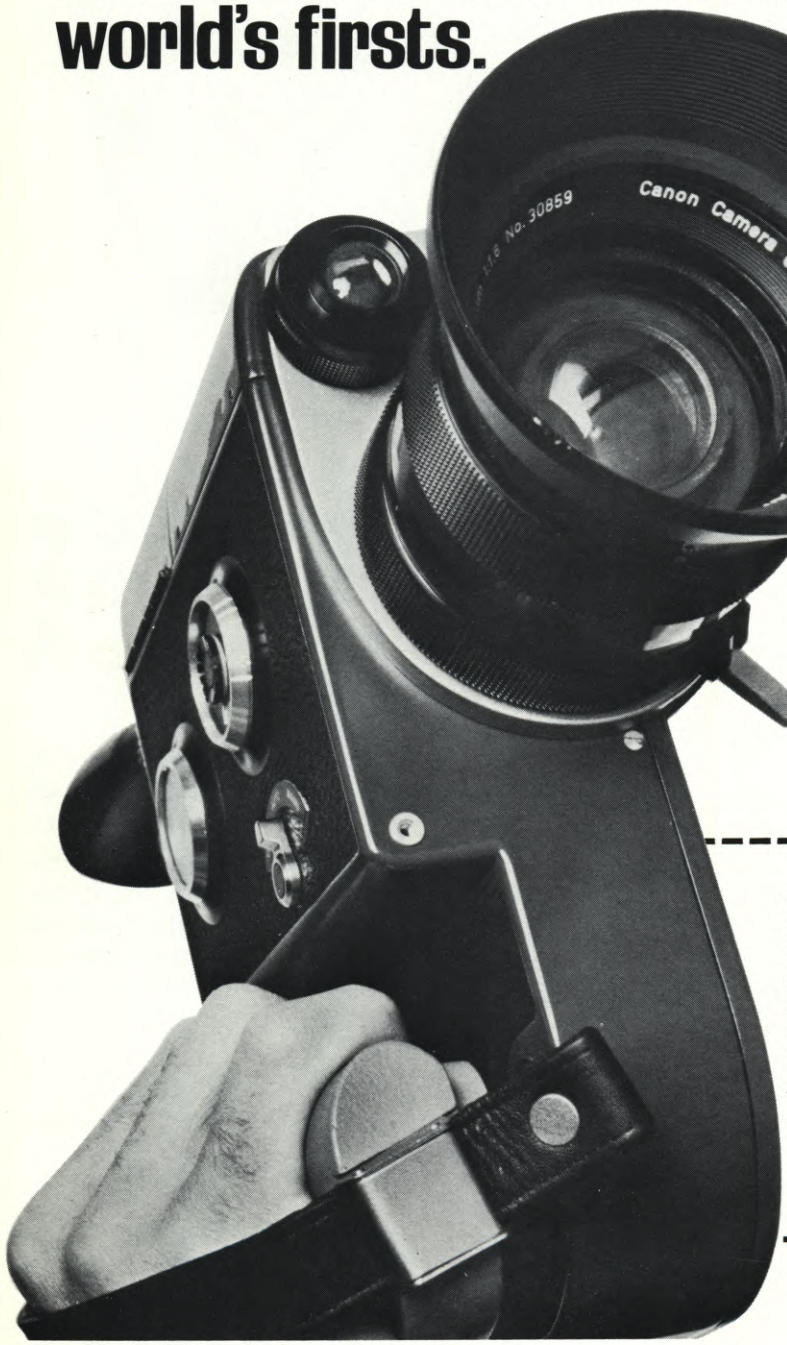

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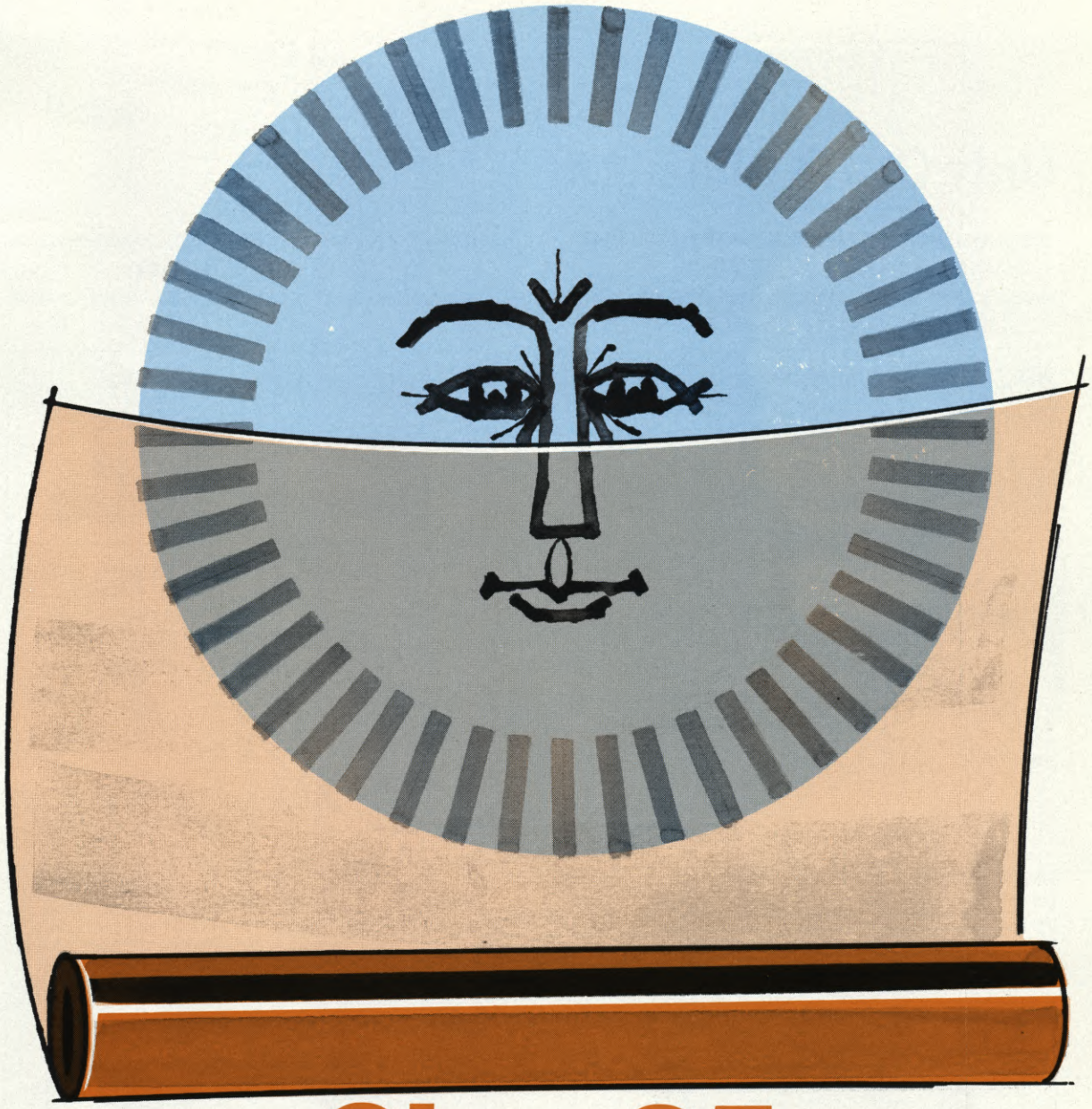

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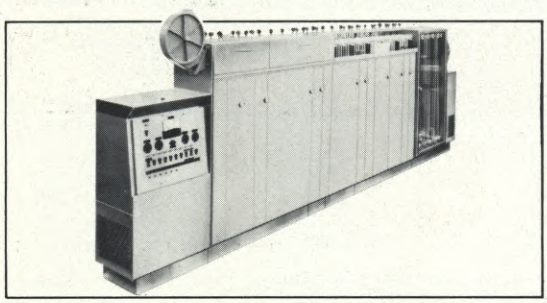

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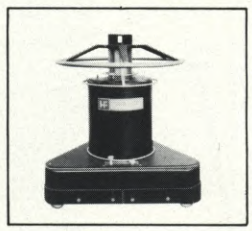

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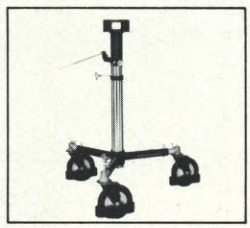

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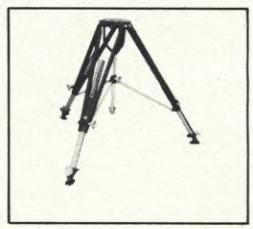

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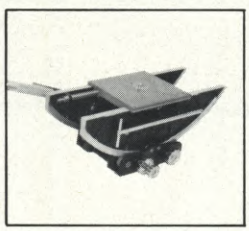

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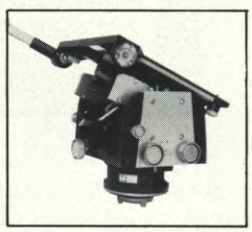

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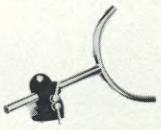

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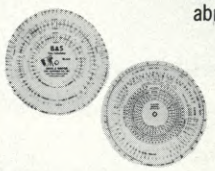

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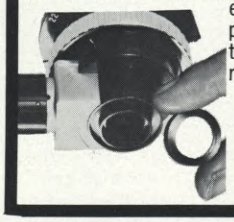

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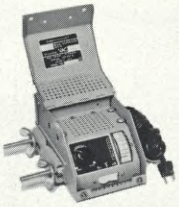

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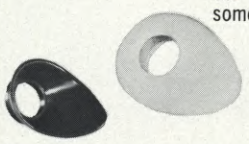

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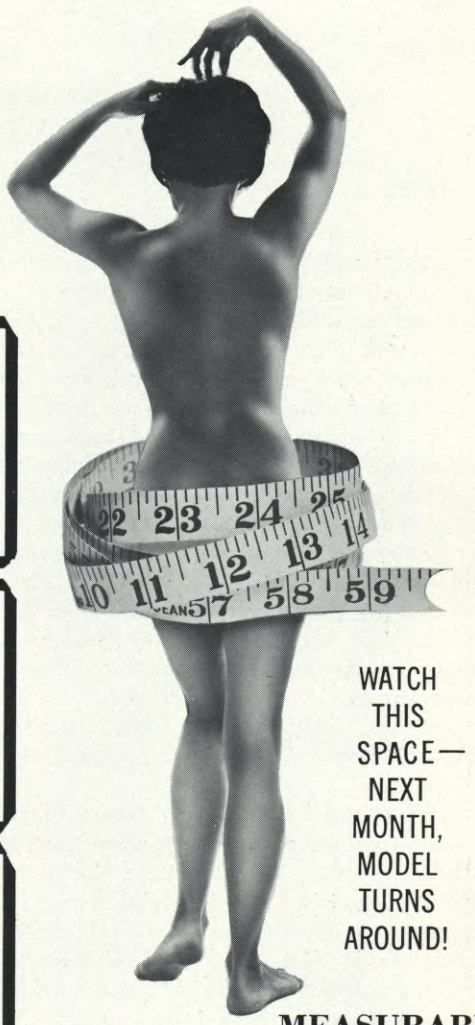

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PHOTOGRAPHING "THE MOLLY MAGUIRES" WITHOUT ARC LIGHTING

In a radical departure from traditional technique, a veteran cinematographer dares to light a major feature with quartz "clusters" replacing Brute arcs

By HERB A. LIGHTMAN

James Wong Howe, ASC, has been my friend and neighbor (my home is cantilevered from a Hollywood hillside directly above his) for quite a group of years.

During all of that time and, in fact, since he first became a cameraman back in 1917, he has been one of the true innovators of cinematography—but without making a big deal of it. For example, the hand-held camera, so recently "discovered" by the new breed of film-makers, was old-hat to Jimmy in 1947 when he climbed into a boxing ring on a sound stage, *wearing roller skates* and hand-holding an Eyemo camera to film the gut-wrenching closeups for a prize fight sequence in "BODY AND SOUL".

Along the way of his fabulous career he has constantly searched out new and different ways of using light and camera—not for the sake of novelty, but as a more effective means of telling a story on film. In his latest picture, Paramount's "THE MOLLY MAGUIRES", he has done it again—and in a way that may have great import for the entire film industry.

"THE MOLLY MAGUIRES" is a multi-million-dollar saga of the Pennsylvania coal-mining scene back in the 1870's. It involved, among other challenges, the filming of night-for-night sequences on the mile-long main street of an actual mining village which served as the principal location. And as if that weren't enough, there was the added problem of lighting the 400-foot tunnel of a coal-mine presumably 1200 feet underground.

(ABOVE RIGHT) "Jimmy" and "Marty" are, respectively, Director of Photography James Wong Howe, ASC, and Director Martin Ritt, shown on location while filming Paramount's "THE MOLLY MAGUIRES" in Eckley, Pa. 96-foot-high coal breaker in background was built at cost of $200,000 for the film. (BELOW) Mood-lighted compositions blend stylistic elements of Greek tragedy and "American Gothic"—plus being evocative of John Ford's classic, "HOW GREEN WAS MY VALLEY".

(LEFT) Cinematographer Howe, clad in white "dust suit" to protect his clothes, surveys incredible coal-mine "set" stretching 400 feet through Paramount Stages 12, 14 and 15. Massive construction was an exact reproduction of an actual mine created by Art Director Tambi Larsen using 138 plaster casts of the mine walls. (RIGHT) The Hollywood coal-mine ready for a take, lighted with concealed quartz lights.

These two sequences alone would have, in the past, absolutely dictated that a full platoon of powerful arc lights be included in the equipment budget—but "THE MOLLY MAGUIRES" was photographed in its entirety *without the use of a single arc light.*

It is fair to question why a Director of Photography, faced with such enormous lighting problems, would opt to risk discarding so tried-and-true a unit as the arc. Almost from the inception of artificial lighting, arcs of one type or another have been a mainstay of the film industry—and still are, where large set areas are to be lighted or a dependable "booster" source is needed for fill light in exterior shooting.

There is no denying that the arc is an excellent unit for such applications—but it is a mixed blessing. For one thing, arcs require a tremendous amount of current for operation—anywhere from 160 to 350 amps *per light* (the most popular unit, the "Brute", draws 225 amps). This means that a fleet of huge generators (with operators) is needed to run them on location. Each light must have its own individual, skilled operator. They are extremely heavy, requiring a couple of grips to move each light into place. They tend to smoke, flicker and sputter, thus causing frequent hold-ups in shooting. For these and several other reasons, they are hellishly expensive to use on location.

Howe's reasons for suggesting the elimination of arcs in photographing "THE MOLLY MAGUIRES" are best summed up in his own words:

"It wasn't because I dislike arcs. They have their place in cinematography. But a light that is motorized and burns carbons is only as good as its operator. We don't have so many good ones today. The older ones have retired and not enough of the young fellows have become that skilled yet.

"I went to the Director, Martin Ritt, and said: 'Marty, don't you find it very frustrating when you are in the middle of a scene that is going well, to have one of these arcs suddenly start to flicker? You have to cut the scene and wait while they change carbons, plus a few more minutes while it burns in. They re-light the lamp and it still flickers, so you have to wait some more while they change grids. By this time, the sunlight is changing and tensions are building. The actors are upset and you, as a director, are ready to commit suicide.'

"Marty admitted that this was all very true, so I said: 'What if I brought along a type of light that never flickers, so that you could shoot your scene as long as you wanted, as many times as you wanted, without having to cut it because a light flickered or began to hum?'

" 'That would be a godsend,' he said, 'If you can do that I'll buy you a good dinner.'

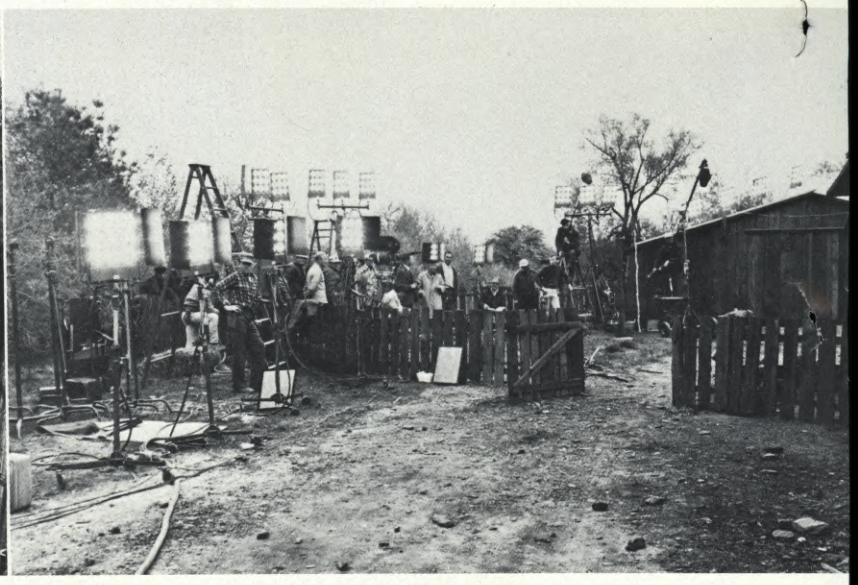
"So, that's how I decided to use nothing but quartz light on this picture. It doesn't matter to me what kind of light I use, as long as it gives me the correct color temperature and enough foot-candles at a certain distance to get my exposure or to fill in when shooting exteriors. All I need is a light that will fill the shadows from 5 to 25 feet away. There's no need to fill shadows 50, 100 or 200 feet away, because these are natural shadows. All I want is shape and form—and the quartz units gave me enough light for this purpose."

The lights selected to do the jobs ordinarily assigned to arcs were of the by-now-familiar multiple-quartz "cluster" variety—or more specifically, the Berkey-ColorTran Mini-Brute 6 and Mini-Brute 9 units. These luminaires accommodate respectively, six and nine PAR 36 lamps, with total wattages of 3900 watts and 5850 watts.

One of the possible objections to multiple-quartz clusters is that, inevitably, they throw multiple shadows, but this didn't particularly bother Howe.

"I tried to light so that the shadows didn't show," he explains, "or if they did show, they were on the ground where they wouldn't be noticed. I did have a problem for a short time when using these lamps (the type coated with dichroic filter material) for exterior shooting. We began getting reports from the lab that the faces were going a bit red. What had happened, as it turned out, was that I had told my chief electrician that the lamps must be kept clean. Otherwise we would lose a lot of illumination. The boys would take a cloth and start wiping the globes, not realizing that they were wiping off part of the dichroic coating and causing us to lose color temperature. Now they have a new type of lamp with the coating on the inside, and it doesn't fade. This is going to be a very wonderful light in the future—and I'm sure they will develop even better lights."

Arriving at the photographic style ultimately to be used in filming "THE MOLLY MAGUIRES" progressed through an evolution that required a certain amount of soul-searching. Questions had to be asked and answered as to whether artistic integrity would have to be sacrificed in a practical compromise with realistic necessity.



(LEFT) Shooting down the main street of Eckley, Pa., the only "coal patch town" in America that exists almost as it did a century ago. In the foreground are three Berkey/Colortran Mini-Brute luminaires, each accommodating nine PAR 36 tungsten-halogen lamps. (RIGHT) A bank of quartz-cluster units lights up location exterior on an overcast day. Such units completely replaced cumbersome arc lights formerly considered absolutely essential on a feature of so vast a scope.

"My involvement with the project began when I received a call from Martin Ritt, whom I admire very much for his work, his integrity and simply as a person," Howe recalls. "We had worked together on three previous pictures: 'HUD', 'THE OUTRAGE' and 'HOMBRE'. He told me that he wanted to do 'THE MOLLY MAGUIRES' in black-and-white because it was a coal-mining story and he hoped to make it visually stark and gutsy. However, the Paramount top executives were opposed to shooting it in black-and-white because they said it would greatly reduce the picture's value for television release.

"Marty liked the story very much and didn't want to give up the project because he had been working on it so long. At the same time, he was afraid of ending up with bright, pretty colors for a film that tells a somber story. He asked me if we could get more of a muted effect by using a system he had heard about which involves pre-fogging the film through exposure to a gray card.

"While pre-fogging does soften the shadows a little and dulls the colors, I have always been opposed to this method because it creates an overall gray cast—like dropping a curtain between the audience and the screen. I did, however, make some tests, but Ritt didn't like the effect when he saw it. I knew that in order to get what he wanted, we would have to 'design' it into the picture."

A meeting was held which included Ritt, Howe, Art Director Tambi Larsen, Costume Designer Dorothy Jeakins and Co-producer Walter Bernstein. The Art Director said that buildings and sets could be painted in neutral shades and that any bright colors that might exist on location could be sprayed down. The Costume Designer brought samples of drab-colored fabrics to use in muting the wardrobe. Finally satisfied that the effect he had in mind could be achieved in this way, Ritt said, "You know what I want now, so you folks put your heads together to plan it all out and I'll go according to your ideas."

The main challenge toward capturing the degree of realism required was to find a place that even remotely resembled a

Director of Photography James Wong Howe, ASC, takes an incident light reading for a scene involving stars Samantha Eggar and Richard Harris. A two time Academy Award winner, Howe received his first "Oscar" in 1955 for black-and-white cinematography of "THE ROSE TATTOO" and was also nominated in the color cinematography category for "PICNIC". He received second statuette in 1963 for his photography of "HUD". Howe has always been a quiet innovator, never hesitating to "gamble" on a new technique he believes to be of value, rather than "playing it safe."

Howe and Ritt supervise lining up of a crane shot outside the village church. The brilliant cinematographer-director team had previously collaborated on such outstanding features as "HUD", "THE OUTRAGE" and HOMBRE". They work together with a special rapport born of mutual respect for each other's qualities as artists and individuals.

coal mining community of the 1870's. By a stroke of rare good fortune, Art Director Larsen discovered exactly what was needed in the small town of Eckley, Pa., the only "coal patch town" in America which still exists almost as it did a century ago.

At the time of the Mollies, Eckley's population was several thousand. Today, the population is only 86 and the 62 families living there are almost all from another generation, since most of its younger people have gone away to school or to other occupations. The 40 occupied homes remaining today were augmented by the studio with 20 additional temporary structures to give the community greater dimension. The original houses, painted in bright colors during the last century were all repainted to the uniform slate gray appearance which resulted from the coal dust settling on the town from the working mines that surrounded it a century ago.

The location trip had been made in the dead of winter when the trees were naked of leaves and the bare branches stood stark against the gray sky. Howe reminded Larsen that, although this was the bleak effect the director wanted, by the time the company was ready to shoot the trees would all be in beautiful green leaf. Certain of the trees which later would bud out and into the kind of colorful beauty not wanted for the grimness of the setting were removed and replanted nearby to be returned to their original sites after the completion of filming. They were replaced by birch trees such as existed there in the 1870's. Shrubs and flowers also were removed and replanted out of camera range for restoration later.

Even so, it was necessary to hire a dozen of the local people to pick the buds off of remaining trees to keep them from leafing (a procedure protested by certain of the citizens) and the larger trees in the background which could be neither removed nor defoliated were sprayed down to a duller hue.

To complete the effect, all signs of the present day were obliterated. Telephone and power lines were put underground at a cost of $105,000—a nightmarish operation since, at the time, the ground was frozen three feet deep. However,

"THE MOLLY MAGUIRES" includes several rough-and-tumble sequences in which the oppressed Irish immigrant miners unleash their pent-up frustrations. (LEFT) Sean Connery, a far cry from James Bond, mixes it up in a game of Irish football, another term for organized mayhem. (RIGHT) Art Lund kicks Richard Harris in the chops during a punch-up in the local pub. All of the stars disdained doubles for these violent sequences, rehearsed them well and suffered only minor injuries.

(LEFT) Camera crew sets up for long shot down Eckley, Pa. main street. Original buildings, since repainted in bright colors, were painted in dull gray or covered with drab siding. Concrete roadway was covered with deep layer of dirt and coal dust. Television antennas and power lines were replaced with underground installations—all to restore the aura of the 1870's. (RIGHT) Several somber sequences were ear-marked to be shot on rainy days, during which the road became a sea of black mud.

to the townspeople, this was a welcomed permanent installation. Television roof aerials were removed and inside aerials installed so the occupants need not miss their regular programs. The Eckley recreation hall was converted into the Emerald House saloon of the story. As one looked up the mile-long main street afterward, the effect was almost like seeing something out of a time capsule.

During filming, the paved highway was buried beneath tons of dirt and coal dust to recreate the look of the period, but upon the completion of filming in Eckley the houses were restored to their original color and design, the dirt and coal dust removed from the highway to uncover its original paved surface and the recently added decorative touches of antiquity were eliminated.

It is very likely, however, that the huge 96-foot high coal-breaker built at a cost of $200,000 for the film to dominate the town will remain. Eckley citizens have petitioned Paramount to let it stand as a landmark and reminder of one of the great experiences in their lives.

Jimmy Howe and Samantha Eggar pose with crew, including (left to right) Key Grip John Hennessy, Gaffer Warren Hoag, Camera Operator Fred Porret and First Assistant Charles Termini. Howe holds Super-8 camera, which he uses on location as a "sketch-pad" for noting possible camera set-ups, unusual natural lighting effects, etc.

The advent of the film unit brought about a change in the Eckley economy which affected every one of its inhabitants in one way or another. For their cooperation, Paramount agreed to pay for six months the rent they paid monthly for their homes to George Huss, owner of the 8000-acre coalfield property of which Eckley is the center. Eckley is, in fact, the only community in the hard coal belt entirely owned by a coal operator.

Almost all of the Eckleyans are used as film extras and for working in what practically is their own front yard, they received a daily fee even greater than their usual monthly rent. Some were given speaking roles for which they received $392.00 per week. And a final touch of prosperity came when an enterprising group from the Eckley Social Club conceived an additional income-making idea. They set up stands selling souvenirs, hot-dogs, candy, soft drinks and books on the history of The Molly Maguires to the several thousand visitors who came from the surrounding area and as far away as Philadelphia, Pittsburgh and New York each Sunday to roam through the set which, of necessity, was blocked off to sightseers during the weekday filming.

The filming schedule for "THE MOLLY MAGUIRES" called for 70 per cent of the multi-million dollar production to be shot on location in Pennsylvania, with the remaining 30 per cent to be filmed at the Paramount Studios in Hollywood.

The sequences specified for location shooting included quite a few interiors, several of which were filmed in existing buildings. Typical is the church sequence, lighted by James Wong Howe in such a way as to take on an aura of pure American Gothic.

Commenting on the photography of that sequence, he says: "The windows were so high that I couldn't cover them with 85 gels—so we fitted the dichroic-filtered lamps into the lights and balanced the interior lighting with the daylight coming in the windows. Actually, I let the outside light go a little hotter, because I think that's the way it is in real life. In many pictures I see, the interiors have just as much light as the outdoor part of the scene. I think that's just a bit too evenly balanced. I lose the feel of the indoors. A little over-exposure of the exterior area of the scene doesn't bother me at all."

The climactic sequence in which Richard Harris and Sean Connery run amuck in the general store, smashing everything in the place and finally burning it down, was also filmed in the Eckley location. It was an especially difficult sequence to light, because there was little or no source indicated.

"I believe in source lighting—having the light in the scene come from the direction of whatever would be producing the main source of light in real life," Howe explains. "For a daylight interior, it would usually be a window—at night, a table lamp or overhead fixture. But in that warehouse sequence we had a problem. There actually wasn't supposed to be any light inside. There were no street lights along the entire street outside. There was only a lantern hanging over the entrance of the saloon down the block. But you can't photograph anything if there is no light, so, in this case, I had to *simulate* a source. I played most of it coming from the direction of the door and put another light near the window so that I could get some dramatic cross-lighting on the men in the scene.

"It was what you would call 'low-key' lighting, I guess. You felt the darkness, but at the same time there was enough light so that you could see what was going on. The problem was that the action in some of the scenes called for a certain depth of field. This meant stopping down to F/4 and using probably 150 to 200 foot-candles for the source, and very little fill light. Then, too, we had varying degrees of fire going in this sequence—which calls for careful handling, because, if there is too much exposure of the flame, it washes out; if there is too little exposure, it goes unnaturally red. You aim at trying to keep the tone of the flame consistent throughout the sequence, while trying to keep your set lighting consistent, too. This is one of the things that is much easier to do in black and white."

With the paved highway running through Eckley temporarily covered by tons of dirt and coal dust, rain became something of a disaster. The road turned into a mess of black mud. Certain sequences, requiring an especially dismal mood, were filmed in the rain, but as a contingency against being held up by inclement weather, several "cover" sets were built inside a local warehouse. These were mainly small rooms duplicating the interiors of the miners' homes and they were built to actual size, with ceilings intact.

Howe, who had photographed "THE HEART IS A LONELY HUNTER" entirely on location, including many small rooms, was hardly dismayed by this.

"I find it an interesting challenge to work this way," he comments. "You end up with something you just don't get in the studio, where the first thing they do is put up a catwalk with all those lights. It's a temptation to use them, because they're handy and you have a schedule to meet, but this doesn't always result in a style of photography that is really right for the subject.

"In 'MOLLY MAGUIRES' we would have, for example, a living room set no more than 10 x 12 feet in area—and there would be 20 to 30 people crammed into it, as there was in the wake sequence. I've found that it's much more difficult to light such a small, confined set than it would be to light a large ballroom where you can use large lighting units and set them far back from the people. This keeps the shadows more or less normal in relation to the subjects. In a small set your light is much closer to the people and it's easy for the shadows to become exaggerated out of perspective.

"I didn't try to dramatize the lighting by using something like a *coucoloris*. I haven't used one of those in the last 15 years. I used to, but I found it was a little too decorative. I like plain surface. I like space. I don't believe in artificially gimmicked shadows falling across people and backgrounds."

Although the greatest portion of the location filming was done at Eckley, important scenes also were filmed in other factual locations in the vicinity of Wilkes-Barre and Hazleton. Production headquarters were established at Hazleton for the three months of such filming, which ranged over Luzerne, Carbon, Schuylkill and Columbia counties and such other towns as Jim Thorpe (the original Mauch Chunk, where the major Mollies' trials took place), Bloomsburg, Weatherly, Ashland and Llewelyn.

Scenes in Jim Thorpe were filmed in the actual 100-year-old courthouse, where the trials were held and where Molly ringleaders were convicted on the testimony of James McParlan. Only slight changes were necessary to reconvert it back to the 1876 period of the story. Other scenes were filmed in the ancient jail, where they were subsequently hung.

The influx of the film unit which included 182 cast and crew members into the region so taxed the available accommodations that producer-director Martin Ritt established a helicopter shuttle service to transport some of the company from Wilkes-Barre to Eckley, 40 miles apart.

The longest interior setting ever constructed on a Hollywood sound stage was erected at the Paramount Studios to recreate the interior of an anthracite coal mine of the 1870's for "THE MOLLY MAGUIRES."

Designed by Art Director Larsen to reproduce to the most minute detail the tunnels, shafts, up-and-down slopes, and entrances and exits of a mine some 1200 feet below the surface, the unusual setting extended approximately 400 feet through stages 12, 14 and 15 of the studio. These are the same stages on which the late Cecil B. DeMille staged some of the biggest scenes for his memorable "THE TEN COMMANDMENTS."

Continued on Page 344

Howe peers through viewfinder, framing composition for low-angle dolly shot, while electricians set two of the Mini-Brute quartz clusters to serve as booster fill lights. Compact, light-weight units could be handled much more quickly and easily than customary Brute arcs.

MAINTAINING MODERN MOTION PICTURE CAMERAS

The highly sophisticated filming machines of today, require proper care by expert technicians utilizing the most advanced testing and calibrating equipment

By VOLKER BAHNEMANN,
Arriflex Corporation of America

It is quite common to expose 100,000 feet, or more, of film in a motion picture camera during the production of a single major TV special. And it certainly is not unusual to expose over half a million feet of film during the production of a theatrical feature, as Joe Biroc, ASC, did recently in the filming of Robert Aldrich's "TOO LATE THE HERO"; or even a million feet of 16mm for a Disney nature film. Flawless performance of a professional motion picture camera is taken almost for granted in these situations, even under extreme environmental conditions.

Arriflex technician, Juergen Schwinzer uses slide projector as light source to project camera aperture onto target for groundglass installation and checking procedure. Target is held by magnets so that it can be freely moved vertically and horizontally for alignment with camera lens axis. Camera being checked is Arriflex 16S.

To get this expected level of camera performance, proper servicing of the equipment is essential. Preventive maintenance on a regular basis is vital; it can avoid breakdown of the camera equipment, costly repairs, and—most important—the loss of irreplaceable and invaluable footage.

Therefore, it is desirable to have a motion picture camera inspected by qualified technicians after it has had several hundred thousand feet of film run through it. A preventive maintenance check is even more important before and after a camera is subjected to exceptionally rough handling or high humidity, temperature extremes, or other severe environmental conditions, such as salt water or sand.

The reason why precision motion picture cameras and accessories need proper care is their technical complexity. Many cinematographers do not realize how much more sophisticated modern motion picture cameras are compared to their predecessors. Consider our light-weight, hand-holdable Arriflex cameras which offer the same, or greater, precision as the much heavier, tripod-dependent cameras which were in vogue ten and twenty years ago.

Consider also that, not too many years ago, a 25mm focal-length lens was considered to be a pretty fair wide-angle lens for a 35mm camera. Today, anything longer than 18mm or even 9.8mm would not earn the description of a truly "wide-angle lens". With this decrease in focal lengths, the manufacturers of lenses and motion picture cameras have had to tighten their mechanical tolerances considerably to stay within the narrow back-focus depth necessary with extremely short focal-length lenses. This requires that lens mounts, turret assemblies—and everything that can affect the flange focal distance from the lens mount to the film gate—be kept within extremely tight tolerances.

The introduction of zoom lenses was another typical example of changing requirements. A zoom lens can be perfectly sharp at its long focal length, but if it is not mounted properly and the flange focal distance is not maintained

correctly it will gradually go out of focus as you zoom back to the wide-angle position. If the lens mount is not properly centered along the optical axis of the lens, the object which you so carefully centered on the ground glass will slowly drift off to one side during zooming.

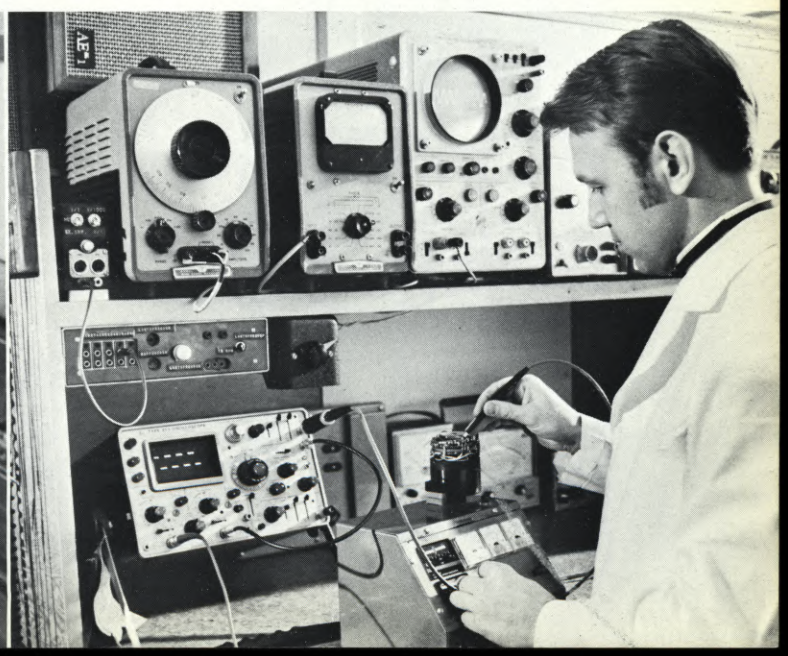
Some of the most significant advances have been made in the field of electronics. These achievements, attributed primarily to space-age technology, have brought exciting changes to the industry. Some years ago, when primarily synchronous motor drives were used, the camera would perform at an, at that time, acceptable standard of precision, but the equipment was tied to the wall plug. Now, with the increasing need for wireless double-system synch-sound shooting and many special applications, such as multicamera operations, which demand a high degree of precision, complex and sophisticated drive systems have been developed for newer cameras. The drives themselves are available in different technical varieties, but basically they are all just about as complex as your home color television set. This might not be apparent until such a unit breaks down and you have to find somebody who can repair it, which at times can prove rather difficult. Therefore, when buying modern, sophisticated equipment, make sure that it is backed by excellent service facilities. 16mm equipment in particular is subjected to great demands. You can appreciate the fact that a 16mm original, which sometimes has to be blown up to a 35mm release print, or projected on a theatrical-size screen, better be perfect in every respect; otherwise the film won't be worth the stock it is printed on. Camera steadiness, lens resolution, focus and framing must be "par excellence". With the introduction of new film emulsions, such as the forthcoming 7252 Ektachrome Commercial from Kodak, film stock can resolve more and is no longer the limiting factor it used to be.

A partial view of the Arriflex Corporation's New York service headquarters. Experience has shown that a roomy, clean, well-lighted shop and pleasant working conditions are prerequisite for top quality work. Camera on tripod is Arriflex 16BL.

We realize that much of the Arriflex equipment used in film production is leased from the major motion picture rental houses and any number of lenses, magazines or other accessories can go with one or more camera bodies. It is, therefore, of vital importance that the camera outfit be checked and adjusted to the very specific tolerances to which each component conformed when it left the factory. If this is done one can take any given lens, magazine or motor and interchange it with any camera body and be assured of maximum performance. The same, naturally, holds true for the adjustment of individual lenses and other subcomponents of a camera outfit. To be able to perform these important tasks and to maintain professional equipment to stringent factory

Continued on Page 358

(LEFT) Service Department's Shelly Glickman fills customer parts order from stock. Extensive and complete in-depth parts inventory is vital to good service operation. (RIGHT) Arriflex technician and electronics specialist Wolfgang Roessel checks out Arriflex 16BL universal motor with the aid of an extremely advanced oscilloscope and special test console. Extensive use of solid state components in modern motion picture cameras has obsoleted "back-of-the-store" type service operations. Years of specialized training and thousands of dollars of equipment are necessary to properly service camera equipment.



A man, his work, and his camera

aldwin Baker Jr. —Director, Writer, Cinematographer.

Not long ago, I shot some western footage in Jackson ole, Wyoming.

ecause my 16mm Beaulieu is so mobile, I was able to pture some marvelous flavor. It's a personal kind of thing. ike to hold my camera as close as I can. Actually I most cradle it. In fact, I saw a copy of a letter from meone at MGM in New York. He said, 'Trying to shake nds with Baker is a real experience. You reach for s hand, and you shake his camera instead.'

ne of my most recent experiences with my Beaulieu was the m I did with Stan Kenton and his orchestra on the road.

ravelled over 3,000 miles with the band on the bus, and y Beaulieu was always in my lap or at my eye. That's hat's great about the Beaulieu. It's so small and light, it's like an extension of my arm. Anyway, what I wanted to do with the Kenton thing was to take the viewer right into the bus; to show him what a series of one night stands were really like. By the way, the name of the film —it's a TV special—is "Bound to be Heard." For the on the bus flavor, I used the Beaulieu with an extreme wide angle lens from the back seat. In that series of shots, you'd swear you were there. I used an Eclair for all the lip sync sequences, but for the feeling, for the real color, I used the Beaulieu.

One important thing of course, is that you have to be ready to grab everything the first time around, so it doesn't look restaged. You know, like the Hindenburg only came down once. In the Kenton picture, 90% of it unfolds just the way it happened. In a thing like that, I feel as though you're capturing a moment in time.

And, as a film-maker, you had damn well better be there when it's happening."

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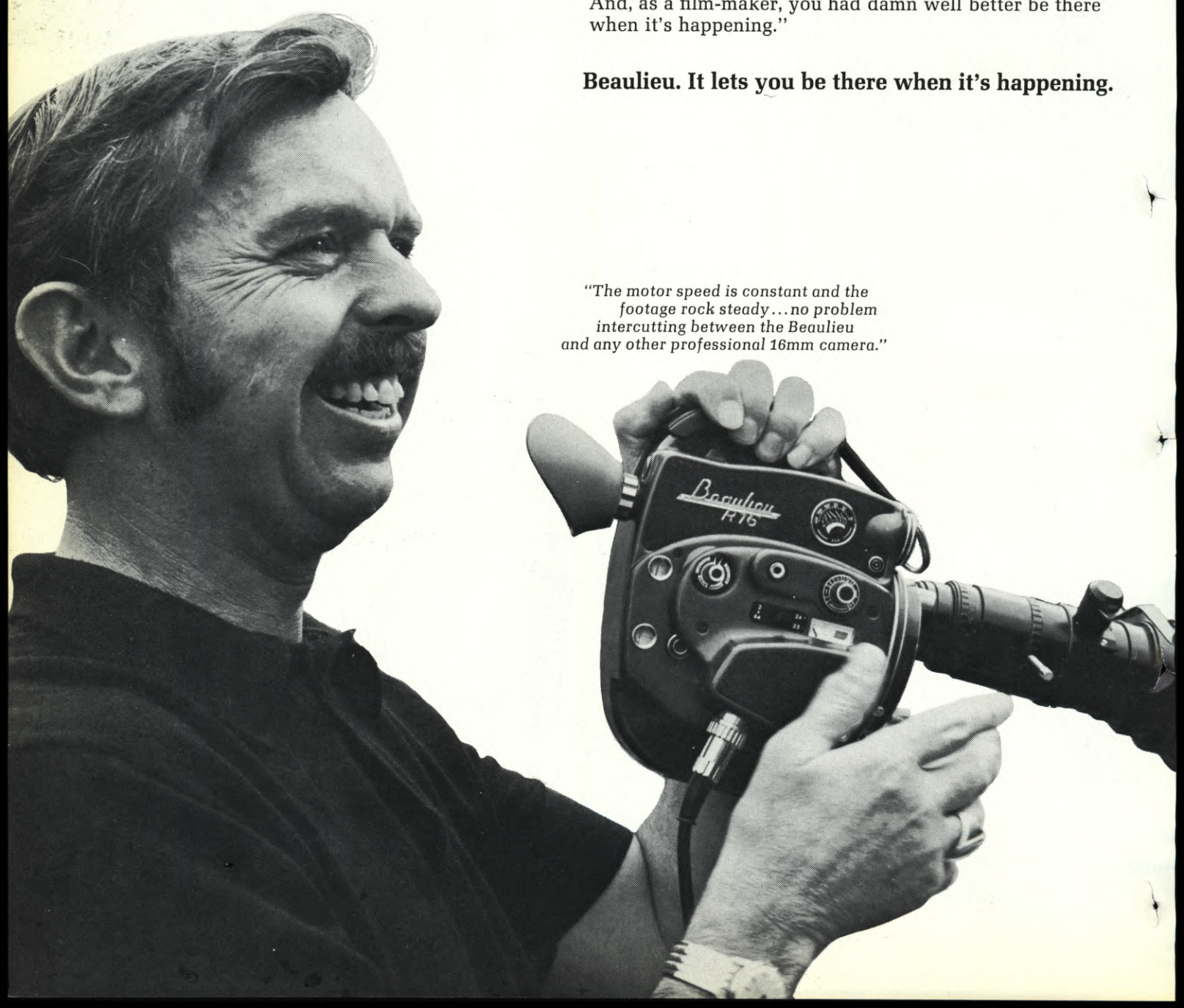

"The motor speed is constant and the footage rock steady... no problem intercutting between the Beaulieu and any other professional 16mm camera."

"Reloading the Beaulieu R16B becomes a very, very fast operation once you get the feel of it... the next thing to automatic loading."

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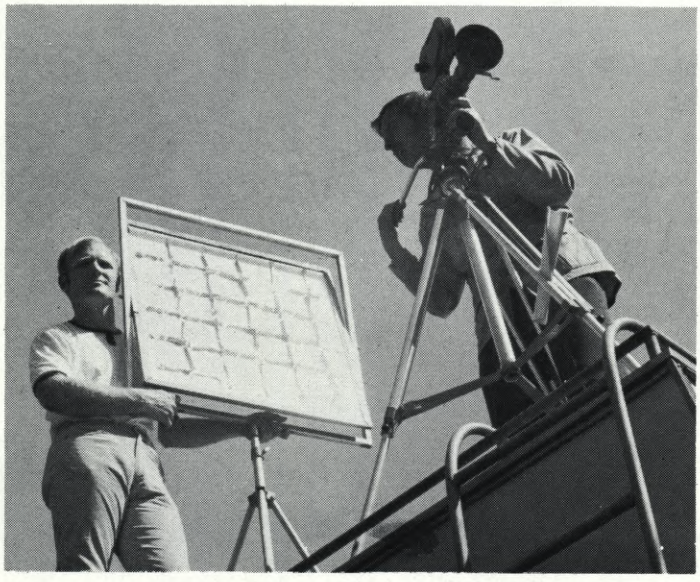
"In a cherrypicker, high up a mast, in a helicopter... the Beaulieu is easily adaptable to difficult shooting conditions without assistance, rigging or time consuming planning. I prefer the Beaulieu to any other camera for my aerial work."



"...impressed by the automatic iris control, liked the way it corrects for exposure as you pan. It doesn't seem to be obvious... very subtle..."

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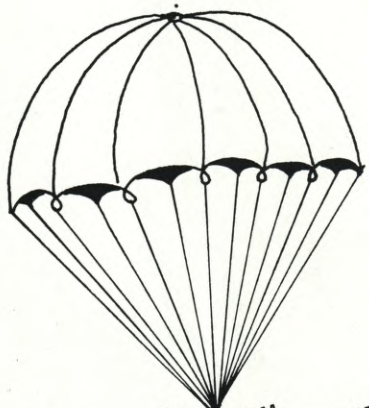

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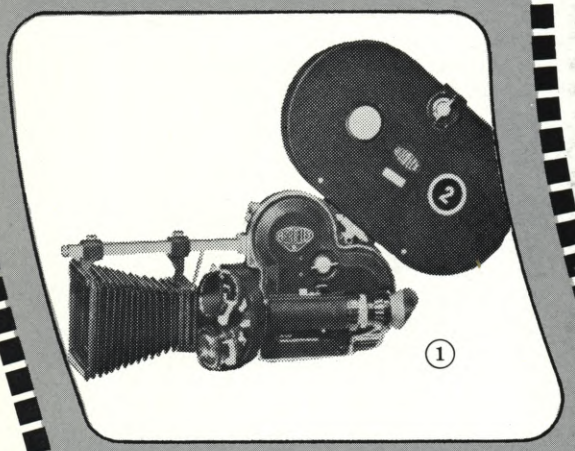

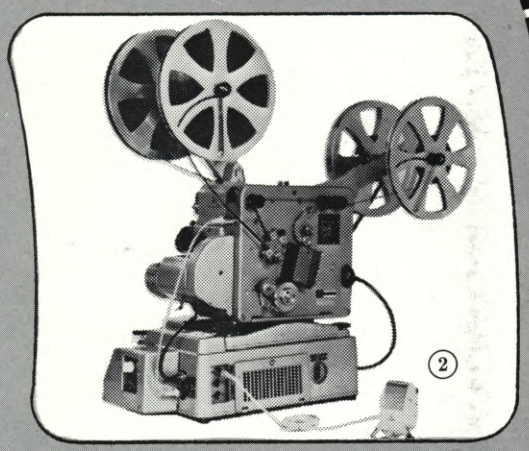

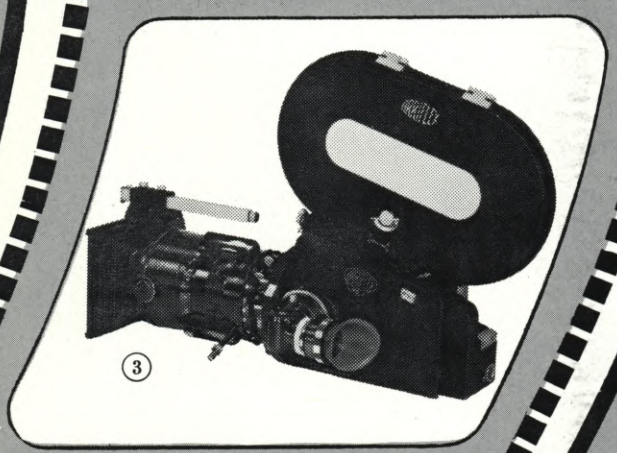

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Bing Crosby at the Computer Image Beverly Hills facility during the filming of intricate animated titles for his "COOLING IT" television Special.

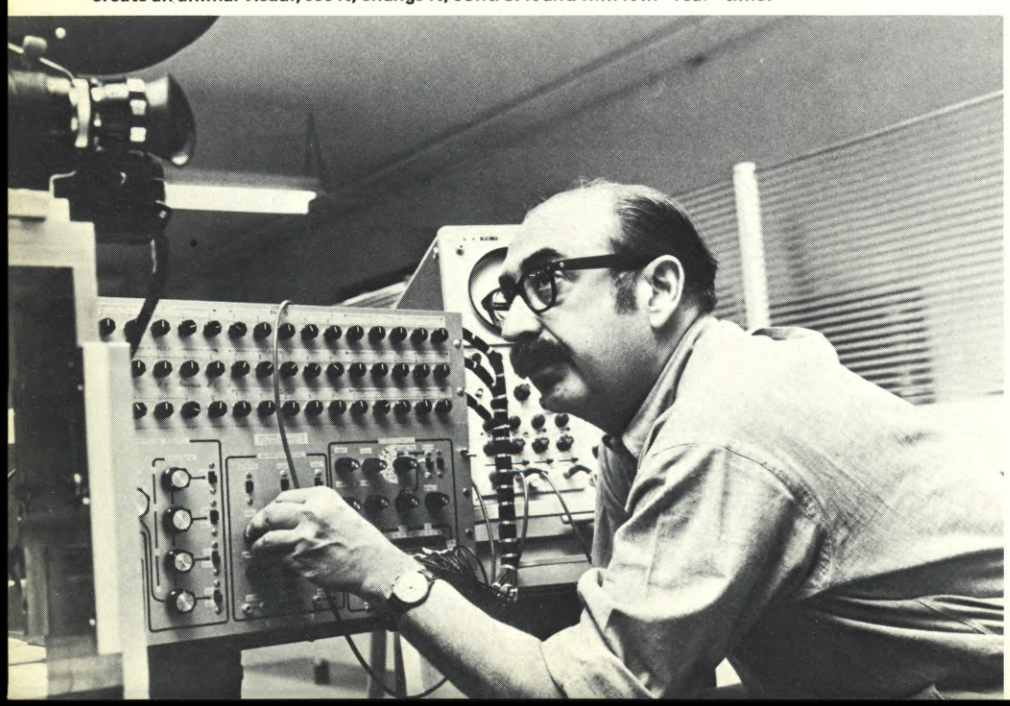
An electronic "brain" that can generate images within itself, or do wonderful things with an artist's designs—all in "real" time—promises unlimited possibilities in low-budget animation

A COMPUTER YOU COULD EASILY LEARN TO LOVE

By MYRON P. SMITH
Director of Photography, Computer Image Corporation

"Yesterday I couldn't spell 'computer', today I are one," summarized my ignorance about the newest dimension in motion picture animation, when, in 1967, I first met Lee Harrison III, founder of Computer Image Corporation and inventor of its computers. I wasn't afraid of a computer, but I felt I wouldn't be comfortable sitting close to one. I shared the general misconception that in order to "talk" to one, you had to learn a strange new language with an incomprehensible name like Algol or Fortran, and that a computer was responsible for confusing my wife's department store charge accounts, sending me anonymous, personalized letters from complete strangers, and otherwise folding, spindling, and mutilating my privacy on a random access basis.

Famed graphics and film designer Saul Bass works with the Scanimate computer in Denver to animate his new logo design for A.T. & T. Afterward, Bass expressed satisfaction at being able to create an animal visual, see it, change it, control it and film it in "real" time.



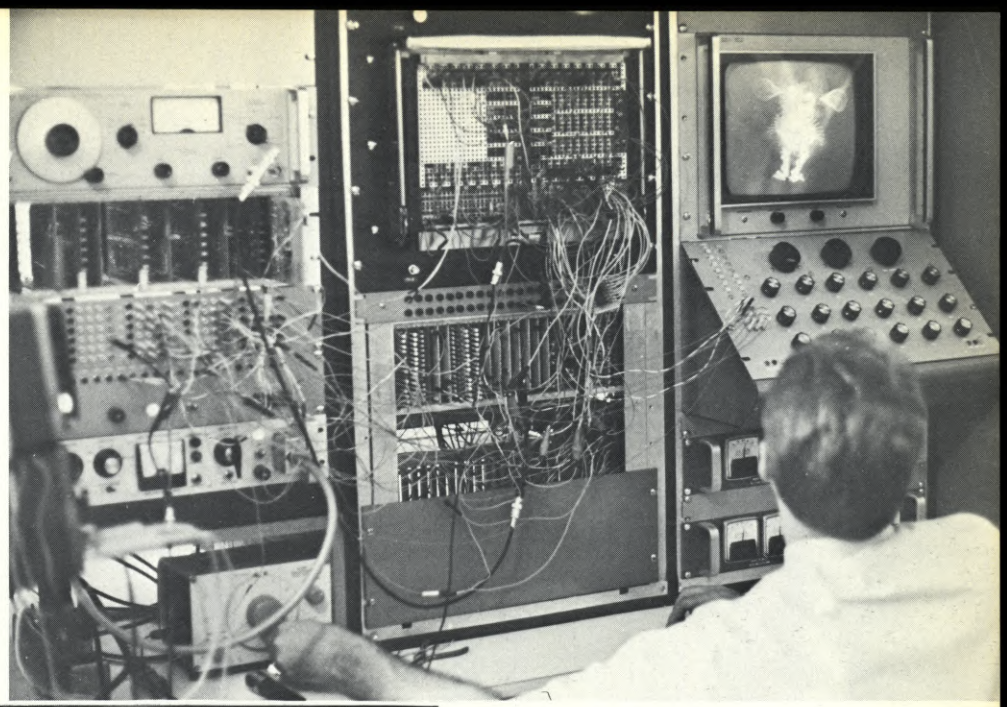
These impressions were acquired before I met Lee Harrison in the editing room at the University of Denver's Department of Mass Communications where I'd been a teacher of motion picture writing, production, and cinematography for nearly twenty years. He had a *shopping bag* filled with bits and pieces of 16mm black and white reversal film. Lee's problem was, "How do you glue this stuff together?" My astonishment was that he could have created the images on those pieces of film with a computer, and photographed them at 24 frames per second.

What I saw on film that day hit a nerve. I quit teaching school to help Lee and his brilliant group of young research engineers build his new company; although, at the time, we didn't even have a name for it. Just a homemade, do-it-yourself computer, and hope. The images I saw that afternoon were produced on a hybrid computer we now call Animac. Animac has since been supplemented with a simpler graphics animating device called Scanimate.

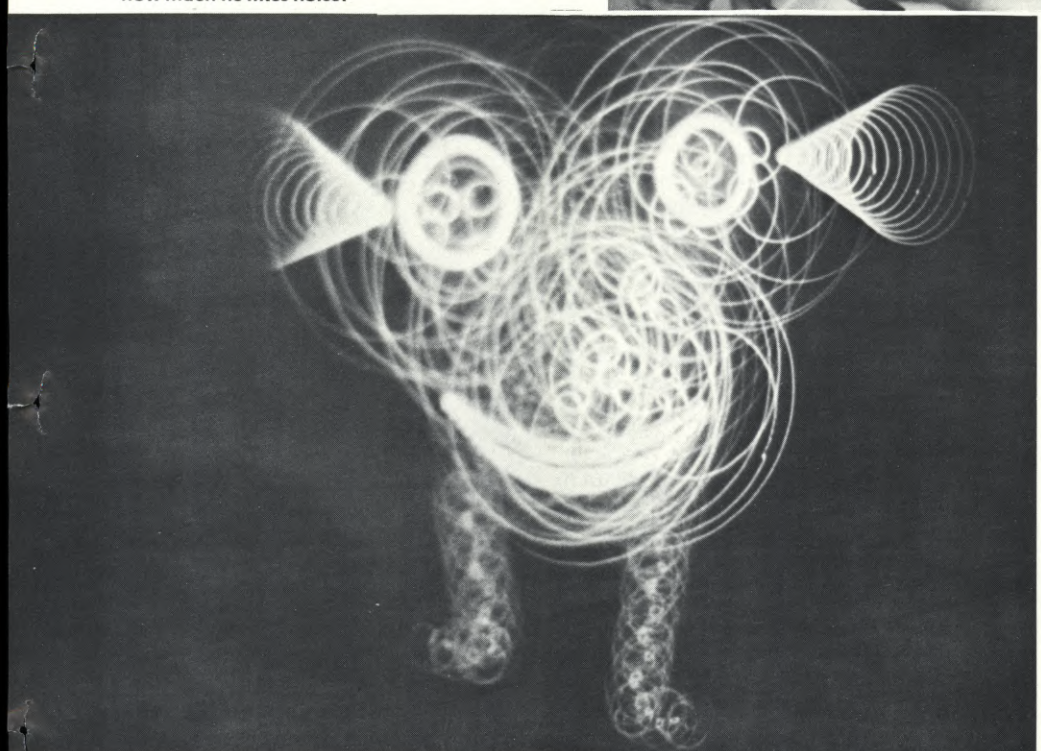
I also learned to differentiate between *digital* and *analog* computers. The difference is significant to the concept of computers, as I shall try to explain later. But most important to anyone's opinion about computers is that they are not scientific Frankensteins with

electronic "brains" dedicated to the enslavement, replacement, and destruction of human values. I learned that computers, in one form or another, have been around almost as long as any of man's tools, and when you hear stories of computers making mistakes, creating consternation and confusion, the blame must rest on a fallible human being, not on the computer. To think otherwise is like blaming your automobile when you back it through your garage door without opening it.

A computer is a device, in many cases, much less perverse and complex



(RIGHT) Developer of the system Lee Harrison, III, creates within the computer a pulsating animated character called "THE DIN" (BELOW) who perfectly lip-syncs a song about how much he likes noise.

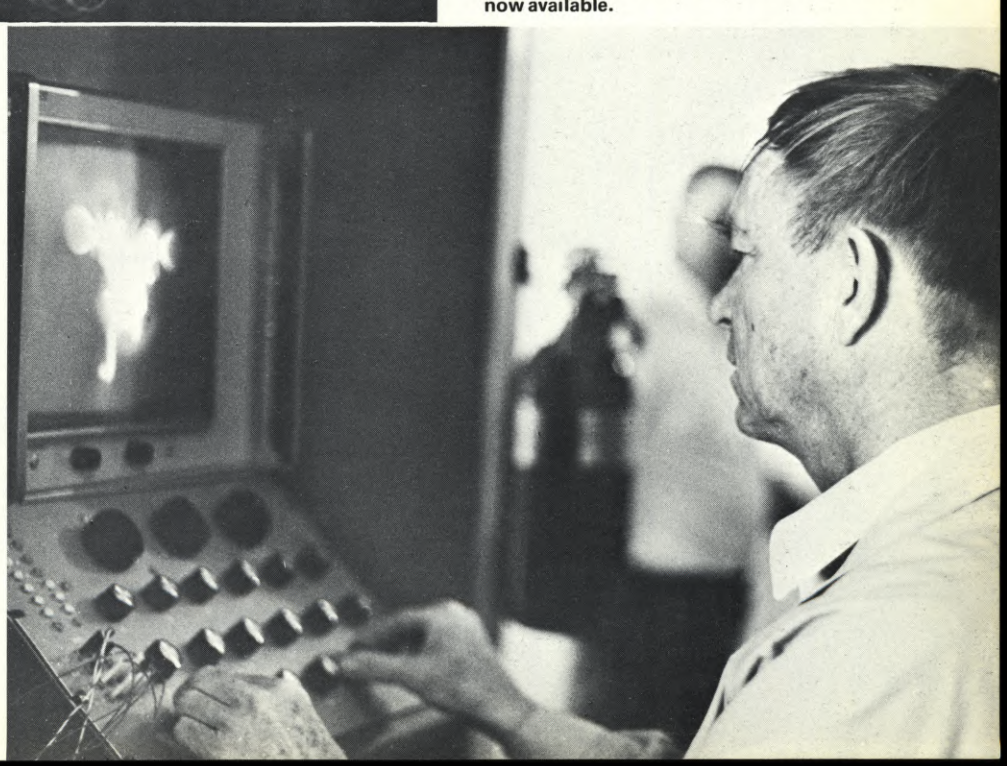


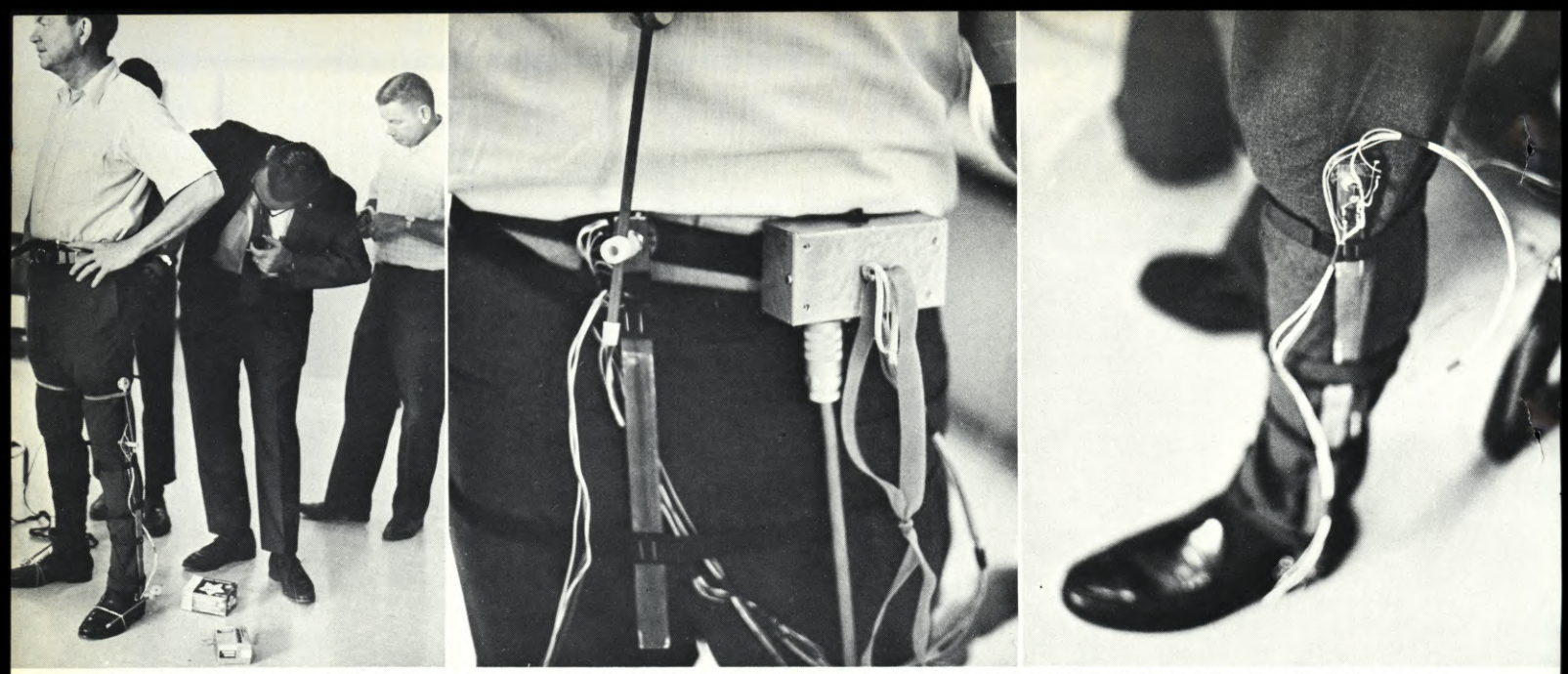
than an automobile, designed for a specific task, and intended to free human beings from the tedium of repetition. But *not* from the responsibility of creative thinking. The creative process will remain forever a unique monopoly of the human mind. So will the science fiction which leads people to a negative opinion about computers.

Before I describe the process of animating with a computer, a word about the difference between "digital" and "analog". We often meet animators and motion picture producers who say, "Oh, sure, I've seen computer animation. Long ago. It was very interesting, but what else is new?" What they've seen is animation produced by a conventional animation stand, controlled by a digital memory system, or animation

produced on a cathode ray tube by what is fundamentally a digital approach to image creation. And some very sophisticated, beautiful imagery it is, too, if you've seen, for example, the work of John Whitney and his sons. It was produced digitally: a unit or element of the image at a time. Translated to images, a unit is a point or a dot of light. String a thousand of these points together and you create a line either straight or curved, depending upon the position of the points. To move the line, or to make it appear to move on the screen, with the digital system it is necessary to begin at the first point in each frame and recalculate the new (displaced) position of each of the thousand points of light which produce the illusion of a moving line.

Chuck Jones, former head of the M-G-M cartoon department, tries his hand at animating "THE DIN". This character, one of the earliest developed, is primitive compared to animation now available.



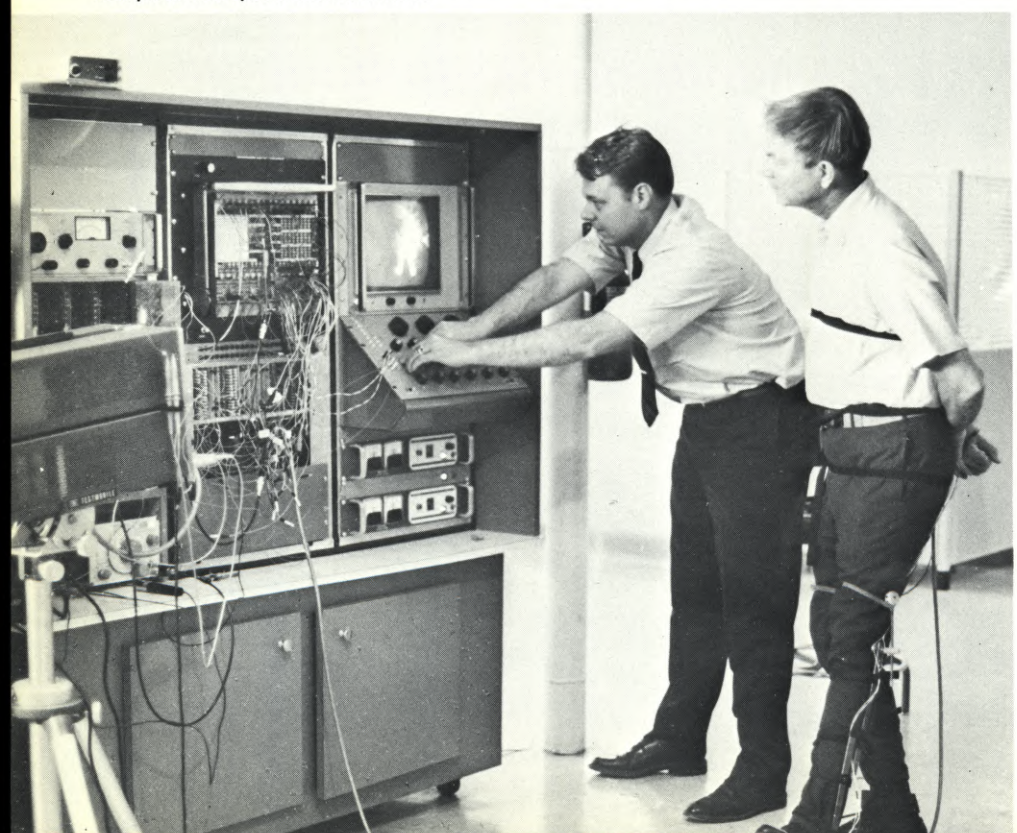


(LEFT) Jones volunteers to have electronic sensors attached to his body so that his movements can be faithfully duplicated by the animated character created within the computer. (CENTER) Detail of the sensor attached to his back and trunk section. (RIGHT) Detail of the sensor attached to his lower leg. Sensors are very light in weight, permitting completely free action.

Since a relatively simple digital image may be composed of an almost infinite number of dots or points, such a system requires the storage of an incredible number of positions, and electronic data storage on a tape or a disc requires ancillary equipment, increased programming time, and a slowdown in the retrieval process. Digital animation equipment is consequently elaborate and costly, and becomes increasingly more time-consuming in proportion to the increased complexity of the image. The resultant image, however, once programmed and recorded, is exceptionally precise and of excellent photographic quality.

The analog process, which is fundamental to Computer Image Corporation's computers, is essentially an electronic "pencil" which draws continuously at very high speed (the speed of light). The electron beam is the pencil point which, in motion, produces a line. It draws randomly and continuously on the phosphor of a cathode ray tube. The lines create an image when the beam is moved coherently by a deflection signal. The deflection is produced by a coordinated group of circuits or analogs,

(BELOW) Harrison adjusts Animac computer, while Jones goes through a series of movements which he can watch an animated character duplicate exactly on the cathode tube. (RIGHT) Jones doodled sketch of his famous cartoon creation, "Bugs Bunny", as wrathful rabbit reacted to the computer that spews out animation.



each of which guides the beam over part of the image. The result is an image in four dimensions: width, height, depth, and the fourth dimension which is time or motion (animation).

Since one analog performs the same function over and over in constructing a part of the image, and since all of the circuits are coordinated to produce all other parts of the image coherently, data storage can be eliminated entirely, and retrieval time is measured in microseconds. Thus, an analog image, though

Continued on Page 384

Goodbye to jerky starts. **Goodbye** to mid-zoom hesitation. **Hello** to long, steady zooms. If you have been afraid to simulate dolly moves, forget it . . . Cinema Product's two new "Joy Stick" zoom controls (integrated J2 for sound stage use, and the J3, the "one armer," for documentary and one man camera crews . . . tapes to panhandle) practically eliminate dollys.

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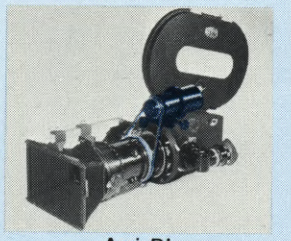
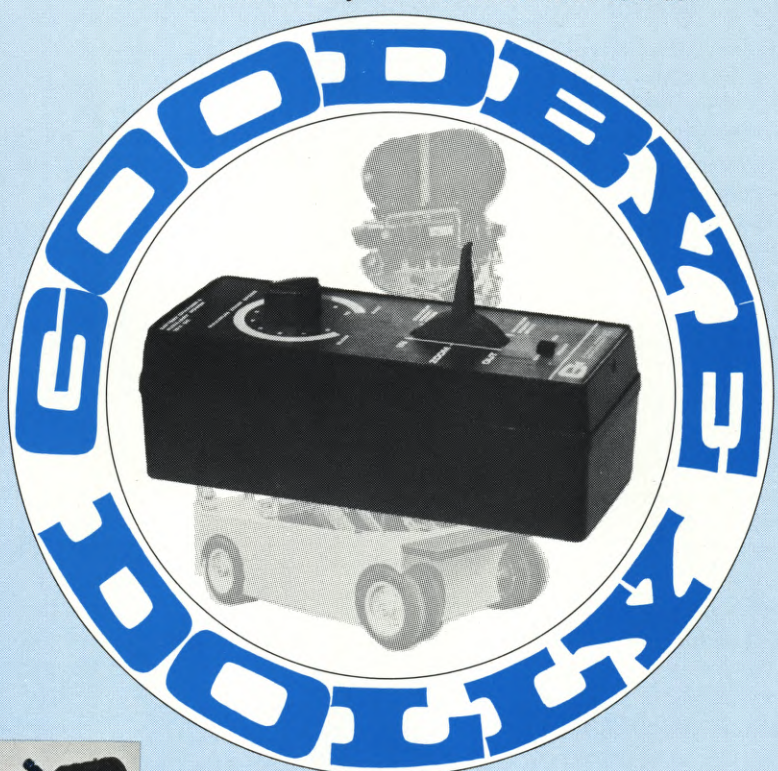


Arri BL

Max rate knob is set to desired speed. By gradually pushing "Joy Stick" in desired direction, you then have continuously variable control from zero at



Arri

mid-position to the pre-set maximum speed in either direction, and you can "feather" on and off zooms that result in gradual starts and stops to duplicate dolly performance. All TV shows at Universal and Paramount are photographed with "Joy Stick" zoom controls. Cinema Product "Joy Stick" controls meet sound stage requirements for silence at all zoom speeds of 5 seconds or slower for full zoom. Bracketry available for use with 3 lenses . . . Angenieux 12-120mm and 12-240mm (16mm format) and 25-250mm (35mm format) and cameras such as Eclair, Arriflex 16, Arri BL (16mm) and Arri and Mitchell (35mm). Highly efficient motor and large capacity, internal rechargeable battery guarantee all day shooting without auxiliary power.

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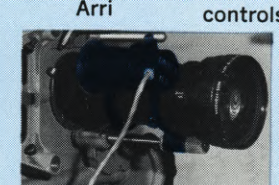

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THE BASICS OF SOUND SYNCHRONISM

A technical guide to the fundamental aspects of single-system and double-system sound recording as employed by today's film industry

By ARTHUR G. EVANS

Ever since the advent of "talkies", the matter of synchronizing the recording of pictures with that of sound has been of prime concern to motion picture technicians.

Today, almost all sound, outside of newsreel photography, is recorded on 1/4-inch tape. Modern tape recorders have numerous advantages over other methods of sound recording:

1. Almost any tape recorder costing over $100.00 will deliver higher fidelity sound than the final optical track on 16mm release prints.
2. 1/4-inch tape recorders are much less expensive than other types of recorders (probably due to the volume of production demanded by the Hi-Fi market.)
3. Tape recorders are lighter in weight and quieter than other machines.
4. 1/4-inch tape is inexpensive and not bulky.

Among many practitioners and technicians, however, there seems to be a great deal of uncertainty as to just how actual synchronism is accomplished with a 1/4-inch machine.

In order to understand 1/4-inch synchronism, it is first necessary to understand how synchronism is accomplished in the "normal" manner.

The two basic systems of synchronism are double-system and single-system. Single-system is used primarily in news work. The sound track is recorded, in the camera, directly on the picture film, either magnetically, or optically. Using this method, the synchronism is absolute, but single-system has a number of drawbacks:

1. Since the picture movement must be intermittent and the sound movement smooth, the design and construction of single-systems are rather expensive and complicated.
2. Optical sound-on-film recording does not yield high quality sound because the silver halide grain clumps of original camera film are too large.
3. Camera raw stock with a magnetic stripe attached is considerably more expensive than film without it.
4. For other than direct projection of the camera original film, sound-on-film requires a separate transfer operation in order to permit editing, which may damage the film.
5. Not all camera raw stock emulsions are available with a magnetic stripe.
6. The iron oxide of magnetic stripes tends to come off in the picture gate, creating an additional cleaning problem.
7. Magnetic striped film is more bulky than non-striped stock; therefore, less film can be loaded in a magazine.

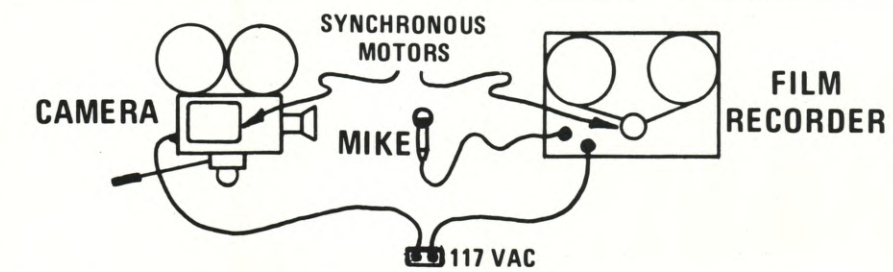


FIGURE 1—When film recorders are used in lip-sync cinematography today, electronic rather than mechanical means of synchronization are employed. The most common electronic method is to drive both camera and film recorder with AC synchronous motors, operating from a common line current.

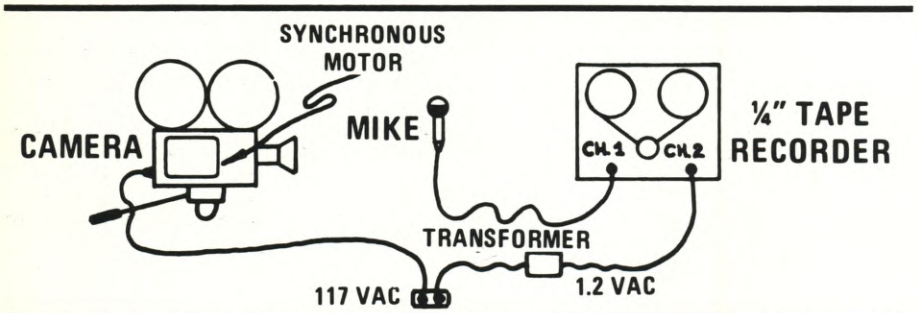
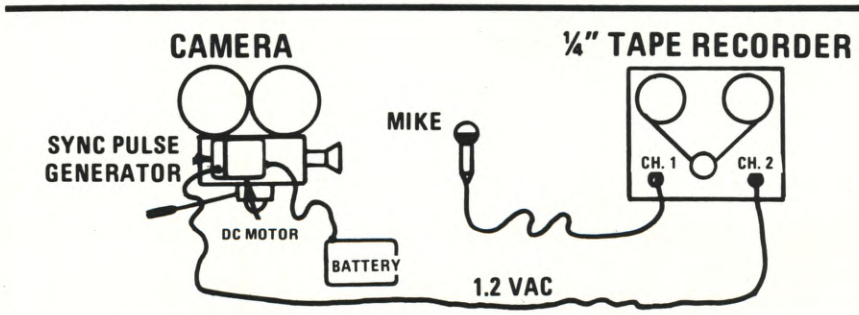


FIGURE 2—Modern 1/4-inch magnetic tape recorders maintain sync by recording a 60-cycle alternating current pulse (providing the camera motor speed information) on another track of the tape. But tape recorders cannot accept a signal as strong as 110 volts. So the current must be transformed to a voltage which is acceptable. For most machines, this is 1 to 2 volts.

The second major system, and that with which we are here concerned, is double-system. Double-system means that the camera and the recorder are separate instruments and that synchronism is maintained by mechanical or electronic means. There are a number of ways of accomplishing this.

The most direct method, and the

FIGURE 3—It is possible to supply a pulse mechanically by attaching camera motor shaft to the sync-pulse generator, which is geared to yield a 60-cycle pulse at 24 frames per second. Since the shaft used is the camera motor shaft, any variation in camera motor speed will be reflected by the generator and recorded on tape.



method which preceded the current use of 1/4-inch machines, involves the use of a film recorder. The simplest way would be to construct the camera and the film recorder so that both machines are driven by a common shaft. This would be a rather cumbersome outfit insofar as photography is concerned. A variation of this idea would be to use a flexible rather than a solid shaft.

These methods, while simple and direct, present numerous mechanical problems. When film recorders are used in lip-sync photography today, electronic rather than mechanical means are used.

The most common electronic method is to drive both camera and film recorder with synchronous AC motors. Synchronism between camera and recorder is maintained because the speed of synchronous motors is determined by the alternating current supplied by the municipal electric company. The clapstick marker at the start of each take is necessary because the two motors will come to speed at different rates.

The use of synchronous motors and a film recorder is a proven and positive method of picture-sound synchronism. But still the system has drawbacks:

1. The system requires reliable alternating current. This can be cumbersome and expensive on location work.
2. Synchronous motors are generally heavier and often more expensive than DC motors.
3. Film recorders and sound film are more expensive and larger than their counterparts in tape.
4. Film recorders make a considerable amount of noise so they must be blimped or placed in another location from that of the filming.

The principle involved in recording with a 1/4-inch tape machine in sync with a motion picture camera is based on the two synchronous motors system.

First of all, 1/4-inch tape synchronous recording requires *two* tracks on the recorder. This requirement, of course, is supplied by any stereophonic recorder. The most commonly used machines in the motion picture industry today—Nagra, Uher, Stellovox—were originally monaural machines to which an additional recording head has been attached.

Now, let's suppose that the picture is being taken with a camera which is driven by a synchronous motor. A 60-cycle pulse (alternating current) is emanating from the circuit at (in the United States, at least) approximately 110 volts. This current is driving the camera's synchronous motor. By definition, the speed of the motor is determined by the pulse or rate of the alternation of the current. If the pulse should vary, the speed of the motor will also vary.

If sound were to be recorded with a 1/4-inch tape machine, sound and picture would soon (probably within seconds) be out of synchronism. This is because of the varying speeds of the two motors, camera and recorder, and because tape will slip and stretch.

Since the tape slips and stretches and the film does not (because of the sprocket holes) information as to the speed of the camera motor needs to be

Continued on Page 377

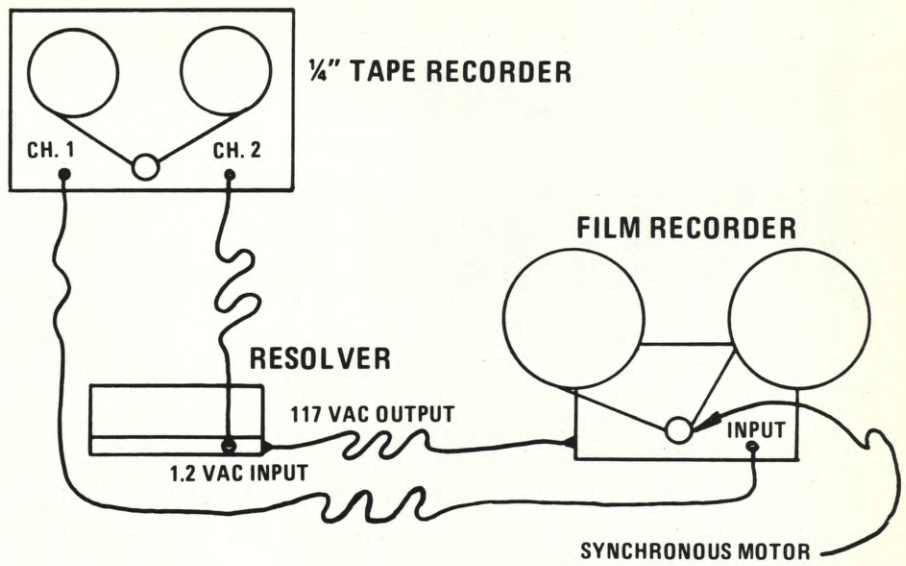
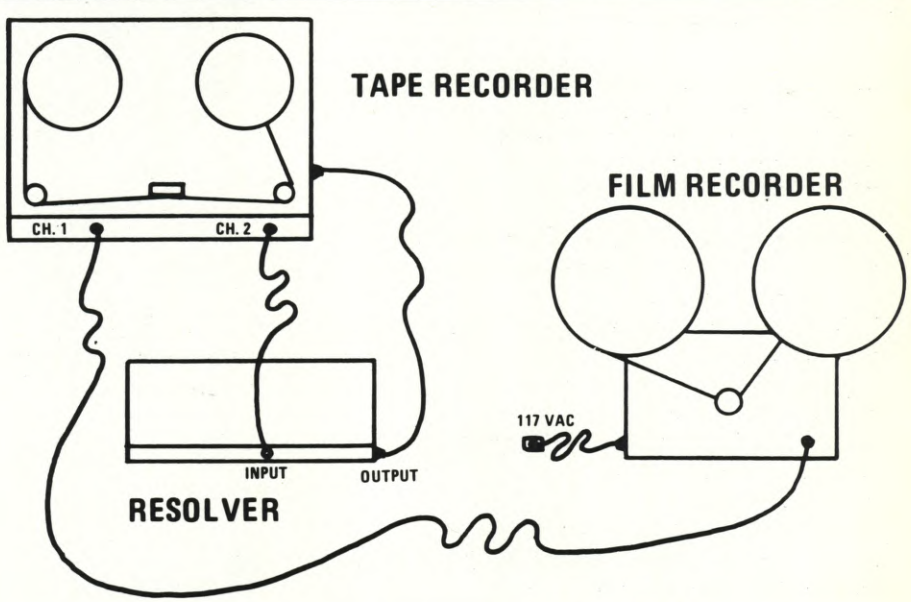


FIGURE 4—In order to transfer sync sound from 1/4-inch tape to sprocketed magnetic film, the output of the tape recorder is hooked to the input of the magnetic film recorder. Accurate speed, based on the 60-cycle pulse previously recorded on the 1/4-inch tape, is maintained by means of a device commonly called a Resolver, which, in this diagram, is shown controlling the speed of the film recorder.

FIGURE 5—An alternate resolving system, as diagrammed here, controls the speed of the tape recorder to conform with the original camera motor speed, rather than the film recorder. In order to use this method, however, it is necessary to use a variable-sync type of tape recorder (such as the Nagra).



VARIABLE SPEED TAPE RECORDER SUCH AS A NAGRA

(ABOUT THE AUTHOR: ARTHUR G. EVANS, President of Cinema Engineering, Inc., received his AB and MS degrees at the University of Southern California. A former Assistant Professor of Photography and Department Chairman at Orange Coast College, he is an Active Member of the Society of Motion Picture and Television Engineers.)

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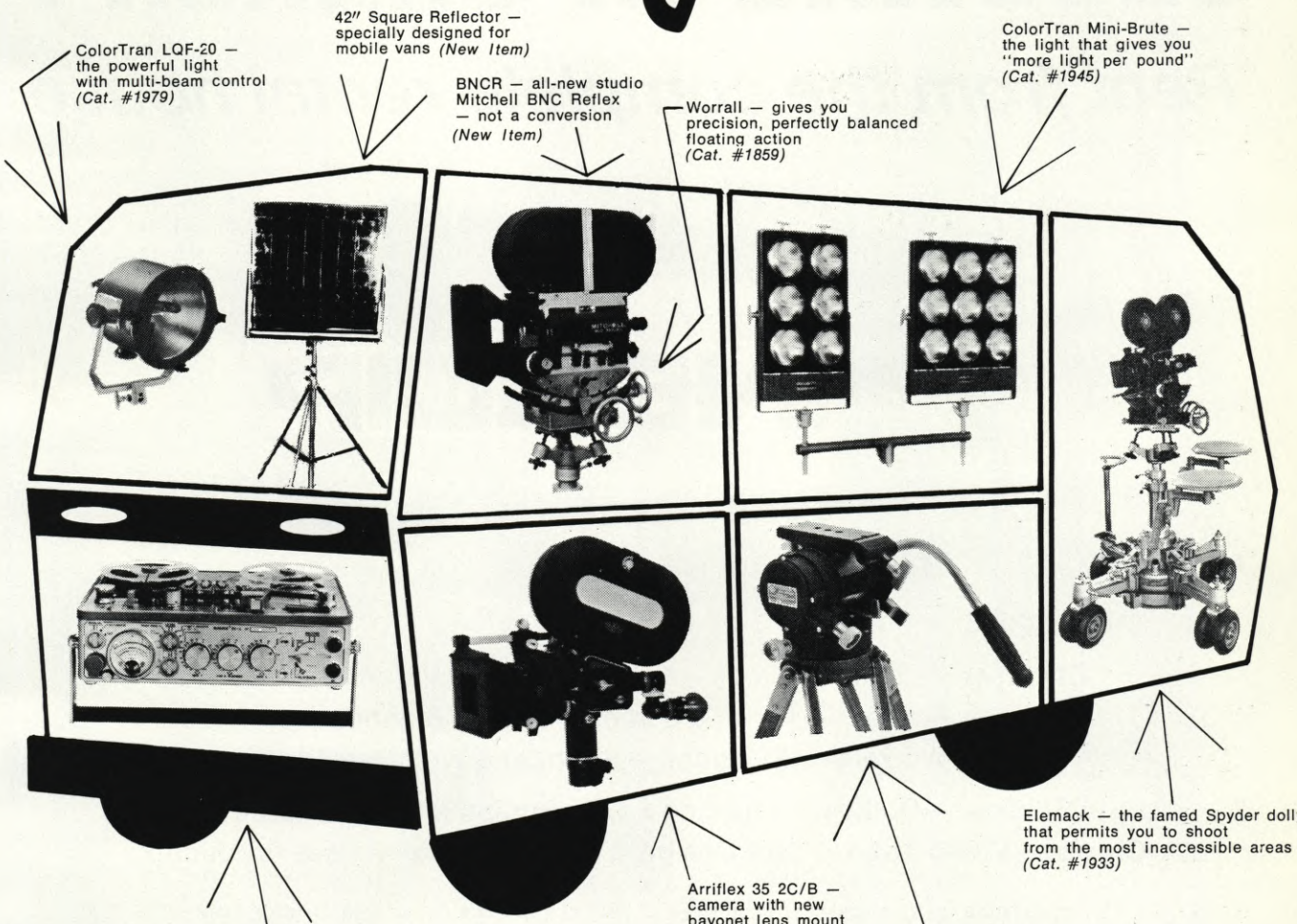

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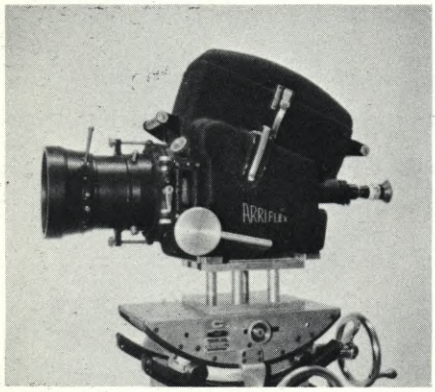

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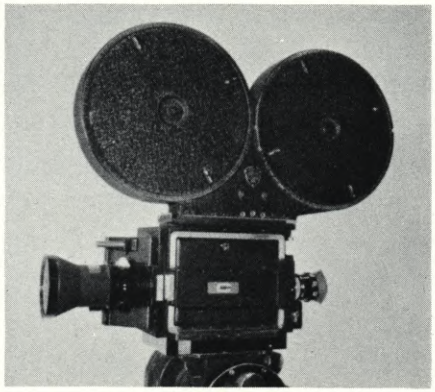

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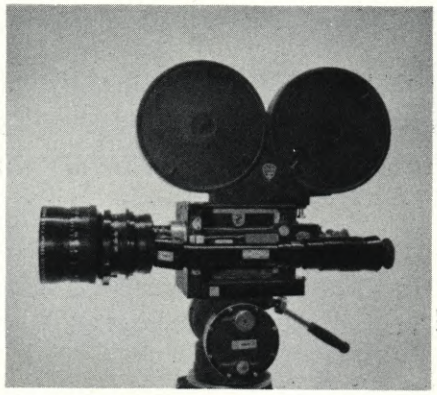

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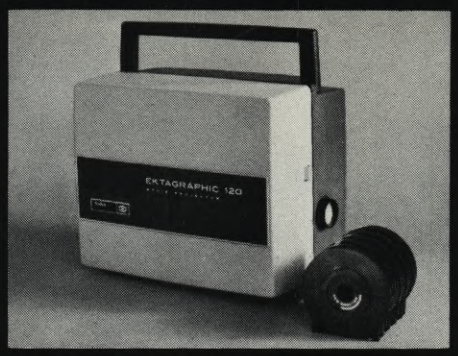

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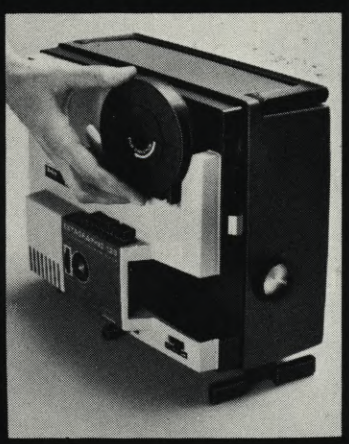

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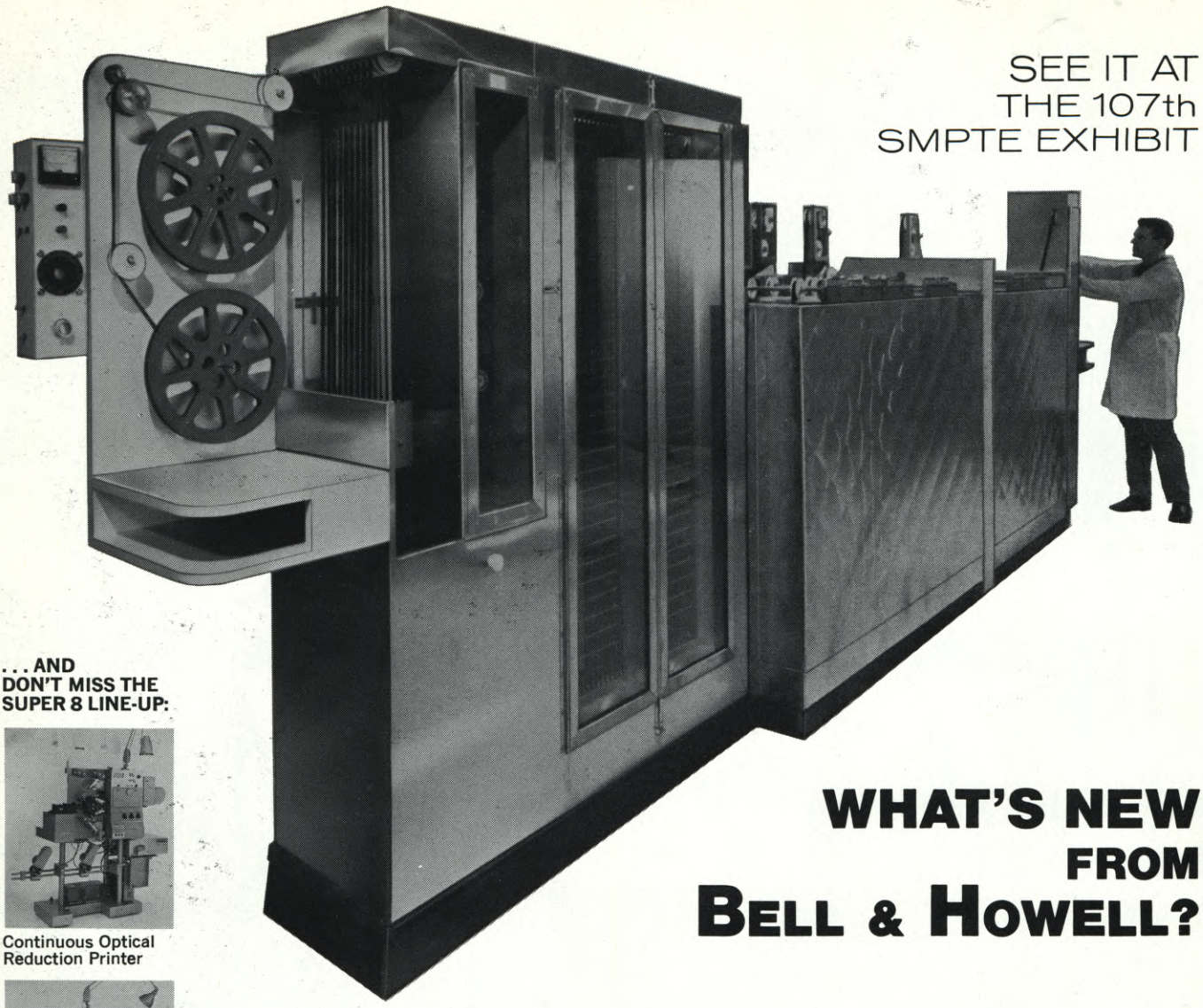

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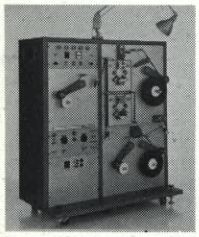

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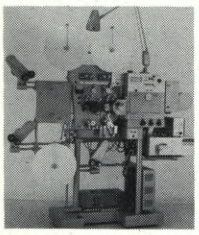

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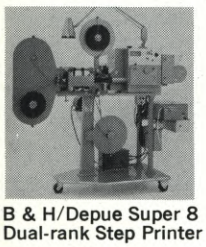

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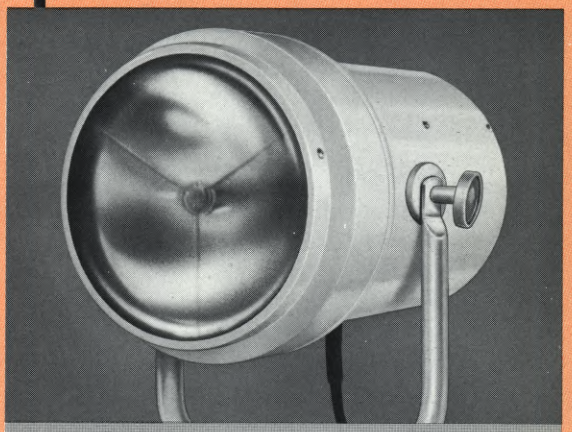
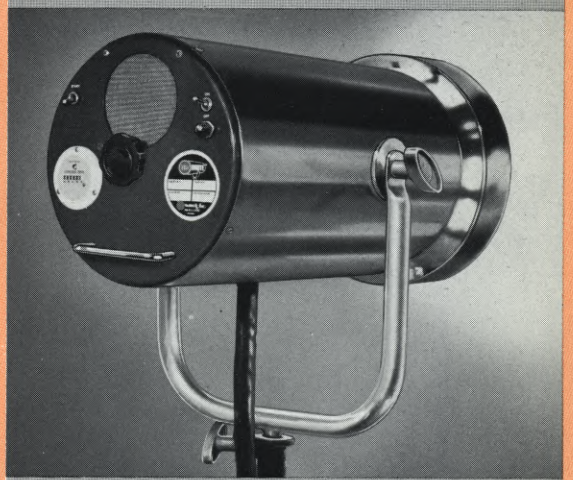
Sunbrute is priced about the same as comparable carbon arc lights, but it costs only $1.00 per hour to operate. Think how much money you'll save in one thousand hours of operation! — Not to mention the convenience of easy portability, quick set-ups, and the finest natural sunlight any cinematographer could possibly hope for!



MODEL XE-20 (2K) — Front View
BEAM DIA: Flood: 8′ at 15′ distance
Spot: 5′ at 15′ distance
DENSITY: Flood: 600 F.C. • Spot: 1400 F.C.
WEIGHT: 25 lbs.



MODEL XE-40 (4K) — Back View
BEAM DIA: Flood: 10′ at 15′ distance
Spot: 7′ at 15′ distance
DENSITY: Flood: 1500 F.C. • Spot: 3500 F.C.
WEIGHT: 29 lbs.

Write or call for full details on new XE-20 or XE-40 Sunbrute Xenon Lights!

Xenotech, Inc.

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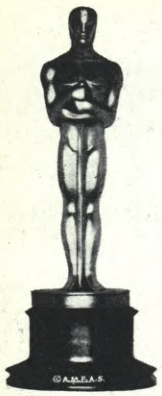


THE FIVE BEST PHOTOGRAPHED MOTION PICTURES OF 1969

By HERB A. LIGHTMAN

On the evening of April 7, night of the 42nd Annual Awards Presentation of the Academy of Motion Picture Arts and Sciences, a bejeweled, be-limousined, formally dressed crowd of motion picture luminaries will arrive at the glowing Los Angeles Music Center, walk past bleachers full of goggle-eyed fans, and enter the elegantly architectured Dorothy Chandler Pavilion. Meanwhile, throughout the nation and the world, an estimated 80,000,000 television viewers will tune in on the film industry's Big Show, and the presentation of the coveted "Oscars" will begin.

They are coveted, these familiar gold statuettes, because they represent the industry's tribute to its own. The artists and technicians who are the recipients of this honor regard it as the highest accolade because it is voted by their peers, their fellow artists and technicians in the motion picture industry.

This year, the five films nominated for Best Achievement in Cinematography represent a wide spectrum of styles, and to chose from among them a single "winner" is almost impossible. By what criterion, for example, must one judge the candy valentine photography of "HELLO, DOLLY!" against the raw and virile style of "BUTCH CASSIDY AND THE SUNDANCE KID"—or the living tapestry of "ANNE OF THE THOUSAND DAYS" against the science-fact aura of "MAROONED"?

It is precisely because it is almost impossible to narrow down to a single choice in a field of such excellence that the members of the American Society of Cinematographers consider the *nomination* to be as important as the Award itself, and it is with that thought in mind that the membership of ASC salutes with pride the following Directors of Photography who have received nominations for "Best Achievement in Cinematography" for the Academy's 42nd Annual Awards Presentation.

DANIEL FAPP, ASC
"Marooned"

CONRAD HALL, ASC
"Butch Cassidy and the Sundance Kid"

ARTHUR IBBETSON, BSC
"Anne of the Thousand Days"

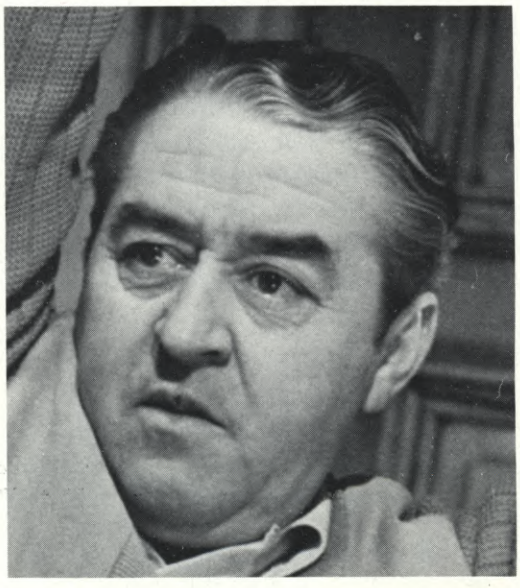
CHARLES B. LANG, ASC
"Bob & Carol & Ted & Alice"

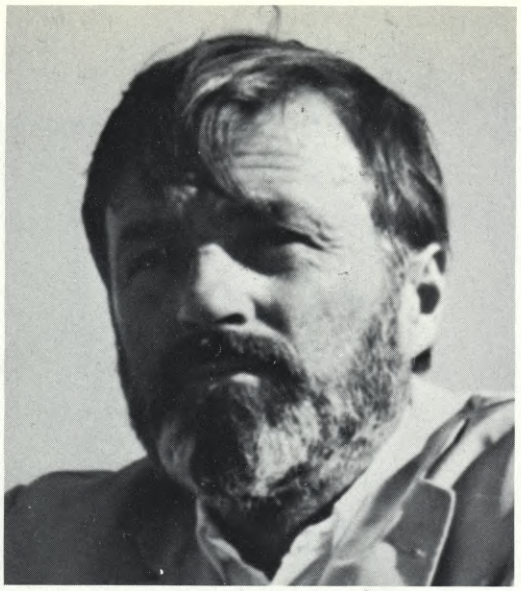
HARRY STRADLING, ASC
"Hello, Dolly!"

"ANNE OF THE THOUSAND DAYS"

"ANNE OF THE THOUSAND DAYS—photographed by Arthur Ibbetson, BSC, is the story of Henry VIII and Anne Boleyn, but told in a way that emphasizes the court intrigue and the monarch's iron will that changed history, rather than his ribald, throwing-the-bones-over-the-shoulder side. Arthur Ibbetson's rich style of photography is ideally suited to the subject. Emphasizing dramatic mood, it is "old fashioned" in the best possible way—avoiding "mod" camera fripperies, such as wild zooms and tricky selective-focus shots which would have been anachronistic to this 16th century drama.

ARTHUR IBBETSON, BSC





CONRAD HALL, ASC

"HELLO, DOLLY!"

"BUTCH CASSIDY AND THE SUNDANCE KID"—photographed by Conrad Hall, ASC, is a film that might well have been photographed in an ordinary way, but Hall, once more proving his unlimited versatility as an artist-cinematographer, brings to it a visual variety and excitement that raises it to the level of cinematic art. Perfectly complementing the film's varying moods, the photography is alternately raw and gutsy, wistful and dreamy, somber and foreboding. It precisely fulfills the prime function of cinematography: to help tell the story in the most appropriate and interesting way.

"HELLO, DOLLY!"—photographed by the late Harry Stradling, ASC, is a joyous, rollicking, giant-size candy box of sheer entertainment. Stradling has photographed it in a bright and airy style that is perfectly matched to the film's spirit and has vastly expanded its visual scope beyond the confines of the original stage form. The photography is technically superb—sharp and crisp, precisely composed, imaginatively lighted and wonderfully fluid in its coverage of the intricate choreography. It is the work of a true "pro" perfectionist—and a fitting tribute to a great cinematographer.

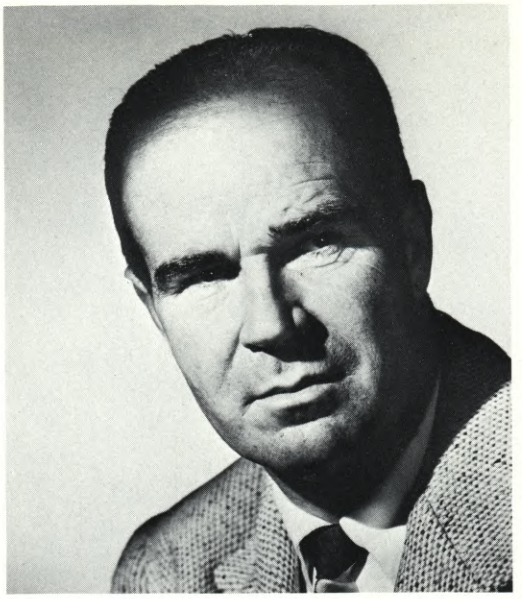
"BUTCH CASSIDY AND THE SUNDANCE KID"

HARRY STRADLING, ASC

"MAROONED"

"MAROONED"—photographed by Daniel Fapp, ASC, throws out the challenge of creating a fictional film that is as believable as the amazing events of our actual space program. Fapp's expertly directed photography aids immensely in establishing the visual credibility of what was formerly thought of as "science-fiction", but is now fact. His technical skill is evident, not only in his lighting of the cramped space capsule, but in his ultra-realistic visualization of the hurricane sequence and the suspense-filled mood of the Houston Space Center Mission Control room, as reproduced in the studio.

DANIEL FAPP, ASC



CHARLES B. LANG, ASC

"BOB & CAROL & TED & ALICE"—photographed by Charles B. Lang, ASC, posed more of a photographic challenge than might be evident to the casual viewer. It plays like a comedy, but the underlying theme is serious indeed: the basic alienation of today's young "moderns" who are desperately seeking to communicate in a meaningful way. Lang's photography is rich with the subtleties required to visually point up these intricate undercurrents. One of the most versatile and technically skilled cinematographers in the industry, he proves that an "ordinary" story can be made quite special.

"BOB & CAROL & TED & ALICE"

HOW NOMINATIONS ARE MADE FOR THE *ACADEMY AWARDS*

The procedure for arriving at the "Final Five" contenders for "Oscar" in each award category is more exacting than most people would imagine

In preparation for the upcoming 42nd Annual Awards Presentation, 3,100 members of the Academy of Motion Picture Arts and Sciences have cast their ballots for the best achievements in filmmaking during 1969. Most of the votes were cast in Hollywood, but the Academy does mail ballots to members who live abroad or who may be away, filming on location.

The nominations recently announced represent the five achievements in each of 22 categories as nominated by Academy craft branch members.

The Academy's nominating procedure is based on a 22-rule handbook which is constantly being updated in order to cover every possible contingency.

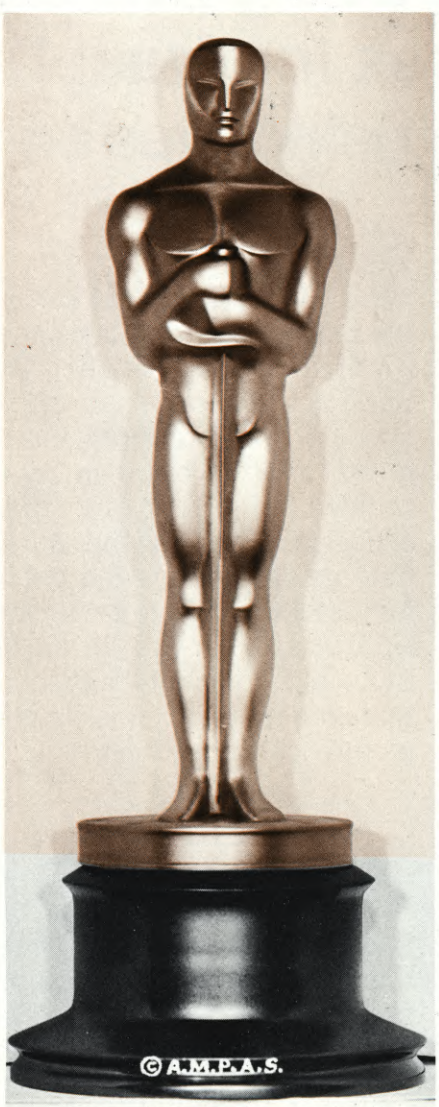
Any motion picture which was exhibited for paid admissions in the Los Angeles area in 1969 was eligible for Awards consideration if the picture played at least a week, after opening, before midnight of December 31.

With the exception of Foreign Language Films, Short Subjects and Documentary Films, pictures are not "entered" by anyone; they automatically are eligible if they meet the requirements. So if you hear or read of a studio, production company, producer or star "entering" a film in the other Oscar classifications, it's an error.

In the case of the Foreign Language Film Award (best feature-length motion picture produced abroad with non-English sound tracks), the Academy invites foreign countries to submit their best films; each nation's selection is made by a group or organization comparable to the Academy, or by a jury or committee composed of representatives from more than one film organization in the country. Only one picture is accepted from each nation. All are then screened for the Foreign Language Film Award Committee, which votes to nominate five of them for Award consideration.

Entries for both the Short Subjects Awards and the Documentary Film Awards are submitted by producing units for nominations consideration. The Short Subjects Branch and a special committee on documentary films view all the films submitted and select the nominees. Films submitted for Short Subject Awards may also be entered for Documentary Awards and vice versa, if they qualify. The winners, as are all winners in the 22 categories, are selected by a vote of the full Academy voting membership.

In the nominations procedure, votes are confined to the individual branches. For example, only cinematographers vote on the nominations for best achievement in cinematography. Rules permit craft branch members who are also active members of other crafts to vote in any category in which they are qualified, if the branch involved gives its approval. This means that a director-writer, for instance, may nominate in two categories. All active members of the Academy vote to nominate the five achievements for the Best Picture of the Year Award.



Each branch has its own set of rules, formulated by the branch and approved by the Academy Board of Governors. Each year these rules are reviewed and, if necessary, updated.

In every category but two, five nominations are made (only two achievements are nominated for the Special Visual Effects Award and in the case of the Short Subjects Award less than five nominations may be voted if not enough of the films being considered meet the branch's standards). The reason for selecting five nominations may be the result of the Academy's 36 charter members nominating five films for Best Picture honors in the first Oscar competition 42 years ago. "Wings" won that year, with another Award going to "Sunrise" for artistic quality.

For four years the five nominations were adhered to, but in 1932 the list was expanded to eight ("Grand Hotel" won that year). The number grew to an even dozen for two years, in 1934 and 1935 ("It Happened One Night" and "Mutiny On The Bounty" took the prizes in those years). For the next eight years, 10 pictures were nominated annually. In 1944, the maximum-of-five rule was established ("Going My Way" was the winner).

In the rules for acting Awards, two interesting paragraphs appear. One establishes that no player can be put in the position of running against himself by being nominated for two different roles. If it should happen that a player gets enough nomination votes for two or more films, he or she competes only for the performance that first receives the quota of votes necessary to nominate.

The other interesting rule is one that makes it impossible for a thespian to

Continued on Page 374

On this assignment, the cameraman had to disguise himself as a delivery boy, and shoot scenes on board a New York City bus with his camera inside a cardboard box.

On board ship, cruising to Bermuda, the filming crew pretended they were tourists, and carried the camera and recorder to each new secret setup inside small suitcases.

What they were doing was shooting sync sound sequences for (gasp!) Candid Camera. What they were using was an NPR.

Smile — you're on Cardboard Box.

The cameraman boarded the bus with his cardboard box, and sat down by himself. The soundman got on at the next bus stop, with his Nagra in its leather case hanging unobtrusively from his shoulder. The director was waiting at the next stop, with a trombone player from the local high school band, in full band uniform with trombone. And at every stop thereafter, another member of the band, in uniform with instrument, climbed on the bus and joined those already on board in playing selections from Sousa.

Through the small holes in his cardboard box, the cameraman shot the bus driver's reactions, which ranged from amazement to fury. When the driver stopped the bus to look for a policeman, director-interviewer Bob Schwartz tapped him on the shoulder and delivered the immortal lines: "You're on Candid Camera." The bus driver didn't believe it, even when the cameraman got up and walked over to him, still rolling, to get a close-up of his expression as Mr. Schwartz told him that inside that cardboard box was a motion picture camera. Gasp.

Psst! — Hand me a Chicken Leg.

The cruise to Bermuda took four days. If the Candid Camera team were discovered by a passenger, the news would spread fast and they would be unable to work for the rest of the time at sea. Several bizarre situations had to be set up and shot without their victims knowing what had been going on until the last day of the trip. The film crew ate in the passengers' dining room; the actors had to skulk inside their cabins all the time — except when they were impersonating soup-spilling stewards or starving stowaways. Hidden inside one of the lifeboats, the "stowaway" would lift its canvas cover a few inches and ask a passing passenger to bring him a chicken leg from the buffet table.

Suspicious Suitcases Prohibited.

To get to each new setup, the film crew carried their equipment casually through the passageways inside small suitcases — big cases would look too sus-

picious. For this, they needed a camera about the size and shape of a briefcase — and luckily they had one. The NPR. At the setup, anyplace where there was room to shoot they couldn't use, because a passenger might wander in. Anyplace where they wouldn't be discovered was too small to shoot in — so they used that.

The great Film Runout Problem.

No room for 1200 foot loads in there. No AC power, usually. No tripod, even, half the time. Certainly no blimp. But if ever there was a show that needed 1200 foot loads, it was Candid Camera. The classic problems of shooting un-rehearsed action, plus the necessity for total secrecy. The program's shooting to aired-footage ratio averaged around *a hundred to one!* And the best action very often happened precisely at film runout, of course. Gasp.

I said Sync, Madam — not Sink.

But Mr. Schwartz reports that the two-man crews got to the point where they could change the NPR's magazine literally in three seconds. They left the tape recorder running; and the NPR's built-in clapper automatically re-established sync. With earlier cameras, they had used a system of warning lights to let the interviewer know that he should stall the action while the crew changed magazines. But with the NPR, all that was found to be unnecessary. The NPR, in fact, turned out to be the ideal Candid Camera camera.

A DOUBLE FRONT-PROJECTION SET-UP THAT USES SLIDES FOR BACKGROUNDS

A simple way to add static backgrounds to your scenes—with a dissolve capability

(EDITOR'S NOTE: The following, reproduced from the current issue of "The Aperture", official publication of Calvin Communications, Inc., details a simple but effective method of front-projection utilizing two standard slide projectors rigged to provide static background "plates" for the filming of composite scenes—with a background dissolve capability. We pass it on to our readers as yet another application of front-projection, one that is easy to set up and operate.)

Calvin's Camera Department has been experimenting with some exciting front screen projection materials and techniques lately. We've learned some things that might interest producers who—

a. have limited studio space
b. are working on low budget productions
c. need to get worldwide locations into a film, but have those locations only on 35mm slides
d. want quality that is hard to get with rear-screen projection.

We've concluded that we can do a better job cheaper using 3M Scotch-lite retro-reflective screen material (#7610) and shooting from out front . . . than we can with the rear-screen method.

The troubles with rear-screen are pretty well known: You have to have as much space behind the screen as in front because the projector has to have room to throw the image to the screen. The projector has to be powerful, and usually that creates hot spots on the projected image. With rear-screen projection, you can't tolerate any spill light on the front of the screen; the image will wash out. The talent has to stand close to the screen because there is not enough light on the screen to give the cameraman any depth-of-field. He has to shoot wide-open, and there's always the danger of the rear-screen image coming out fuzzy. Most rear-screen work has to be done with special equipment, using 4" x 5" transparencies, for example. The emulsion has to be cemented to glass and the film base removed so it won't melt or turn brown from the heat of the projector. All these disadvantages can be eliminated through front-screen projection with a set-up like that indicated in the following diagram:

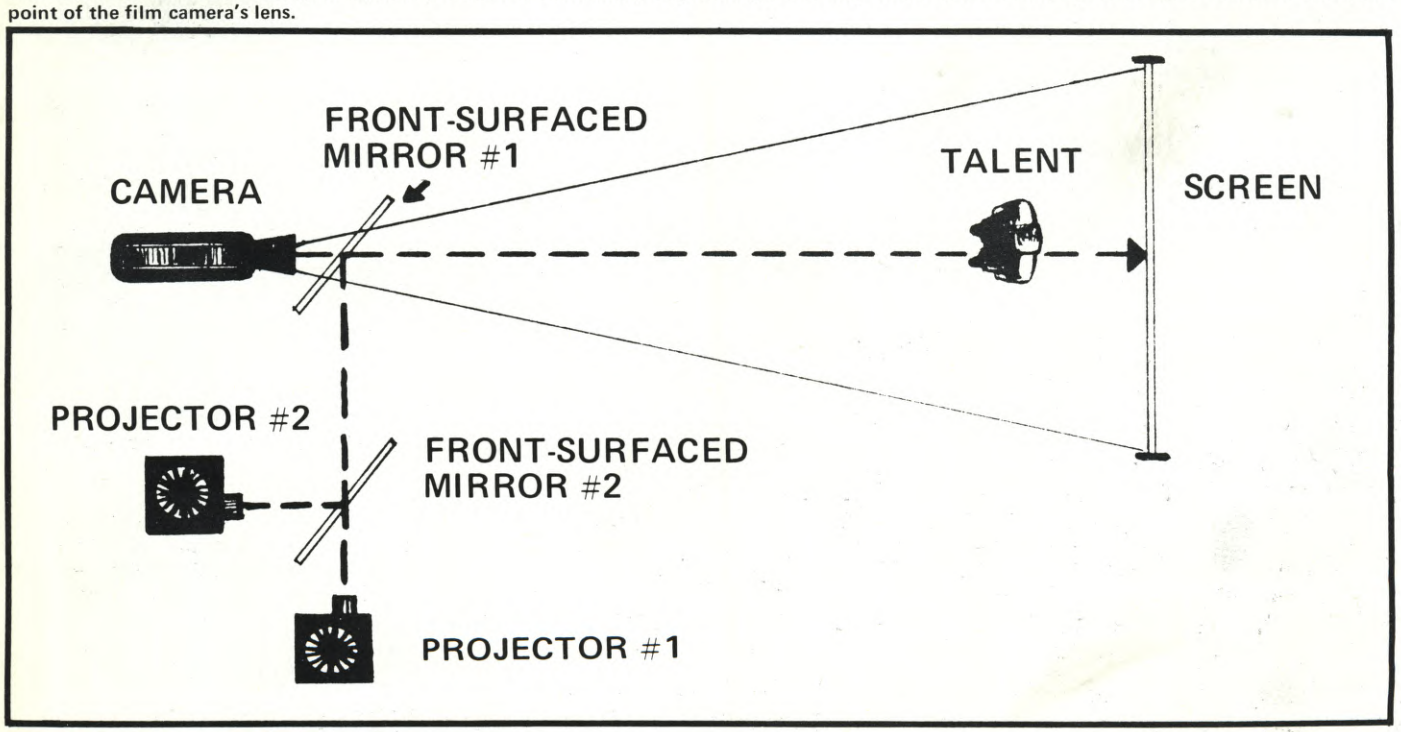
If only one projector is used, it would be #1 in the diagram. The image is thrown to mirror #1 which bends the light 90° to the screen. The screen reflects light straight back to its point of origin, which in the diagram set-up is the camera lens. Using two projectors equipped with dissolve units (and another mirror mounted in position #2) you can even get dissolve effects. Or, using black slides in one of the two projectors, you can get fade-in or fade-out effects. The mirrors referred to, it should be pointed out, are front-surfaced mirrors, with 30% reflectance and 70% transmission characteristics.

The advantages of this kind of front-screen projection are several:

a. The screen image is extremely brilliant. In fact, we've had to use a neutral density filter in order to keep over-all light levels tolerable

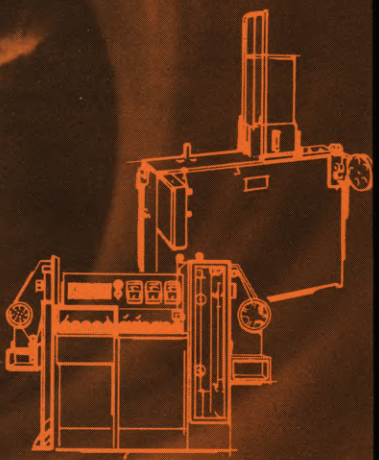
Continued on Page 369

The front-projection system used at Calvin Communications, Inc. employs two 35mm slide projectors equipped with dissolve units. The front-surfaced mirrors, set at a 45-degree angle to the projectors, reflect 30% of the projected light and transmit 70%. The retro-reflective screen material, with its tremendous gain capability reflects an extremely bright image, but only when viewed from a position dead center to the nodal point of the film camera's lens.



NEW TREISE PROCESSORS FEATURE

SBR™ drive!

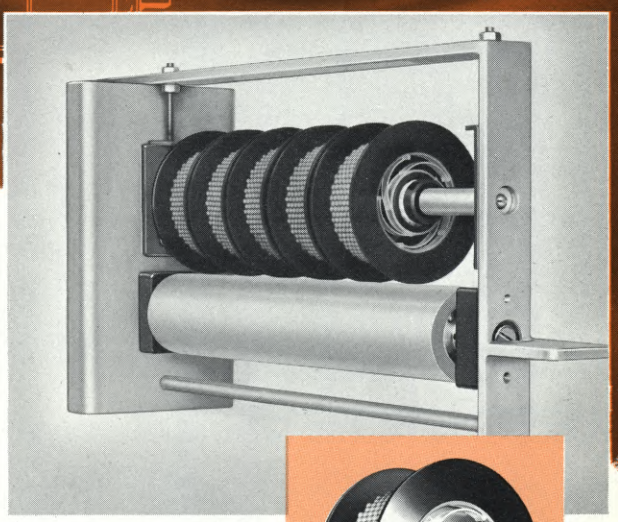


Now you can change film sizes ...and still maintain uniform tension and constant speed!

Any laboratory that changes film sizes frequently or plans to process multi-perforated film will find the new Treise Processors a dream to operate. They feature a revolutionary new type of demand-drive that assures uniform controllable tension and constant film speed throughout the processor.

The heart of the Treise SBR-Drive is a unique new film roller with a flexible heavy-duty 5-leaf spring insert. The spring bearing rollers (SBR) are mounted on a stationary shaft at the top of each rack and are free to rotate. An overdrive shaft is mounted directly underneath. As film tension increases (or decreases), the SBR contact (or pull away from) the drive shaft. The result is individual strand control! Due to the unusual construction of the Treise spring insert, the distance between the rollers and the drive shaft is so small that the slightest change in film tension creates a response and thus maintains a remarkable degree of equilibrium.

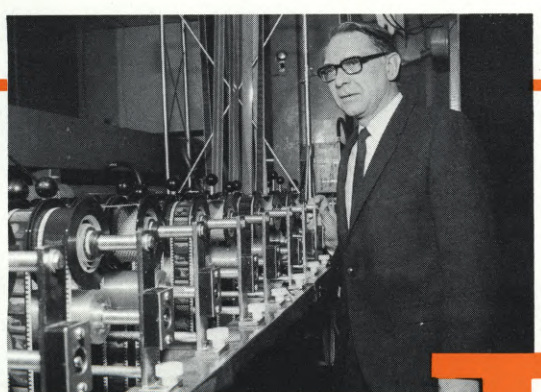
All SBR are equipped with "soft touch tires" that firmly grip the film and smoothly move it along without the slightest scratch or abrasion. Treise processors operate smoother, too, because they feature heavy-duty gear box drive and torque motor take-ups.



When using SBR-Drive, the elevator is kept at a fixed position less than an inch from the bottom of the tank, thus permitting full utilization of chemical solutions. SBR-Drive comes either in individual lift-out racks or as part of a complete unit lifted out by hoist, for quick easy servicing.

SBR-Drive includes an automatic braking system to stop the processor, in the event a film breaks due to some error in handling.

The new Treise SBR-Drive Processors feature stainless steel tanks, with hastelloy or titanium components in ferri bleach areas. Models are available to accommodate any film size from 8mm to 105mm, to handle any kind of process, and to operate at speeds from 30 fpm to 250 fpm.



Bill Smith, Allied Film President, checks over his SBR-Drive.

ALLIED FILM LAB modified a 10-year-old processor with SBR-Drive . . . and now it runs like new!

Join the many leaders, like Allied Film Lab, Foto-Kem, News Film Laboratories, University Microfilm, etc., who are already benefiting from this revolutionary "step forward" in processor design. Write today for complete details about our modification program. Modernize *your* processor with Treise SBR-Drive!

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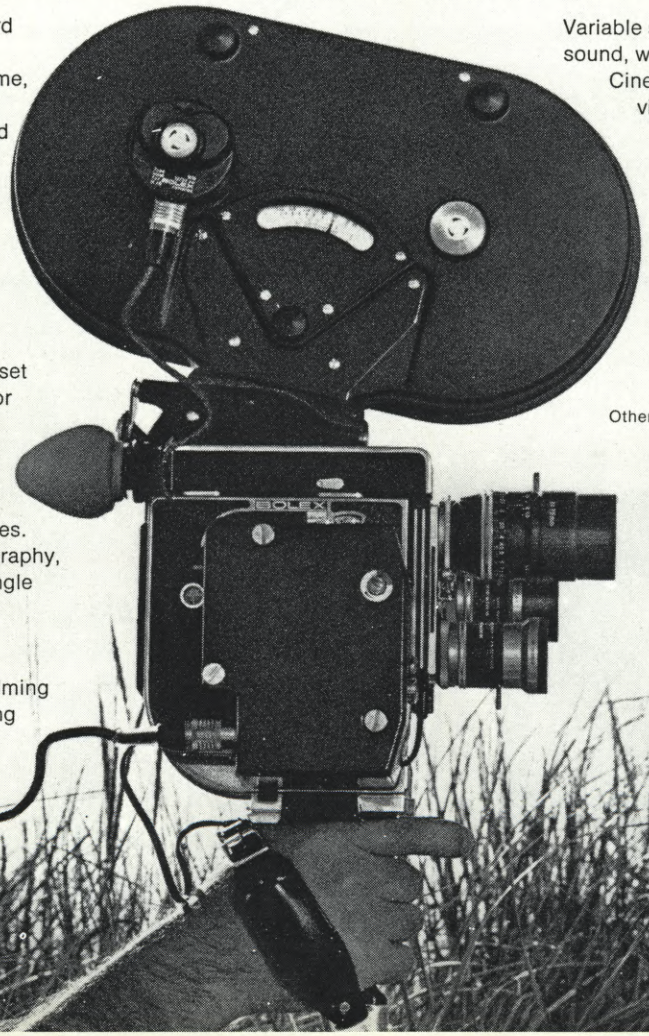

Variable speed filming, from 12 to 64 f.p.s. Sync. sound, with the constant speed (24 f.p.s.) motor. Cinephotomicrography—without disturbing vibrations, because of the Bolex circular shutter. Underwater filming, with the special Bolex underwater housing. Bolex is so versatile and reliable that it becomes an extension of yourself. More than a camera. More like a friend.

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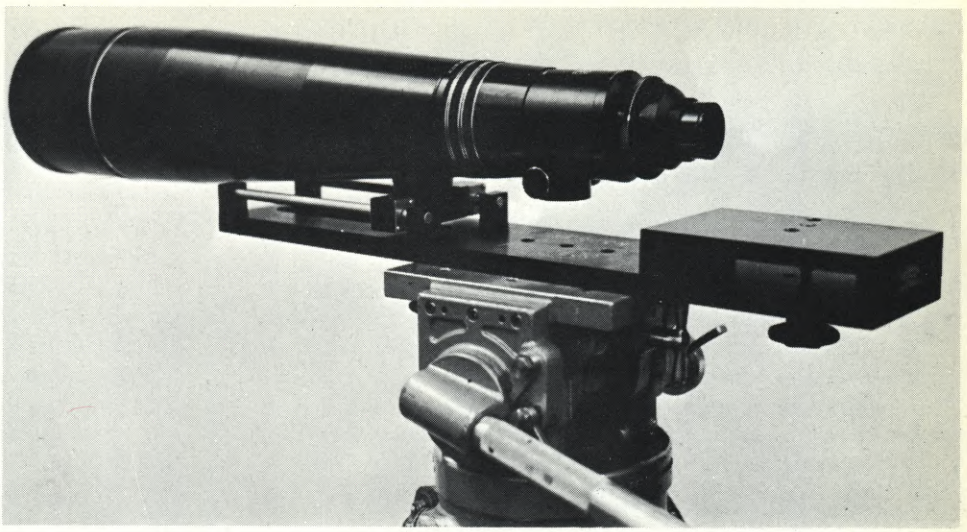
Other products: Hasselblad cameras and equipment. Hermes typewriters and figuring machines.

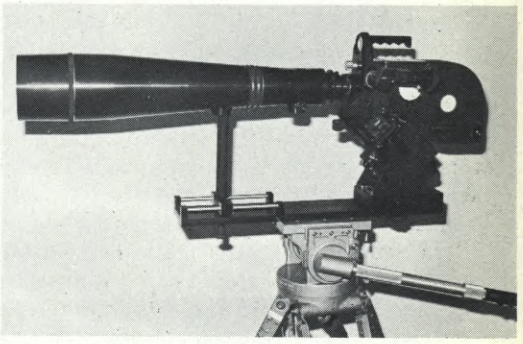
*Kern Switar lenses were selected to film the moon landing.

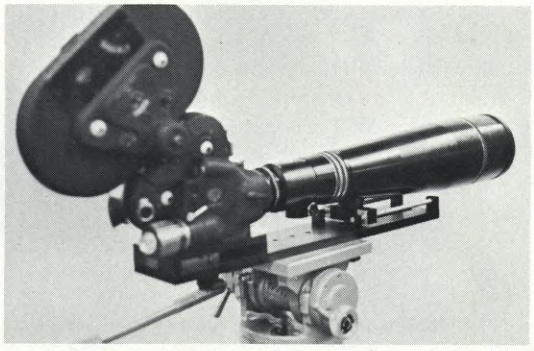
NEW

UNIVERSAL LONG LENS SUPPORT CRADLE DESIGNED BY F&B/CECO



With the help of the cinematographers in the industry, F&B/CECO has designed a universal long lens support cradle that easily adapts to all popular cameras. You asked for it. Here it is. The lens rides on ball bearing bushings which allows finger-touch focusing. F&B/CECO thanks you for your help.





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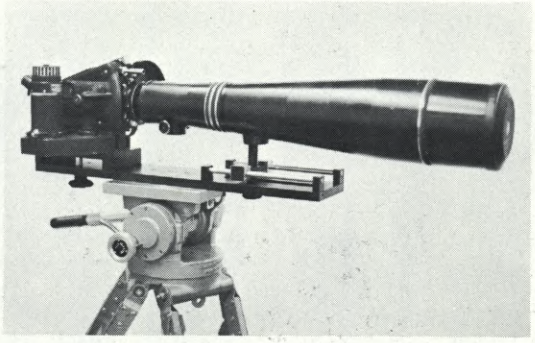
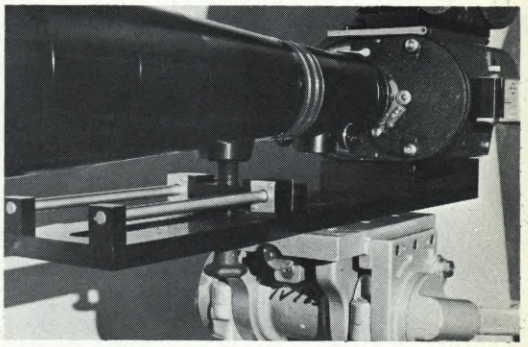
16mm Mitchell	35mm Mitchell R35 Mark II





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PHOTOGRAPHING "THE MOLLY MAGUIRES"

Continued from Page 311

Much of the walls of the mine were covered with actual casts from one of the deepest coal mines in northeastern Pennsylvania. A total of 135 different casts were made by plaster experts in areas in which it would have been impractical to stretch the necessary cables and set up lighting equipment for filming.

These casts reproduced every type of coal tunnel wall and ceiling, including glistening anthracite, or "blue coal" stratas, dull-gray slag stratas, iron ore veins and areas in which all three were exposed.

After the casts were "laced" together, the seams were closed with a mixture of plastic and plaster and the entire surface sprayed with a plastic-like material. This, in turn, was painted as required to ensure an effect so realistic that visitors knocked on its surface to determine which was the imitation wall and which was the real anthracite, of which 200 tons were shipped from Mahanoy, Pa., to the studio in Hollywood. An arrangement of dripping water and tiny rivulets seeping through the walls formed a murky sludge on the tunnel floors to add to the discomfiture of the film-makers just as it did to the miners in the time of the story.

Not only did the tunnels curve and vary in height from five feet to a nine-foot center to permit mules to haul the coal cars over the tracks provided for that purpose, but there were various off-shoots and pockets. At times the actors worked in areas 38 feet above the sound stage floor. The highest point of the setting, which extended 45 feet to the top of the stage, reproduced the slope entrance of the actual mine in Pennsylvania. Especially installed engines controlled the cables which raised and lowered the coal cars and the cars on which the miners descended and ascended from the mine depths.

Among the areas within the mine set were the stable for the mules which spend their entire lives in the mine and eventually become blind, a blacksmith shop and a turntable which permitted the coal cars to be turned and shunted in various directions.

During the shooting, director Martin Ritt and his crew assumed more the appearance of mine workers than film-makers. Special cover-all suits were issued to the crew as protection from the all-pervading dirt and coal dust, and painters' masks were worn as protection from breathing the dust during the filming of action and explosion scenes.

Before leaving the Eckley location to go toil in Paramount's *ersatz* coal mine-on-the-lot, Howe had, in the interest of realism, paid a visit to the real thing—1200 feet under ground.

"I didn't really care much about going down into those mines," he confesses. "The timbers were rotten and there was water dripping all over the place. But going down there and seeing how they worked gave me an idea of what the lighting should look like. At first you can't see anything, but then the pupils of your eyes open up and it's amazing how much you can see. Even so, there's not enough foot-candles to photograph anything—but I knew I would have to find a way to light our coal mine set so that it would have this appearance, while still giving me enough light to get an exposure.

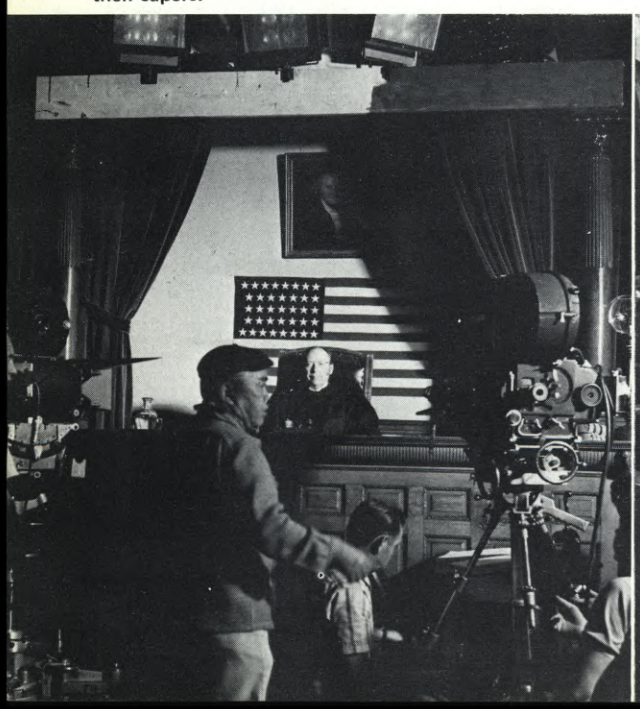
"Now, of course, coal miners wear little electric lights on their caps, but during the period of our story they wore oil lamps backed up with little reflectors. Here and there would be larger oil lamps with huge wicks, as well as candles set in spikes driven into the walls of the shaft.

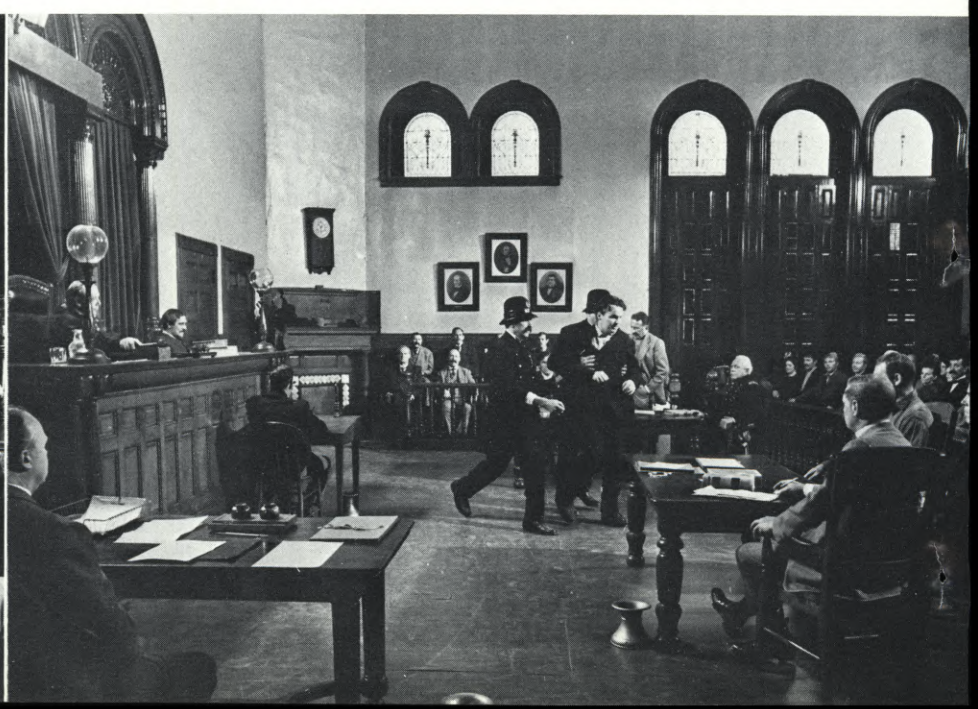
"There were a few other problems I could foresee. The coal miners' faces are black from the coal dust. Their clothes are almost black for the same reason. And you have to photograph them against a black background. If we had shot this picture in black and white I would have had a difficult time getting separation between the characters and the background. In color the chances were a little bit better.

"I had always thought that coal was black, but it's surprising how much color there is in it under lights—mostly blue. Also, it's not a photographically dead material. It shines and sparkles with a lot of life."

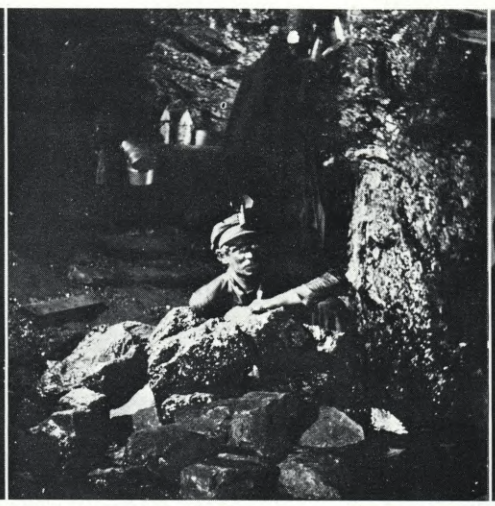
Back in the Hollywood coal mines, Howe set about trying to duplicate the look of the real thing, circa 1870. The set had been built exactly to the proportions of the actual mine—with no "wild" walls. The highest point of the main tunnel was about nine feet. There was a track running down the middle to accommodate the little coal cars pulled by mules, and smaller tunnels, where the digging was actually going on, slanted off of the main one. They were only three

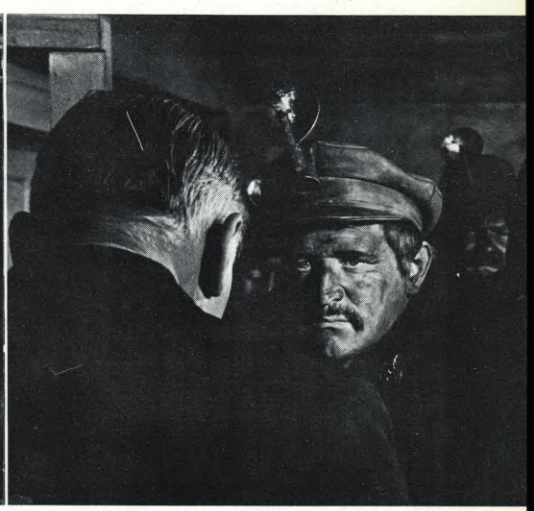
(LEFT) Two Panavision cameras are set for filming inside the 100-year-old courthouse in the town of Jim Thorpe. (RIGHT) Sequence duplicates actual trial of the Molly ringleaders held in this courtroom, which required only minor changes to restore it to 1876 authenticity. The rebels were convicted on the testimony of company spy James McParlan, played in the film by Richard Harris, who infiltrated their ranks and actually participated in several of their capers.





Harris and Connery, playing company undercover spy and Molly ringleader, respectively, relish a moment of genuine camaraderie as they enjoy the blaze they have set inside the company-owned general store. Sequence was filmed in an actual building on location. Low-key lighting was tricky because of extreme depth-of-field required, plus necessity of maintaining consistent color tone of the flame from scene to scene.





(LEFT) Plotting by lamplight, the Molly leaders look like figures in a classic painting. Howe favors clean source lighting, dislikes decorative shadows on the background. (CENTER) Harsh cross-light inside the mine, provided by small quartz units, accentuates the rugged masculinity of the miners. (RIGHT) Miners of the period wore oil lamps with miniature reflectors on their caps. For shots in which they were faced away from camera, Howe substituted tiny, battery-powered high-intensity lamps.

or four feet high, just big enough for a miner to crawl around inside.

It was necessary to separate the planes of the tunnel to indicate its depth and show where the sub-tunnels branched off, but due to the cramped quarters it was impossible to use conventional studio lighting units, such as 5-K's and 10-K's. Instead, ColorTran Mini-lite 6 units (650 watts) and Set Lights (1000 watts) were "hidden" behind convenient out-croppings of coal.

"For this purpose, I needed small units that would give me an even flat light over a large area, because I didn't want the long shots to look too spotty," Howe explains. "If I had used spotlights the shadows would have been too sharp. I wanted softer shadows, or better yet, an *absence* of shadow, because I don't think black shadows against a dark background would have helped the effect any."

The critical element was that of duplicating the feel of source light coming from the small oil lamps the miners wore on their caps. To achieve the effect, Howe bought several dozen of the tiny high-intensity lamps used to light certain instruments on space ships. No larger than a marble, they are extremely rugged and can be operated from a battery pack. These were mounted in the cap-lights of the actors playing the roles of miners. They used them mostly when turned away from the camera, wearing the battery pack in front. Off in the background they looked like so many fireflies.

"Of course, when the actors were facing right into the lens, especially in close shots, they would switch to the oil lamps with polished reflectors," explains Howe, "but when they were faced in the other direction or walking away, the little globes worked very well. The reflectors spread the light out so that you didn't get a spot effect, which would have been bad. Exposure-wise, I was able to get quite a bit from these little lamps—mainly because of reflections from the coal. The film picked up quite a bit of color because of the sheen and I was also able to silhouette miners against a coal background. If the coal had been dead black, without any reflective surface, this wouldn't have been possible."

For shooting the extensive night-for-night scenes in "THE

Continued on Page 371

XENON LIGHTS FOR CINEMATOGRAPHY

A light-weight, low-amperage, compact unit that is cool to the touch, but puts out almost as much light as a Brute arc, promises much for location filming.

By JEFF HUTCHINSON, *Vice President, Xenotech, Inc., Van Nuys, California*

The problem of illuminating shadows in scenes lighted by natural sunlight is one that has plagued photographers since the invention of color film. Unless the "fill" light has nearly the same color temperature as sunlight, objects illuminated by the sun *plus* the fill light will have different color values than those lighted only by the sun. The original fill light was the sun itself, bounced from reflectors into important shadows, a practice that became even more popular when aluminum foil became available. When the conditions are right, no artificial fill light can beat this system for simplicity or low cost.

Carbon arc lights are, and have been, the mainstay of sun-fill "booster" lighting for at least the last twenty years. The units are rugged, simple to operate, and produce a powerful beam that comes close to matching the color temperatures of sunlight. They are also heavy: 175 to 250 pounds for the "head" itself, plus another 80 pounds for the grid, and 215 pounds for the electrically-operated elevator that must be used to raise and lower the light. Their weight and bulk were not particularly significant in the days when big budget feature films were made primarily on large Hollywood sets, where power and people were in plentiful supply.

The so-called "FAY-light", a dichroic-filter-coated, tungsten-iodide lamp, developed originally for home moviemakers, swept the professional market several years ago. Its simplicity, low initial cost, and light weight have made it a favorite with many location companies. Basically, the FAY-light is a 650-Watt tungsten-iodide lamp, with a filter coating on the bulb that raises the apparent color temperature of the projected beam to 4500-4800° Kelvin, sufficiently close to sunlight for many noncritical applications. Clusters of these lamps, in rectangular and circular arrays containing up to twelve bulbs (7.8KW), are readily available. Their operating cost is high, they produce multiple shadows (one for each lamp), and the illumination field from a multiple-lamp array leaves much to be desired. But they are simple to build, operate and wrap.

Compact size of the Sunbrute 4000-watt Xenon Floodlight is evident here, as the unit is used to "buck" high-noon sunlight. The light weighs less than 30 pounds, and is equipped with a bail compatible with most pedestal stands now in use.

In this scene, the subject was sprawled across the front seat of the automobile. Shadows were filled by means of a single Sunbrute 4000-watt Xenon Floodlight. Excellent color balance was maintained without auxiliary filtering, because of the light's 6000° K inherent color temperature.

Xenotech, Inc., has developed a new type of lightweight, high radiance, xenon arc floodlight for motion picture and television cinematography. The units incorporate many of the desirable features of both carbon arc and tungsten lights, while eliminating many of the limitations of this equipment. The new xenon lights, trade-named "Sunbrute"[tm], are presently available in

COMPARATIVE PERFORMANCE SUMMARY

	Input Power	Beam Intensity At 25 Ft.	Beam Size Between 50% Power Points	Beam Lumens	Efficiency, Lumens/Watt	Color Temp.	Weight
1. 225-Amp Carbon Arc* With Grid	120V.D.C., 225A. (27,000 Wts.)	Flood: 595 F.C. Avg. Spot: 2185 F.C. Avg.	14.5 Ft. Dia. 4.0 Ft. Dia.	98,000 27,500	3.5 1.0	5000°K 5000°K	305 lbs.
2. 225-Amp Carbon Arc, Without Grid	68V.D.C., 225A. (15,300 Wts.)	Same	Same	Same	6.20 1.76	5000°K 5000°K	225 lbs.
		Beam Intensity At 15 Ft.					
3. Nine-Lamp "FAY-Light"	120V., 48A. (5850 Wts.)	950 F.C. Avg.	4.5' x 7.0' Elliptical	29,900	5.1	4500 to 5000°K	32 lbs.
4. Sunbrute XE-20	30V.D.C., 67A. (2000 Wts.)	Flood: 600 F.C. Avg. Spot: 1400 F.C. Avg.	8.0 Ft. Dia. 5.0 Ft. Dia.	30,160 27,500	15.5 13.7	6000°K 6000°K	25 lbs. 25 lbs.
5. Sunbrute XE-40	30V.D.C., 134A. (4000 Wts.)	Flood: 1500 F.C. Avg. Spot: 3500 F.C. Avg.	8.5 Ft. Dia. 5.5 Ft. Dia.	85,000 83,000	21.2 20.7	6000°K 6000°K	29 lbs. 29 lbs.

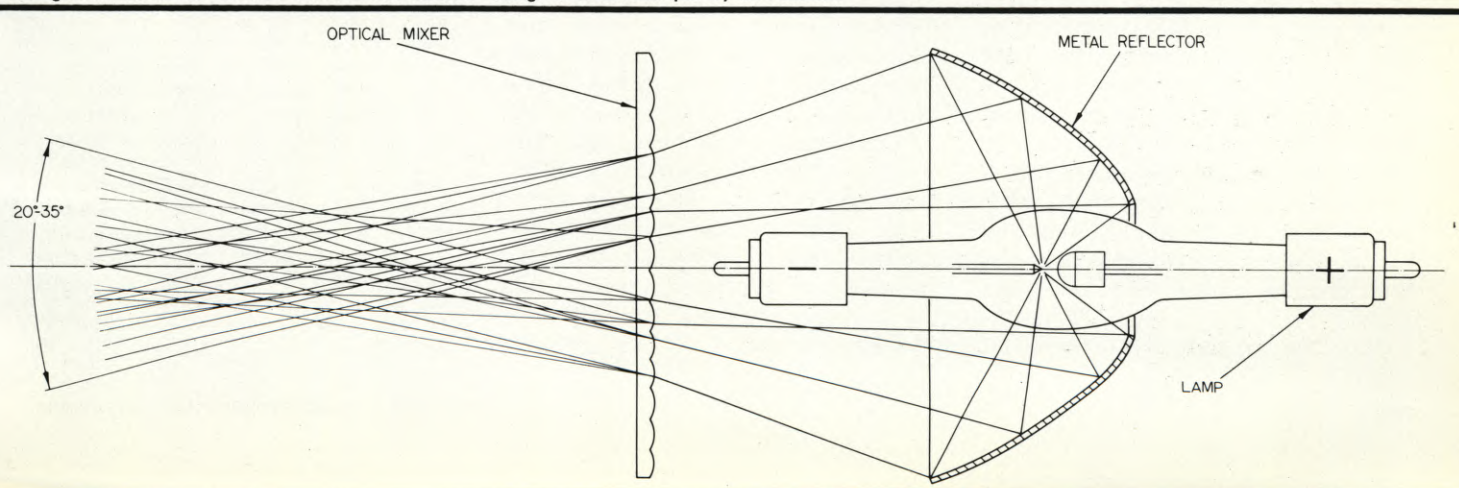
*Data from tests at MGM London Studios, Sept. 10-11, 1969.

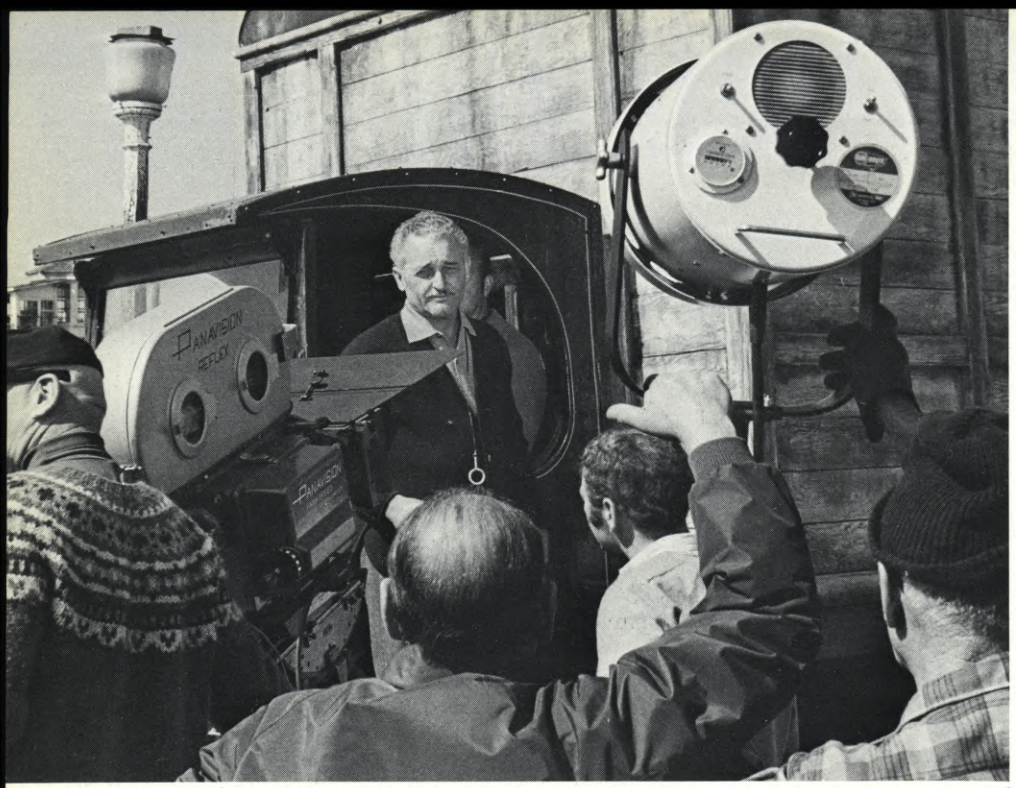
COMPARATIVE OPERATING COSTS (EXCLUDING LABOR)

	6-Lamp FAY-lite	9-Lamp FAY-lite	225A Carbon Arc "Brute"	Sunbrute 2K	Sunbrute 4K
Initial Cost, light source(1)	$84.00	$126.00	$1.68/trim	$550.00	$725.00
Rated Lifetime, lamp set(2)	30 hrs.	30 hrs.	40 mins/pos 80 mins/neg	500 hrs.	500 hrs.
Operating Cost per hour (light source only)	$2.80/hr.	$4.20/hr.	$2.09/hr.	$1.10/hr.	$1.45/hr.
Labor time to change lamp set	30 mins.	45 mins.	3 mins/change 2 mins/burn-in	15 mins.	15 mins.
Total Labor, 500 hours operation	8.3 hrs.	12.45 hrs.	31 hrs.	15 mins.	15 mins.

(1) Based on average 1969 low net selling prices to high-volume users.
(2) Lifetimes of lamps based on manufacturer's warranty.

Practical use of xenon lamps depends on careful design of the reflector and any other optical elements used with the lamp. The Sunbrute reflector collects more than 80% of the radiation produced by the horizontal xenon arc, and reflects it through an optical "mixer" element to the illumination plane. The arc, only one-quarter of an inch long at the lamp, is magnified almost 500 times to light a ten-foot diameter field. This great magnification demands that the reflector contour design and surface quality be flawless.





Director of Photography Phil Lathrop, ASC, on location in Alabama during the shooting of "THE TRAVELING EXECUTIONER". Sunbrute 2000-watt xenon floodlights, operating from AC power supplies, were also used for several interior set-ups to buck daylight coming through the windows. 6000° Kelvin color temperature makes filter correction unnecessary.

2000 and 4000-watt sizes. The 2K unit is roughly equivalent to a 10-lamp FAY-light, while the 4K unit is comparable in light output to a 225-ampere carbon arc "Brute". The lights may be operated from batteries, portable generator sets, or from rectifiers connected to A.C. mains. The Sunbrute 2K weighs about 25 pounds, and the 4K unit weighs about 30 pounds.

A great amount of effort has been expended to make these new lights compatible with equipment now in use. The 2K and 4K yokes are designed to fit all standard pedestals. The lights will be equipped with diffuser holders that will accept all standard "Junior" grip equipment. The beam spread and density range of both lights allow for their use in roughly the same way, at the same distances, as FAY-lights and Brutes, although the unique design of Sunbrute lights probably will facilitate many new, heretofore impractical, lighting methods. The xenon lights may be positioned in tight corners, lighted, and left burning unattended, while rehearsals and other setups are being made. Large arrays of the Sunbrutes could be lighted by remote control. Their light weight and small size makes possible direct mounting of the lights on boom cars and insert cars where they could be "bore-sighted" with the camera to illuminate whatever is seen in the viewfinder. Both the 2K and 4K Sunbrutes are equipped with focusing adjustments that provide control over the beam width.

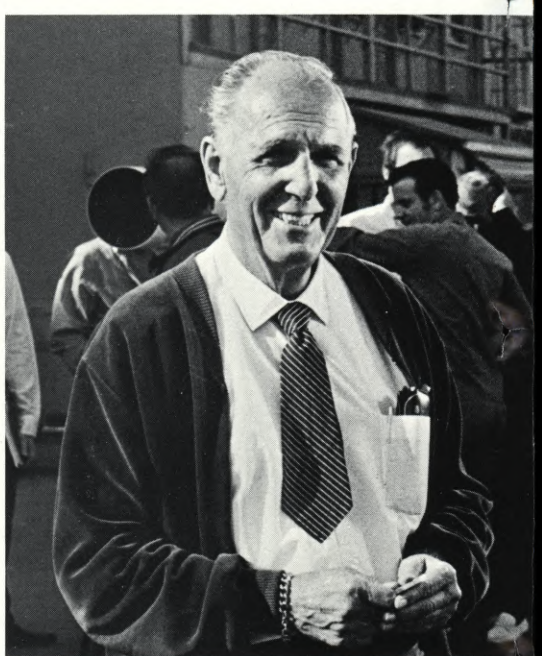
Based on our early experiences, Sunbrute 2K lights seem destined primarily for lighting interiors, to buck sunlight coming through windows and doors, and as special effects lights. A good example of the latter would be the simulation of sunbeams coming into a room from outside a set.

The Sunbrute 4K light will probably have more universal appeal, because of its many advantages over the large carbon arc, whose performance it nearly equals.

One important factor that has made possible the design of new xenon lights like the Sunbrutes is the dramatic improvement in the quality and availability of xenon lamps. The U. S. Army, since 1962, has purchased over ten thousand 2.2 kilowatt xenon tank searchlights. The Army's requirement for these searchlights, and for other military lights using larger and smaller lamps, has created a large market for high quality, reliable xenon lamps. U. S. manufacturers now producing xenon lamps include PEK Laboratories, ILC Laboratories, Illumination Industries, Durotest, Westinghouse, Hanovia, and General Electric. Osram lamps, from Germany, are imported by MacBeth Sales Company, while Ushio lamps, from Japan, are distributed in the United States by Radiarc, Inc. This ready availability of lamps is a far cry from the days of 1960 when xenon lamps were virtually unknown in the United States. The Army's seemingly unrealistic (in 1962) environmental tests for military lamps also contributed to the development of reliable, long-life lamps which are now commercially available.

Xenon lamps radiate energy from xenon gas molecules which are excited by an electrical arc between the lamp electrodes, rather than from the consumption of the electrodes, as in the carbon arc. Since xenon molecules radiate at approximately the same part of the spectrum, regardless of lamp input power, the brightness, or color temperature, of the light will remain constant over wide input power variations. This property gives xenon lamps a decided advantage over any filamented lamps, all of which change color temperature with input power changes. Tests of the Sunbrute XE-40 4K xenon light show that the color temperature remains between 5700-5950° Kelvin over an input power range of 2000-4000 Watts.

Continued on Page 362



FENTON HAMILTON, for many years head of M-G-M Studios' Electrical Department and a world-renowned authority on motion picture lighting, has worked closely as a consultant in the development of xenon units for use in cinematography. The following is his statement concerning the most recent progress in the state of the art:

The byword until now has been that "We will do the job with whatever is available," and the economic restraints that are presently demanded of every producer bring back the persistent questions: When will lightweight xenon lamp units be developed for our industry? How soon will they be available?

Xenotech has not only answered all the questions, but has succeeded in designing the first of a new generation of xenon lamps that rather stun the imagination. They offer possibilities that have heretofore been thought of only in terms of "maybe in the future."

It is gratifying that I have had the opportunity to be a small part in this development that will do so much to improve our ability to be more competitive in this most competitive business.

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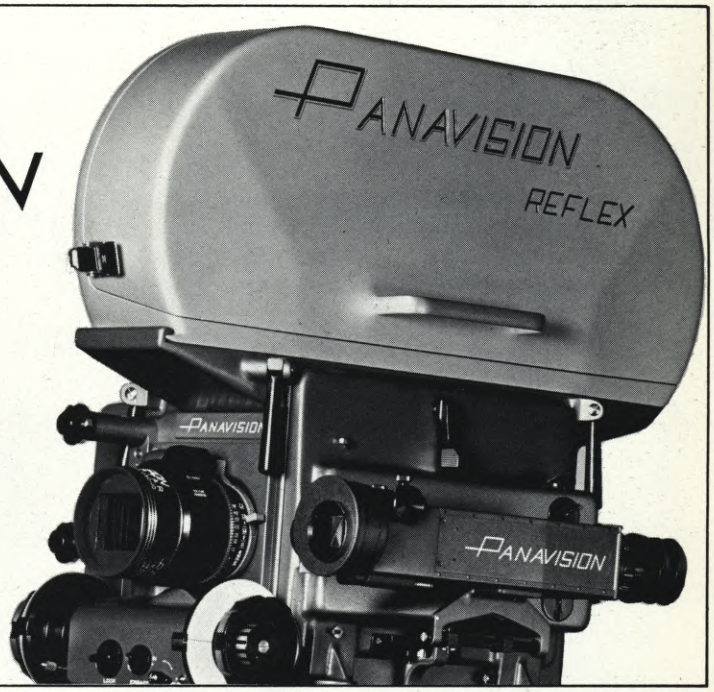

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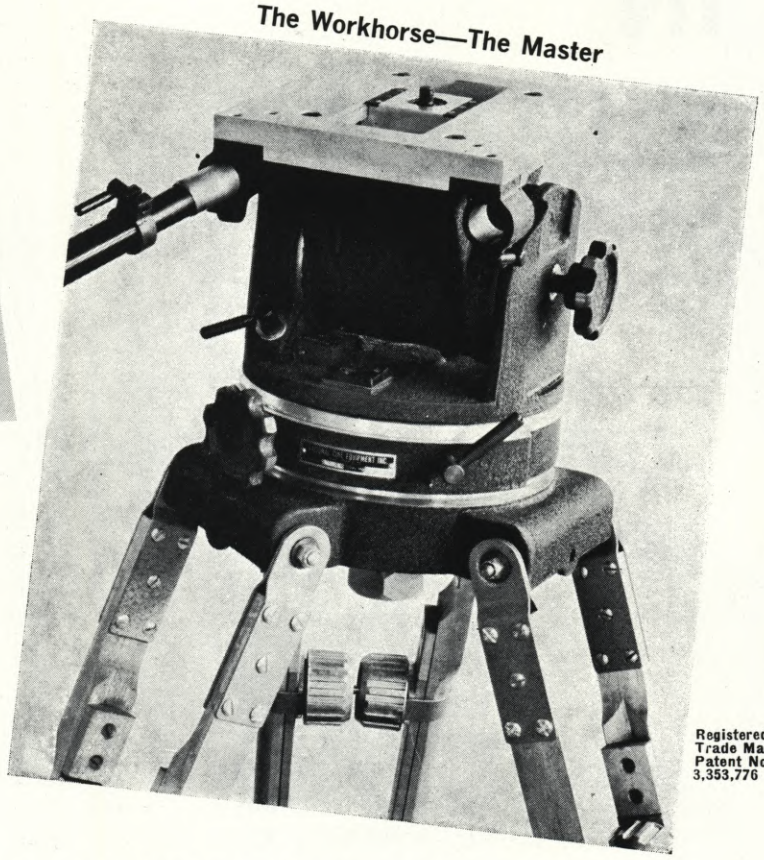

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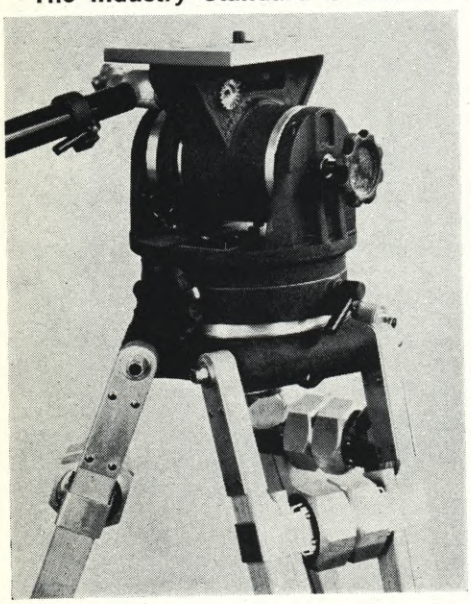

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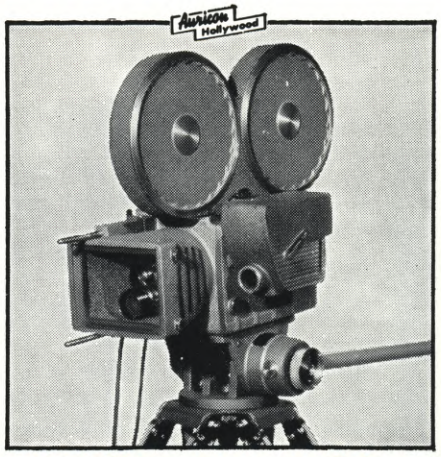

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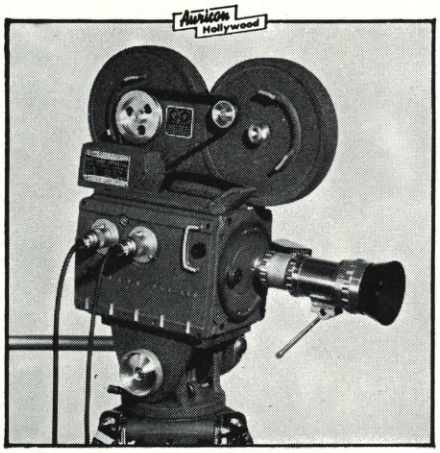

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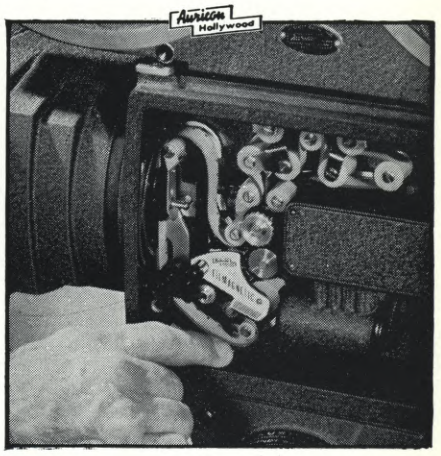

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AN EVALUATION OF QUARTZ SET-LIGHTING EQUIPMENT Versus CONVENTIONAL INCANDESCENT AND BRUTE ARC SET-LIGHTING EQUIPMENT

The results of a full-scale test conducted by Paramount Studios to determine if tungsten-halogen lamps can truly duplicate the mood and quality of lighting achieved until now with standard equipment

By GLENN FARR
Engineering Research and Development, Paramount Studios

Because of the many controversial aspects in the use of quartz halogen bromine clear, and dichroic-coated, PAR type lamps, Paramount Pictures Corporation, Facilities Division, required actual photographic results to evaluate the feasibility of this type of lamp for set lighting.

Mr. Russ Brown initiated the motivation to obtain these photographic evaluations, with live action, and set dressing in interior and exterior sets for cinematography to compare quartz lighting with conventional incandescent lighting and with brute arc lighting.

To obtain optimum results, the photography was directed by James Wong Howe, ASC, who, by the application of his artistic ability, is without a peer in his profession.

Eastman Color Film 5254 was used for the photography.

Set lighting units necessary to conduct the tests were supplied by Berkey-Colortran Company and Mole-Richardson Company. General Electric Lamps, Cat. No. G.E. Q1000 PAR 64/7D were supplied by Berkey-Colortran Company. Dichroic coating on this type was applied by Optical Coating Laboratories, Inc., Santa Rosa. Dichroic coating on 650-watt PAR 36 lamps, by G.E. Photo Lamp Division, Nela Park, Cleveland, is a new hard dichroic coating designated on FBE lamp cartons as YW. These lamps were also supplied by Berkey-Colortran.

In all tests various luminaires were used for light distribution, but not all lamps in units were burning. Amount of units used for tests with total wattage and amperes will be indicated.

James Wong Howe, ASC, shown on location for "THE MOLLY MAGUIRES" with star Samantha Eggar, was commissioned by Paramount Studios to conduct an in-depth test of tungsten-halogen lighting units, following his extensive use of them in photographing "MAGUIRES". In background are two of the Mini-Brute quartz clusters which he used to replace arcs on location.

Scene 1-Take 1 was a test of an interior set. Dressing of all sets was supervised by Bud Brooks. This was to observe the results of photography with all dichroic coated lamps for light sources. This test was conducted to observe results for evaluation only, for color observation, using a 35mm camera lens, with an 85 filter on camera, key light 350 F.C., fill light 100 F.C., over-all 400 F.C. and shot at a lens stop of F.4. Closeups, Scene 2-Take 1, and Scene 3-Take 1 are identical lighting except with 75mm lens. Total luminaires used was 15, some Mole-Richardson, some Berkey-Colortran. Total wattage 21,100, total amps. 175.

Scenes 4-Take 1, 5-Take 1, and 6-Take 1 are all lighted with 3200° K clear quartz lamps in 15 luminaires with a total of 17,750 watts, 148 amps. Action shots with 35mm camera lens at stop F.4, key light 200 F.C., fill light 50 F.C., over-all 200 F.C., closeups with 75mm lens.

Scenes 8-Take 1, 9-Take 1, and 10-Take 1, identical conditions except lighting was all incandescent using 15 luminaires with a total of 30,000 watts, 250 amps.

Comparison tests as seen in Scenes 12-Take 1 and 13-Take 1 were to evaluate the use of *one* 1000 dichroic coated lamp for moonlight effect through a window with balance of lighting all incandescent, versus an arc brute for moonlight effect. In both test shots all following other conditions were identical. Ten incandescent units used, wattage including 1000w dichroic coated PAR 64 lamp, 9490 watts, 80 amps. versus same with arc brute at 33,990 watts, 283 amps. Moonlight effect on wall 100 F.C. over-all key 150 F.C., camera lens 35mm at F.3 stop.

Comparison tests were made as above except quartz lighting was used in place of incandescent lighting in reverse order Scene 14-Take 1 with arc brute and 9 quartz luminaires with a total of 33,240

watts, 277 amps. versus Scene 15-Take 1. Same test using *one* 1000 watt dichroic coated lamp for moonlight effect with 8740 watts, 73 amps. Same identical conditions as before, namely, moonlight effect 100 F.C., over-all key 150 F.C., camera lens 35mm at stop F.3.

Comparison test shots of moonlight effect through window on stairway wall, Scenes 16, 17, 18, 19, all Take 1, were done using an arc brute for the moonlight effect versus *one* 2000-watt clear quartz lamp in Multibeam with dichroic filter. All with balance of lighting quartz or incandescent, except in all scenes, light effect of moonlight reflection on girl's hair was with a 2000-watt Multibeam unit with clear quartz lamp and dichroic filter on luminaire. Lighting units used with arc brute and quartz lighting totaled 5, total watts 29,800, 248 amps. Scene 17 with arc brute and incandescent units, 30,500 watts, 250 amps. Scene 18 with 2000-watt clear quartz in Multibeam with dichroic filter for moonlight effect and balance incandescent 7000 watts, 67 amps. Scene 19 same, except quartz lighting in place of incandescent 6300 watts, 52 amps.

All above at same lighting and camera conditions, front light 125 F.C., cross light 150 F.C., backlight on girl's hair 100 F.C., moonlight effect on wall 200 F.C., lower staircase wall 10 F.C., back of main set wall 40 F.C., camera lens 35mm, stop F.3.

Scene 35-Take 1 is comparison in photography to determine results under adverse conditions, shooting toward double glass doors and windows from interior set without diffusion on doors or windows, with 6-light Maxi-brutes using six 1000-watt dichroic lamps in each unit. One unit inside for front lighting, 2 units outside toward subject, 1 unit outside toward double glass doors and windows, no diffusion, 24,000 watts, 200 amps., camera filter 85N3, 35mm lens, stop F.10, 5000 F.C.

Scene 36-Take 1, same conditions throughout test, except arc brutes with Y1 filters. Total watts 102,000, 840 amps.

Scene 37-Take 1, day shot of exterior set lighted with 5 arc brutes as follows: 3 for background, 1 for foreground, 1 left cross, all with Y1 filters. Total 127,500 watts, 1060 amps., 1000 F.C. camera filter 85, 35mm lens, stop F.7.

Scene 38-Take 1, same as Scene 37 except five 6-light Maxi-brutes used with six 1000-watt dichroic coated lamps burning in each unit. Same camera conditions at 1000 F.C. Total 30,000 watts, 250 amps.

A bank of Mini-Brute tungsten-halogen units set up on location for filming of "THE MOLLY MAGUIRES" (See story on Page 306). Howe's meticulous tests proved that, with only minor variations, every effect heretofore achieved with conventional incandescent and arc equipment can be duplicated by means of intelligently used quartz units—and with far less amperage.

Scene 39-Take 1, night shot, using all 3200° K clear quartz lamps in 11 lighting units. Practical fixtures as photographed lighted with #1 250-watt photofloods and regular 100 and 150-watt globes, total 11,700 watts, 98 amps., 150 F.C. camera lens 35mm, stop 3.5.

Scene 40-Take 1, closeup, all conditions same as 39-Take 1.

Scene 41-Take 1, similar conditions, except with 11 incandescent lighting luminaires, total 14,750 watts, 123 amps.

Scene 42-Take 1, closeup, same lighting and conditions as 41-Take 1.

The results of these tests indicate the present possibilities using quartz lightweight set lighting units with clear quartz lamps.

The manufacturers of set lighting units to accept PAR type and other types of quartz lamps have made available to the producers of theatrical and television film exceptionally lightweight equipment.

The scenes from Paramount Pictures Corporation production "THE MOLLY MAGUIRES" of which James Wong Howe was Director of Cinematography, were made without the use of any arc brutes, as was the entire production. Interior scenes of church and courtroom were lighted entirely with dichroic coated quartz lamps. The night scene was lighted with clear quartz lamps and incandescent lamps as follows:

Interior of Church and Courtroom: All dichroic coated PAR 36, 650-watt lamps.

Night, long shot of street: A combination of conventional incandescent lighting units and lighting units with 650-watt clear quartz bromine halogen lamps and 1000 watt clear bromine halogen lamps. ■

A NEW WAY OF SEEING ... A FRESH WAY OF FILMING

"Today, the ski slope . . . tomorrow, the world!" might well be the motto of this company of individualistic young film-makers who use an exciting cinema language to communicate ideas on a scale that is global in scope

Roger Brown, President of Summit Films, Inc., has announced seven new ski films produced by the company for immediate release.

"The Moebius Flip" is a fantasy movie about a group of skiers (the Hart Ski Company talent team) who find that the world has flip-flopped onto the other side of reality. The skiers perform a variety of dare-devil stunts in an attempt to return to reality including the sensational "Moebius Flip" by Hermann Gollner. The 28-minute, full-color film includes some stunning visual effects and pioneering film techniques. "The Moebius Flip" was co-produced and directed by Roger Brown and Barry Corbet and is being distributed by Association Films and Modern Talking Pictures Service. Sponsors include the Hart Ski Company, Trans World Airlines, White Stag and Ski Magazine.

"Ski Racer", sponsored by The Lange Company (a major American ski-boot manufacturer) is "one of the most moving statements about ski racing ever put on film" according to Brown. The highly personal and mood-provoking treatment of Producer-Director Paul Ryan has captured the excitement, anxiety and thrills of competition skiing. The 36-minute full-color film also features a closing sequence of free pleasure skiing by super-star Jean Claude Killy. "Ski Racer" is being distributed by Modern Talking Picture Service.

Vail, the famous Colorado ski resort and original home of Summit Films, also announces release of another Summit production "Skileidoscope", a 28-minute 16mm full-color film. Joern Gerdts, producer and director of the Vail film, has worked with the children of Vail to create a warm and often humorous treatment of skiing pleasure at this fast-growing and ever-popular Colorado resort. "Skileidoscope" is distributed by Modern Talking Picture Service.

Perhaps the most "far out" sports film ever produced is "Ski the Sky" produced and directed by Summit filmmaker Robert Fulton and sponsored by the Vermont winter resort, Killington Ski Area.

"Ski the Sky" is a "delightful and dizzying visual experience" according to Brown. Fast cuts, triple exposures, multiple overlays and a variety of other

At Vail, Colorado, a gem of a ski resort land-locked in a magnificent valley of the Rockies, producer-cameramen Roger Brown and Barry Corbet record scenes for the much-honored "SKI THE OUTER LIMITS" a film which, like none before, captures the special mystique of a sport that turns skiers into addicts. Appearing before the cameras are members of the Hart Ski Demonstration team. (LEFT TO RIGHT:) Bill Peterson, Arthur Furrer, Hermann Goellner and Tom LeRoy.

Barry Corbet, operating a Milliken DBL camera, and Roger Brown, using an Arriflex 16S, film low-angle shots of Tom LeRoy. Summit Films, Inc. began humbly at Vail with films that concentrated on skiing. Its small but highly creative production teams now operate throughout the world shooting a vast variety of subject matter.

cinematic techniques give the viewer a feeling of the mood and excitement of skiing at Killington. Accompanying the strong visual treatment, "Ski the Sky" features a sound track of folk, jazz, classical and electronic rock music. Distributed by Association Films.

The films emerging from Summit Films, Inc., have a special, truly unique flair, the result of magnificent visuals that achieve distinctive mood and excitement through a blend of creative imagination and intricate cinematic techniques. But the films are no more unusual than the production organization itself. Comprised of a handful of young, highly individualistic all-around film-makers who know their craft, but whose "secret weapon" is imagination that recognizes no boundaries, Summit breaks all the rules and comes up with films of sheer physical beauty and deep, pervading mood.

AMERICAN CINEMATOGRAPHER has asked one of Summit's "one-man film teams" to tell about this "far-out" approach to creating excitement on the screen and to detail some of the highly sophisticated techniques used. The following is Summit as Barry Corbet sees it:

A GLOBAL FILM COMMUNITY . . .

By BARRY CORBET

A decentralized film company? With offices in Vail, Colorado (where?)? And Aspen? That's a bigger town; (pop. 1500). Well, it used to be worse—there was an office in Jackson Hole, Wyoming but that one moved to Denver. Then there is the San Francisco office. Really! They all produce films. Another far-flung filmic giant, a veritable network . . .consisting of a bare handful of movie makers.

The Vail office exists because Roger Brown lives there. He is the president of Summit Films. His cutting rooms are small, but his back yard studio (200,000 acres) is stupendous and is contiguous with that of Bob Fulton, whose back yard is in Aspen.

San Francisco? That is for Paul Ryan, who likes it there and so makes films there. Denver is a cutting room for Barry Corbet and administrative base for executive producer, Carl Rapp.

What? No account executives? No outside editors? Nope, they're all in New York, Chicago, and Los Angeles, which is to say that they are out of it. That's just the point—no interruptions, no committee-produced films, just a private facility in which one cameraman-director-editor-producer makes one film at a time under his own direction.

Brown and Corbet, co-owners of Summit Films, started off with several assumptions. For example, that there is virtually no place an Arriflex can't go; that small location crews work infinitely faster and better than large ones; that some activities and endeavors have a

Continued on Page 367

use an Arriflex on your next assignment..

ARRIFLEX at work — ONE OF A SERIES*

ARRIFLEX® masters schuss and slalom for spectacular TV ski sequence

"We need some unusual and exciting ski scenes for an important TV account," the ad agency executive said. "Can you get them for us?"

John Stephens could . . . and did. The 30-year old ski expert and second cameraman or operator with Local #659, International Photographers of the Motion Picture Industries, packed his ski gear, his self-designed camera rig and his Arriflex 35mm and headed for Utah.

Stephens, rig and Arriflex proved an intrepid trio, schussing down steep Utah slopes, skirting trees and fellow skiers, maneuvering into hairpin turns and executing sudden stops. Extraordinary angles of action were possible with the rugged, reliable Arriflex, equipped with wide angle lens, mounted in a variety of unique shooting positions — rigged to balance above Stephens' head, from the tip of a ski or behind a clamped ski boot.

The finished footage was fantastic, far [illegible] the ad agency's demands for the [illegible] modern ski film.

ARRIFLEX at work — ONE OF A SERIES*

Photographer, Roger Ruhlin (right) & 2nd director, R.Brinkman filming bad weather sequences.

Arriflex spans point of view from driver's seat.

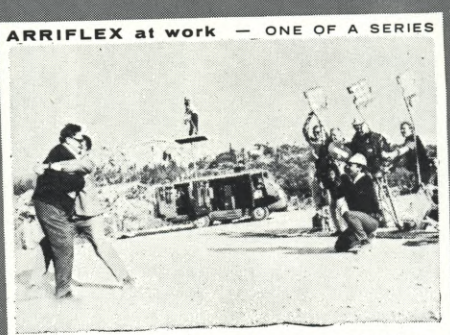
ARRIFLEX® goes on the road for ALLSTATE INSURANCE CO.

Allstate Insurance Companies of Skokie, Illinois, has put Arriflex 35's in the driver's seat and on the road. As a result, this year alone, some 60,000 students in high schools, colleges and military bases throughout the country will receive realistic behind-the-wheel driver training within the confines of their classrooms.

Constant travel companions in these film assignments are Film Director Richard C. Brinkam, Cameramen Roger Ruhlin and John Peterson, and two Arriflex 35mm motion picture cameras, equipped with Ultrascope anamorphic lenses for wide-screen filming. As illustrated in the production stills, one Arriflex spans the point of view from the driver's seat. A second Arriflex, mounted on the [illegible] situations. The scenes shot in full color 35mm were reduced for 16mm projection with resulting unparalleled breadth, depth and clarity."

The films are used in the classroom in conjunction with the Allstate Good Driver Look Trainer — a machine simulating the behind-the-wheel appearance and operation of a modern American automobile. The student "drives" the machine with his eyes "on the road," as it is visualized on the screen. He accelerates, steers, turns, stops, brakes, responding to the filmed situation. His reactions are electronically [illegible] Only [illegible] between camera and recorder. For fast action and camera mobility, for high picture quality without disrupting the [illegible] conditions for this fast-paced [illegible]

ARRIFLEX at work — ONE OF A SERIES



GLOBE-TROTTING **ARRIFLEX®** AND UNIQUE ELECTRONICS SOLVE LOCATION PROBLEMS FOR NBC'S "I SPY" TV SERIES

ARRIFLEX at work — ONE OF A SERIES*

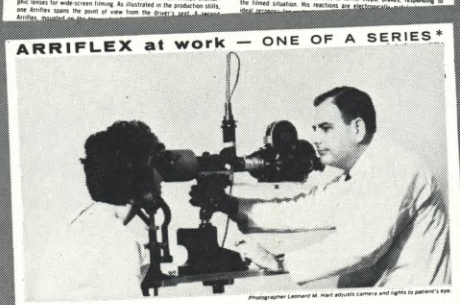
D. FRED KIZER (left), CHIEF OF THE CRYSTAL GROWTH SECTION, BASIC RESEARCH GROUP AND SIDNEY I. FELDMAN, MOTION PICTURE SPECIALIST, SET UP ARRIFLEX 35 WITH 50MM MACRO KILAR AND LONG EXTENSION TUBES FOR TIME-LAPSE MONITORING OF CRYSTAL GROWTH

ARRIFLEX® monitors crystal growth studies for U.S. Army Engineers

Crystal growth studies, like all scientific endeavors at the U.S. Army Mobility Command's Engineer Research and Development Laboratories, Fort Belvoir, Va., have as their ultimate object, better equipment and military techniques to meet the demands of modern warfare.

These studies, carried out under controlled conditions [illegible] vital to the basic research being conducted [illegible] programmed to catch by time-lapse photography any phase of change in crystal growth, or other phenomena. In addition to growth rates, other parameters of specimens can be determined. These include density, [illegible] viscosity of the crystal [illegible]

ARRIFLEX at work — ONE OF A SERIES*



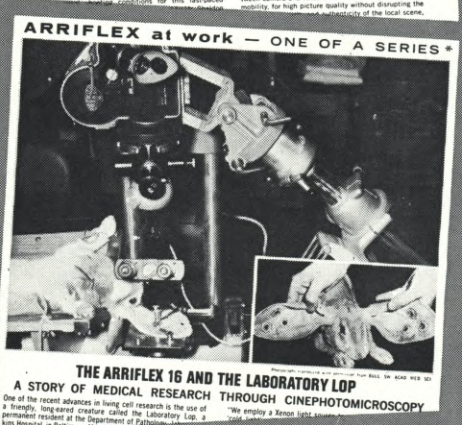
Photographer Leonard M. Hart adjusts camera and lights to patient's eye.

ARRIFLEX records retinal circulation via new fluorescence cinematography technique

The paper, recently published in The Journal of Laboratory and Clinical Medicine, bears five signatures and the imposing title, "Fluorescence [illegible] of the retinal circulation, a description of [illegible] and medical [illegible] Arriflex with a wide aperture lens and a binocular ophthalmoscope," he related. "The camera is focused on the retina, through the ophthalmoscope. Fluorescein dye, injected into the patient's arm, is photographed in its passage through the retinal vessels, providing a dramatic and detailed [illegible] of the blood flow in retinal arteries, capillaries, and veins."

Arriflex is operated at [illegible] per second for a period of 1

ARRIFLEX at work — ONE OF A SERIES*



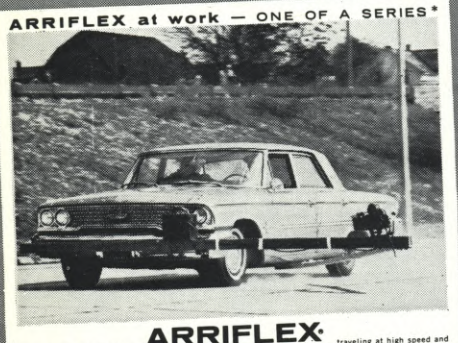
THE ARRIFLEX 16 AND THE LABORATORY LOP

A STORY OF MEDICAL RESEARCH THROUGH CINEPHOTOMICROSCOPY

One of the recent advances in living cell research is the use of a friendly, long-eared creature called the Laboratory Lop, a permanent resident at the Department of Pathology, Johns Hopkins Hospital, in Baltimore, Md.

"We employ a Xenon light source [illegible]

ARRIFLEX at work — ONE OF A SERIES*



ARRIFLEX® [illegible] speeds a blow-out for

Filming the effects of a dyna[illegible] traveling at high speed and the shattering effect of the driver-controlled tire blast. Re[illegible]

ARRIFLEX at work — ONE OF A SERIES*

ARRIFLEX® scales the Alps, Andes and Himalayas with Austrian cameraman-mountaineer

When Austria is your native locale, mountain-climbing is a likely pursuit. So is photography, with all the magnificence of the Alps at your doorstep.

Become expert at both, do them in unison, combine them into a single career, and you're a rarity—one of the world's few professional cinematographers completely at home on the treacherous terrain of a perpendicular mountain wall.

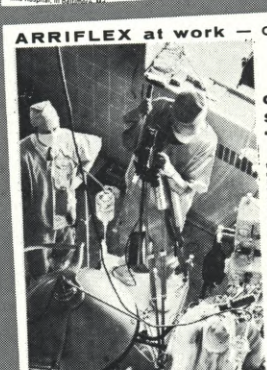
Such a man is 30 year old Herbert Radtschnig of Salzburg, Austria, whose cinema, documentary and television film assignments have taken him from the Alps to the South American Andes, to the hazardous Himalayas of India and Tibet. Radtschnig's constant companion on these assignments is an Arriflex.

"On some jobs I use a 16mm camera; on others, a 35mm," Radtschnig relates. "But always an Arriflex. Its ruggedness when packed in a rucksack, its light weight portability and its absolute reliability are tremendous assets on mountain-climbing expeditions. The precise viewer system, the 3 lens divergent turret and the quick change of magazines are advantages that no other camera offers. They facilitate the fast shooting required when you're on precarious footing."

Radtschnig has just returned from a five-month television film expedition in India and Nepal with the Tibet explorer, Heinrich Harrer. Cameraman and camera were exposed to complete contrasts in climate and location.

"First I had to shoot rhinoceros in the sultry jungles of South Nepal, then take a raging snow storm at an elevation of 18,000 feet in the bitter cold Himalayas. Radtschnig said. "Even without a change of [illegible]

ARRIFLEX at work — ONE OF A SERIES*



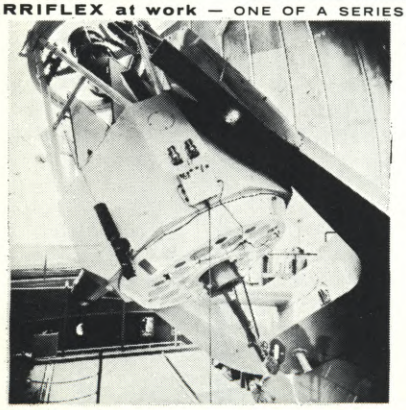
ARRIFLEX® COVERS OPEN HEART SURGERY FOR C.B.C. "CARDIAC TEAM"

For Kelly Duncan, staff Director of Photography with the Canadian Broadcasting Corporation, assignments run the gamut from fantasy to fact. But no dramatist's imagination could create greater impact than "Cardiac Team." This 30-minute award winning* documentary, filmed by Duncan, was staged in the operating theatre of St. Paul's Hospital, Vancouver, with an unrehearsed cast of seven doctors, three nurses and the patient, a 3-year old Indian orphan whose normal life span depended on immediate corrective open heart surgery.

"The big stumbling block to quality footage was the 'sterile field,' a bacteria-free area extending four feet around the operating table which I dared not penetrate," Duncan said. "Movement was restricted to an absolute minimum. I squeezed in at the head of the operating table with camera and tripod mounted on a two-foot riser, so that I could shoot over the shoulder of the chief surgeon. The compactness and portability of the Arriflex, with its own power supply, made working in the crowded confines possible."

"But most important," Duncan added, "was the Arriflex's through-the-lens viewing system. It facilitated the constant change of lenses and rapid focusing needed to capture the surgeon's hands, the instruments, the small, exposed child heart. The divergent lens turret mount enabled me to use a 12.5 mm wide angle lens [illegible] converting

ARRIFLEX at work — ONE OF A SERIES*



ARRIFLEX® is astronomer's aide at Kitt Peak National Observatory

High on a rock-bound mountain peak in Tucson, Arizona, is the Kitt Peak National Observatory, site of the world's largest [illegible]

"The projected black and white film displays an image of the [illegible] mirror as background over which is seen a dividing

ARRIFLEX at work — ONE OF A SERIES

ARRIFLEX® plays dual role—shoots *animation* and *live action* for Multiple Sclerosis Society of America

How do you convey the crippling effects of Multiple Sclerosis in some 50 countries throughout the world—in only 83 seconds of running time? This was just one of the problems facing Ros Fleming in filming a sequence for "My Friend Joe," a 13½ minute 50F color production for the Multiple Sclerosis Society of America. "Even more restrictive [illegible] ing them how limited animation can strengthen their message while reducing costs."

An Arriflex 16 shot both the live action and animation sequences. "The shoot was a natural. Budgetary considerations limited the [illegible]

ARRIFLEX at work — ONE OF A SERIES

A PRODUCERS SIGNATURE CORPORATION PHOTO

ARRIFLEXES BY-THE-DOZEN HELP FILM TOURNAMENT OF ROSES PARADE

If you tried to rent an Arriflex in Hollywood on January 2, 1967, chances are, you were out of luck. William E. Brusseau, Director of Productions for Producer's Signature Corporation, and [illegible] turned the dream to a nightmare! As Brusseau put it: "Because we were following objects that moved at their own pace, and we were unable to anticipate exactly what their movements would [illegible]

..you'll be in good company!

ARRIFLEX at work — ONE OF A SERIES*

Extreme close-ups of tiny soldering operations put startling dramatic punch into the instructional film, "On Solder," which demonstrates proper soldering techniques in a way never before depicted on the screen. Produced by Scope Film Associates, the film has won the American Film Festival "Blue Ribbon" Award, the Industry Film [illegible]

ARRIFLEX® gets the prizewinnin[illegible]

achieved many original and exciting effects in the camera ... without any lab-made opticals ... including full-screen macro-zoom scenes of a single drop of molten solder and flux flowing like a giant river of lava! You can do that with an Arriflex. Place any combination of optics on

ARRIFLEX at work — ONE OF A SERIES*

ARRIFLEX® goes hunting with the Missouri Conservation Commission

Filming a hawk's swift plunge calls for sharp follow-focus and accurate centering of the viewfinder image. That's one reason biologist Charles W. [illegible]

framed and focused exactly the way it's being filmed. Another reason ... wide-angles and telephotos can be mounted side-by-side on the Arriflex turret, which diverges lens axes a full 21° to

ARRIFLEX at work — ONE OF A SERIES*

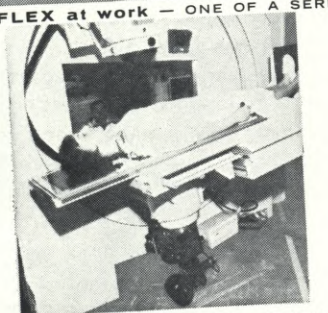
ARRIFLEX® DELVES THE OCEAN DEEP WITH RON CHURCH

If you're an ardent skin diver, oceanographer, ichthyologist, film producer, photographer, deep sea fisherman, adventurer or have been a World's Fair visitor, then you've met, read, heard or seen Ron Church. Always with a camera. Invariably with an Arriflex.

Ron recently appeared in full diving regalia, Arriflex in hand, on the cover of SKIN DIVER Magazine. His revealing article on [illegible]

"The Arriflex with its electric drive and reflex viewing is the ultimate for underwater work," Ron volunteered in a recent magazine interview. "And its 400 ft. capacity is tremendously beneficial when you go to all the trouble involved to get yourself down deep, you don't like coming up to change [illegible]

ARRIFLEX at work — ONE OF A SERIES*



The North American Philips Co., pioneers in advanced X-ray techniques, selected the Arriflex as the ideal motion picture camera to be used with their electronic Image Intensifier. Illustration shows the [illegible] with Arriflex 35

ARRIFLEX® serves medicine in Cineradiography with [illegible]

changes as they actually take place, the motion picture film allows prolonged and repeated radiological observation by individuals or groups, without exposing either the patient or technicians to excessive radiation. The standard Arriflex—35mm or 16mm—with only minor modifications, is as ideally suited for this specialized application as [illegible]

ARRIFLEX at work — ONE OF A SERIES*

MIS PHOTOGRAPHER ARAM PETER MARGOSSIAN USING SYNCHRONIZED FLASH ILLUMINATION AND MODIFIED NIKFITT LENS

ARRIFLEX® achieves macrocinematographic objective for Moody Institute of Science

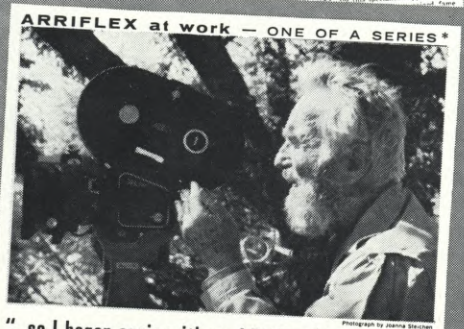
A 10-year project of photo-documenting bees maintaining their cities, communicating, telling time and even measuring distances geometrically, was [illegible]

jecting the results [illegible]

ARRIFLEX at work — ONE OF A SERIES*

Academy Award-Winning team triumphs again at expo67 MONTREAL CANADA

ARRIFLEX at work — ONE OF A SERIES*



"...so I began again with an ARRIFLEX..." STEICHEN

Photograph by Joanna Steichen

In his eternal search for photographic perfection, Edward Steichen, called "the century's most influential photographer," [illegible]

pictures into a film? Why not start the series

ARRIFLEX at work — ONE OF A SERIES

The hand-held **ARRIFLEX® 35** gives a new freedom to filmed color TV commercials

Among the many pioneers of the new visual in color TV commercials, Gerard Hirschfeld, A.S.C., finds the hand-held camera, a responsive and creative tool.

Hirschfeld is Vice President and Director of Photography for MPO

Case in point, a shipboard commercial for Parliament cigarettes. The script called for a nighttime party scene. Hirschfeld took his crew, 30 quartz-iodine ColorTran lamps, two small generators, and one camera aboard an 85-foot yacht. "We wanted the realism of [illegible] motivation," Hirschfeld states. "Only one camera was used, but

'ARRIFLEX® at work'

WRITE FOR OUR NEW 40 PAGE BROCHURE

The popular Arriflex-at-Work series of case studies is now available in a new 40 page brochure. Read how filmmakers have used their ingenuity and Arriflex versatility to solve problems which you may face on your next assignment. For your free copy, fill in and mail the coupon today.

get your copy! ☐ *Please send me your new 40 page brochure*

ARRIFLEX CORPORATION OF AMERICA
WOODSIDE, N.Y. 11377

NAME _____

COMPANY _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

MAINTAINING MODERN CAMERAS

Continued from Page 313

tolerances takes an experienced protessional service department, backed up by the manufacturer. It requires a wide range of complex and expensive test equipment and special tools, a group of skilled maintenance technicians and a well stocked and organized spare parts department.

The Arriflex Corporation of America, for example, maintains two technical service centers, one at its Woodside, N.Y. headquarters, and one in Burbank, California. We employ a full staff of factory-trained technicians, most of whom spent several years of training and working at the Arriflex plant in Munich prior to joining Arriflex in the U.S.

Let's follow a camera through the Arriflex Service Department and highlight some procedures:

When a camera enters the Service Department it is thoroughly examined and an estimate of the work involved is forwarded to the equipment owner on a detailed work sheet covering every assembly of the camera. This procedure is in addition to reviewing the repair instructions received from the customer and repairs will only be made after the Service Department is authorized to perform all the work necessary as outlined on the estimate. Only by applying Arriflex standards and working to factory original specifications can we ensure top performance of the equipment. Therefore, for example, if you send your camera in to have the switch repaired, and Arriflex discovers your finder to be out of alignment, we will ask approval for repairing all of the defects, not only the ones you were aware of.

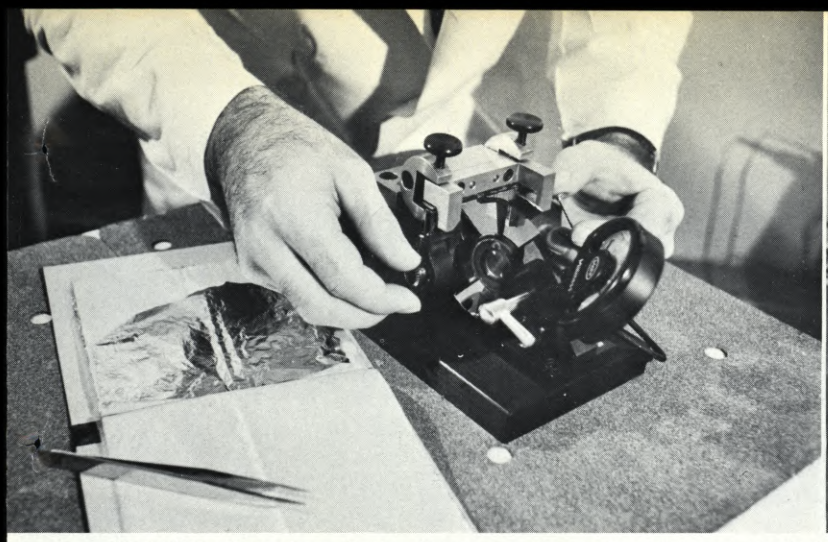
Let us tell you about some of the routine procedures that each camera has to undergo in our Repair Department:

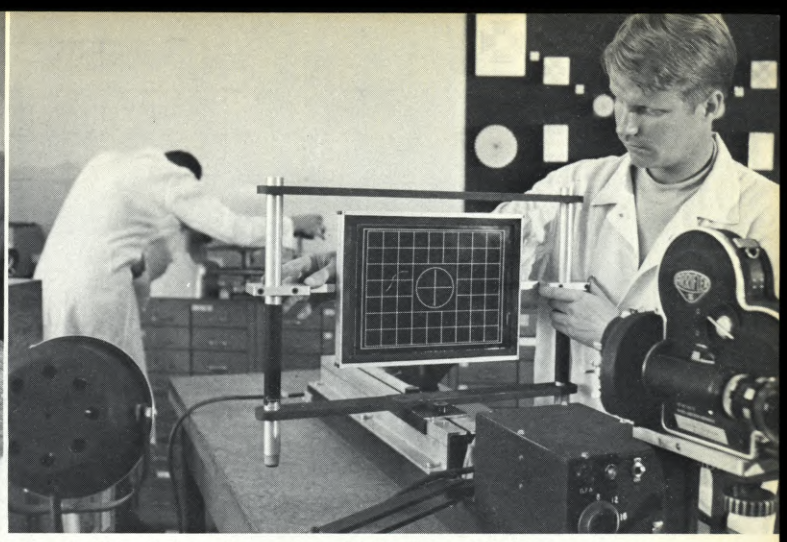
First, every turret cavity is checked for proper flange focal distance with a precision dial gauge measuring against a flat steel plate inserted behind the film gate. If this measurement shows any deviation from the very close tolerances (±.01mm–.015mm resp. .0004''–.0006'') it must be corrected before any further checking can be done.

With the proper focal distance established, the camera is then loaded with fresh film and equipped with a steel mounted fixed test lens focused at infinity. The image on the running film is visually examined through a Zoomar Autocollimator. While observing the image, varying tension is manually applied to the back pressure plate to see when maximum image sharpness is obtained. The pressure plate is then mechanically adjusted to this position. After this sequence of tests the camera should be as perfect as possible with regard to image sharpness.

The next, and equally important, step is to assure that the reflex finder focus coincides exactly with the film plane focus. To test the reflex finder system, the camera (loaded with film) is mounted on a test bench in front of a step-target at exactly two feet distance from center target to film plane. A lens fixed in a steel mount, precisely aligned to focus at two feet only, and with a resulting depth of field slightly narrower than the total spread between the two extreme targets, is used to shoot a short test film. This film is processed and examined carefully under a stereo-microscope with 10x magnification (same as the viewfinder). The target image observed on the viewfinder ground glass must be identical to the

The precise alignment of the transport claw and the registration pin is checked through the use of a profile projector which makes available a greatly magnified image of the components.





(LEFT) Arriflex mirror shutter alignment and operating tolerances are checked and adjusted through use of special jig shown. Dial gauge measures to 0.00004" and is used in conjunction with thin gold foil to adjust mirror to operate within a tolerance of 0.00016" (RIGHT) Arriflex technician adjusts target grid on test bench in preparation for image steadiness test on Arriflex 16S. In background technician checks lens on autocollimator.

one recorded on the film. If there is any deviation, the viewfinder is adjusted accordingly.

The reflex finder system not only has to reproduce the same focus on the ground glass that is in the film plane, but also the exact framing of the subject. To accomplish this there must be no parallax error in the system. The best way of checking parallax is to project the film gate opening on a screen by placing a prism in the film gate and sending a light beam through it. The edges of this projected field are marked by a frame corresponding to the exact dimensions (aspect ratio) of the SMPTE-Standards for film gates. After the camera is positioned so that the projected area falls exactly within the markings, the prism is removed from the aperture and, with the mirror shutter rotated 180°, the same projection is made through the reflex finder system. The ground glass markings are now visible on the screen and must fall concentric within the marked frame. By rotating the mirror shutter through one revolution and observing the ground glass markings one can detect if the mirror shutter does not rotate perfectly flat because the lines would move slightly. If it is necessary to realign the mirror shutter the movement mechanism is removed from the camera and fastened in a special alignment jig equipped with a dial gauge reading to .001mm (.00004"). The mirror shutter is mounted on its flange and balanced with gold leaves until it turns true to .004mm (.00016") variation on the largest diameter.

Film, by its very nature, is an extremely difficult material to work with; it shrinks, swells, scratches easily, flexes and bends and has to move through a film gate at high acceleration rates and come to an abrupt stop 24-times per second, while recording a high-quality picture on an area less than a half inch square. The pull down claw and registration pin must work with chronometer-like precision, yet handle the film with great care. The claws and pins must be polished to an absolute smooth surface finish so that perforations are not damaged or the film lifted off the aperture plate when transported, causing image deterioration. The timing cycle between pulldown (dark time) and shutter opening (exposure) must allow the film to be at full rest from the first opening of the shutter until it is fully closed; movement of the film during exposure could result in a complete loss of image, in severe cases, or "ghosting" of a small portion on the upper or lower edge. If frame after frame is not positioned accurately by the registration pin it will cause picture unsteadiness, easily visible on the screen. On the other hand, if the film moves very slightly during exposure, despite perfect registration, the result is a loss of resolution which many people falsely attribute to be caused by a "soft" lens.

To align and check the film transport movement, Arriflex uses a variety of precision tools, among them a profile projector that displays a 20x magnified image of the movement on a large viewing screen. Using standard Kodak *steel* film, both transport claw and registration pin action can be measured and adjusted with great precision.

Modern motion picture cameras are

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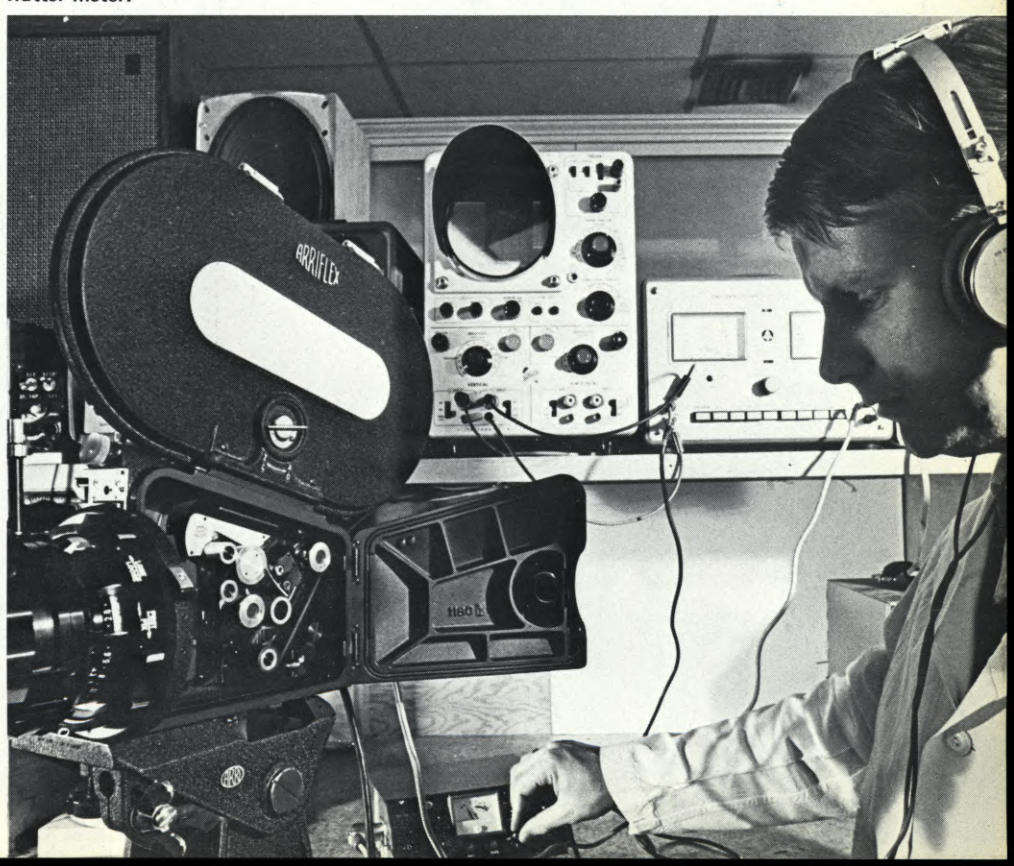
Technician adjusts amplifier control while testing Arriflex 16BL Single System Sound Module. Recording quality and characteristics are checked through use of oscilloscope and wow and flutter meter.



There's nothing new about a film lab.

Nothing fancy. Nothing spectacular. Nothing dramatic. Nothing glamorous.

It's just the place with the responsibility of printing and processing everything you've struggled to capture on film.

You want perfect prints. Usually in quantity. Always on a rigid schedule.

And no lab understands this better than Cine Magnetics.

It's why we've invested so heavily in modern equipment, like our new high-speed Optronics Mark X Quad Printer and our new Filmline black-and-white processor.

It's why we've created new facilities and enlarged old ones.

And it's why we've accepted only the most experienced people.

Today, we have a complete 8mm, Super 8mm and 16mm center for motion picture duplication and preprint services.

(The man to call: Ed Schuller, General Manager. He'll be glad to discuss your print needs, arrange a tour of the lab, or send one of our salesmen to see you.)

We print. We process. We load cartridges; Kodak, Technicolor, Fairchild, Jayark, Bohn-Benton and others.

Not terribly exciting.

But incredibly professional.

Cine Magnetics Film Laboratory

A DIVISION OF CINE MAGNETICS, INC.
520 North Barry Avenue, Mamaroneck, N.Y. 10543 (914) 698-3434
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BOOK REVIEW

THE TECHNIQUE OF THE FILM CUTTING ROOM By Ernest Walter. New York: Hastings House, Publishers. 1969. Illustrated. 282 pages.

This book deals with the *mechanics* of editing 35mm film as it is applied to the motion picture industry. It is not intended to deal with the *creative* aspects of editing or the *theory,* but rather the physical side—the day-by-day labors that all film-making requires.

The author states in the introduction that the role of the film editor is a mystery to most people who are not directly involved in film production. "Indeed," he writes, "it is seldom fully understood by those other film production departments who are directly involved." After reading and *studying* this book (it is essentially a textbook) there will be a clearer understanding of what the film editor must do with the sometimes complicated maze of film that must be assembled into a smooth-running motion picture.

The editor's work is divided into two parts. The artistic assembly of the film and the physical problems of handling it. One is impossible without the other. The physical handling of film can sometimes vary a great deal. For example, as the author states, a 20-second TV commercial may often present as many problems in film cutting as will a half-hour or one-hour filmed TV series. Consider then, the film editor who must deal with the miles of film that go to make up a multi-million dollar feature picture. There are many aspects to handling such a bulk of film which will also include sound effects, music and dialogue tracks in addition to the picture elements. All of these problems are *thoroughly* and even painstakingly discussed in this excellent book.

There is a chapter on the cutting room in which the various pieces of equipment used are discussed and even compared. For example, the horizontal editing table such as the Steenbeck and the more conventional editing machine such as the famous Moviola. Other points covered in this chapter include: cutting room layouts, film benches (including a comparison of the difference

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XENON LIGHTING

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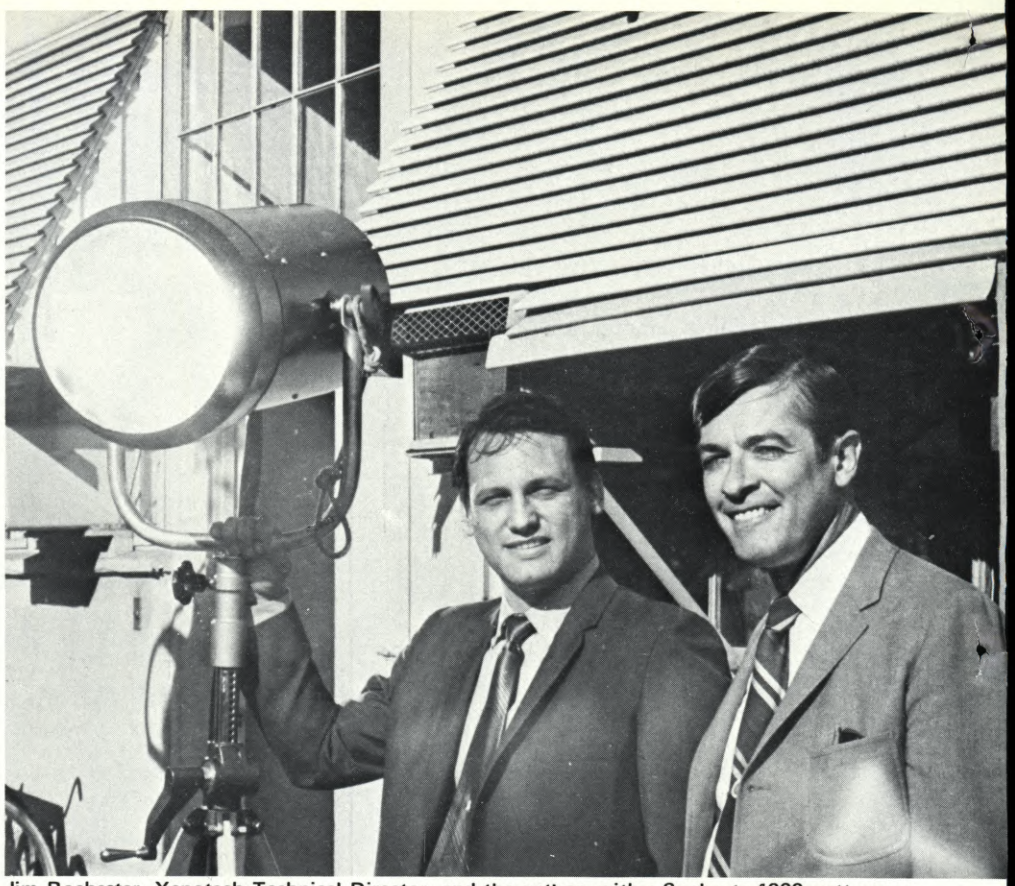
The basic design of the Sunbrute was taken from the Nightsun Model SX-16 xenon searchlight, manufactured by Spectrolab, to whom Xenotech is an exclusive licensee. Many internal changes in the SX-16 were made in order to adapt it to the needs of cinematographers, but the inherently rugged and reliable design, necessary to permit its survival in the helicopter environment, was retained.

Xenon lamps are not without their problems. If not properly cooled, their end seals will leak, causing loss of gas pressure, and failure of the lamp. The explosive failures of early xenon lamps, however, are rare today due to advances in the automation of quartz envelope blowing, formerly a "black-art" hand operation.

Sunbrute lights are equipped with thick front windows that also serve as beam mixers. These specially designed windows will safely contain fragments of the xenon lamp, in the unlikely event of an explosion inside the housing. The safety window serves a third purpose by being a filter that intercepts untraviolet radiation from the lamp that might otherwise cause discomfort.

Xenon lamps, by their nature, operate at voltages between 25-35 volts, D.C. Through the cooperation of Westinghouse Electric Company, a method has been devised that permits their motor generator sets, used on all of Fouad Said's Cinemobiles, to deliver up to 600 Amperes of 30 volt, D.C. power, while simultaneously supplying 120 volt, D.C. power for incandescent lights. A similar arrangement has been made with Sweinhart Electric Company to permit use of the Sunbrute lights on their "LASER" battery carts. Various sizes and shapes of A.C. line-operated supplies are also available, as are D.C. aircraft generators, which operate satisfactorily in the 28-34 volt range. The lights may also be used in conjunction with resistive "grids", directly from 120 volt, D.C. power, with an attendant loss in power conversion efficiency.

Our task of developing this new equipment would have been insurmountable without the guidance and encouragement of many old-line Hollywood lighting "pros", who graciously allowed us to share their time and experiences. Fenton Hamilton and Tom Howard, of MGM, John Pofahl, of CBS, and many others, have saved us from pursuing countless blind paths. We are sincerely grateful for all the help we have received. ■



Jim Rochester, Xenotech Technical Director, and the author, with a Sunbrute 4000-watt xenon light during tests at Columbia Pictures. The lights, operating from a Cinemobile Mark V mobile production unit, will be used for all location filming of "KANE", a new Columbia feature starring Sidney Poitier.

This photo, made on location during filming of "THE TRAVELING EXECUTIONER", shows how the Sunbrute 4K adapts to existing lamp stands. Its light weight eliminates the need for an electric elevator to adjust lamp height. This light is equipped with "ears" that permit use of all standard "Junior" grip equipment.

Notes about Frezzolini® Products from General Research Laboratories

by JAMES J. CRAWFORD, Vice-President Engineering.

Every TV News cameraman carries around a spring wind 100 foot 16mm motion picture camera for silent stories and fast mobility. The spring wind cameras store their energy kinetically and release it with the expansion of the spring. Great where there is no other power but the camera will only run less than one minute.

But what about electric motor cameras? Frezzolini has two great Power Packs for them: the 100-DX and the 1000-DX. They solve the cameraman's portable power problems. What are these Packs anyway? In fact they are portable self-contained power plants.

Model 100-DX Power Pack

With solid-state oscillator module, $495.

With crystal-control module, $880.

Crystal-control module separately, $495.

Half of the Power Pack is a rechargeable battery. The other half contains an inverter and a battery charger. The battery charger can recharge the battery anywhere in the world where AC power is available (110 volts or 220 volts, 50 cycles or 60 cycles).

The inverter changes the direct current from the battery to alternating current (AC) and at the same time increases the voltage to 110 volts, 60 cycles for the camera motor. The Power Pack output voltage is adjustable to match the motor power requirements of your particular camera.

What about the accuracy of the 50 or 60 cycle AC output of the Power Pack? Frezzolini Power Packs are built with precision solid-state oscillators to control the Power Pack AC output frequency within plus or minus ½-cycle. This is excellent for filming single-system sound.

In either the 100-DX or the 1000-DX Power Packs the oscillator module is quickly interchangeable with our Temperature-Compensated Crystal-Control Module, *the best in the business for accuracy and stability.* It controls the Power Pack AC output frequency with an accuracy of plus or minus 0.0006 cycle. This means you have dead synchronization in double-system filming from beginning to end of a 1200 foot 16mm roll of film. The Crystal-Control Module can be purchased as an accessory or originally installed instead of the solid-state oscillator module in your Pack. (The Crystal-Control Module costs more so that's why we make two different kinds of modules.)

Model 1000-DX Power Pack

With solid-state oscillator module, $798.

With crystal-control module, $998.

Spare battery pack, $155.

Separate extra charger, $189.

Either Power Pack can be used to operate 60 cycle camera motors or switched to 50 cycle output which is generally used for European 16mm camera motors. What's the difference between the Frezzolini Power Packs and why do we tell you about the two Power Packs?

The Frezzolini 100-DX Power Pack is a basic unit weighing slightly less than 14 pounds. It will run about 9 four-hundred foot rolls of 16mm film (1½ hours). Are we hedging when we say about 9 rolls? Not at all. The running time depends on the battery charge. For example: if a power pack, any pack with any battery, is left in an unheated car trunk overnight in below-freezing weather it will be less efficient than usual.

The Frezzolini 1000-DX Lightweight Power Pack weighs only 4 pounds and will run about 6 four-hundred foot rolls of 16mm film (66 minutes). It has an "Instant Interchange" battery (2 pounds) for continuous filming. This is the Power Pack for use when the cameraman is on a brace and needs maximum mobility.

The 1000-DX was originally developed for cameramen in combat zones. Its first real trial was during the 1968 political conventions. Then they were shipped to Vietnam. Since then it has become the *Lightweight Standard Power Pack* for TV news.

Let's get back to the double-system filming using either of the Crystal-Controlled packs and the *New* Frezzolini Nagra 537 Conversion. Any Nagra that you send us can be modified so that it is not necessary to tie the recorder and camera together with a cable. Both camera and recorder can now operate independently of each other, and still maintain perfect sync. How do we do it? We install a Crystal-Control Module (1.3 ounces) permanently in the Nagra, with an external switch. Now the Nagra can be used as you always have for wild sound or with an umbilical cord to a camera generator, or WIRELESS with our built-in crystal-controlled sync generator. In addition there is a button on the Nagra which can be depressed to simultaneously place a 400 cycle tone on the track for a positive sound start mark and to energize a moveable wand with a brilliant strobe-like light that gives your editor his positive picture start mark. This eliminates the need for clapsticks. The editor will especially appreciate the 400 cycle sound start mark. On rewinds he can find our 400 cycle sound start mark at high speed without slowing down to sound speed to locate the usual sound start mark.

The Frezzolini Nagra 537 Conversion combined with a Frezzolini Crystal-Controlled Power Pack is your answer to the need for camera freedom and mobility.

Nagra® 537 Conversion, $540.

Your professional camera supply dealer has Frezzolini Power Packs and can arrange for Frezzolini Nagra 537 Conversions. If you want more details about the Power Packs or the Conversions write us, or phone. For your business people, who write the orders, this page shows all the prices. They're next to the pictures.

General Research Laboratories

DIVISION OF

Frezzolini® Electronics Inc.

7 Valley St., Hawthorne, N. J. 07506

PHONE: (201) 427-1160

BOOK REVIEW

Continued from Page 361

between the British and American), sync-machines, tape splicers and sound readers.

Of special interest is the layout the author has given for a combination cutting/projection room—one in which the editor can work in front of his Moviola and cutting bench and also have his work projected on a screen inside the cutting room. This surely must be the ideal cutting room and one that is very practical.

Here are a few of the other subjects covered in this book: The assistant's daily routine and the daily routine of the editor. These routine procedures include such things as daily studio screenings, selection and coverage, editorial coding, syncing dailies, breaking down rushes, first assembly, the first cut and the paper work—logging, filing—that is a "must" in any orderly cutting room. Incidentally, the author has worked mainly in British studios and he discusses the differences between film identification systems used in Europe and America. Over there, on the first day of shooting, regardless of the number of the script scene being filmed, the first shot of the day is numbered "slate one", "take one" and so on. Here, the script scene number is used on the slate board and if the first shot on the first day is scene 125, the slate is so marked. The American reader will easily get used to the author's reference throughout the book to "slate" instead of "scene".

There are chapters on sound editing, music editing, post production, sound dubbing and preparation for picture negative cutting. Cinematographers will be especially interested in the chapters on special shooting period procedures wherein rear projection, background plates, steadiness test, combined photography, mattes, travelling mattes, etc. are covered as they *apply to the editor.*

The author has been a film editor for 25 years and has worked in leading studios in the United States, England, Scandinavia and other leading countries. His recent credits include: "OPERATION CROSSBOW", "THE INN OF THE SIXTH HAPPINESS", "THE HAUNTING", "DARK OF THE SUN" and "THE SHOES OF THE FISHERMAN". Mr. Walter has performed an outstanding service to both the motion picture industry and students of film making with this superb text.

GEORGE J. MITCHELL

A NEW WAY OF SEEING

Continued from Page 355

unique purity which is transferable to audiences in a meaningful way; that life is motion, so the cinematographer must perforce become an expert on motion (hence, the interest in skiing); that for film-makers, mobility is freedom; and that one can proceed in total ignorance of Hollywood's realities and not get eaten alive by the fotofates.

Summit's productions are unique, too. Brown started in the skiing and mountaineering film business, and the company made forty sponsored mountain films en route to virtually preempting the field. Sponsors included three major airlines, two state development agencies, various ski industry manufacturers, and many ski areas who liked Summit's highly interpretive approach to their material.

"SKI THE OUTER LIMITS" has won more national and international awards than any other ski film, including the Emily Award (Grand Prize) at the American Film Festival, first prize at the U. S. Industrial Film Festival, Cortina Film Festival and Trento Film Festival, and bronze medals at the Atlanta International Film Festival and International Film and TV Festival of New York.

"SENTINEL: THE WEST FACE", a rock climbing film, won the Trento Gold Medal in 1968.

"THE MOEBIUS FLIP" is a sequel to "SKI THE OUTER LIMITS". A Denver lab, Western Cine, provided the know-how and patience for multiple pull-back step printing with separate color registers for each pull-back. The resultant masters contained the accordion strobe effect with the skiers starting in correct register and fanning out in separate color register throughout the effect. Each image retains its color integrity. Scenes shot at 24 fps yielded best results when the several images were pulled back by four to eight frames. Much of the material was filmed at 400 fps, in which case separations of 15 to 25 frames gave the best results. Western Cine was able to perform similarly from A and B rolls. This makes possible the cutting in of contrasty material, such as high-contrast black and white negative extensions of the Ektachrome original. The results are astounding, since different colors become dominant as the images turn serially into black and white, then serially emerge into separated colors once again.

The years 1969 and 1970 have brought new horizons. "NZURI: EAST

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DOUBLE FRONT-PROJECTION

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for the talent. Of course, this brilliant image means that the camera can be stopped down to bring maximum depth-of-field advantages into play.

b. Talent can be positioned at any distance from screen. Spill light on the front side of screen is not as serious a problem as it is with rear-screen projection. The image doesn't wash out so much.

c. The talent masks his own shadow, so that there is no halo, no shadows, and no fringing.

d. Pan and zoom shots are facilitated because the front-screen image can be blown up to a size that manual zooms and pans can be made clearly and smoothly . . . and quickly. Similar moves on a copy stand or Oxberry unit are extremely time-consuming and consequently expensive.

We've also noted some limitations and disadvantages which should be mentioned. For example, the camera and projector alignment is critical. Position of camera is determined by projector lens and size of projected image, and alignment must be right on. Although a zoom lens can be used, no dolly or trucking shots are possible because of the alignment problem.

If a teleprompter is to be used, it will have to be set to one side. If placed directly in front of the camera lens, the light from the teleprompter will blind the talent. It is well to remember that a retro-reflective surface does not produce a satisfactory image which can be seen at an angle from the light source. Therefore, it is impossible for talent to see projected images of chart or graph material.

Inquiries about Scotch-lite can be directed to the 3M Company, Minneapolis, but the material comes in rolls two feet wide for those who want to try to manufacture their own screens. We have determined that overlap seams are virtually invisible and in no way hinder photography. However, do-it-yourselfers are warned that getting the material bonded smoothly and evenly to a suitable backing is a tricky task. We don't recommend it.

Instead, we suggest you let our Camera Department have a crack at your copy work or show you some of the more exotic applications of this interesting new front-screen projection technique. ■

Continued from Page 345

MOLLY MAGUIRES", Howe deployed his Mini-Brute banks in patterns not too different from those he would have used with arcs. Since these units were less powerful than standard Brute arcs, however, it might be assumed that a tremendous number of them would have been necessary to light the long shots, but such was not the case.

"The quartz banks were very bright," Howe comments. "I had to place them far back and sometimes I had to diffuse them. In shooting one long shot, where a train pulls into the station at night, I used only four of the quartz banks to light the whole thing. I just placed them where they were needed. You couldn't see the track until the headlight of the train finally hit it."

Following the completion of "THE MOLLY MAGUIRES", Howe was asked by Paramount Studios to make direct comparison tests on interior and exterior sets lighted first with conventional incandescent and arc units, and then, for exactly the same mood, with quartz lights exclusively. The specific results of these tests are presented elsewhere in this issue of AMERICAN CINEMATOGRAPHER.

The suggestion that he might have been taking a considerable chance in dispensing with the conventional arc lights on a "big" picture for which their use (according to tradition) was clearly indicated brings no false heroics from James Wong Howe, ASC.

"I think that today the cinematographer, the director and even the actors have to be willing to take chances," says he. "They should be willing to gamble a little more in order to get effects that are a bit different. The normal thing is not really interesting; it's the unusual, and sometimes even *accidental,* things that are. Of course, you've got to know what you're doing—but suppose someone walks by and accidentally kicks a light out of position. There are all kinds of apologies and the normal thing is to put it back where it was. But you look at the effect and realize it looks wonderful, that you never would have thought of putting the light there—so you leave it there. You're breaking the rules, defying tradition and maybe even taking a chance, but why not? You just can't play it safe all the time and still progress. You've got to take a chance now and then." ■

A NEW WAY OF SEEING

Continued from Page 367

AFRICA", a documentary for Trans World Airlines, is a highly sophisticated exercise in matching cutting to musical rhythms. "OUTWARD BOUND" explores the impact of severe physical confrontation on teenagers. Environmental responsibility is the theme of Summit's new production. In developmental stages are films investigating urban crises, architecture in a plastic-conformed world, ceramics, and the Chicano movement.

Unique films provide unique location challenges. I have filmed at 27,300 feet on Mount Everest and on the tops of the four highest mountains in Antarctica. Brown has filmed on top of Mount Ararat in Turkey and Kilimanjaro in East Africa. All Summit's photographers are expert skiers (Brown once trained with the U. S. Olympic team). Good ski films require good skiers as subjects. Good skiers do not like to be kept waiting, so it is important to be able to transport a tripod, camera, and rucksack at their speed. Or to chase them with a handheld camera. Summit's smooth travel shots from skis add an important sense of dimension and participation to its films. Racks for travel shots have proved to augment vibration, to destroy versatility in framing and camera motion, and to be hideously dangerous to the photographer. A camera cushioned in both hands is smoother, more accurate (once you know where it is pointing—the viewfinder is not used), mobile, and can be thrown away in case of a fall or an unintentional excursion into thick forest. It is also possible to ski backwards and shoot uphill (at moderate speeds) or ski forward shooting back between the legs at the subject (for high speeds or difficult terrain).

Summit has a cavalier attitude on winterizing cameras. My only unwinterized camera in Antarctica (an Arriflex 16S) outperformed all others at temperatures down to -50°F. Outside of mounting ski pole baskets on tripod feet (old-fashioned leather-thonged ones—the new rubber ones bounce) and simple unipod attachments for mounting a camera to an ice-axe head, Summit's crews have found little need for modification of equipment.

More important is the man filming. He must be so at home in hostile conditions that his energies are freed from the exigencies of survival and free to concentrate on the film.

Summit also tries to provide time for experimentation. Bob Fulton wanted

the freedom of shooting sync sound alone, without wireless microphones or umbilical ties to a sound man. He can now walk into a crowd with a BL slung from one shoulder, a Nagra slung from the other. Taped to the recorder is a Sennheiser 804 directional microphone. There is no way of knowing he is shooting from both hips, in sync. His mobility is spectacular. So are his highly developed techniques of in-camera editing. As a result, Bob is approaching his ideal of shooting a 1:1 ratio of film taken to film used. As he puts it, "Most of us eventually learn to talk 1:1; why not learn to film that way?" The advantages are not only economical, but include utilizing the increased integrity of the cameraman being the editor, *at the same time.* There is always an entropic loss of purpose between the moment of filming and the time of cutting unless . . .

Research sometimes serves to innovate, sometimes to reinforce classicism. Summit's goal is to become a global film community embracing the best of new and old, a comfortable crucible for any talented film-maker. ■

ACADEMY NOMINATIONS

Continued from Page 337

win both an acting and a supporting acting award for the same role. The supporting categories had been established in 1936, with no one ever dreaming that the strange occurrence of 1944 could possibly happen. Barry Fitzgerald was nominated in both acting categories for his role in "Going My Way". Academy voters gave him the Oscar for his supporting performance, with Bing Crosby, also in "Going My Way", winning the Best Performance by an Actor Award.

A rule now says that if a player receives enough nominations votes to be nominated for Best Performance by an Actor in both acting categories he is declared in the running only for the one in which he received the greater percentage of total votes. Whether a role is voted on as leading or supporting is determined individually by members of the Actors Branch at the time of balloting.

There's nothing to prevent a player from being nominated for Best Performance by an Actor in one picture and for Best Performance by an Actor in a Supporting Role in another picture. It happened in 1938 when Fay Bainter was nominated for Best Supporting Actress in "Jezebel" and for Best Actress in "White Banners". She won for her

supporting performance. The last time this rarity occurred was in 1942, when Teresa Wright was nominated as Best Supporting Actress for "Mrs. Miniver", and as Best Actress in "Pride of the Yankees". She won for her "Mrs. Miniver" role.

Directors, too, have a rule that prevents them from competing against themselves. Writers are similarly protected. There are two writing Awards, Best Screenplay (based on material from another medium) and Best Story and Screenplay (based on material not previously published or produced). A writer could be nominated once, but not twice, for each Award. The same applies to a team of writers. But a writer can work with several partners and thus could be nominated more than once in a writing category.

In all categories but acting, directing and writing, filmmakers can be nominated for more than one achievement in a single classification.

Each branch conducts its own nominating procedures under rules established over the years to make the selection fair. With all ballots go reminder lists which include the titles of the year's eligible pictures.

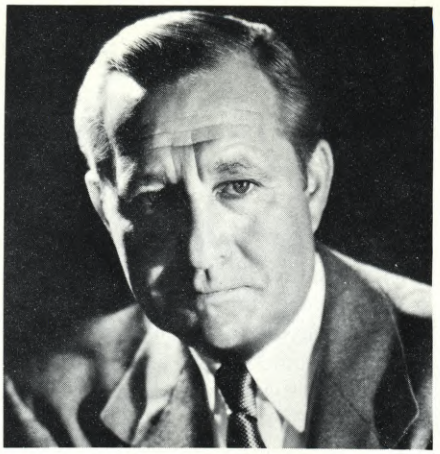
After the nominations ballots are tallied and the nominations are announced, final ballots are sent all voting members, who vote for one achievement in each of the 22 categories.

On April 7, Awards for the 22 achievements will be presented at the 42nd Annual Awards Presentation, to be held at the Los Angeles Music Center. It will be telecast in color by the ABC Television Network and will be seen throughout the world.

There can be no write-ins. What about ties? They can happen—and did, last year, when Katharine Hepburn and Barbra Streisand received the same number of votes for the Best Actress Award and were both honored, Miss Hepburn for "The Lion In Winter" and Miss Streisand for "Funny Girl". A tie also took place back in 1932, when Wallace Beery ("The Champ") and Fredric March ("Dr. Jekyll and Mr. Hyde") tied for the Best Actor Award.

All ballots are mailed to the accounting firm of Price Waterhouse & Co., official tellers for the Academy. There the votes are counted and the results kept secret until the night of the Awards. Tabulations are never divulged; if you hear someone say that a certain actor won his Oscar by a single vote, or by a landslide, you can be sure he is "talking through his hat."

There is no way he could know. ■



IN MEMORIAM

Arthur Edeson, ASC

Members of the American Society of Cinematographers were deeply saddened to learn of the recent death of their beloved Charter Member, Arthur Edeson, ASC, at the age of 78.

One of the founders of A.S.C. more than a half century ago, he served as its President in 1953-54, as well as on the Board of Governors and several committees.

Among his accomplishments as a pioneer cameraman in the film industry were two of Douglas Fairbanks' greatest hits, "Robin Hood" and "The Thief of Bagdad". He soon became regarded as one of Hollywood's most artistic cameramen.

However, Edeson's career reached a new pinnacle of excellence with his ultra-realistic photography of "All Quiet on the Western Front", considered by many motion picture historians to be the greatest war film ever made.

Edeson's long list of impressive credits include the first (Charles Laughton-Clark Gable) version of "Mutiny on the Bounty", "Devil Dogs of the Air", "The Lady With Red Hair", "Casablanca", "Sergeant York", "The Maltese Falcon", "Mask of Dimitrios" and "The Conspirators".

He is survived by his widow, Alla, and will be sadly missed by his legion of friends in the film industry—especially by the members of the American Society of Cinematographers, which he helped to bring into being.

In one of his last public appearances prior to his final illness, Arthur Edeson, ASC, addresses Society's membership during dinner meeting at Hollywood Clubhouse.

SOUND SYNCHRONISM

Continued from Page 325

recorded onto the tape simultaneously with the sound. This information is provided by the 60-cycle alternating current driving the camera synchronous motor. Therefore, all that is needed to provide the camera motor speed information is to record the 60-cycle pulse on another track of the tape. But tape recorders cannot accept a signal as strong as 110 volts. So the current must be transformed to a voltage which is acceptable: for most machines, 1 to 2 volts.

To summarize then, if the picture is photographed with a camera fitted with a synchronous motor, the sound is recorded by means of a 1/4-inch machine equipped with two recording heads, and the pulse of the alternating current is recorded on the second head through a transformer, synchronous sound recording is achieved. As with the film recorder method, a clapstick marker at the beginning of each take allows for the two motors reaching speed at different rates.

But the system so far described requires an AC synchronous camera motor. In many instances, however, a DC camera motor would be more desirable. For instance, batteries to supply AC power are more bulky and expensive. But by definition, there is no pulse involved in driving a DC motor and hence no pulse to record on the 1/4-inch tape.

It is possible, though, to supply a pulse mechanically when using a DC motor. Inside the camera there are a number of shafts turning between the motor and the movement. And, of course, there is a shaft in the center of the motor. All that is required is to attach one of these shafts to a generator. Through the use of gears, the generator is made to turn at the proper number of revolutions in order to yield a 60-cycle pulse when the camera is operating at 24 frames per second. Since the shaft used to generate the 60-cycle pulse is either the motor shaft itself, or one attached to it, any variation in camera motor speed will be reflected by the generator and recorded on the tape.

A further refinement of this method is the use of an electric slate. The electric slate provides a start mark at the head of each take on the film and tape simultaneously. The electric slate then eliminates the necessity of someone standing in front of the camera and microphone and clapping.

In the camera gate, the electric slate consists of a sub-miniature light bulb.

When activated, it fogs a frame or two. At the same time the light goes on to fog the film, a buzzer makes a signal on the tape. In some cameras, as in the Arriflex BL and the Eclair NPR, all this happens automatically. In others, a button must be pushed by the cameraman after the camera and recorder are at speed and before the action starts.

At any rate, the electric slate is a very useful accessory. It's a little hard to be candid when one has to use a clapstick before each take. And the additional employee necessary to do the "clapping" is also eliminated.

So far, we have discussed only the original sound photography and sound recording on 1/4-inch tape. But, of course, the sound as originally recorded on the tape is not usable at this point. Sound and picture must be edited. In order for the editing operation to take place, the sound must be on sprocketed film so the editor can run both sound and picture together in synchronizing moviolas and double-headed projectors. Also, the picture film and the sound film must be aligned in frame-for-frame synchronism.

In order to get the sound from 1/4-inch tape onto magnetic film (optical film is no longer used until release prints are made) the sound must be transferred from tape to sprocketed film. This is accomplished by hooking the output of the 1/4-inch tape recorder to the input of a magnetic film recorder.

If this were done, and nothing more, the magnetic film and the picture film would not be synchronized. The 60-cycle pulse recorded on the 1/4-inch tape is a magnetic record of the speed of the camera motor during photography. However, if the pulse signal is used to either control the speed of the tape recorder or the film recorder during transfer, then synchronism can be maintained.

The speed control is accomplished by a device commonly called a *resolver*. There are two types of resolvers in current use; one controls the speed of the film recorder and the other controls the speed of the tape recorder.

The resolver which controls the speed of the film recorder is the simplest to understand. First of all, of course, the output of the tape recorder is linked to the record input of the film recorder. Next, the 60-cycle pulse signal (which is on either a parallel or overlapping track) is fed into an amplifier. The output from the tape recorder is around one to two volts. In the amplifier, the pulse signal is amplified to 110 volts. The output of the amplifier is linked directly to the synchronous motor

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AMERICAN CINEMATOGRAPHER

which drives the film recorder. As the tape in the 1/4-inch machine plays back, one channel dubs the sound track onto magnetic film while the other track drives the film recorder. Since the 60-cycle pulse is a sound record of the speed at which the camera was operating originally during shooting of the picture, the film recorder operates at exactly the same speed as the camera. What is achieved, then, is a second-hand version of using synchronous motor-driven camera and film recorder in the first place with none of the attendant disadvantages thereof. This method allows the use of any stereophonic tape recorder to record sync sound.

The other resolving system controls the speed of the recorder to conform with the original camera motor speed rather than that of the film recorder. As the sound is transferred from the tape recorder to the film recorder, the 60-cycle signal is sent into the resolver. The resolver sends an electronic message back to the tape recorder which varies its speed, thus compensating for variations in camera motor speed. Of course, in order to use this method, it is necessary to use one of the variable-sync tape recorders on the market (such as a Nagra).

The first method described here has the obvious advantage that any stereophonic tape recorder will do the job. A Nagra is more expensive than almost any stereo tape recording machine. The second system, however, is the standard of the professional motion picture industry in the United States.

Thus, the producer who wishes to shoot sync sound is faced with a number of choices. The ultimate decision will be determined on the basis of: a) cost and b) availability of equipment. If money is no object and one is located in Los Angeles, New York or Chicago, all of this equipment is available on a rental basis from the several large equipment rental houses located in these cities.

If rental money is short or the equipment is to be purchased, then some pencil sharpening is in order. (All of the equipment needed for the operation, excluding editing equipment, will run upwards of $100.00 per day to rent.) Decisions as to whether to purchase all necessary equipment, rent it all, or some of both must be made carefully in order to avoid wasting money and/or delaying production.

Without the availability of expert and very experienced personnel, perhaps the best solution for industrial in-plant units, for instance, would be to hire a consultant for a few days. ■

WHAT'S NEW

Continued from Page 296

$174. f.o.b. Mountain View, California. It is available from stock or current production. For further details, contact Roger Dorr, marketing director, High Frequency Engineering Co., 2626 Frontage Road, Mountain View, CA 94040, Telephone (415) 321-3764.

•

SYLVANIA LAMPS USED FOR FILM MAKING AT SAN QUENTIN PRISON

Tungsten-halogen lamps produced by the Photolamp Division of Sylvania Electric Products Inc. are utilized as the major light source for film productions at San Quentin Prison. Sylvania is a subsidiary of General Telephone & Electronics Corporation.

Since its inception 10 years ago, the workshop has completed some 70 film productions ranging from 25-minute, color films to two-minute black and white film clips.

The workshop, the only one of its type, is manned by inmates on a voluntary basis under the supervision of a professional cameraman, Dick Queirolo of San Francisco. The group produces its own scripts, filming and soundtracks through use of donated materials. Of the 33 inmates who have participated in the program, nine have entered the film industry as the result of workshop training.

Shown above going over a script and setting up a scene are, left to right: Richard Hall, cameraman and sound technician; Edward Costello, script writer; Mr. Queirolo; Lt. Von C. Morris, institution sponsor, and Bill Lawhon, director of photography and film editor.

•

BIRNS & SAWYER OFFERS NEW HEAVY-DUTY TRIPOD

Birns & Sawyer, Inc. is manufacturing a new, improved version of the Mitchell-type heavy-duty tripod. Made of straight-grained woods, stained and oil-treated, with thicker, wider ferrules of stainless steel, this new and more rugged tripod, the VGH300, is designed to accept all heavy-duty friction, fluid, and geared heads—the O'Connor 100 and 200, Worrall, etc. The VGH300 comes in three models: the Standard Tripod (Cat. #2580), the Sawed-Off (Cat. #2581), and the Baby (Cat. #2582). Additional information may be obtained from Birns & Sawyer, Inc., 1026 North Highland Avenue, Los Angeles, California 90038. ■

INDUSTRY ACTIVITIES

Continued from Page 300

ident and station manager of WAVE-TV, a Louisville station.

The D. W. Griffith Student Film Festival is open to filmmakers from anywhere in the United States. No institutional affiliation is necessary to enter any of the five categories. A total of $2,500 in prize money will go to the winners. The money was made available by co-sponsor WAVE-TV, which will also award at least one summer internship position in its Special Projects Department to entrants who evidence special talents.

The five categories are dramatic, documentary, animated, experimental, and silent films. Judges for the 1970 competition include Richard Schickel, film critic for *Life* magazine and Pauline Kael, *New Yorker* film critic. Other judges will be added at a later date.

Rules for the competition and entry blanks are available by contacting the D. W. Griffith Student Film Festival, the University of Louisville, University College, Belknap Campus, Louisville, Ky., 40208. Deadline for entries is May 1, 1970. The judging will take place May 14, 15, and 16.

During the week of May 11-16, concurrent with the competition, the University of Louisville will sponsor the D. W. Griffith Film Festival and Institute. During mornings, institute registrants will participate in discussion and practical sessions in filmmaking conducted by a national expert on the cinema. Afternoons will feature screenings of major films that relate to that morning's activities. The Institute members will also view the screenings of the competition films and hear the judges' responses and decisions. A public showing is planned of the outstanding films. A small fee will be charged for the non-credit institute. Applications and information may be obtained by writing the D. W. Griffith Film Institute at the above address.

The events honoring Griffith were originated by Walt Lowe of WAVE-TV's Special Projects Department. Mr. Lowe is an expert on Griffith, who directed some of the greatest early fiim classics, including *Intolerance* and *Birth of A Nation.* He worked with Huffman, Morris Bein, Chairman of the University of Louisville's Division of Humanities, Robert Doherty, Chairman of the Department of Fine Arts, Leon V. Driskell of the English Department, and Robert McMahan of the Music History Department. ■

MAINTAINING MODERN CAMERAS

Continued from Page 359

designed with an ever-increasing portion of electronic systems to be able to meet the demand for higher precision, ease of operation and lighter camera weight. In addition, electronic slating devices for double-system sound shooting, electric controls on zoom lenses as well as semi- or fully automatic lens diaphragms are used more every day. To service and maintain this equipment, camera service stations must expand into this field with personnel, tools and instruments. One of the greatest reasons for equipment damage and unnecessary expense for repairs is unqualified people trying to modify or repair electronic systems.

With the use of transistorized solid-state circuits it is more important than ever to use properly rated power sources for cameras. New governor-controlled motors run to much higher precision than a camera tachometer is capable of indicating. Repair and test methods must be kept in step with the equipment. This is why these motors should *not* be adjusted with a Strobotac or an RPM-meter, but with an oscilloscope, using a pilot generator as a signal source and the line frequency as reference. Instead of the oscilloscope, reed-type frequency meters which indicate to 1/2 Hz accuracy can also be used for speed adjustments.

Sound-on-film, single-system sound, normally only used for news photography and "scratch-tracks," has entered a new stage in development. The Arriflex 16 BL Single System, with performance characteristics close to those of elaborate professional tape recorders, requires very special care and servicing. Using a wow and flutter meter in combination with standard SMPTE recordings as well as oscilloscope and db meter, we can evaluate and adjust the module for optimum performance. Every sound module is tested with new prestriped Kodak 7242 film, since once through the camera, film would already perform much differently from new stock. This is a considerable expense, but only this way can we be sure about the performance of a sound module.

On a complete overhaul, the entire camera outfit, including lenses, motors, magazines and all other miscellaneous accessories, is cleaned, repaired, relubricated and tested in the manner described. Equipment which has gone through the Arriflex Service Department and passed our final inspection after repairs, is given a three (3) months warranty covering parts and labor. ■

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Two Veteran Cinematographers
ARTHUR C. MILLER, A.S.C.
AND
WALTER STRENGE, A.S.C.

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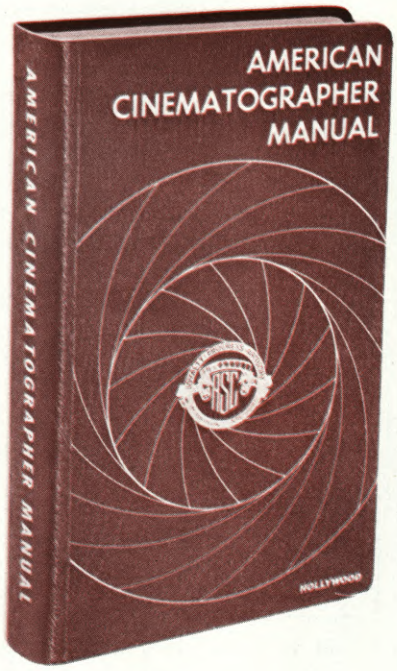

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A COMPUTER YOU COULD LEARN TO LOVE

Continued from Page 322

somewhat less precise than a digital image, is produced instantaneously and is completely responsive to human control without the assistance of programmed storage or even the slightest knowledge of electronics, computer language or computer programming.

Any energy input can be used to modulate the image or any of its components as the creator watches the product of his animation on a monitor. He can produce animation by turning a knob, manipulating a joystick, or flipping a switch. Taped or live dialogue fed into the Animac computer will produce instantaneous lip movements in an animated character. A pantomimist or dancer, wearing an anthropometric harness, can produce comparable movements in the cartoon character simply by body movement. Music can drive or animate the image, in perfect synchrony with a synchronous sound track. The result is a computer you can learn to understand and even *love,* one which will mirror your creativity and permit you to see and modify the results immediately.

Before I write about what I think are the dimensions of the Computer Image process, let me give a brief description of some of the photographic problems and their solutions which we have encountered in several years and hundreds of thousands of feet of cathode ray photography.

Photographing an image drawn by an electron beam with a motion picture camera poses about the same problems as making a kinescope with a film camera. Cathode ray tubes used in the Computer Image process are similar in principle to the picture tube in a television monitor or a home television set, except the beam does not scan from left to right in the standard raster pattern of interlaced lines. It moves in any direction or dimension as the computer operator directs it. It produces a visible image on the phosphor-coated, inner face of the tube. Since various phosphors have varying persistence, and varying densities and grain sizes (depending on the method and quality of manufacture) the best image quality results from a tube with the flattest face, free from optical distortion; the smallest grain size (the vapor deposition method produces a phosphor with finer grain than the precipitation application process). Finally, the shortest persistence commensurate with sufficient light for exposure causes less image smear.

The face of the CRT is shielded from ambient light with a hood or light trap since extraneous light on the face of the tube will activate the phosphor and reduce contrast and definition. The cameras we use are the Arriflex M for 16mm film and the Acme or Mitchell NC for 35mm photography. Both are powered by synchronous motors and operate at 24 frames per second. An attachment on the camera, designed by Computer Image engineers, feeds camera synchronization to the computer; that is, tells it electronically when the shutter is open so that each frame of film receives a complete image, evenly exposed.

Presently, we are photographing on black and white film stock or recording on monochrome videotape. However, we will soon be able to record directly on color videotape or color film.

After much experimentation, we use Eastman Plus-X Reversal (7276) for 16mm, and Double-X Negative (5222) when filming in 35mm. Color is added to the film animation by printing to a color stock. Although we use an Acme 16-35mm optical printer for this part of the process, we also discovered quite accidentally, that exceptionally good color printing using a traveling matte can be done on a contact printer. The discovery came about when one of our rolls of black and white animation was inadvertently double exposed; that is, printed twice on a Bell & Howell Model C contact printer with two color filtrations. Not only did red and blue produce a beautiful magenta but the misregistration one would expect from this accident was not apparent in the finished footage.

This started the Denver Laboratory of Western Cine Service, where we do much of our color work, on a series of experiments. By printing the black and white original rolls to a color stock with a Dichroic light source, an incredible number of subtle color combinations was obtained. The black and white reversal original rolls were then composited on the contact printer to Eastman High Contrast Positive (7362), and processed to a negative. With this traveling matte, a color background was added to the color animation.

Registration, of course, depends upon the dimensional stability of all the rolls since a continuous contact printer has no registration pins. Thus, the degree of precision is influenced by a number of variables including temperature, humidity and the moisture content of the film base, but the results we get are exceptional, far better than one would expect from contact printing.

For larger formats, we're equipped with an optical printer at our Beverly Hills production facility.

Although Computer Image is, as yet, very new in the field, it has already racked up an impressive list of accomplishments, a few of which will illustrate the system's versatility.

Bob Booker, Producer of The Warner Brothers feature "THE PHYNX", created the titles for the movie in three hours instead of the normal six to eight weeks and saved $35,000.00.

Encyclopedia Britannica Productions completed its first computer-animated cartoon "GROWING" on the Animac computer without cels or art work. It took them three days to complete the animated graphics and they filmed the 8½-minute film in 8½ minutes. By conventional methods, it would have taken three to six months and the cost factor would have been ten times greater.

Other users of Computer Image's "computer animation" have included: Columbia Pictures for the feature "GETTING STRAIGHT", Chevrolet, "AMERICAN FAMILY INSURANCE", L. Q. Jaf for their feature, "COME-IN CHILDREN", United States Steel, The Bing Crosby Special, Smothers Brothers Special, Raquel Welch Special, Lockheed, Carson & Roberts, Foote Cone & Belding, Cascade, Storescope, United States Communications, ABC, NBC & many others.

Another major use of computer animation, as developed by Computer Image, has the potential of becoming one of the most effective tools available in educational and training programs because the cost is reasonable and production time is a matter of weeks instead of months and in many cases, years.

Linguistically, it is the best possible vehicle for learning! Simplicity of the images maintains great aural-oral awareness. Sychronization of lips, figure movement, and form convergences draw consistent attention.

Most important, "Visual Phonetics" is now a potential reality. We can now actually *show* visually how a word is spoken. Visual Phonetics are possible only by Computer Image Corporation's computers, techniques and production facilities.

Since we're pioneering a new process at Computer Image, we're constantly concerned not only with technology, but with the application of the product, and also with the future of animation, which movie-makers are aware has been a declining art form. The reason less new animation appears on theater and

television screens today than twenty or thirty years ago is probably an economic one: by conventional methods, it costs too much. And certainly the substitutes produced by limited animation techniques are not advancing the art form.

Both the president of our young company, Bruce L. Birchard, and Lee Harrison, the inventor of our computers and Chairman of the Board of Directors, are aware of the relationship of cost to the time required to produce animation conventionally. That's why, from the beginning, a primary objective of the Computer Image system has been to produce animation quickly. But they're also convinced that speed alone is not enough, and have set as our immediate objective full, three-dimensional, character animation, equal to or better than the best animation by conventional methods. I have no doubt that this capability will be operational before the 1971 deadline we have set for ourselves. The techniques we have demonstrated to support the patents held by the company, when consolidated, will be sufficient to enable a producer to make a "FANTASIA" or a "SNOW WHITE AND THE SEVEN DWARFS" on a three-week production schedule. Concurrent with this development, we will expand our present capability of doing simpler character animation since we believe we can help produce a revival of this art form.

But we think another significant reason for the decline of animation is the decreasing number of animators, men and women whose creative genius brought so much human insight and so much compassionate humor to the motion picture screen in the past. The hope for the future, we think, is in a new generation of creators, and upon them as much depends as upon an electronic system which is quick, versatile and economical.

Some of our friends who produce animation by traditional methods look with some misgiving and suspicion at our computer systems. Their question, often unspoken, seems to be: "What will computer animation do to my art? What is going to happen to me?"

I wish we could answer these questions with 20/20 foresight. We think technological innovation has always produced change and its discomforting consequences. But, we're trying to change the methods by which animation is produced; not the human process by which it is created. And an animator, we believe, is first and always an artist and a creator of art. The Computer Image approach does not eliminate artists,

writers, musicians, actors—gifted creators. It relies on cameramen and their photographic talents. Since we film animation at an unconventional 24 frames per second instead of the single-frame animation process, we think we will create more jobs for skilled cinematographers as well as for editors, sound technicians, and photochemists. The Computer Image system opens the way for a parallel contribution from people skilled in electronic image creation and reproduction.

All of the talents which contribute to the delightful product called animation are just as essential to the Computer Image process as they are to the conventional system. What we have tried to remove from the equation, we hope no one will mourn: the delay, the tedium, and the waste of human effort in the one-frame-at-a-time method. In short, we believe we can put more experienced artists and craftsmen to work with our new tools. We love animation and we certainly wouldn't eliminate the people who create it. If we did, we'd walk hand in hand into oblivion with them.

I have been fascinated in exploring the potential of our graphics animation computer, Scanimate. The input for this computer can be any object, photograph, drawing or painting produced by any art technique. The ease with which Scanimate can be operated and the unique results it produces add up to a new animation art form, a new language, a new form of expression. Scanimate animation has a look and a style which is both unique and of infinite variety. Seemingly, this is a contradiction, but out of it has grown what we have named "a new dimension," "a new way to see." It is not exclusively the language and the tool of any generation, but the hopeful thing to us is that young people, some of them graphic artists, some without art training or background, can create unbelievably beautiful imagery. They will, we think, become the "graphic animators" of the future, expanding new art forms to supplement the timeless charm of character animation. And all of us at Computer Image Corporation, which is a young company looking at tomorrow, think you will see a lot of these new images, produced by a new kind of animator, on the motion picture screens of the future.

After all, they haven't any inhibitions about learning to love a computer, and, as Lee Harrison says, "If any generation, young or old, is intimidated or frightened by our computers, we'll plant a delphinium next to the control panel just to prove they won't harm anyone." ■

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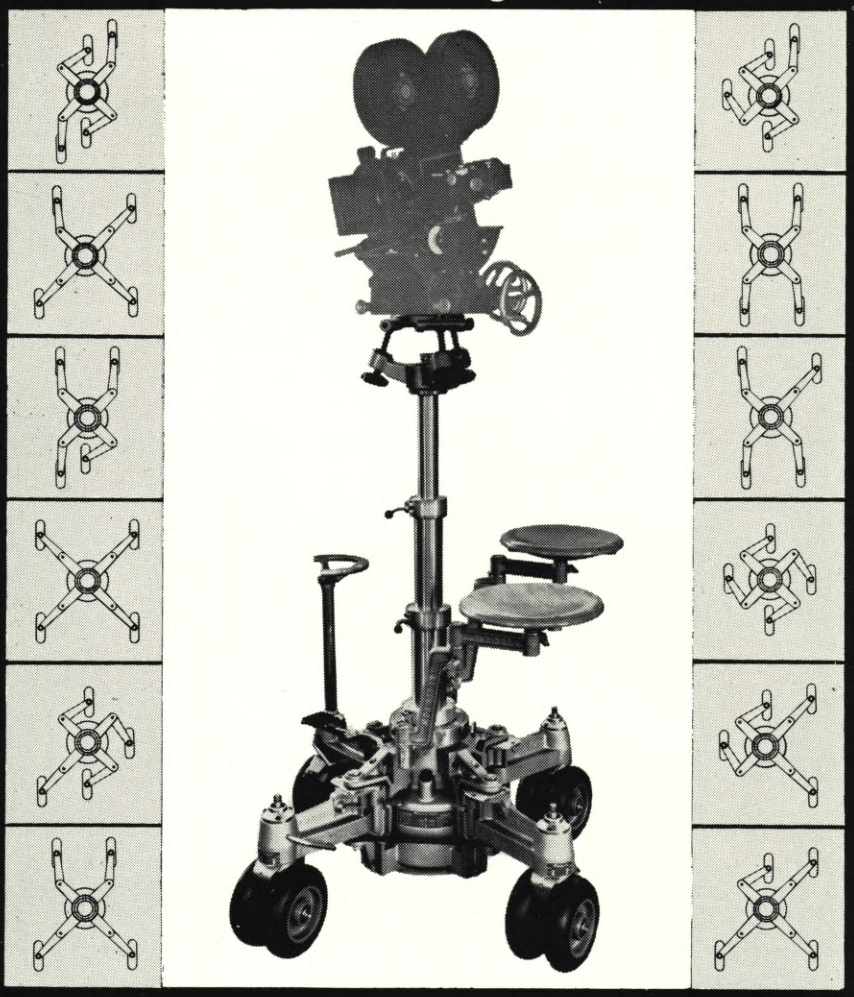

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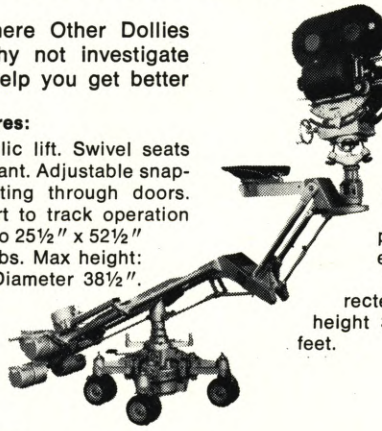

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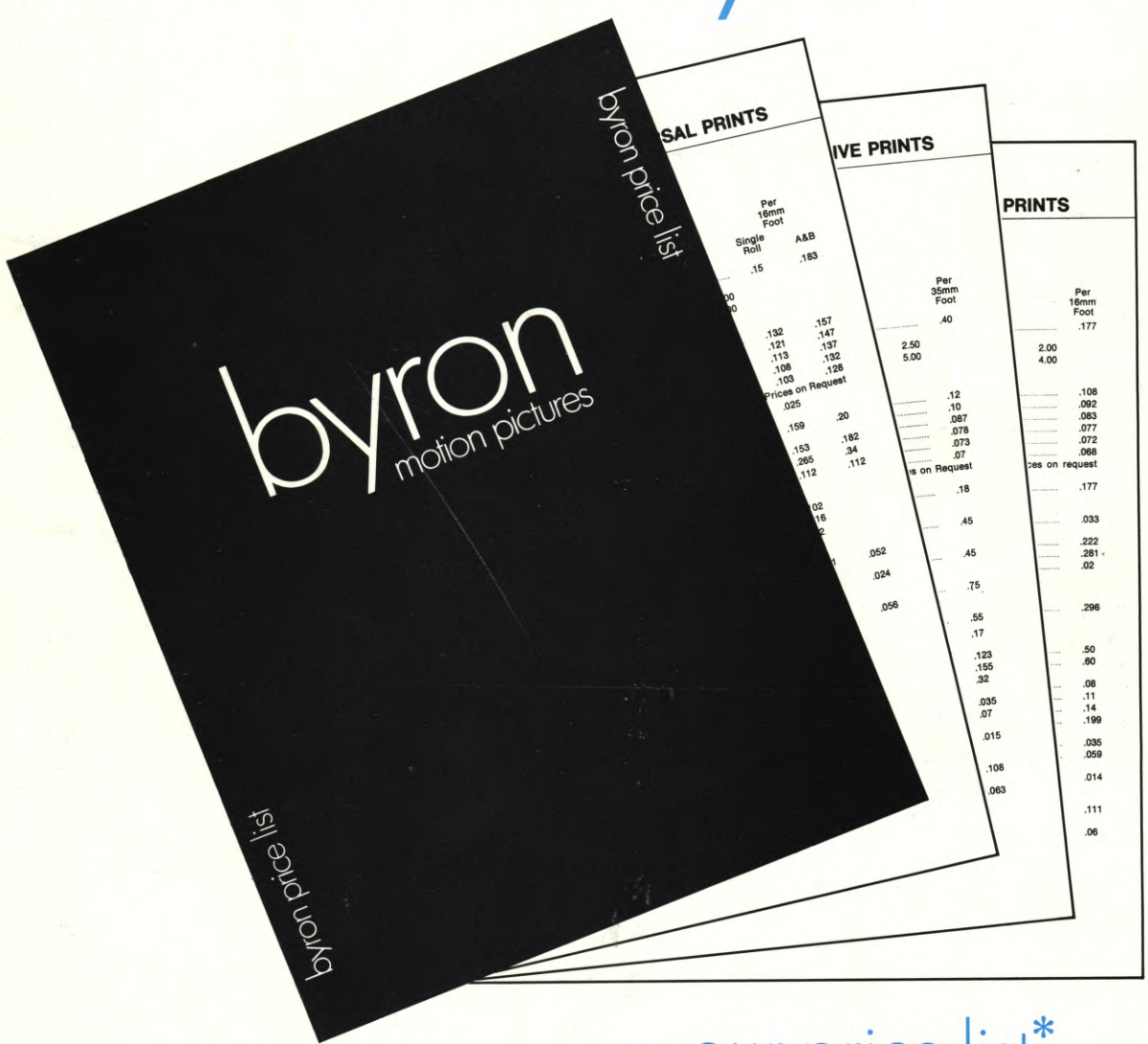

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