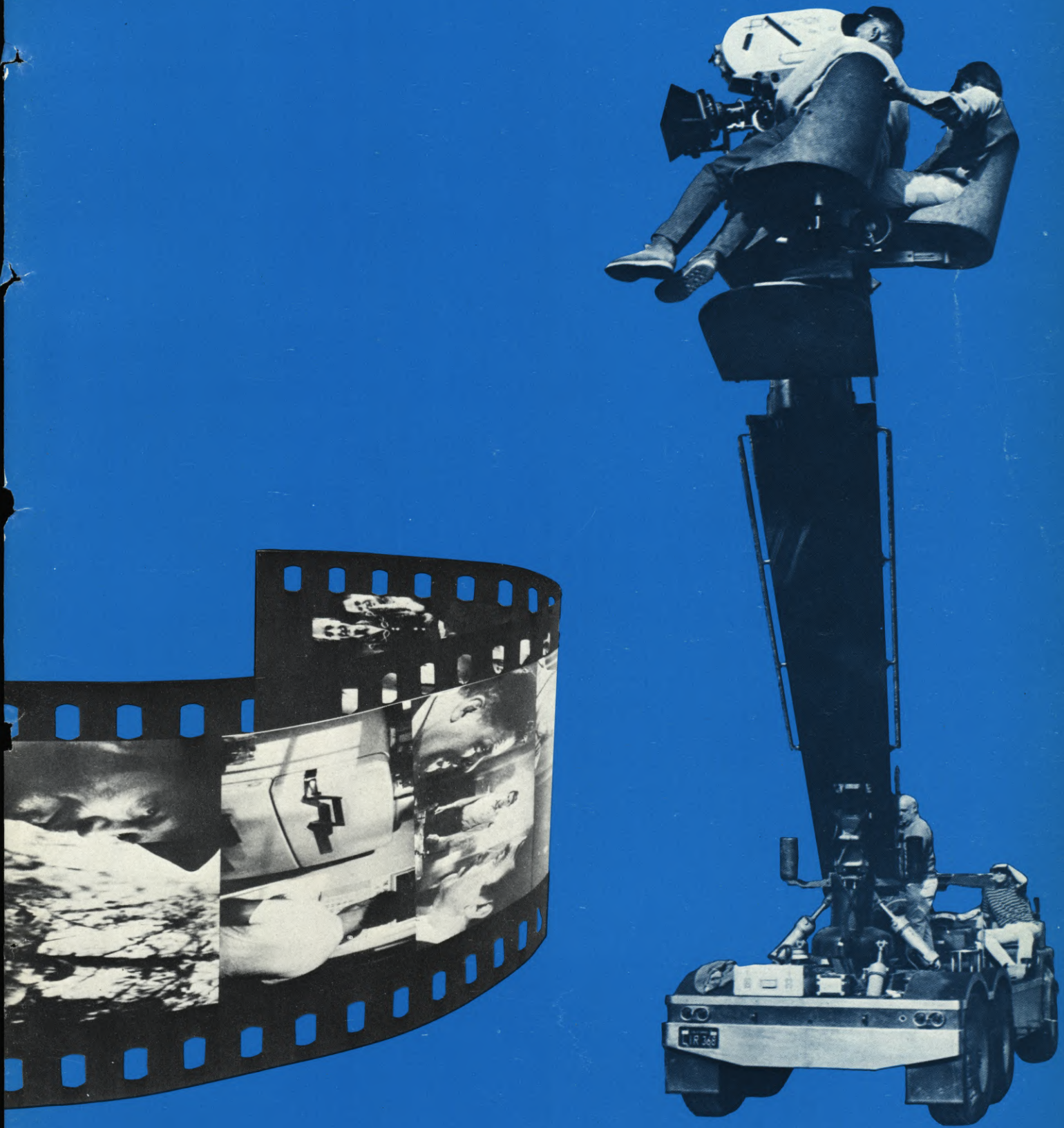


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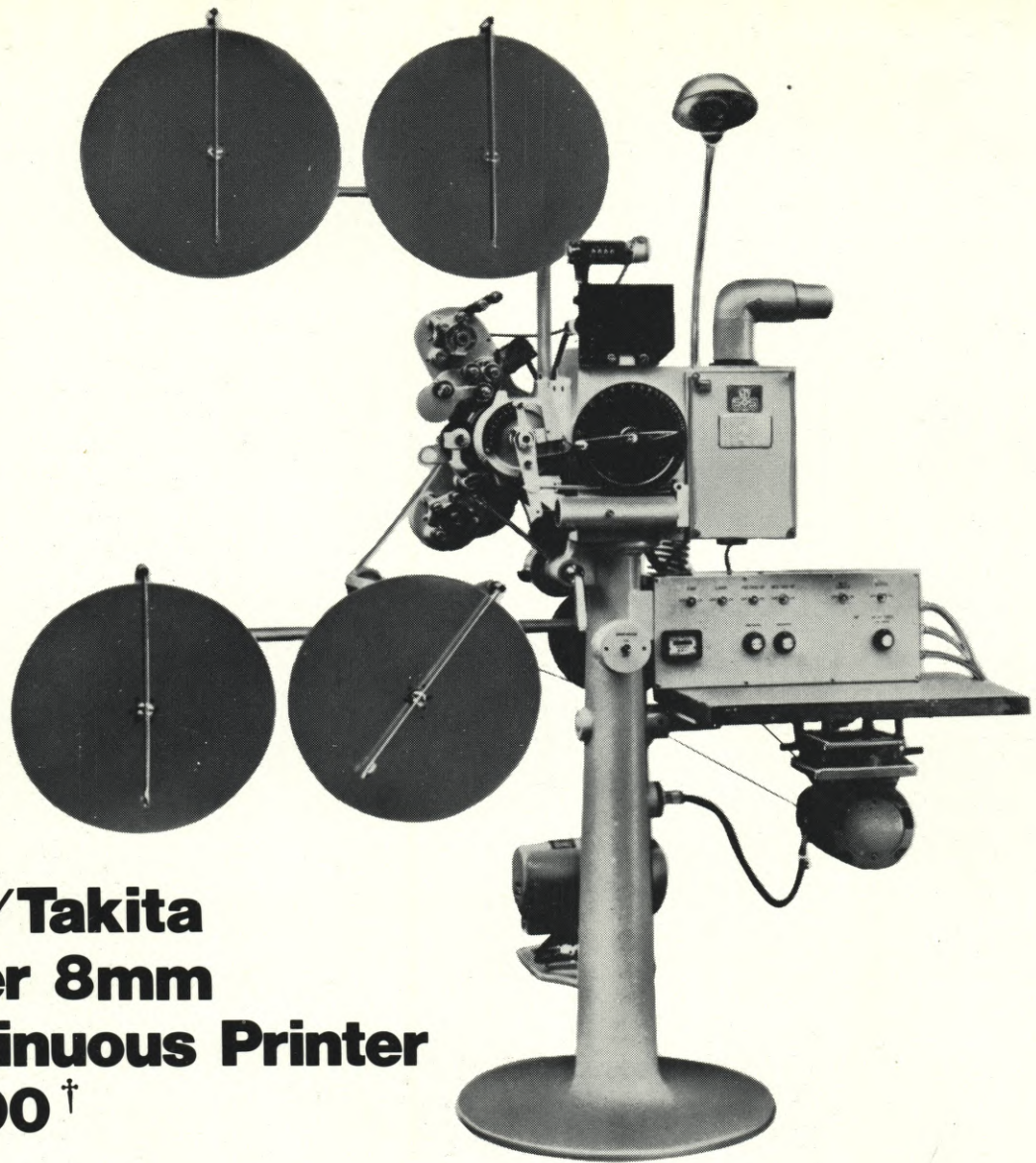
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AMERICAN
Cinematographer

International Journal of Motion Picture Photography and Production Techniques



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AMERICAN Cinematographer

International Journal of Motion Picture Photography and Production Techniques

NOVEMBER, 1970

VOL. 51. No. 11

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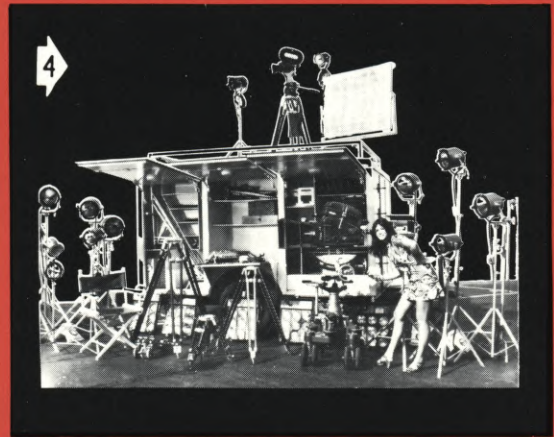
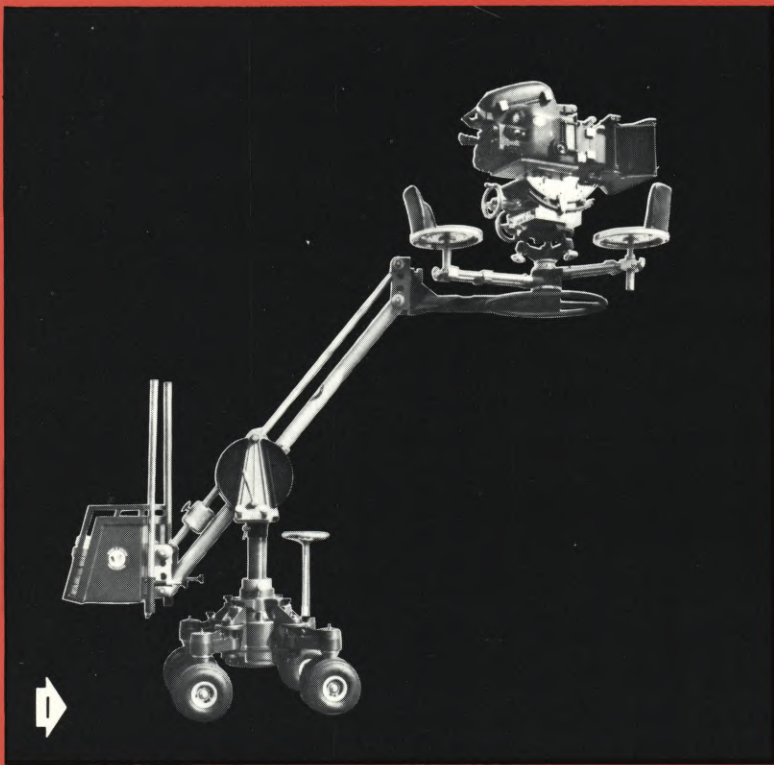
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ON THE COVER: Anamorphic squeezed frames from the new Columbia Pictures release, "I WALK THE LINE", plus photo of the giant Titan crane used during location filming of the picture in Tennessee. Cover design by Allen Shapiro. Stylized photography by Lee Karjala.

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. Copyright 1970 ASC Agency Inc. Second-class postage paid at Los Angeles, California.



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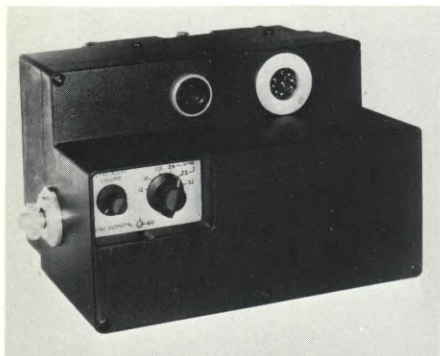
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WHAT'S NEW

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A NEW CRYSTAL CONTROLLED MOTOR TO DRIVE THE MITCHELL BNC

Cinema Product Development Co., announces the successful development of a crystal controlled D.C. Motor to drive the BNC studio camera from a 24 to 36 volt battery pack.

It features a highly efficient, direct drive motor, which eliminates right angle gears and sleeve bearings. It is considerably quieter than a multi duty motor and has a maximum torque output of 300 oz-in.

It provides variable speeds of 12, 16, 20, 24, 25 and 32 F.P.S., forward and reverse. At 24 and 25 F.P.S., the motor speed is accurate within 15 parts per million over an operating temperature range of 0 to 140 F. A beep tone sounds whenever the motor is not in sync.

Production deliveries are now being made. For further information write or phone Cinema Product Development Co., 2044 Cotner Avenue, Los Angeles, California 90025. Tel. (213) 478-0711.

SYLVANIA'S NEW SUN GUN FOR SUPER-8 CAMERAS CARRIES 5-YEAR GUARANTEE

A compact, lightweight Sun Gun® movie light designed for Super-8 movie cameras that is guaranteed for five years against defects in material and workmanship has been introduced by Sylvania Electric Products Inc.

The new Sun Gun movie light (Model SG9) draws only 350-watts, but the tungsten-halogen lamp and a 2¼-inch deep reflector provide exposure values that are equivalent to a 650-watt movie light.

The new unit weighs only 10 ounces and attaches easily to the top of a movie

camera and can be ready for use in seconds. It comes equipped with three adapter brackets so that it can be used on virtually all Super 8 movie cameras. In addition, there is an optical handle available for either right or left-handed movie-makers using standard 8 millimeter cameras.

The high-efficiency tungsten-halogen lamp, manufactured exclusively by Sylvania, and the reflector are one integral unit and the lamp is not to be replaced. The lamp is permanently mounted in the reflector and upon burnout the total unit should be discarded.

The lamp has an average rated life of 25 hours. Amateur movie photographers average about three hours use of a movie light per year. If the lamp in the new Sun Gun movie light burns out prematurely during the five-year guaranteed period, the company will replace it, provided the consumer had returned the warranty card at the time of the original purchase, and also sends \$2.00 to cover shipping and handling costs. This is the first unit in the industry to carry this type of warranty.

The optical system in the new Sun Gun movie light is set at a medium flood position and is designed to cover the normal lens areas of Super 8 movie cameras. In addition, the head of the unit can be tilted at a 45 degree angle for indirect or "bounce" lighting. When the unit is directed at a white wall or ceiling, a softer, shadowless light is achieved on the subject.

Bounce lighting illuminates a greater range of distance than direct light and permits the subject's eyes to become accustomed to the brighter light before it is focused on them directly.

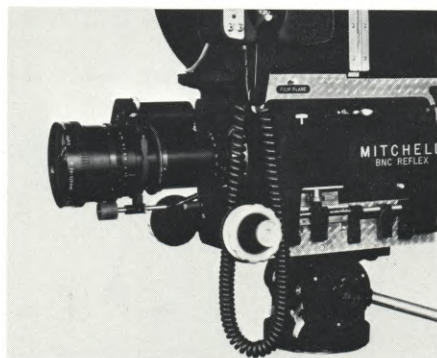
The new SG9 Sun Gun movie light provides a 3400 degree Kelvin light source at 120 volts. It is operable on any standard AC household current, and comes equipped with an 11-foot cord.

The unit is lighted by a simple ON-OFF switch on the cord. The beam of light will illuminate the full range of most zoom lenses. And when the Sun Gun movie light is securely mounted, the type A filter on cameras having one, will be correctly positioned for indoor pictures.

The new SG9 Sun Gun movie light is being inventoried at Sylvania Distribution Centers around the country and will be available immediately to the

amateur movie-making markets. The unit carries a suggested retail price of \$12.95.

The new Sun Gun movie light was developed and is manufactured by Sylvania Lighting Products at Salem, Mass.



ANGENIEUX 6x20 L2 ZOOM LENS

Angenieux Corporation of America has initiated distribution of a unique zoom lens for 35mm cinematography. Designated the 6x20 L2 this zoom lens has achieved new levels of optical performance through advanced concepts in zoom lens optics. With an aperture of f/2.6, T3 and a 6X focal length range of 20-120mm, this new zoom lens can be focused as close as 3 feet from the image plane.

Of primary interest to the feature film and commercial producers, the wide angle (20mm) of this new zoom allows the freedom of camera movement necessary for the cinema verite techniques used today. The photometric aperture of T3 allows filming under cooler lights and even under ambient lighting conditions. For further flexibility, supplementary close-up lenses are available to allow focusing as close as 23 inches from image plane to subject.

Initially, the 6x20 L2 will be released in mounts to fit Mitchell Reflex cameras. Other camera mounts are expected with increased production.

For further information, contact Bern Levy, Motion Picture Sales Manager at (area code 516) 678-3520.

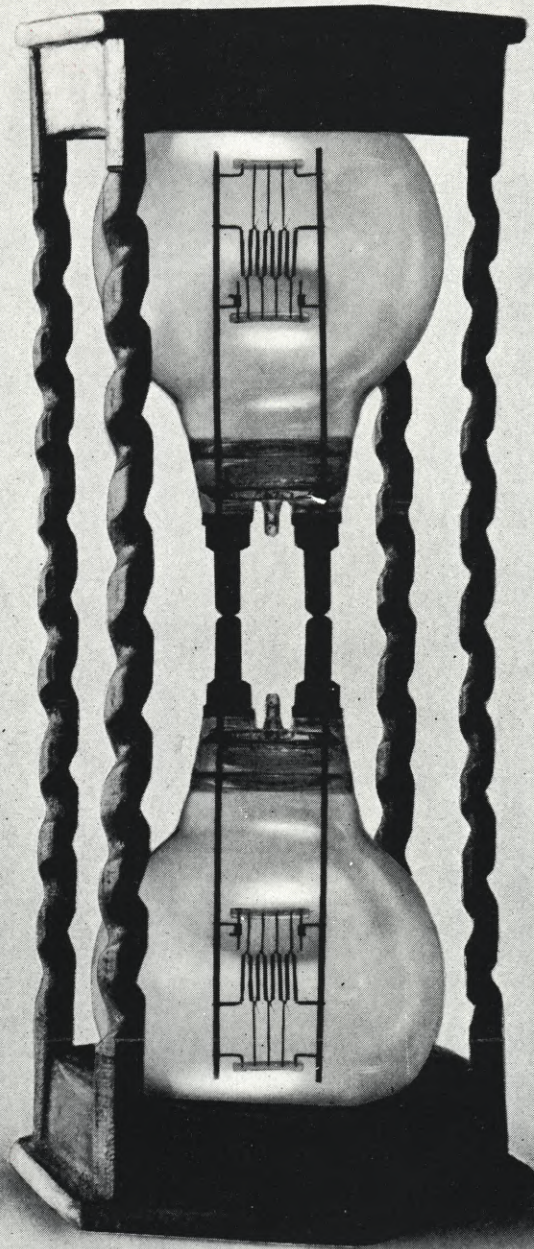
ALAN GORDON ENTERPRISES TO SELL AND SERVICE THE NEW BOLEX 16 PRO MOTION PICTURE CAMERA

Alan Gordon Enterprises Inc. has been appointed a sales and service headquarters for the new Bolex 16 Pro motion picture camera.

The new Bolex 16 Pro is a fully professional 16mm double system

Continued on Page 1141

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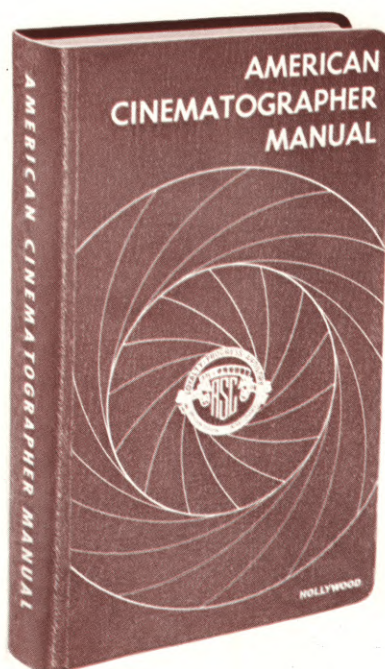
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AND

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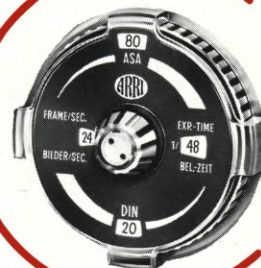
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a major achievement in
exposure control
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NEW! thru-the-lens ARRI PRECISION EXPOSURE CONTROL system for the ARRIFLEX® 16 BL

Functional schematic of the Arriflex 16 BL CdS precision exposure control system

Taking and Viewfinder Light Path (including optical components)

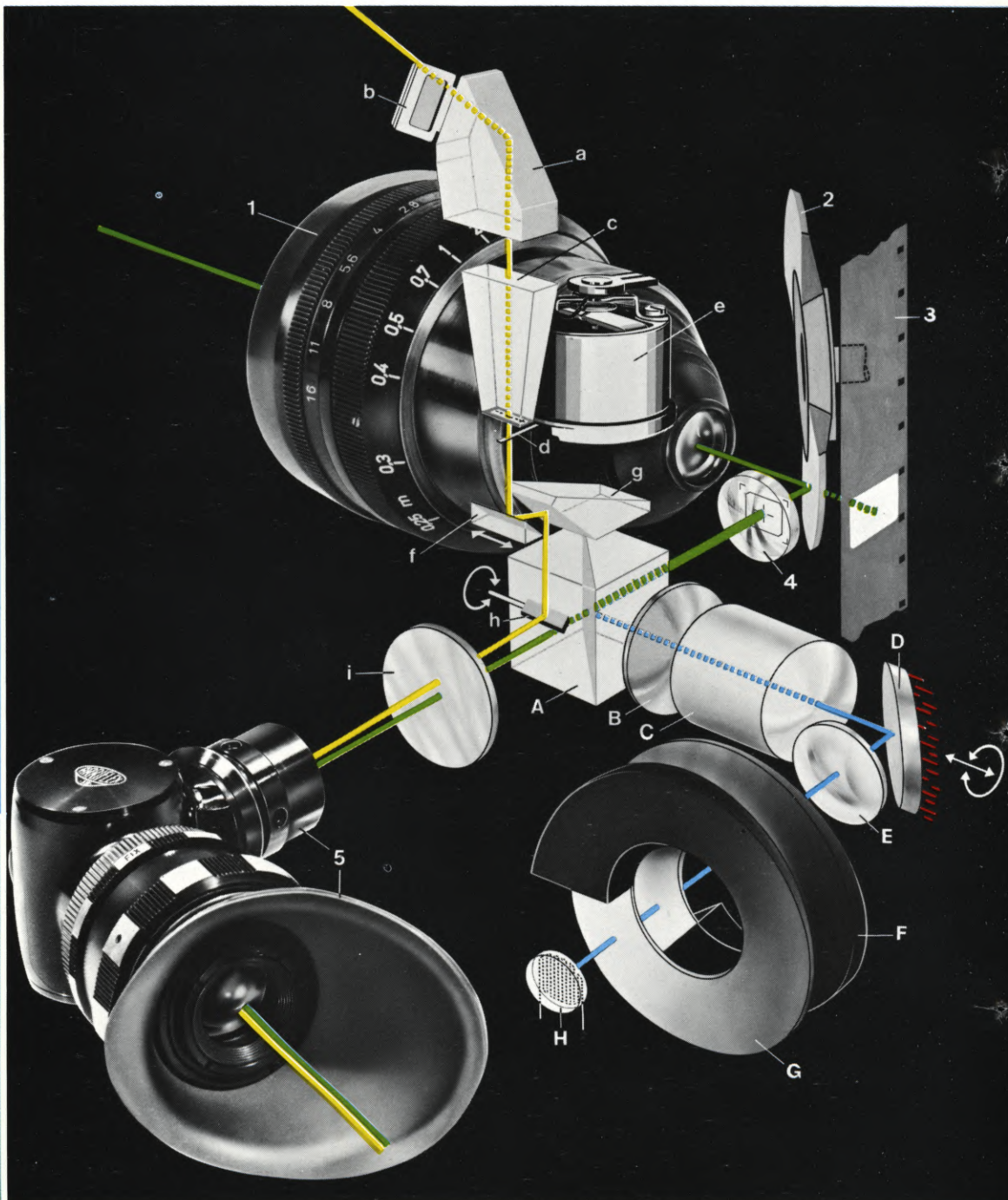
- 1 Taking lens (interchangeable)
- 2 Mirror shutter
- 3 Film
- 4 Ground glass (with frame marking)
- 5 Finder — standard optical equipment for camera (interchangeable against offset finder)

Measuring Light Path (including optical components)

- A Beam splitter
- B First lens element
- C Second lens element
- D Reflecting mirror (cold mirror)
- E Third lens element
- F N. D. wedge for exposure time
- G N. D. wedge for film speed
- H CdS photoresistor

Light Path for Projection of Meter Reading (including associated components)

- a Light collecting prism
- b Matte with slot for gelatine filters (brightness attenuation for meter scale)
- c Light guide block with meter scale
- d Indicator
- e Galvanometer Instrument
- f First reflecting mirror
- g Second reflecting mirror
- h Third reflecting mirror
- i Protecting glass



APEC is the first and only thru-the-lens exposure control system that is thoroughly professional, that is of the highest accuracy and that provides the cameraman with complete, reliable exposure information.

The mirror-shutter reflex system invented and pioneered by Arriflex revolutionized modern motion picture camera design. It put picture information in the through-the-lens viewfinder. Field—Focus—Depth—Perspective—all seen through the eyepiece. It made filming faster, surer, and easier. It opened the way to film styles and methods never before possible. It made Arriflex the most preferred professional motion picture camera in the world!

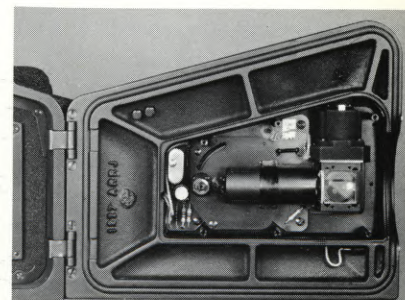
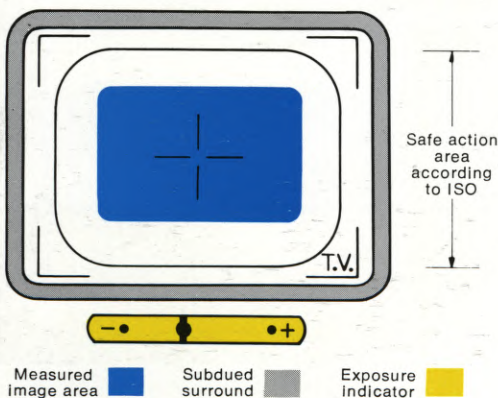
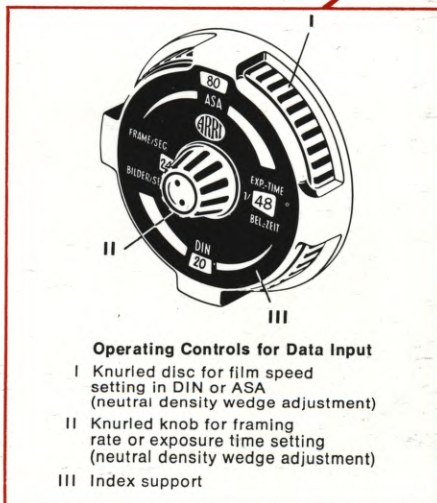
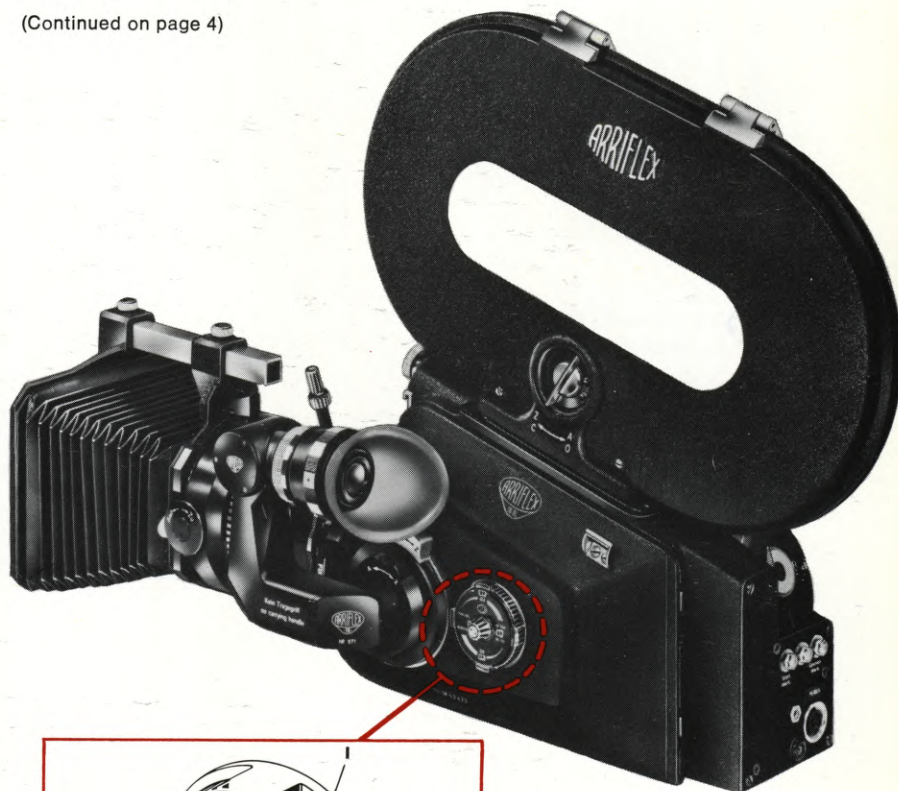
But with all this information available at the eyepiece, the professional cameraman heretofore still had to turn to another instrument for the one more piece of information that he had to have: **CORRECT EXPOSURE.** Now, Arriflex changes the art again! With the Arri Precision Exposure Control built into the 16BL viewfinder system, picture information is now complete. For the first time in a professional motion picture camera, the viewfinder shows a bright, parallax-free ground glass image **and** beneath it, the correct exposure setting on a large, easily visible scale. Now, the working cameraman has complete information and total control of every element of the picture, without ever taking his eye from the viewfinder. View! Focus! Turn diaphragm control till meter zeroes! Shoot! He can work as fast as that!

APEC OPERATES WITHOUT OBSTRUCTING FILM LIGHT PATH The Arri exposure control is not built into the film light path of the camera. There are no prisms, no beam splitters or other optical devices in the path of the light rays which go to the film. Therefore nothing interferes with getting maximum picture quality on film. APEC is built into the viewfinder system of the camera, sensing being done only when the camera shutter is in the closed or viewing position. Viewfinder brilliance is not affected since only a very small amount of light is diverted for measurement.

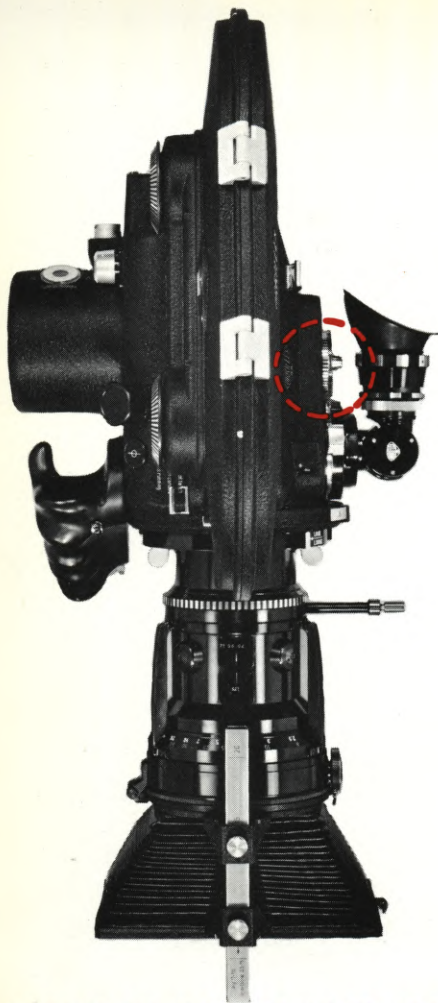
APEC COMPENSATES FOR ALL FACTORS The 16BL Exposure Control System works with any Arriflex lens—zoom, macro, wide angle or telephoto. It compensates for filter factors, lens extension, variation in lens transmission and all other variables that conspire against correct exposure information.

APEC CONVENIENTLY BUILT INTO CAMERA DOOR The entire APEC mechanism is built into the door of the Arriflex 16BL and is operated by outside concentric control knobs which actuate the film speed setting (ASA 16-500) and the camera speed setting (24 to 50 fps).

(Continued on page 4)



The entire APEC mechanism is built into the camera door (illustrated with cover removed)



APEC IS AN ULTRA-SOPHISTICATED ELECTRO/OPTICAL INSTRUMENT

control knobs actuate two, counter-rotating, high precision, stepless, circular neutral density wedges. The neutral density wedges are located in front of a special CdS photocell. Before the light measuring beam reaches these discs, it goes through a high powered multi-lens optical system and is deflected by a cold mirror which filters out all infra red light in order to make APEC equally accurate under daylight or tungsten illumination. Also, the high efficiency beam splitter which takes the light

beam from the finder optics has a selective reflectance especially matched to the cell response. Another feature of this beam splitter is to absorb any light that might accidentally enter through the eyepiece so that it cannot affect the meter reading.

The APEC System uses sophisticated electronics for broad range temperature compensation. Special circuitry automatically compensates the meter reading so that exposure indications are equally accurate with the camera running or still. Also featured is a tiny voltage stabilizer so that the CdS cell is automatically powered by the camera battery thus eliminating the need for a special battery. All electronic components are mounted on a single printed circuit board for easy accessibility.

'apec'

The exclusive design concept utilizing precision optical inputs, sophisticated electronics and a Wheatstone bridge circuit (which zeroes the exposure meter needle when activating the diaphragm ring) guarantee the utmost operating stability and reading accuracy. This system makes it possible to use a fixed operating point of the CdS cell curve irrespective of light level and thus overcomes the variables inherent in even the best CdS cells, caused by temperature, humidity, light level, dark storage, etc. It is far superior to the common "all electric" exposure meter designs found in most other cameras.

APEC GIVES YOU INTEGRATED OR SPOT READING The area measured by the photo cell, represents approximately $\frac{1}{3}$ of the 16mm film format and provides a reliable reading in most filming applications. It is center weighted to favor the most important part of the frame. At the same time, when a zoom lens is used on the 16BL, spot measurements can be made with the lens at its telephoto position. At a 120mm focal

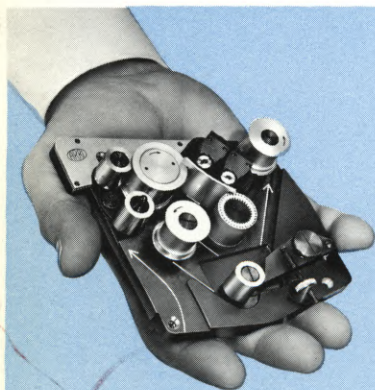
length setting of a zoom lens for example, a spot measurement as small as 3° is obtainable.

APEC PROVIDES EXPOSURE READING AT THE EYEPIECE As related before, the exposure reading is seen on a bright expanded scale, located under the ground glass. As viewed through the eyepiece, the meter needle is projected into this scale by means of a special optical system which picks up ambient light in the shooting direction. The diaphragm ring of the taking lens is turned until the needle is zeroed on the center point. This gives the exact diaphragm setting for perfect exposure. Additional marks to the left and right are provided to show one F/stop under and over, respectively. The brightness of the scale can be reduced by inserting gelatin filters into a hinged frame located over the light collecting prism.

APEC IS A MAJOR CONTRIBUTION TO PROFESSIONAL FILMMAKING On location, where so much of today's filming is done, the Arri Exposure Control System is a major contribution to creative filming. So simple to use, it will serve old timers and novices alike. It means fewer retakes. It means greater productivity. It means better, more consistent color.

With the APEC System, Arri accomplished another 'first' which will set the pace for the professional motion-picture camera field for years to come. The Arriflex 16BL is the only professional camera which can offer this feature plus so many other exclusive advantages: rugged reliability, true mechanical and optical precision workmanship, brightest finder image, single-system sound convertibility, etc.

APEC is now available as a factory installed option on new 16BL's and will be offered in early 1971 as a modification to existing models from serial #50701.



ARRI Single System Sound Module

another unique feature of the ARRIFLEX 16BL

The unique capability of matching its sound recording system to the assignment, makes the 16BL your best investment in a sync sound camera. Single-system, double-system, either or both—conversions made in moments with a screwdriver.

The superbly engineered Arri Single System Module does the trick. Place the palm-sized module into the 16BL's camera head and you're set to enjoy the advantages of single-system

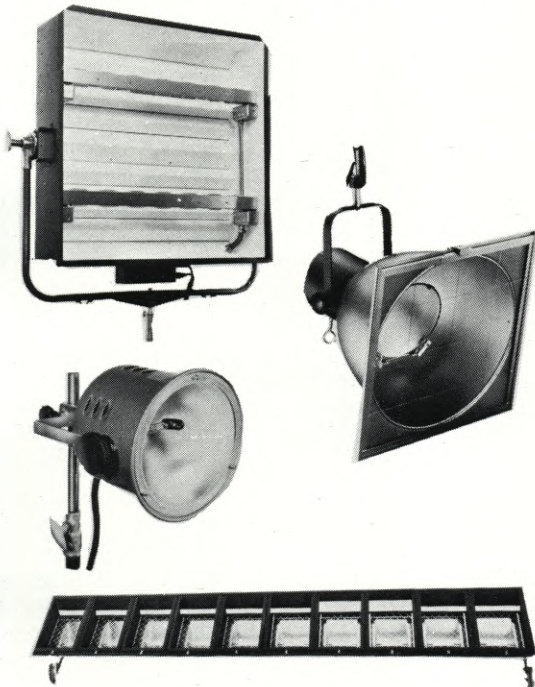
sound with sound quality that matches the unequalled mechanical/optical perfection of the 16BL itself.

A companion Arri recording amplifier offers dual mike inputs with built-in mixing; music/speech selector switch, and you can monitor from line or off the recorded track. Threading the single-system configuration is as fast and simple as the installation of the module itself.

Camera, Action

LIGHTS!

Now's the time to stock up on that lighting equipment you need. AGE Inc. is offering several outstanding buys on major studio lighting equipment, so be sure to take advantage of this terminated inventory.



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ColorTran Soft Light 8000W LQS 80-10P	\$530.00	\$ 379.50
Lamps B532 1000W 3200K	\$ 15.25	\$ 8.50
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M/R single broad type 22, head only Traditional stage light, uses PS52 globes, provision for barn doors and diffuser holders	\$ 63.00	\$ 33.50
10K type pan, head only Converted M/R 2231 cone light for use with 10,000W TKG96 globe	\$ 250.00	\$ 75.00



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INDUSTRY ACTIVITIES

11 COUNTRIES REPRESENTED IN PHOTO EXPO 71 EXHIBITORS LIST

Manufacturers from 11 countries are represented in the latest list of exhibitors published by Photo Expo 71, the major international photographic exposition scheduled for next year. It will take place April 17-25 in the Chicago's new McCormick Place on-the-Lake, the nation's foremost exhibition center.

Among the countries represented in Photo Expo 71 to date are the United States, West Germany, Japan, the United Kingdom, Canada, France, East Germany, Switzerland, Denmark, Australia and Austria.

In releasing the exhibitors list, Robert P. Burrows, president of the National Association of Photographic Manufacturers, the show's sponsoring organization, pointed out that the growing number of participating countries underscores the suitability of the exposition's subtitle, "The Universe of Photography".

In addition to serving as an arena for the promotion of business and exchange of ideas and information between manufacturers and customers, Photo Expo will provide a breadth of new knowledge and inspiration to all photographers—sophisticates as well as novices.

Fact cards for visitors to Photo Expo 71 are available from NAPM, 600 Marmon Ave., Harrison, N.Y., 10528.

A "FESTIVAL OF BUSINESS AND INDUSTRIAL FILMS"

The 6th Annual Chicago International Film Festival will once again accord special attention to its prestigious *Business and Industrial Films Competition*. The Festival will be held at the Carnegie Theater November 6-20, 1970, and during this period, one entire day will be devoted to a public exhibition of the best of the category at three separate performances.

The Chicago International Film Festival is unique in all the world of film festivals because it is completely competitive... it encompasses all categories of films... and it is open to all film makers. The nine categories of film include: Feature Films; Short Subjects; Student Films; Educational Films; Business and Industrial Films; Television Commercials; Television Productions;

Films for Children; and "The Condition of Man".

Another unique feature is the built-in protection factor in all nine categories that the Chicago Film Festival has offered each of its entrants throughout the years and continues to offer him with regard to the viewing and consideration of his film. In the *Business and Industrial Films Competition*, as an example, it is Festival policy to select a prominent chairman who is well qualified to head this category. His jury consists of top men in the field representing various business and industrial organizations. Their pre-screening and final screening sessions are conducted separately from the other Festival Competitions. As mentioned before, the final screenings will again be shown during the Festival period, quite unlike any of the other festivals which show but two or three finalists at a closed affair to a select few in the trade.

The 1970 Regulations Book for the Chicago International Film Festival is now available. *Business and Industrial Films Competition* entries can be registered in the following classifications:

- A. Commercially Produced Films
 - 1. Sales Marketing
 - 2. Public Relations
 - 3. Training-Recruiting
- B. In-Plant Productions
 - 1. Sales Marketing
 - 2. Public Relations
 - 3. Training-Recruiting
- C. The Special Film: A film, because of budget, size, multiplicity of images or multi-screened is termed "Special".

Gold and Silver Hugos, respectively, will be awarded to the winners in the various classifications and Certificates of Participation are presented to all entrants. The results of the Competition and the names of the winners will be distributed all over the world and published in major newspapers, magazines and trade periodicals. Names of Competition participants are listed in the Chicago Film Festival Program Book... a printed showcase of our presentation which is used the year round and sent all over the globe to acquaint others with our Festival and Competitions. An added feature in this year's Program Book will be an article written by the noted authority on business film, the editor of *Business Screen Magazine*, Mr. Ott Coelln.

For Regulations and Entry Forms, write: 6th Chicago International Film Festival, Regulations, 12 East Grand Avenue, Room 301, Chicago, Illinois 60611, U.S.A.

ACADEMY TO ALLOCATE \$10,000 IN SCHOLARSHIPS TO FOSTER STUDENTS' WORK IN SCIENTIFIC, TECHNICAL FIELDS

The Academy of Motion Picture Arts and Sciences has designated \$10,000 in scholarship funds to be used for research in the scientific and technical areas of filmmaking, according to an announcement by Daniel Taradash, Academy president.

Taradash noted that recommendations for grants to graduate students for use in such areas will be made by a new Academy committee, the Scientific and Technical Scholarship Committee, with Gordon E. Sawyer as its chairman. Sawyer is a member of the Sound Branch of the Academy. Members of the committee are Hal Mohr, ASC (Cinematographers Branch), William W. Hornbeck (Film Editors Branch), Wilton R. Holm and Sidney Solow (both Members at Large).

In past years the Academy has made scholarship grants of many thousands of dollars in artistic areas to help students and teachers in areas ranging from script writing to internships with directors; the technical scholarships will be made in addition to its overall scholarship program.

"The grants will be recommended," Taradash said, "for meritorious motion picture projects now in work or being planned, or formerly frustrated by lack of such aid.

"The value of such work cannot be measured in terms of its potential or real aid to motion pictures alone. Many of the ingenious techniques and devices developed by private industry in the past have helped not only entertainment films but also films in the fields of education, medicine, the physical sciences, the exploration of space and many others. Many of these have been honored by the Academy with its Awards of Merit. Now the Academy will take steps to assist materially in the development of these innovations."

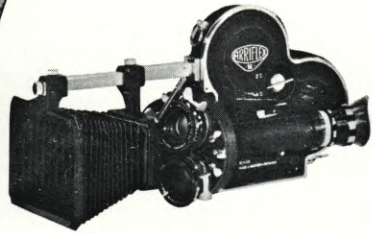
Scholarship fund allocations in artistic areas will be announced soon, Taradash said. ■

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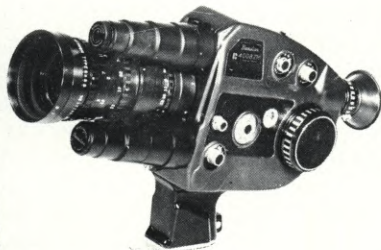
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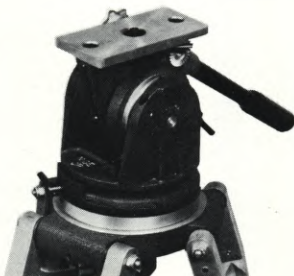
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3



4



5

1. The **ARRIFLEX 16S**. A highly advanced motion picture camera with mirror-shutter reflex viewfinder; ultra precise registration-pin film movement; three lens divergent turret; fps tachometer; takes 100 ft. internal spool — 400 ft. external magazines. Rugged, capable, and versatile. Electric motor drive. Available with or without motor, lenses, and matte box. An all around 16mm camera, capable of producing professional results without complicated operating procedures. The famous Arriflex 16M and Arriflex 16BL are also available at Bel Air Camera. Drop in and inspect these extremely fine cinema cameras... or write for literature.
2. The **Beaulieu R.16**. This is one of the world's most advanced 16mm motion picture cameras. Embracing features not found in any other 16mm camera such as the "Reglomatic" (Patented) automatic diaphragm control, mirror shutter, extra luminous reflex viewfinder system, electronic speed control, sync sound capabilities, self-contained battery, ability to use any C mount or 24 x 36mm miniature camera lens, and its extreme light weight, the Beaulieu R.16 can answer, the requirements of any cinematographic project. Long the favorite of the news cameramen, it is fast becoming the first choice of the "New Cinema" producers. A thorough examination of the Beaulieu R.16 will convince you that this is your camera.
3. **UHER 1000 Report Pilot "Sync" Tape Recorder**, designed especially for studio quality sound motion picture production. Perfectly matched for use with such cameras as Beaulieu R16, the Arriflex, the Eclair, etc. The guaranteed frequency response of 20-20,000 Hz at its stroboscopically controlled speed of 7½ ips and full track recording leaves no margin for error, and results in perfect synchronized sound the first time—every time. Fully "climatized" to ignore temperature and humidity variations, and ruggedly constructed to withstand the unavoidable abuse of "in the field" operation. Combines such specialized features as interruptable automatic photo-electric level control, interruptable low frequency filter, Pilotone level test button, battery condition test button, off-the-tape monitoring, continuous stroboscopic speed control, built-in monitoring speaker, and adjustable playback and record equalization, (CCIR or NARTB)
4. The all-new **BEAULIEU 4008ZM** (motorized zoom/motorized macro) Super 8 motion picture camera fulfills the most exacting demands of the professional camera user, and enables the advanced amateur to produce motion pictures far above the average range and quality. **EXCLUSIVE** features include a macro system with precise power focusing as close as 1 mm from the surface of the lens, motorized zoom with infinitely variable speeds from 2 to 12 seconds, continuously variable frame speeds from 2 to 70 ips, and the largest, (27X Magnification!) and most brilliant of all Super 8 reflex viewing screens. Standard equipment includes the superior Angenieux 8-64 mm f.1:9 automatic zoom lens. Automatic exposure control, variable mirrored shutter, interchangeability of lenses.
5. The **HERVIC HYDROFLUID JR.** An ultra-precision, sturdy, vibration free tripod designed for cameras weighing up to 20 pounds. The only fluid tripod with integral ball and built-in spirit level for quick and exact leveling regardless of terrain. Velvet smooth pan of 360 degrees, and tilt from plus 85 to minus 85 degrees, mounted on pan and tilt shafts to accent its smoothness and precision. Finely finished all aluminum construction — only 17 pounds complete with V-groove heavy duty wooden legs equipped with secure quick-acting locks. Telescoping pan/tilt handle is adjustable for angle and right or left hand operation. The largest silicone dampening area in its class of fluid tripods. 3/8 inch tie down screw with quick lock.

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Please send me literature on the cinema products checked.

- Arriflex Beaulieu R.16 UHER 1000 Beaulieu 4008ZM
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 HUERTIER Dual—BMM Silent/Sound Projector

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CINEMA WORKSHOP



By ANTON WILSON

COLOR TEMPERATURE

To achieve correct color reproduction, the light source and film emulsion must be matched. The industry has settled on two basic conditions, "photographic daylight" (approximately 6000°K) and "type B" artificial (3200°K). The "type B" films were designed to match the color characteristics of 3200°K incandescent bulbs which have been the predominant source of artificial light for the last 40 years.

The principle of the incandescent bulb is relatively simple. A voltage is applied across a tungsten wire (or filament) and a current begins to flow. The filament is designed with a certain amount of resistance which can be thought of as "electrical friction." As the current flows through this resistance, heat is generated in the same manner as the heat that is produced from mechanical friction. The resistance of a filament in a photographic bulb is carefully engineered to produce just enough heat to raise the temperature of the filament to 3200°K. At this temperature it will glow or incandesce with a continuous "white" light.

It is important to note that the heat is generated by the current passing through the resistance. The amount of current is determined by the applied voltage. If the voltage is raised, more current flows, more heat is generated and a higher color temperature results. Inversely, if a lower voltage exists, less current flows, less heat is generated and a lower or *redder* color temperature will

result. Thus the resistance of the filament in a bulb can only be engineered to produce proper color temperature at a *stipulated voltage*, usually around 120 volts. If the voltage is varied from this amount, the color temperature will vary proportionately. If long extension cords are used, a certain amount of voltage will be "dropped" across these wires, and thus a lower voltage is actually being applied to the bulbs, causing less than 3200°K light. Too many lights on the same circuit can also produce a drop in voltage and subsequently a warm or reddish light. In high industrial areas, it is not uncommon for the line voltage as supplied from the power company to drop below its normal value at certain times of the day. All these effects must be taken into account. A small volt meter is a handy item to have. By measuring the voltage at the lamp socket (not at the wall), referring to the graph (FIGURE 1) will reveal the approximate color temperature.

Some studios are provided with dimmers which actually vary the voltage to the bulb. These can only be employed with black and white films, as the color temperature will also rise and fall with the change in voltage. Therefore, for proper color rendition when using color film stock, the dimmer voltage must remain at the voltage stipulated on the bulb.

Conventional incandescent bulbs have one serious drawback. They will maintain proper color temperature for only a very short period of time. From almost the instant that the bulb is turned on, it very slowly begins to

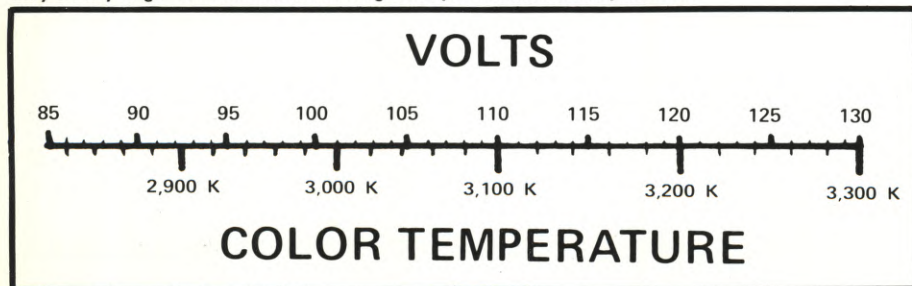
decrease in both light output and color temperature. At the high temperatures at which the tungsten filament operates, the surface tungsten molecules "boil off" or evaporate in the same manner as water boils and evaporates at elevated temperatures. As these molecules boil off, the filament begins to get thinner and thus its resistance to electric current gets greater. As a result, less current flows, and the heat generated also diminishes, causing a drop in color temperature and light output. This process continues slowly but surely until the bulb eventually burns out. The condition is aggravated by the fact that after leaving the filament, the tungsten molecules are deposited on the inside surface of the glass bulb. This black deposit causes a further decrease in light output.

These shortcomings have been rectified with the advent of the tungsten-halogen bulb. As with the conventional bulb, the tungsten molecules begin to evaporate from the filament at operating temperatures. The tungsten-halogen bulb is filled with a halogen gas, such as chlorine, iodine, bromine, etc. As the molecules evaporate they combine with the halogen gas which thus prevents them from being deposited onto the glass envelope. The gas subsequently deposits the molecules back *onto the filament* and the cycle is repeated. Thus, in a tungsten-halogen bulb, the filament does not get thinner and the output and color temperature remain constant for the life of the bulb. The tungsten-halogen bulb is made very compact by keeping the glass envelope very close and tight around the filament. This subjects it to extremely high temperatures necessitating the use of quartz-type glass which has a higher melting temperature. Another advantage of the halogen bulbs is the absence of filament "sing" or vibration that sometimes occurs with conventional bulbs and causes noise in the soundtrack.

Keep in mind that the color temperature and light output of a tungsten-halogen lamp are dependent on voltage in exactly the same manner as a conventional tungsten bulb, and the previous

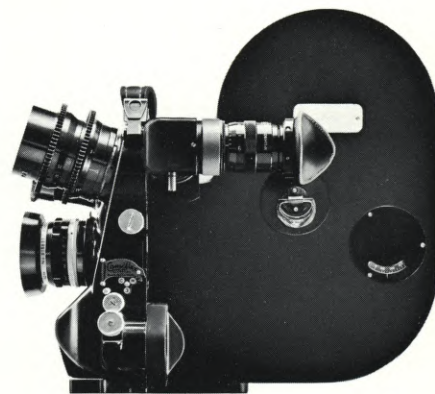
Continued on Page 1127

This color temperature graph applies to all 120-volt tungsten-halogen lamps. The identical data is also valid for conventional tungsten bulbs when they are new. However, very shortly afterward, they slowly begin to decrease in both light output and color temperature.



EUROPEAN CURRENCY REVALUATIONS HAVE CHANGED SOME CAMERA PRICES

So which is the least
expensive, totally
professional camera:
the Arriflex 16S/B?
No. The Eclair CM3.



What's more, the CM3 lets you
change magazines in five seconds,
plus...shoot 16 and 35mm with the
same camera!

The Franc has been devalued; the Deutsche Mark has gone up. As a result, most French products, including Eclair cameras, have become less expensive on the U.S. market, while most German products have gone up in price.

With two 400 foot magazines, three lenses and constant-speed motor with sync-pulse generator, the CM3 now costs about \$200.00 less than the Arri S/B GS similarly equipped. Not much less, certainly. But with all its features, you would expect the CM3 to cost a lot *more*. The Arri S, of course, is the least expensive Arriflex. It's the one with a body designed for 100 foot loads, to which you can attach a 400 foot magazine.

The CM3 is the Eclair camera that won an Academy Award for its design. In addition to its five-second clip-on magazine change and its unique capacity for shooting both 16mm and 35mm with the same camera body, same motor and same lenses, (different magazines), the CM3 gives you

extremely bright and accurate reflex viewing, (simpler optics, groundglass at the film aperture), a viewfinder and eyepiece that each rotate through 360°, (any angle, either eye), three heavy duty bayonet lens mounts, (for critical seating of wide-angle and zoom lenses), plus a variable shutter, matte box and sound blimp.

You can also adapt the CM3 to shoot 35mm Techniscope in seconds, at no cost; and the CM3 accepts Panavision lenses. Most features are being shot wide screen, most commercials in standard 35mm, most industrials and documentaries in 16mm. The CM3 is the only camera that will shoot all three formats. What's *your* next job going to be? And the one after that?

For a CM3 brochure,
write to Eclair Corp.
at 7262 Melrose Ave.,
Los Angeles, 90046;
or at 73 S. Central
Ave., Valley Stream,
New York, zip 11580.

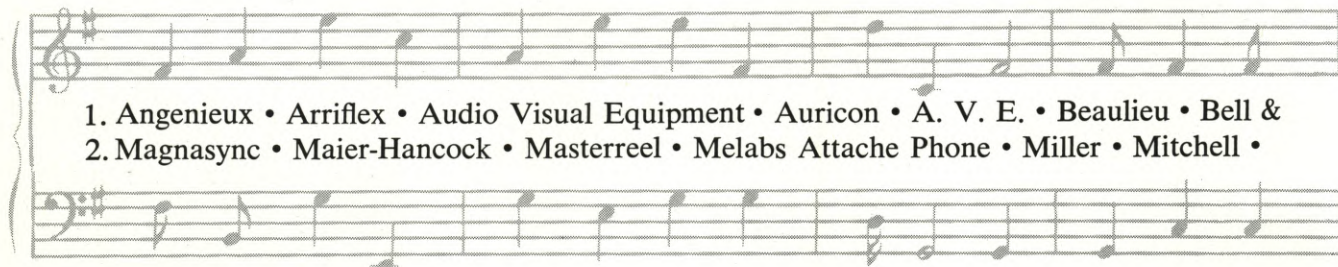
eclair

The Camera Mart Theme Song

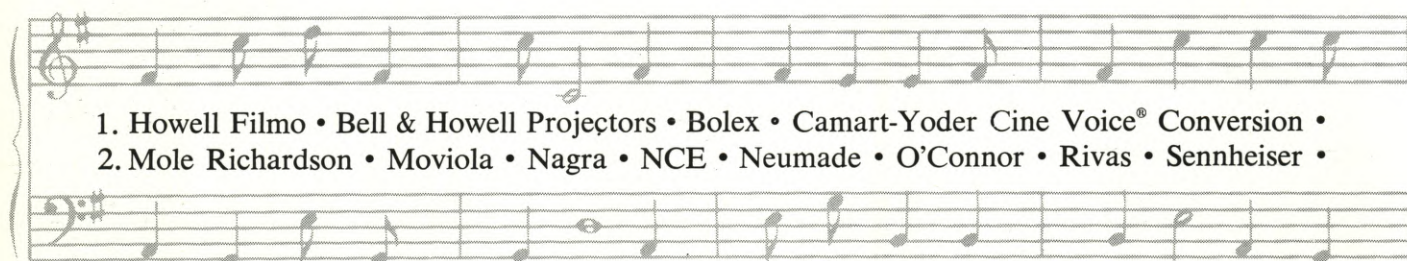
(Recorded at the Camera Mart Building)

Words by Samuel "Chick" Hyman

Music by Paul Meistrich • Anna Browning



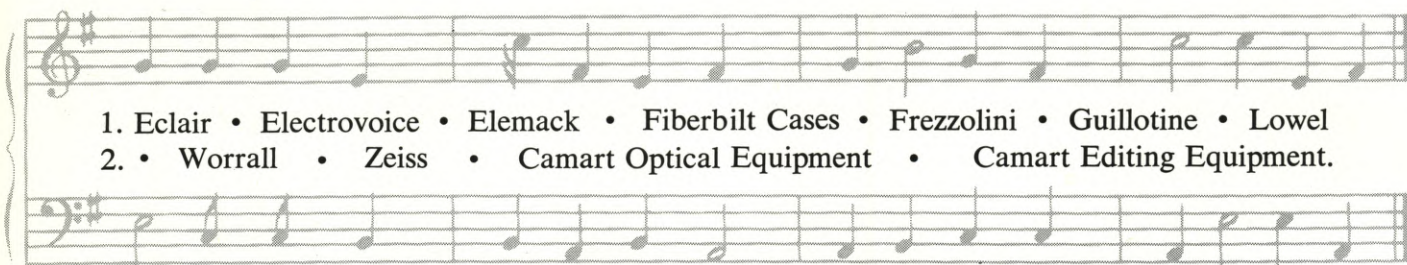
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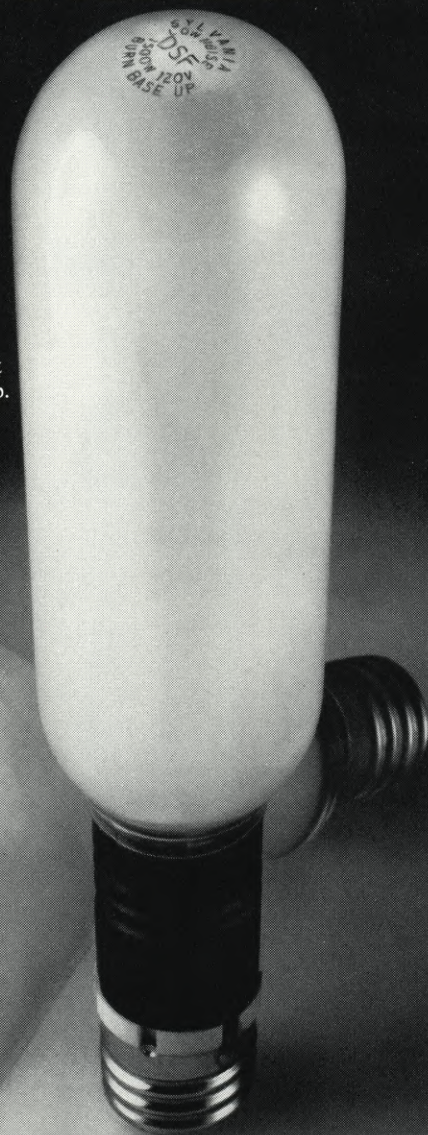
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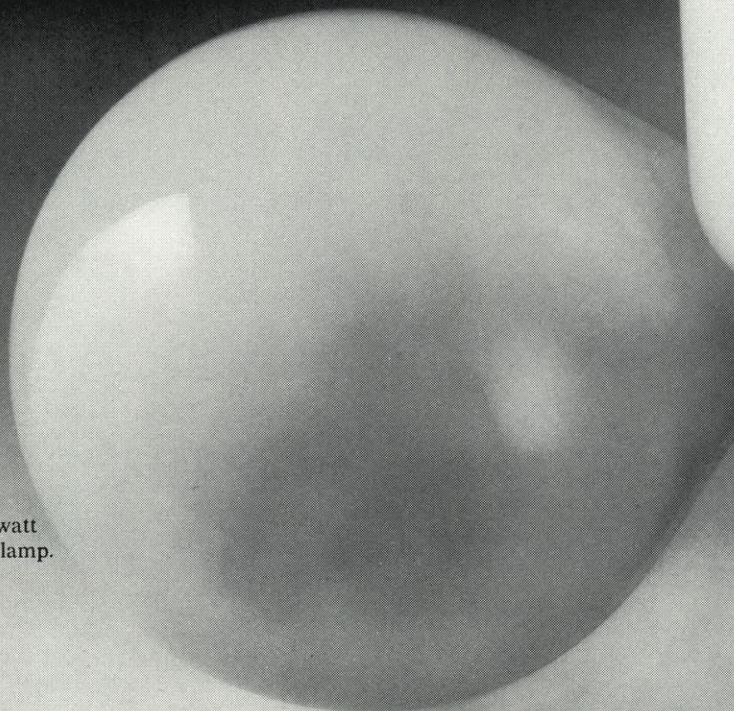
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Its average rated life is 250 hours. More than twice the life of the PS52.

And that's useful life, because the DSF is as bright at the end of its life

as it was at the beginning. There's no darkening with age as in the PS52.

And its 3200° K color temperature is there right from the beginning. And it's still there 250 hours later. Constant.

The DSF has low-noise construction. There are no loose parts to resonate when used with SCR dimmers.

With all these advantages, the DSF is more than a replacement.

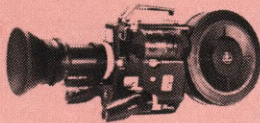
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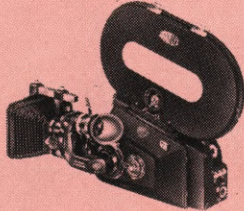
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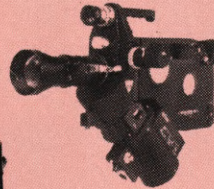
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How many ways can you use the KEM Universal?

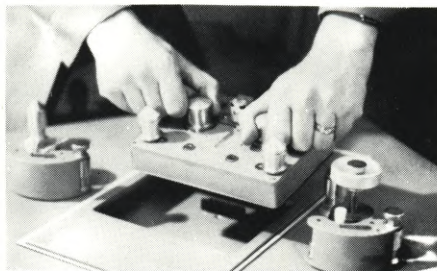
Tell us and win a prize!

Even if you lose this contest, you win. You'll be finding out about the editing machine that's revolutionizing the film industry... and discover how you can cut your valuable editing time to a fraction... handling any editing job from rushes to final sound mix... all on one editing machine.

The aim of this contest *isn't* to figure out the number of ways you can apply the KEM Universal in your current post-production work; then, you'd just have to list the number of editing and checking steps between shooting and release prints. But that's too easy.

Instead, we'd like you to figure out the total number of different configurations possible to custom design the KEM for any editing job.

To make things easier for you, we want you to include only combinations possible with the 8-plate KEM. Even though you could purchase a basic 6-plate with exactly the Modules you need and then step up to a 7

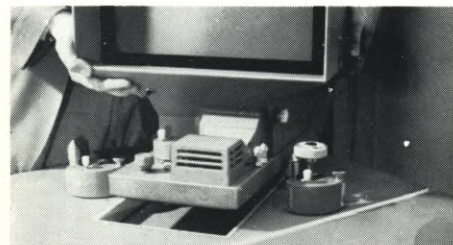


Sound Module

■ Composite Sound Module drops in alongside the center Picture Module, in 16mm optical/magnetic or 35mm optical or magnetic. But don't count this module in your figuring—it sends the number of combinations soaring.

■ So, with the various Modules (not counting composite sound), you can have the following combinations:

Picture or TV	Sound
1	0
1	1
1	2
1	3
2	0
2	1
2	2
3	0
3	1
0	1, 2, 3, 4



Picture Module

or 8-plate with Extensions and Modules bought or rented to fit new requirements.

Helpful Hints and Other Info

■ The first principle of the KEM is this: Picture, TV and Sound Modules drop right into receptacles in a second. Transport changes between Super 8—16mm—35mm can be made in a minute.

■ Picture Modules have big, bright 9½ x 13" screens in: □ Super 8* □ 16mm □ 35mm.

■ TV Modules, including video amplifier, can be used in place of Picture Modules for film-to-video applications, in: □ 16mm □ 35mm.

■ Sound Modules, precision-made with hi-fi magnetic heads available in: □ Super 8*

□ 16mm Edge Track □ 16mm Center Track □ 35mm Mag Stripe □ 35mm 3-track Full coat.

*Super 8 cannot normally be used in interlock with other gauges.

■ To keep the number of possibilities from getting completely astronomical, we're not going to count all the Modules we can supply on special order, like Pictures in Super 16, Techniscope, CinemaScope and 65/70mm or Sound in 35mm 8-track, or 17.5mm and special interlocks like Super8/16mm or 45 fpm pictures running with 90 fpm tracks.

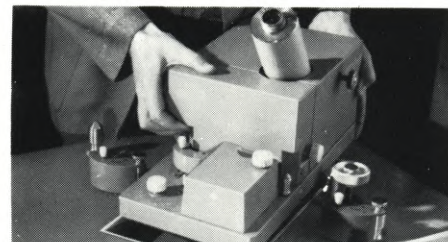
Also good to know (but don't count it) is that:

■ the KEM can run all its transports at 3, 24, 48 and 120 fps, *in sync*. Or at 1000+ fps out of sync.

■ At the heart of the editing job, you can use 2 Pictures and 2 Sounds in synced pairs to judge your cuts like a TV director, without marks or splices.

■ Or, you can use 1 Picture and 3 Sounds for the best sound-editing table in the world.

■ Or that Modules interchange between machines for an almost geometric increase in the number of possibilities with more than one KEM. (Infinity is not the answer we're after.)



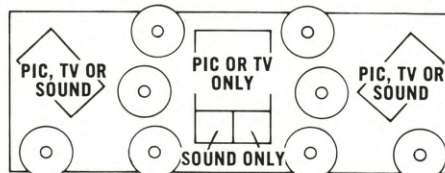
TV Module

Contest Rules

1. Anyone can enter except employees of KEM, its advertising agency or their relatives.
2. Only one entry per individual. Entries must be made on company letterhead or equivalent.
3. In case of ties, entry with the earliest postmark will be the winner. If there is no correct answer submitted, the closest answer will be declared the winner. Decision of the judges is final.
4. This contest is void in areas where prohibited or taxed by law.
5. All entries must be postmarked no later than midnight, February 28th, 1971.

The Prizes: As first prize we'll give you a week's free rental on an 8-plate KEM in New York City or Hollywood, Calif. — worth \$450. (We'll agree on a mutually convenient time. Winner, of course, provides own transportation.)

2nd Prize, portable TV. 3rd, portable radio.



Note: if two Sound Modules are used in the center of the table, no Picture Module can be used in the rear center.



KEM ELECTRONIC MECHANIC CORPORATION

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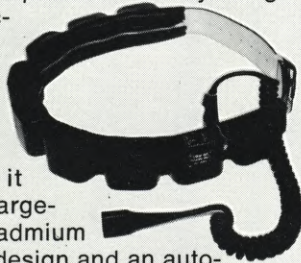
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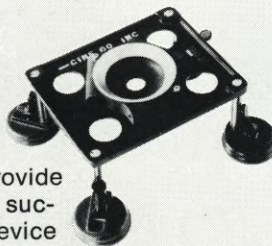
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Our single universal shoulder pod ("unipod") is a lightweight shoulder mount that accepts all cameras. Easily removable between takes, it keeps the camera in the ideal shooting position while offering the maneuverability of single-shoulder construction. Used with the Uni-Eclair Mount (detailed later), this is the only practical pod for the Eclair NPR-16. (By the way, we also have an excellent double-shoulder pod as well.)



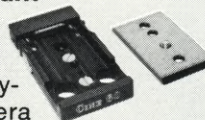
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If you've ever watched a good shot pass you by while trying to thread a camera onto a tripod or shoulder pod, the Cine 60 Snaplok is your answer. Combining rapid, fail-safe operation with the ruggedness and precision alignment needed for day-in, day-out use, the Snaplok features light weight and high rigidity. One section mounts on the camera; the other on tripod or shoulder pod. A single pushbutton instantly separates the two. The base unit of the Snaplok is compatible with standard 1/4" and 3/8" sockets.



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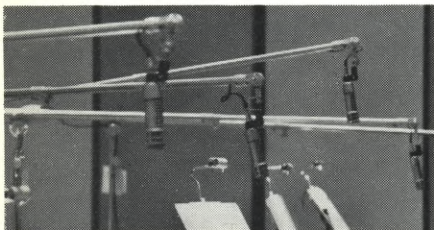


How good is the new Electro-Voice RE20 studio dynamic microphone?

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So for their new scoring Studio M, Glen Glenn engineers asked to see the latest products in every category... tape, film, electronics, and — of course — microphones. Especially a new E-V dynamic cardioid microphone which they had seen in prototype form earlier.



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Since then, Glen Glenn has scheduled a number of major recordings with RE20's. And the RE20 has often been used where previously an expensive condenser was the automatic choice. Why? Because the RE20 has proved itself a significant advance in microphone design. With wide-range, peak-free response on axis (even the off-axis response is better than many other studio microphones on axis). Transient response rivals any other studio microphone, regardless of design. Directional control is uniform and predictable from every angle. Yet proximity effect is virtually eliminated (a problem that plagues almost every cardioid — except E-V Continuously Variable-D® microphones).

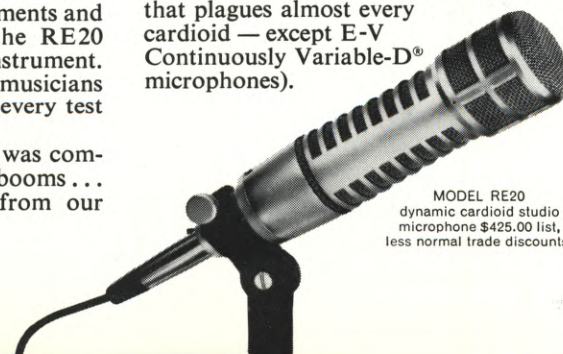
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P. S. For full technical data on the RE20, write us today. To find out more about Studio M, write Joe Kelly, VP, Engineering, Glen Glenn Sound Company, 6624 Romaine St., Hollywood, Calif. 90038

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What we mean at MPL when we say "personalized service"

(Reprint of an editorial from The MPL Recorder)

Statements made by people about the work they do are often mere statements far removed from the fact. That is why **MPL** once again brings to our readers' attention the matter of "personalized service" so important to every film producer.

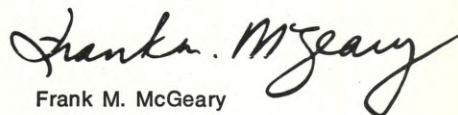
What we mean at **MPL** when we speak of "personalized service" is this: we keep making it emphatically clear to everyone working in our laboratory that each

customer's film is of the greatest importance to him, and for that reason is of the greatest importance to us. We adhere to the principle that there is no such thing as a film of secondary importance, and that *each film deserves and must receive our closest personal attention.*

The highest goals we set for ourselves sometimes fall short of achievement. But at **MPL** we go out of our way to see to it that when we speak of giving

"personalized service", we mean what we say.

That is why we consistently give producers films of the highest quality. And our 24 hour service assures you of prompt attention to all the work you send us.



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**Can you find
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You also get the finest automatic exposure control system ever built. A Gossen light meter measures the light intensity coming directly through the lens. And it electronically controls a miniaturized motor that instantly rotates the Angenieux's diaphragm ring to the correct aperture setting. No footage is lost due to rapidly changing light conditions.

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(LEFT) A caravan of studio trucks filled with sophisticated filming equipment transported from Hollywood clusters about a Tennessee farmhouse on location for "I WALK THE LINE".

"I WALK THE LINE" is a moderately budgeted Columbia Pictures production based on a novel by Madison Jones entitled "An Exile". It concerns a sheriff in a small town in Tennessee who becomes involved with the daughter of a moonshiner. He leaves his wife and family in the hope of taking a new lease on life with the girl, only to discover that he has been deluded about her feelings for him.

authentic as possible. Even though people at the studio assured him that they had found adequate locations for the entire film in Northern California, he insisted upon going to Tennessee so that he could stage the action in the actual region where the story takes place, using local residents in supporting roles and as extras. He felt that it was important not only that the film look like Tennessee but also that the actors should be able to work in the actual environment so that they could absorb the mannerisms and speech patterns characteristic of the region.

Shooting in Tennessee did, of course, add certain complications. First of all, the production company wanted to be prepared for virtually any kind of set-up, so it was necessary to transport a

driven from Tennessee. Shooting was also scheduled so as to allow time for certain props and set dressing needed in both places to be driven across the country.

Tennessee comes under the jurisdiction of the Chicago local of the I.A.T.S.E. The Chicago local requires a Hollywood-based production shooting in its territory to hire a certain number of members of their local. In this case, it was agreed that the company would hire a five-man camera crew and a still photographer from Chicago and 7 grips or electricians from Nashville. Frankenheimer hired Bill Birch, with whom he had worked before, as Director of Photography for the second unit. The Chicago camera crew shot more than sixteen thousand feet of film in Tennessee and even stayed there on location shooting with doubles for almost two weeks after the cast and the first unit had left.

Chicago cameramen were also used

THE PHOTOGRAPHY OF I WALK THE LINE

PART I

By RICHARD PATTERSON

The first major decision affecting the production techniques was the decision to shoot as much of the film as possible on location in Tennessee. The director, John Frankenheimer, saw the story as very similar to intimate dramas he had directed for live television many years ago, except that with a film it would be possible to set the drama in authentic surroundings, and he was concerned with making the texture of the film as

Night-for-night scene, filmed on Tennessee location with villain Ralph Meeker in the foreground, sets a mood of brooding intensity that pervades most of the film.



considerable amount of equipment across the country, including a 2400-amp generator, seven cameras, practically every kind of camera support from a Chapman Titan crane to a shoulder mount, and an ample supply of lighting units ranging from brutes to gimmicks.

Transportation problems were further complicated by the fact that the schedule called for two weeks of shooting in Northern California immediately following the first three weeks in Tennessee. Some of the locations found in Northern California proved to be more appropriate for the story than anything found within a feasible area of Tennessee, and the possibility of a radical change in the weather would have been too great in Tennessee in November. The move to Northern California was accomplished by flying the camera and sound equipment along with the crew, and sending a second shipment of grip and electrical equipment up from Hollywood until the original lot could be

In quest of that X-quantity of authenticity, a major studio sends cast and crew all the way across the United States and back again

extensively for multiple camera set-ups with the first unit. Quite often on location three or even four cameras were shooting simultaneously for action that was difficult to re-stage or simply as a means of getting a greater variety of angles in less time.

David Walsh, the Director of Photography for the film, was brought in the day before shooting started in Tennessee after the cameraman initially hired for the job became ill. Needless to say, he had precious little time to prepare for the film, but he was ready to begin shooting the morning after he arrived.

(ABOUT THE AUTHOR: Richard Patterson is a 28-year-old film-maker with a magna cum laude degree in Philosophy from Yale University. His two-part article on "I WALK THE LINE" is the result of observations made by him while serving an American Film Institute internship with John Frankenheimer during production of the picture. He is currently doing advanced work under an AFI fellowship, while also completing production plans for an original screenplay.)

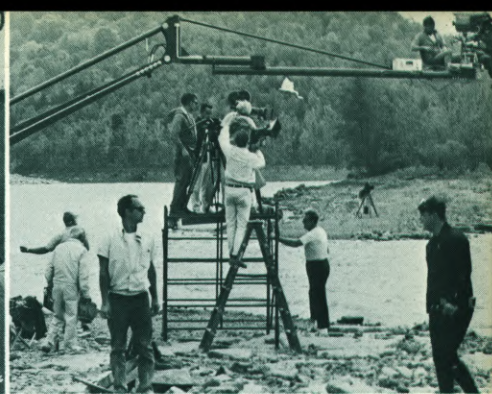
The following Sunday he drove around to the various shooting sites with the director discussing how the film would be shot. Walsh, who is 38, is probably one of the youngest Directors of Photography in Hollywood today. He got his start as an animation cameraman at Disney Studios and eventually worked on several films as an operator for William Fraker, ASC. When Fraker turned director for "MONTE WALSH", he made David his First Cameraman. "I WALK THE LINE" is his second picture as a Director of Photography.

David also brought with him Joe Smith, the gaffer with whom he had worked on "MONTE WALSH", as well as on "BULLITT", "PAINT YOUR WAGON", and "ROSEMARY'S BABY".

The director decided to shoot this film in Panavision for several reasons. First of all, he was anxious to work with



(LEFT) Ultra-realistic fight sequence, with star Gregory Peck in the thick of the fray, is a high-point of the action staged on location. (RIGHT) One of several multiple-camera set-ups on location. The Panavision Reflex camera is mounted on the Titan crane. Two Arriflexes with different focal-length lenses are mounted on a platform, while a third Arriflex is set up on the opposite shore.



The basic camera for the film was a Panavision Silent Reflex camera equipped with a full complement of Panavision lenses, including 1000mm and 800mm telephoto lenses, 50-500mm Panazoom lenses, a Macro 55mm lens capable of focusing to within inches of the camera, and a 55mm F/1.4 high-speed lens. In addition to the PSR, extensive use was made of Panavision-modified Arriflexes.

Probably the most unusual camera technique employed in the production was the use of split-field diopters. A set of 6 half-diopters was included in the camera kit ranging in power from 1/2 to 2. Split-diopters are often used in filming commercials, but this was probably one of the first times they were used in a dramatic film. The most common use of the split-diopter is for filming a shot in which half of the frame would be filled with an extreme closeup of one character while the other half of the frame would be filled with medium or full figure shots of other characters in the background, with both the foreground and the background figures in sharp focus. The split-diopter is especially useful with a wide-screen format such as Panavision, because a full face close-up characteristically fills only half the width of the frame. By using a split-diopter for the closeup, it is still possible to focus on background action in the remainder of the frame—even when shooting wide open, as was usually the case in the studio.

The positioning of the camera and the various subjects is critical when using a split-diopter for two reasons. First of all the diopter has virtually no depth of field. It was often necessary to experiment with different diopters and focus settings, as well as to adjust the position of the subjects slightly in order to find the combination that would yield the proper focus and composition. A typical set-up used a #2 split-diopter with a 50mm lens at F/2.8 focused on 7 feet. The diopter enabled the subject in the foreground to be sharp at less than 2 feet, while the rest of the image had the normal depth of field from about 6 to 8 feet from the camera. To get the same effect without the split diopter it would have been necessary to shoot at F/22.

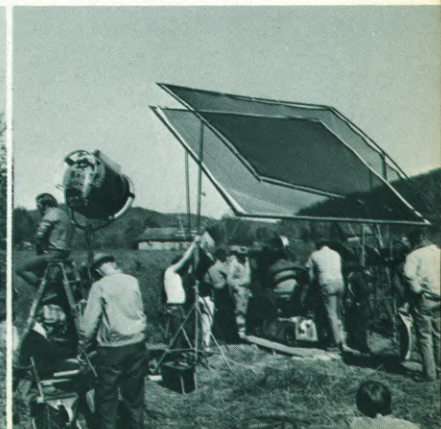
The second critical feature of a set-up involving a split-diopter is the positioning of the edge of the diopter. If the diopter is correctly cut and mounted so that its edge is perpendicular to the film plane, the edge itself will not be visible; but the difference in focus will be. Normally, in using a split-diopter, the foreground subject is so dominant that it distracts the eye from the change in focus at the edge of the diopter. In one exterior set-up involving a diopter the background behind the subjects was undifferentiated greenery; and, while the average viewer will probably not notice it, the edge of the diopter is clearly visible because of the variation in focus on the background. In shooting on a set however it is usually possible to



David Walsh, 38-year-old Director of Photography, who stepped in on short notice when originally assigned cinematographer became ill, discusses effect with Director John Frankenheimer.

the anamorphic wide-screen (2.35/1) format, and he liked the Panavision system because it makes use of the full negative area. This not only yields a better image quality on a large screen, but also eliminates the possibility of the film's being projected with the wrong aspect ratio. Frankenheimer remarked that he was tired of seeing his films projected improperly and spoke of once seeing a film of his projected without masking to the 1.85/1 ratio, with the result that the audience was seeing all sorts of things never intended for their eyes. On top of this, Frankenheimer, who takes a genuine interest in the technical aspect of film-making, feels grateful for the work that Panavision has done in developing anamorphic lenses.

(LEFT) Rehearsal of a crane dolly shot which requires a change of F-stop to compensate for difference in light levels in front and in back of the house. (RIGHT) Two 12' x 12' nets are used to diffuse direct sunlight for scene shot in Tennessee. Sheds in the background are actually false fronts built to conceal facade of a modern brick farmhouse.



set up a split-diopter shot in such a way that the edge of the diopter is lined up with a corner or some other straight line in the background, preferably a line caused by two converging planes. In such cases the edge of the diopter is completely invisible in the shot.

Care was also taken to stage the action for shots involving a split-diopter in such a way that nothing crossed the diopter "line", but even in instances where someone's hand crossed the line for a moment occasionally, the change in focus was not really noticeable during the movement. In one set-up, the split-diopter was used for a close shot of one character sitting in a chair while the normal focus was set to carry two other characters in full figure in the background. The action required that one of the characters in the background give a cup of coffee to the character seated in the chair. The cup was transported across "the line" by having it placed on the arm of the chair below the frame line and then brought back into frame on the other side of the arm.

Another shot using a split-diopter involved an extreme closeup of the moonshiner, McCain, a medium shot of his son Clay standing behind him, and a full figure shot of his other son Buddy sitting on a couch at the opposite end of the room. At first the diopter was positioned so that both McCain and Clay would be in it and the normal focus would carry Buddy, but it was not possible to position McCain and Clay so that they were both sharp and the

framing on McCain was tight enough. The diopter was repositioned to cover only McCain, and the focus set to carry both Clay at 8 feet and Buddy at 25 feet. The lighting was built up to enable the lens to be set at F/4.5 by pushing the film one stop. The lens was changed from a 50mm to a 40mm, and the focus was set at 12 feet with a #1 diopter on McCain.

The most elaborate set-up involving split-diopters was a shot consisting of closeup profiles of two men facing each other, with a third man full figure in the background between them. The original staging called for the man in the background to be 15 feet from the camera, but given the composition for the foreground subjects, this would have required a diopter between a #1 and a #1½ or else a considerable increase in the light level. Since such a diopter was not available, the subject in the background was cheated forward to 13½ feet, and a #1 diopter was used with the 50mm lens at F/3 set at 12 feet. In order to focus on the foreground on each side of the frame and leave the center clear for the normal depth of field, two split-diopters were used. Since there was no mount made for the diopters which would enable one to be used on each side of the frame, the diopters had to be taped to a piece of ½-inch plywood which was cut to fit into the matte box.

David Walsh did not hesitate to force the development of 5254 a half or full stop, but he would not force it more

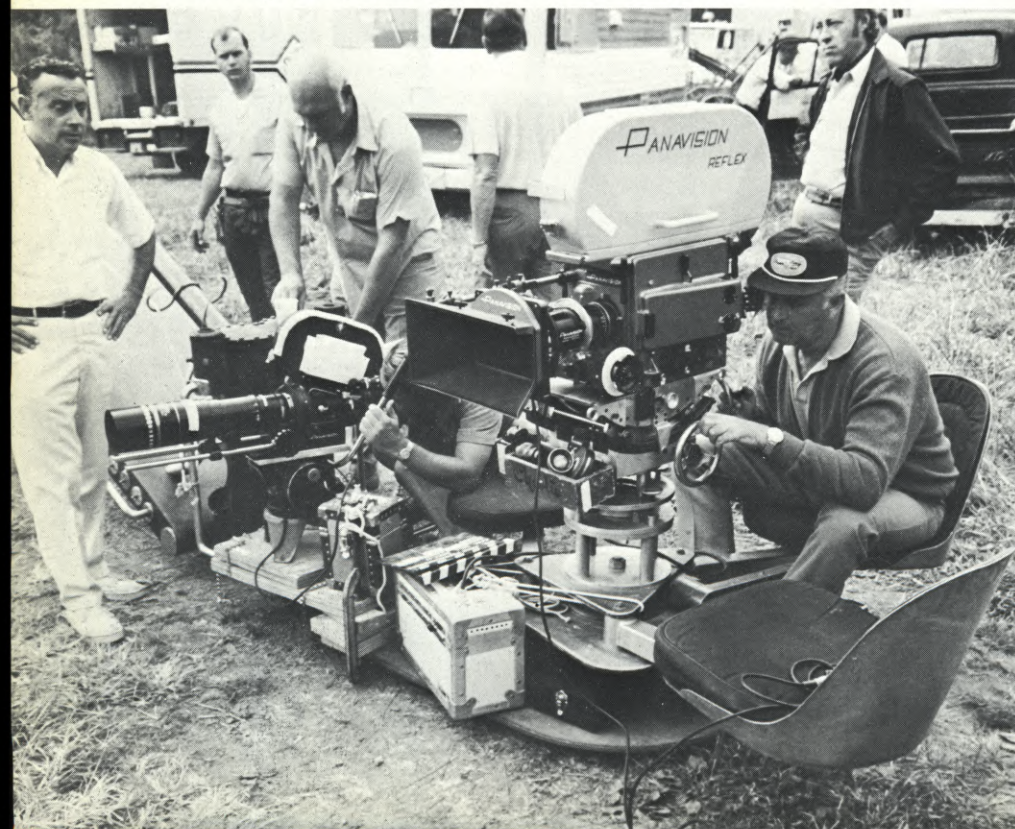
than one stop even though he said he had seen some footage pushed two stops by Technicolor which he considered completely acceptable. Since much of the film was shot in overcast weather, it was occasionally necessary to force exterior footage shot with the 1000mm F/6, 800mm F/5.6, or the 50-500mm Panazoom F/4.5 lenses. Most of the night-for-night footage was forced one stop; and occasionally in the studio, when a higher F-stop was needed for greater depth of field, the film would be pushed one stop rather than build the lighting all the way up to the necessary stop. In the studio the key light was usually set for 125 foot-candles for day and 40 or 50 foot-candles for night, with the fill light on the set in one instance being as low as 5 foot-candles.

For one scene in the film the camera moves around the outside of a house in a combined crane, dolly, and zoom shot. The composition was such that, even with carbon arcs providing fill-light on the back porch, the difference in the light level between the back porch and the front of the house was 3½ stops. The exposure was controlled by stopping down by one stop as the camera moved around the corner of the house. The change was made so smoothly and timed so well with the camera move that it is virtually undetectable, and the result is that the front of the house in direct sunlight is brighter than the back in the shade but not so much brighter that there is loss of detail or quality on either end. In other situations, fill lighting could be used to balance the scene within the limits of the latitude of the film. Normally, in exteriors, shadow areas were raised to within a stop or a stop and a half of the principal subject.

The director and the cinematographer were concerned with giving the film a "look" which was both distinctive and appropriate to the script. There were two aspects of the story which determined the photographic style of the film. First of all, the predominant themes of the story line are "down-beat." It deals largely with desperation, defeat, and despair. Secondly, the director viewed the story as a vehicle for social comment. He saw the central character as a man being smothered or crushed by his social environment; and he felt that, even though the character and the story were fictitious, the social environment was all too real.

What was needed, then, was a photographic style which would underscore the authenticity of the setting (thereby lending credence to the social comment) while, at the same time, working to create a mood which would be in

Two cameras mounted on the Titan crane arm: an Arriflex with 800mm telephoto lens and the Panavision Reflex camera with 50mm-500mm Panazoom lens. This set-up was for a shot of Peck running across a field toward the camera and involved a rise with the crane arm from ground level to maximum height, carrying two operators and two assistants.



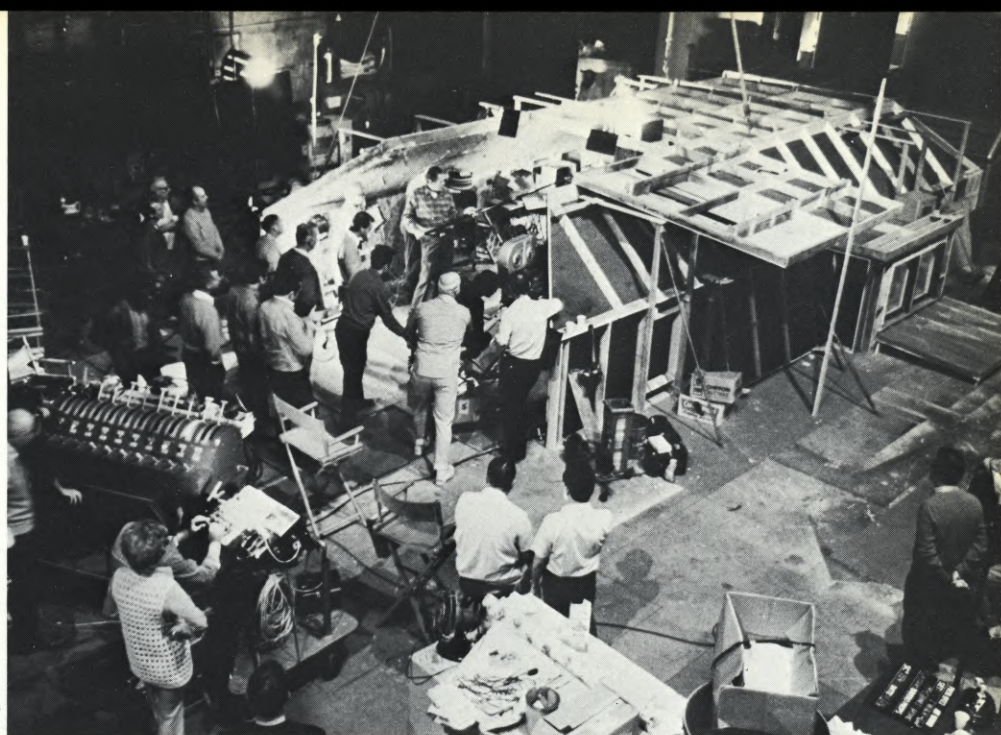
keeping with the thematic material in the story. For example, the director knew that simply shooting the film in Appalachia would not guarantee the kind of impact he was after. Davidson, Tennessee, may have the lowest per capita income of any town in the United States, but the Cumberland Hills around Davidson are undeniably beautiful; and it would be relatively easy to use them as a setting for an idyllic romance of some sort. The director repeatedly emphasized to his cameramen that he wanted to avoid any picturesque shot which looked as if it belonged on a postcard. He suggested shooting the hills with back light as much as possible so that they would register almost black rather than shooting them in such a way as to bring out the rich autumn colors.

One of the things the cameraman did to create an appropriate mood was to diffuse the image by the use of nets, diffusion filters, and fog filters. The net, which he described as an old Paramount silk he was particularly fond of, was used for most of the day exterior set-ups except those utilizing extreme telephoto lenses. A #1 fog filter was used for night exteriors and for studio interiors. A diffusion filter was used for one day exterior, and B or C diffusion filters were added for some closeups to soften the texture of the skin.

The only instances in the studio when a fog or diffusion filter was not used were the shots involving the split diopters. It was apparently not feasible to mount the fog filter in the matte box together with the diopter, although the net had been mounted directly over the front of the lens without a frame for an exterior shot using a split-diopter. With the interior diopter shots it was felt that the closeup image obtained with the diopter would be sufficiently strong to distract attention from the change in the image due to the absence of the filter.

The net was not used in the studio as a rule, because the lens must be stopped down somewhat in order for it to work properly. It might also be noted that when the lens was stopped down considerably for exterior shots in bright sunlight, the net would cause mild flares on hot spots such as chrome on cars or light reflecting off of glass or water.

The film was conceived in terms of a progression from bright to heavily overcast or even rainy weather, and the shooting on location was scheduled around the weather as much as possible. The climax of the film, a fight which takes place in light rain, contains undoubtedly some of the strongest images



One of the smaller studio sets that was lighted without the use of scaffolding. A section of the ceiling has been removed in this set-up, but for another sequence shot on this set, the entire ceiling was left intact, which necessitated having 1-inch holes drilled in it to accommodate the tips of the Sennheiser microphones used to record sound.

in the film. The costuming and the art direction were also geared to a gradual darkening of colors in the film. For example, three different shades of khaki were used for the sheriff's uniforms in the hope that the gradual darkening would not be noticeable as such but would work subliminally to reinforce the developing somber mood of the story.

The lighting for the film was relatively low-key. This was not only appropriate to the mood of the script, but also created a style which the cameraman and the lighting director felt could be more interesting visually than flatter high-key lighting. In discussing one lighting set-up for a night interior in which the fill-lighting on the set was as low as 8 or 10 foot-candles, Joe Smith recalled a comparison Bill Fraker had made between low-key lighting and the virtues of radio as an entertainment medium. Just as radio left a great deal to the listener's imagination, so also, lighting which illuminates backgrounds only enough to let the audience know there is something there engages the imagination and can work to get the audience more involved in the film.

This is, of course, most applicable to night scenes where there is justification for large shadow areas, but it can also apply, to a lesser degree, to day scenes. One of the advantages of shooting at low light levels is that the use of small lighting units allows more control over the lighting on the set. Quite often a set-up yielding a 100 foot-candle key for a one or two-room set would involve

20 units, the majority of which would be used to create lighting effects on the set.

The mood of the photography is determined not only by the ratio of key to fill, but also by the general level of

Continued on Page 1095

Unsqueezed anamorphic frame blow-ups illustrating uses of split-diopters. (TOP) Scene using single diopter to maintain sharpness of foreground and background subjects. (BOTTOM) Scene utilizing two diopters.



ALASKAN ADVENTURE

American Cinematographer Editor, on the trail of a story about the filming of a unique documentary on ecology, makes it to our 49th State with gun, camera and a reception committee of Grizzly bears!

By HERB A. LIGHTMAN



(LEFT) Floatplane, carrying supplies and mail for filming crew at landlocked Lake Eva, Alaska, comes in for a landing on the water. Melting snows from the mist-shrouded mountains in the background create streams which are the source of the lake and its adjacent water system. (RIGHT) Intrepid film-makers pick their way down the hill from 10 x 35-foot hut which serves as their "home" in Alaska. Author calls it the "Lake Eva Hilton" and says it has all the charm of a piano crate.

Bush pilots of Channel Flying Service unload the camera gear from Dehavilland Beaver floatplane, while underwater cameraman in wet-suit checks his air tanks prior to filming sequences of salmon spawning in the lake. The lake is completely isolated—untouched and unpolluted by Man, which makes it an ideal area for complex ecology study.



Lake Eva, Alaska

A few hours after leaving Los Angeles, we touch down at the Juneau, Alaska airport, where we transfer from the sleek commercial jet to a Dehavilland Beaver floatplane.

In addition to the bush pilot who is to fly us to our final destination, there are four of us aboard: Larry Savadove (Producer-writer-director), Bill Young (Production Supervisor and 2nd Unit Director), Jeb Gholson (underwater cameraman, who also does alright on dry land) and myself.

A colorful group.

At the moment, I am the most colorful of them all, mainly because of the hat I am wearing. When Bill Young first called me in Hollywood and invited me to go along on this junket, he said, "Be sure to wear a wide-brimmed hat—something you can drape mosquito net-



(LEFT) In weather cold enough to make a brass monkey ponder his fate, cameramen change into wet-suits and prepare to go underwater for filming of salmon spawning. Elaborate courtship rituals of the fish stirred up the mud bottom of the lake, making clear photography almost impossible. (RIGHT) Laugh-a-minute cameraman Jeb Gholson throws a hi-ball salute at the camera while being towed up the creek in a rubber boat.

ting over. They've got mosquitoes up there as big as B-52's."

Except for an occasional ski cap, I never wear any kind of headgear—but I dutifully made it into the sporting goods shop and tried on a bunch of wide-brimmed hats. They all made me look like Smokey the Bear. I finally settled on a rakish Anzac number, with brim flipped up on one side and a dappled jungle camouflage pattern. When I showed up at the airport wearing this chapeau, Young took one look and said, "Man—like, you're on the wrong safari."

Up, Up and Away

When the Beaver has been loaded with what seems like tons of camera gear, we clamber aboard and the plane takes off from the water, soaring above a wonderland of waterways, snow-topped mountains and lush forests of spruce and hemlock. It is virgin wilderness, wildly beautiful in its grandeur.

And what are four jaded Hollywood types doing in the midst of all this?

We are here because of a unique television documentary that is being filmed, part of a series of one-hour specials, collectively called "THE NEW EXPLORERS".

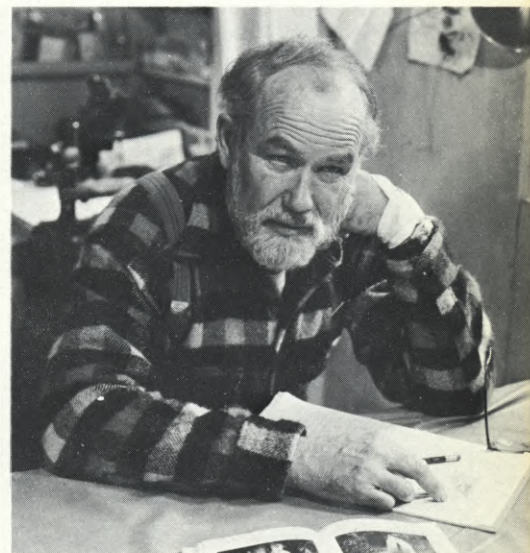
The first of the series, produced in association with Dr. Theodore Walker, will be a detailed ecological study of Lake Eva, an isolated lake located on Baranof Island in the Peril Strait near Sitka, Alaska. During the course of production Dr. Walker will live alone on Lake Eva for six months. He will be equipped with six motion picture cameras and four still cameras, plus a collection of tape recording equipment on which he will capture the sounds of the environment and dictate a daily diary of ecological observations. It is expected that he will expose more than 100,000 feet of film and record up-

wards of forty-five hours of magnetic tape in this endeavor.

Larry Savadove explained the point of it all.

"We had a three to four-year 'head start' on the current public emphasis on the subject of ecology," he told me. "As is true of all producers, regardless of how useful the project may be, we always believe we can improve on the production. In undertaking production of 'THE NEW EXPLORERS' series, we are searching a means to illuminate the subject of ecology in a new and dramatic manner. The basic premise is to allow a scientist the time to study a total environment and to enforce on him the isolation in which he would be more likely to arrive at new theoretical bases for explaining complex problems of interaction in nature.

"By simplifying, to a large extent, the mechanical problems of photographic data-taking, we hope to bring to the



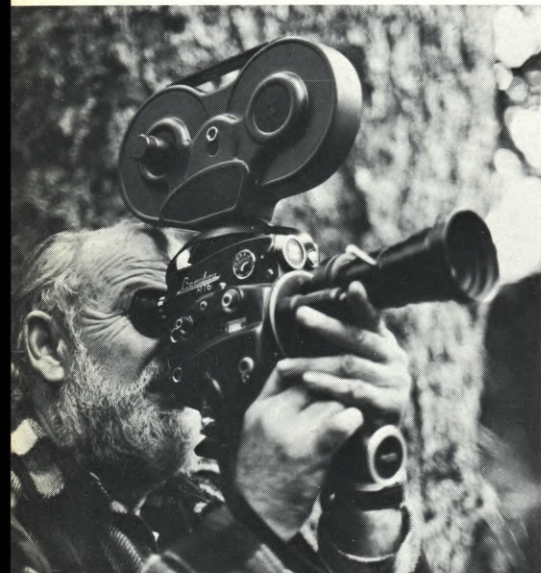
Famed biologist, Dr. Theodore Walker "wears three hats" as technical consultant, cinematographer and "star" of television special, which will be the first of "THE NEW EXPLORERS" series.

Dr. Walker sets up a Beaulieu 16mm camera, remotely controlled by radio, inside a plexiglass housing on the banks of the estuary, that point in the lake system where the waters of the creek flow toward the ocean and intermix—a favorite gathering spot for Grizzly bears feeding off of the salmon.





Remo-Rad wireless units used to operate Beaulieu R16B cameras in Alaskan location. (LEFT) Small, light-weight Remo-Rad transmitter is carried by means of strap slung over the shoulder. A single transmitter can activate several cameras. (RIGHT) Remo-Rad receiver, shown wedged between slats of tripod leg, is attached to camera and turns it on in response to wireless signal from transmitter.



Dr. Ted Walker operates Beaulieu R16B camera, one of three he is using to film bulk of footage for initial one-hour special of "THE NEW EXPLORERS" TV series.

television audience a new dimension of the ecology story. Dr. Walker and others of 'THE NEW EXPLORERS' are capturing the panorama of the seasonal changes in the environment which so radically affect animal behavior. In the final analysis, what we are describing is the method by which nature itself creates vital changes in the environment. As animal life adapts to these changes, necessary patterns of living are created, and it is possible that, from these new patterns, Man, in his threatened environment, may learn the lessons of adaptation and survival. All of this information will be related in the context of one man's adjustment to a whole environment and his observations of the activity therein, both on audio tape and on film."

Splendid Isolation

While about 90% of the footage making up the final cut of this first

special in the series will have been shot by Dr. Walker all by himself in the splendid isolation of Lake Eva, the plan calls for him to be joined periodically by a professional camera crew to record his activities and thus provide an understandable visual framework for his studies.

At this writing, he has already been up here for several months and has sent back a couple of miles of very exciting film. He has also had one professional visit from a camera crew which included ace documentary cinematographer Vilis Lapenieks. It is now time for another such visit—which is precisely why we are here.

Lake Eva was carefully selected as the location for this ecological study and concurrent filming because it represents an ideal water system for both purposes. Fed by streams created by the melting snows of the Baranof Mountains, the lake is a mile and a half long and approximately 260 acres in area. The water from the lake empties into a creek which flows downward in a series of rapids and small waterfalls for about a mile until it widens into an estuary and flows into the sea. It takes only about 30 minutes between the time that the water leaves the lake until it enters the sea—but the very short span of distance between is the breeding grounds for four species of salmon and three species of trout, a veritable biologist's delight.

Just now it is salmon spawning time. These sea-going beauties, summoned by some mysterious call of nature back to their own birthplace, leave the ocean and enter the estuary to swim upstream to Lake Eva, leaping the rapids along the way. Informed of this migrating *smorgasbord* by nature's strange communication, hordes of Grizzly bears

(LEFT) Cameraman Jeb Gholson sets up Arriflex to shoot scene of Walker at work near the creek. The famed biologist went into ecstasies of delight as a mother otter and two babies poked their heads above adjacent log jam to observe him during filming. (RIGHT) The Technical Consultant/Cinematographer/Star of the show lines up remotely-controlled camera mounted inside plexiglass box constructed to protect it from the elements.

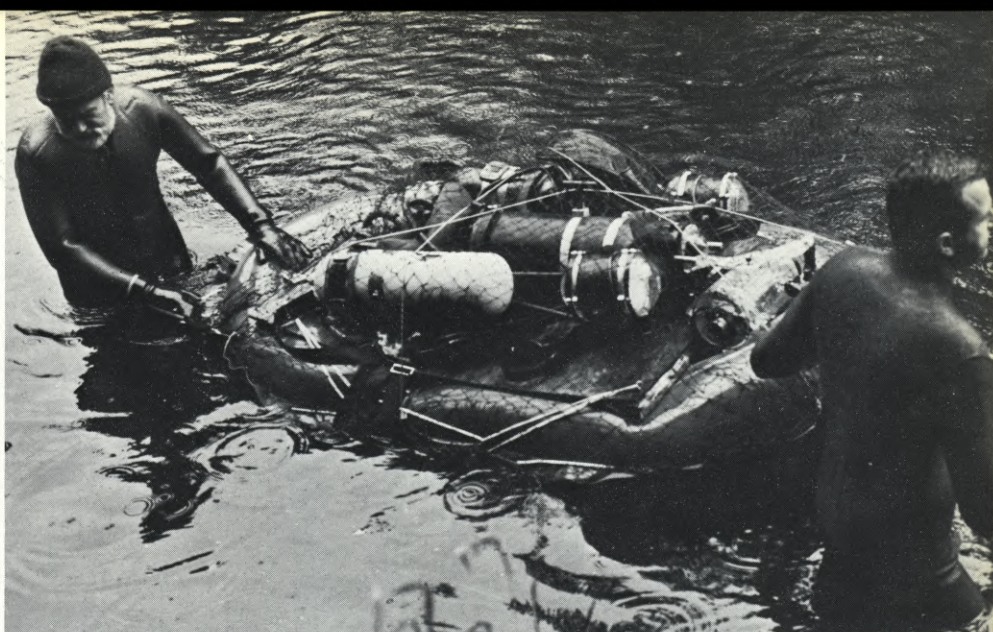


mass along the banks of the estuary and the creek to scoop the salmon out of the water and gobble them down, after which they will lumber off into the woods and go to sleep.

The salmon that manage to make it past the Grizzly bears and the rapids enter Lake Eva where they spawn and then die. Bald Eagles swoop down from the tops of towering trees to claim their carcasses.

This savage cycle, known technically as a "feeding chain", is in full tilt down below as the estuary comes into view under the nose of the floatplane, but it all looks so peaceful.

The tiny craft follows the route of



Wearing heavy foam wet-suits as protection against the ice-cold water, Walker and Gholson propel the latter's sophisticated underwater camera rig toward the lake on a rubber raft. Efforts to get clear shots of salmon spawning were temporarily foiled due to extreme turbidity of the water.

tiger, judging from the way he slings a 60-pound pack onto his back and goes loping off at a brisk pace through the undergrowth. The rest of us Hollywood athletes have all we can do to keep up with him.

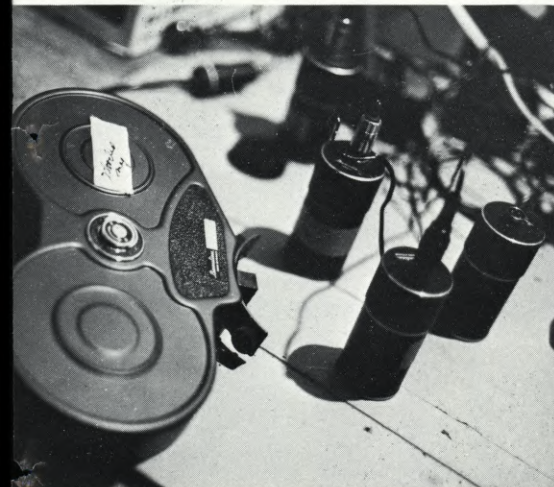
The Forest Primeval

Laden down with 45 pounds of camera and recording equipment, plus luggage, plus a lead-weighted skin-diver's belt someone has given me to carry, I am hardly in a mood to wax rhapsodic over nature. Yet, I can hardly help but be stunned by the sheer raw beauty of the surroundings. We are making our way through an incredibly lush rain-forest, still in the full glory of the "green explosion" that bursts upon the land in late summer and lingers until the "horizontal rains" bring on the snows of winter. Giant ferns, reaching out in all directions, lend the landscape a pre-dawn-of-history aura, and one almost expects to see dinosaurs come crashing through the undergrowth. It is the most remote and virginal wilderness I have ever personally encountered—completely untouched, unspoiled, unpolluted by Man.

Underfoot the ground is soft and springy, red earth laced with peat moss. At the moment it is also extremely muddy, as we slip and slide along what passes for a foot trail. We skid off of stumps and slog through knee-deep water until the trail comes to an abrupt halt at what may best be described as a "sea of mud".

"It's 'African Queen' time!" sings out Jeb Gholson, the joker of the group—conjuring visions of Humphrey Bogart dragging the boat of the same name through just such a morass, and

Continued on Page 1105

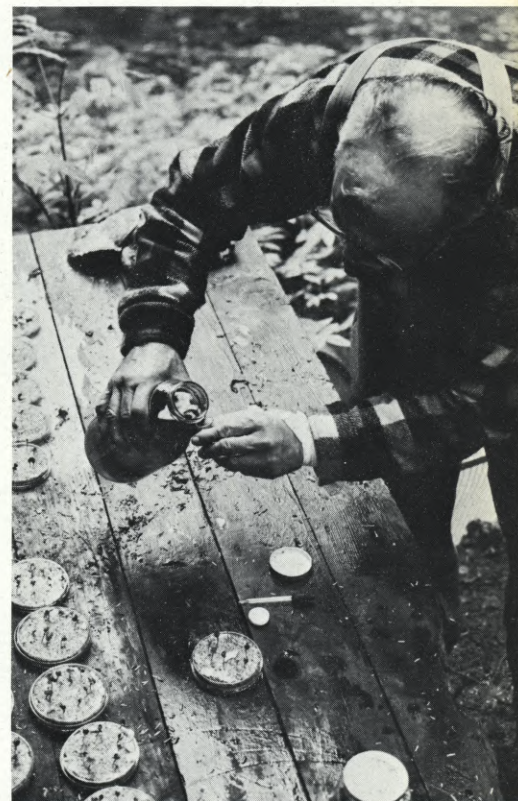


Batteries for the Beaulieu R16B cameras are kept continuously on charge to insure fresh power supply. 200-foot magazine provides ample footage for filming long sequences.

the creek upstream until, suddenly there is Lake Eva, a silvery pool surrounded by emerald forests. We land on the water and taxi to the far end of the lake where, in a little cove, a picturesque figure stands smiling and waving at us.

He has a white moustache and beard that makes him look a little like Santa Claus and/or Hemingway. He is wearing a knit cap, black and red checked wool backwoods shirt, old-fashioned galluses and hip-high waders. This visual throw-back to pioneer America is actually the very hip Dr. Theodore Walker, recently of the Scripps Institution of Oceanography, and a world-renowned expert on limnology (the study of lake systems). Not one to stand on ceremony, he is known to his friends and associates simply as "Ted".

It becomes evident from the horse-play that ensues when we pile out of the plane, that he is also a genuine Grade-A character. His speech pattern fascinates me. It is one-third homespun philosopher, one-third college professor and one-third longshoreman. The white beard is deceptive, for he is obviously a



Dr. Walker tends his "hydro-garden" of radish seedlings grown in petri dishes and irrigated with water samples from different areas of lake system.

From the air, Baranof Island, near Sitka, Alaska, appears to be a maze of lush waterways. Land-locked Lake Eva is located on the island.



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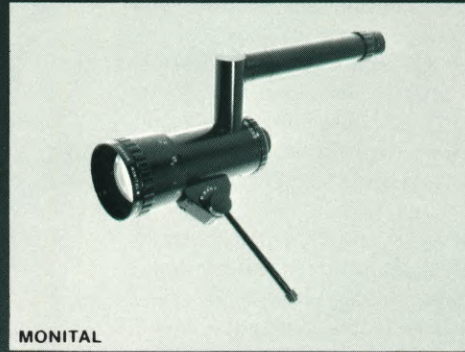
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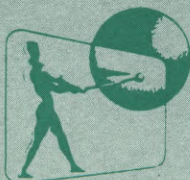
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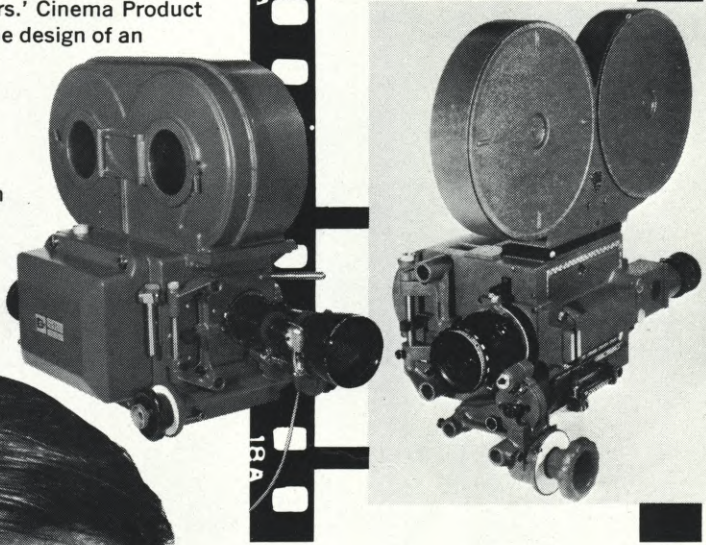
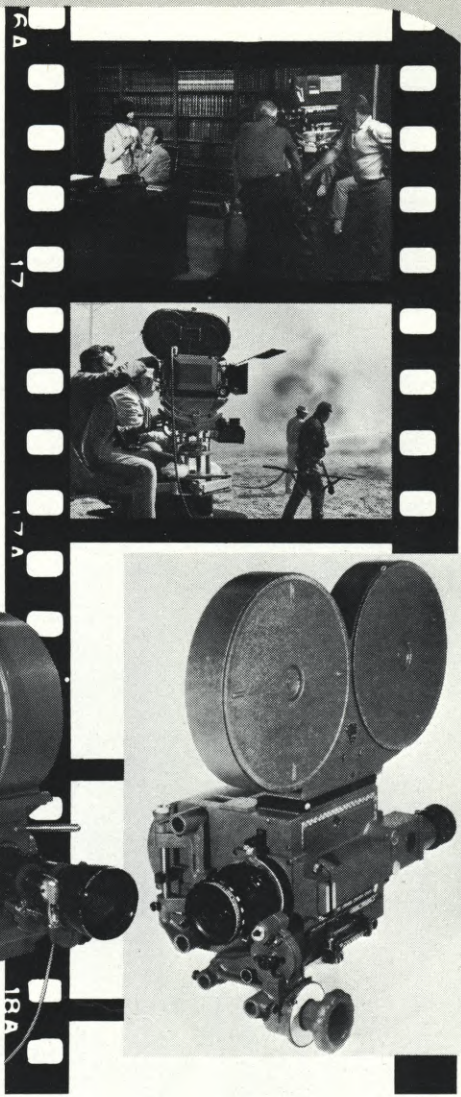
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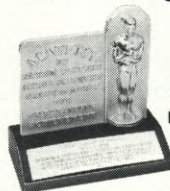
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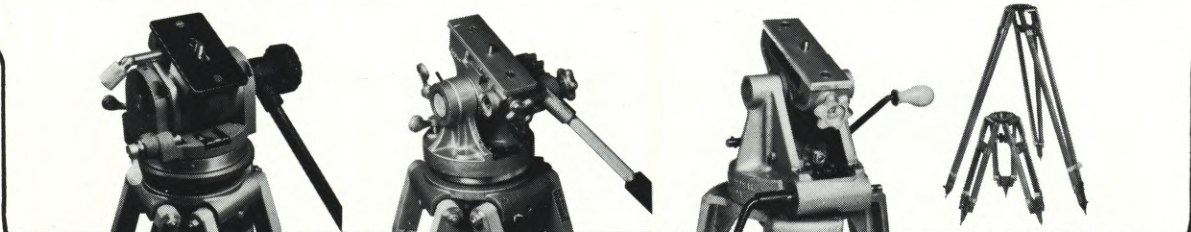
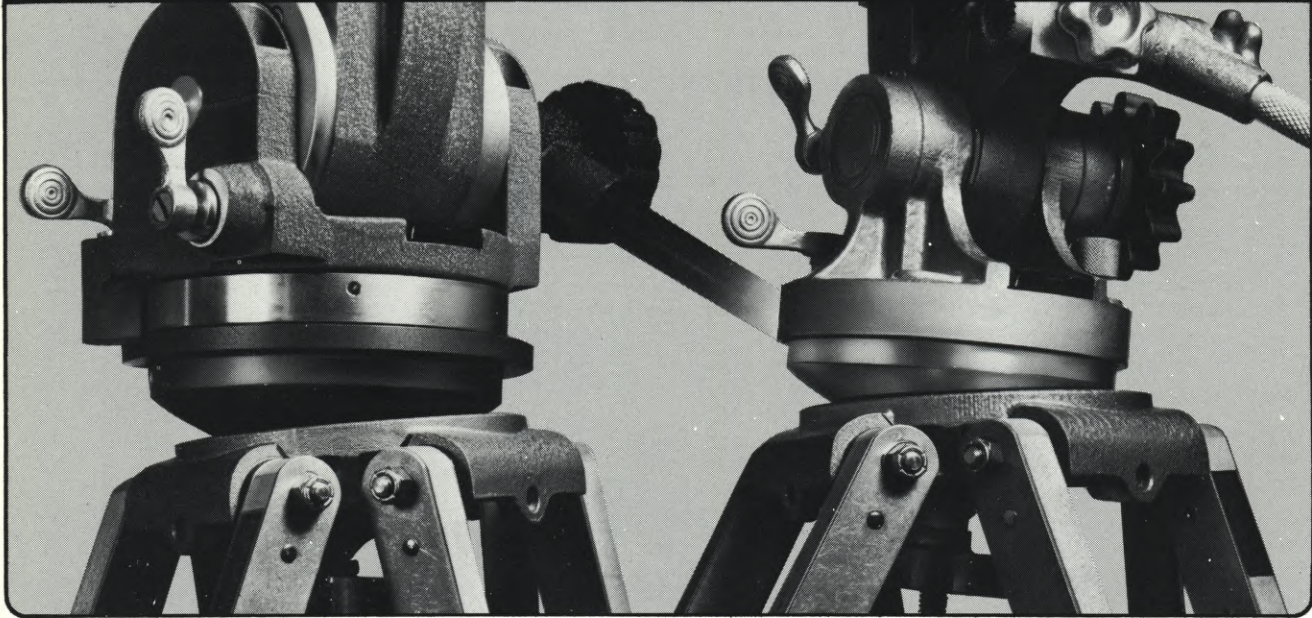


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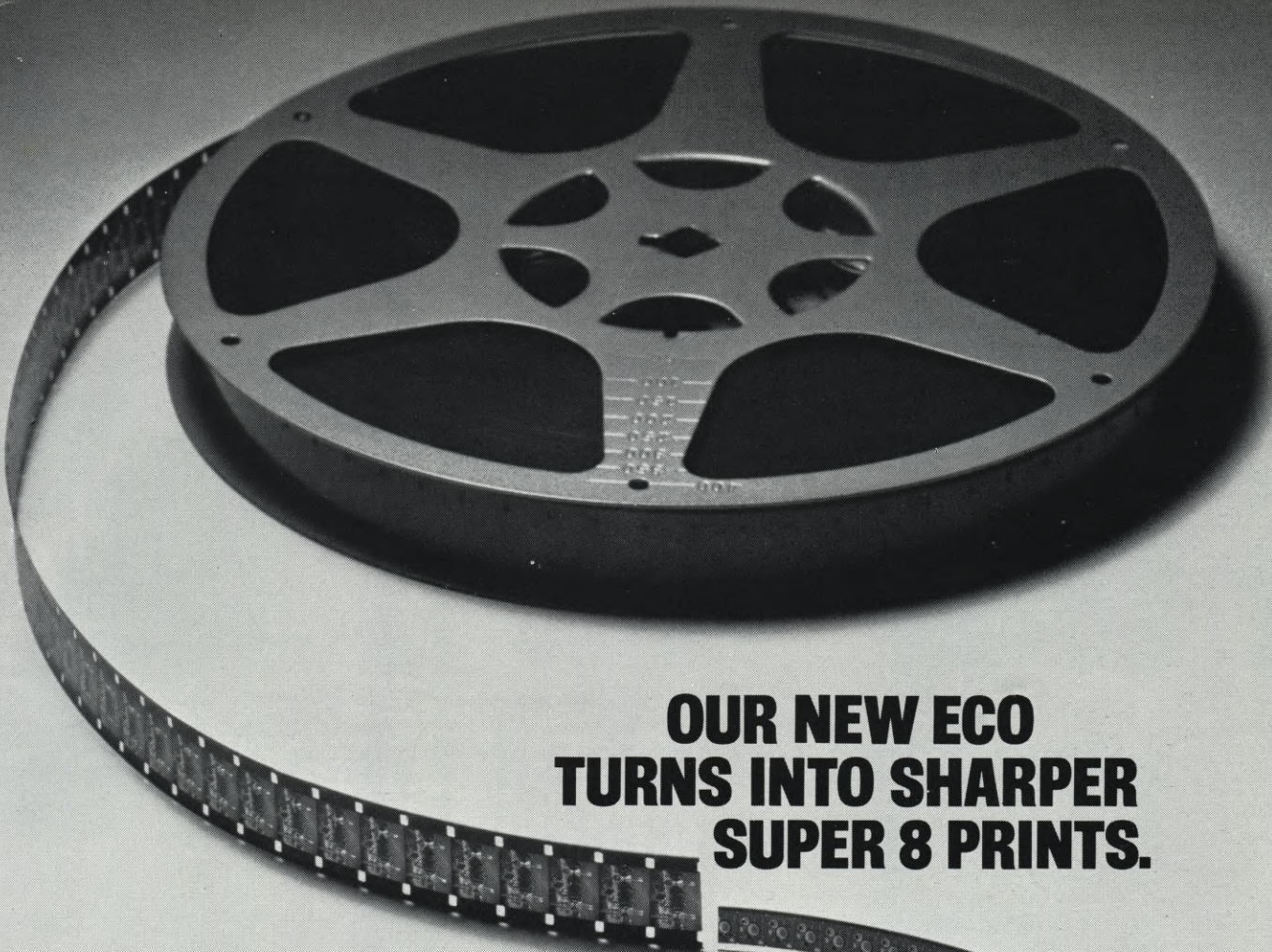
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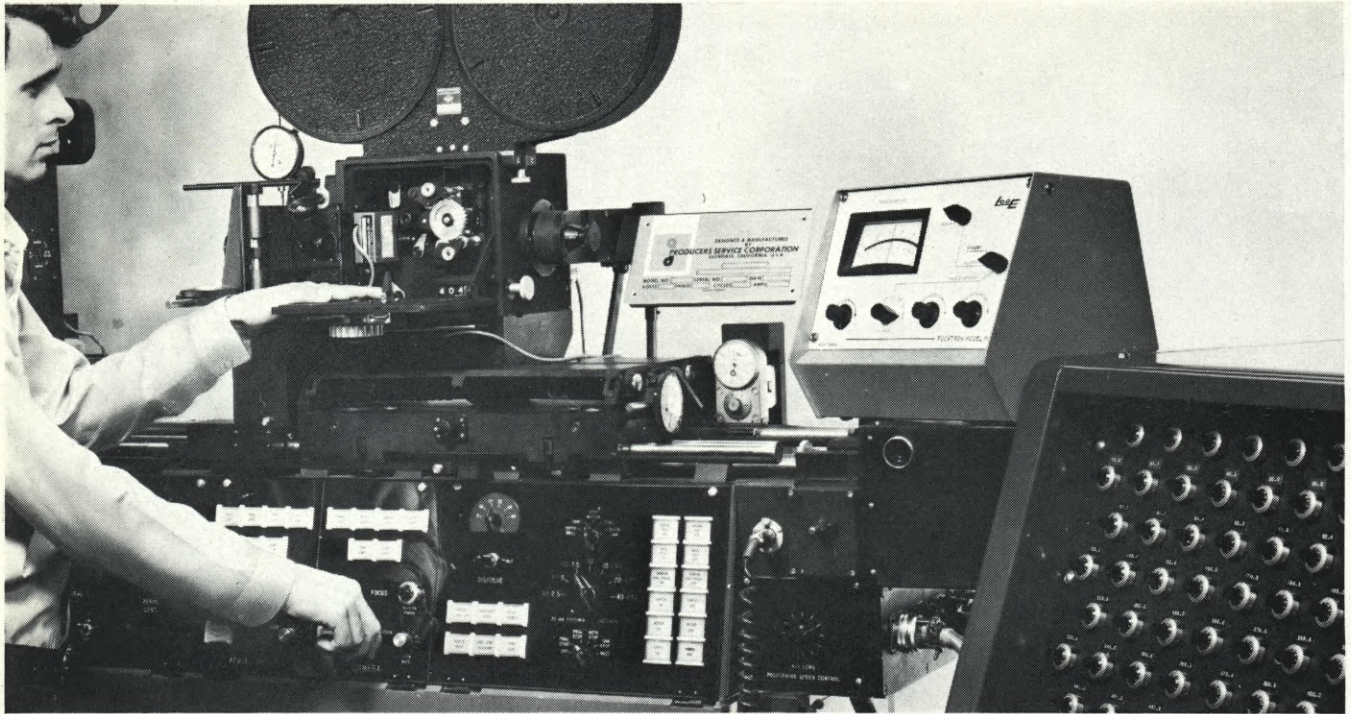
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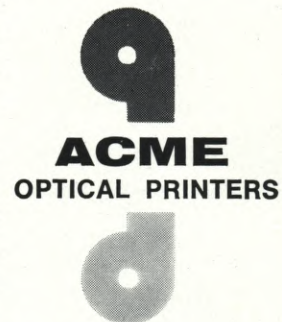
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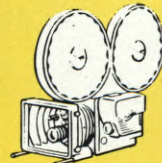
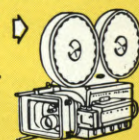


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THE HANDIOLA

A simplified, low-cost device for editing sync-sound in both 16mm and Super-8 formats

By DON SUTHERLAND

The Handiola, an interlock editing unit for Super-8 and 16mm double-system films, appears to be the solution for film-makers who cannot afford high-priced editing consoles, but who are confounded by the relative inefficiency of inexpensive equipment. While many low-budget producers can rent expensive consoles when needed, many others, including institutions teaching film production, require the full-time presence of sync-sound editing hardware, and have been forced to choose between efficiency and economy. Economy usually won, and the result was often a jury-rigged setup, with a sound reader placed adjacent to a film viewer. These setups do work, but not without compromise; establishing and maintaining sync is often tricky, and cutting

picture and track requires activity at different locations on the editing table. The result is loss of efficiency, and endangerment of accuracy. The Handiola overcomes these problems by combining the best elements of two extremes—the economy of viewer/reader setups and the efficiency of the expensive consoles.

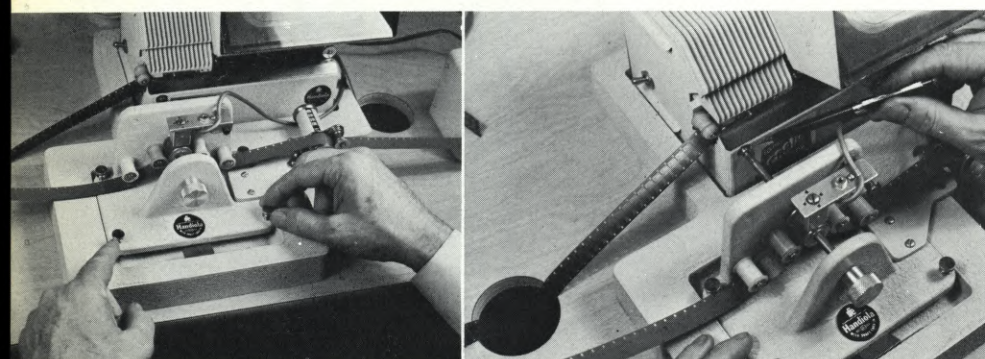
The unit is modular in concept, various inexpensive components being added as required. Handiola's viewing system is a Kalart viewer, identical to the popular standard Kalart unit with one exception: a socket located below the optical system. This receives a shaft from the sound reader assembly, which consists of a sprocket and swing-away magnetic head. The entire assembly slides fore and aft on a rigid frame, to

establish and release physical interlock. This enables the editor to first align his visual start-mark in the viewer, and then align his audio start-mark in the sound assembly. Sync now having been established between the two media, he simply slides the tape assembly into the socket for positive interlock. Sync is maintained as he cranks in either forward or reverse directions. Should he choose to advance either picture or track independently, he simply withdraws the sound assembly and moves either medium to the desired point.

A significant advantage of this system over the jury-rigged viewer/reader setups, as well as other pre-packaged units combining viewers and readers, is that the 16mm frame and its corresponding sound are always directly opposite each other. The editor can cut his picture anywhere along the threading path, cut the "frame" of fullcoat directly across, and be confident that frame-for-frame sync will be maintained. This is one of the Handiola's features that puts it in the same league with the expensive consoles operationally, even though its technology is more akin to the viewer/reader systems.

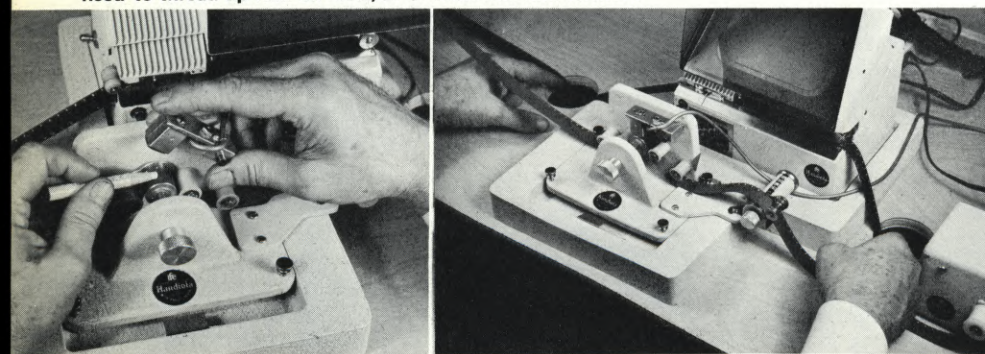
Since the two transport mechanisms are shaft-interlocked, movement of picture will automatically move track in sync, and vice-versa. The editor, without having to reach across for rewind handles, can perform precise picture cueing by manipulating track—a technique he may prefer if original picture stock is laced-up. This interlock also eliminates concern that constant tension be maintained on the film, lest sync be lost—a characteristic that plagued users of earlier pre-packaged viewer/reader systems.

The Super-8 Handiola is essentially identical to the 16mm version, with only one slight difference: although picture frame and its corresponding sound "frame" are directly opposite each other when located in their respective reading units, they do not maintain this straight-line relationship when advanced to a position where they can be cut. The Super-8 unit is designed specifically for use with the Optasound system, the only Super-8 sound movie system that uses perforated 1/4-inch tape for the track. Although there is a perforation-for-perforation relationship



(LEFT) The Handiola is a device for achieving instantaneous positive interlock sync. Once picture and track start-marks are aligned in their respective units, sync is maintained by simply sliding tape transport assembly 1/4-inch toward viewer. Shaft engages the viewer's sprocket for positive interlock between both media, running forward or backward; movement of either medium causes the other to move in sync. Note inching knob on front of tape transport, for precise cueing without handling tape or film. Accessory frame counter is shown installed at right. (RIGHT) Pen points to interlock shaft, at point of connection with viewer. 1/4-inch movement of tape assembly establishes and releases interlock.

(LEFT) By marking track on sound sprocket, it becomes unnecessary to raise picture head for film marking. Tape is advanced until clear of playback equipment; in 16mm Handiola, corresponding picture frame will be directly opposite the mark on tape. On Super-8 Handiola, tape mark is aligned with reference indicator; corresponding film frame falls opposite a similar reference mark on film channel, beneath viewing screen. (RIGHT) Spill wells for film eliminate need to thread up film on reels, or to maintain film tension.

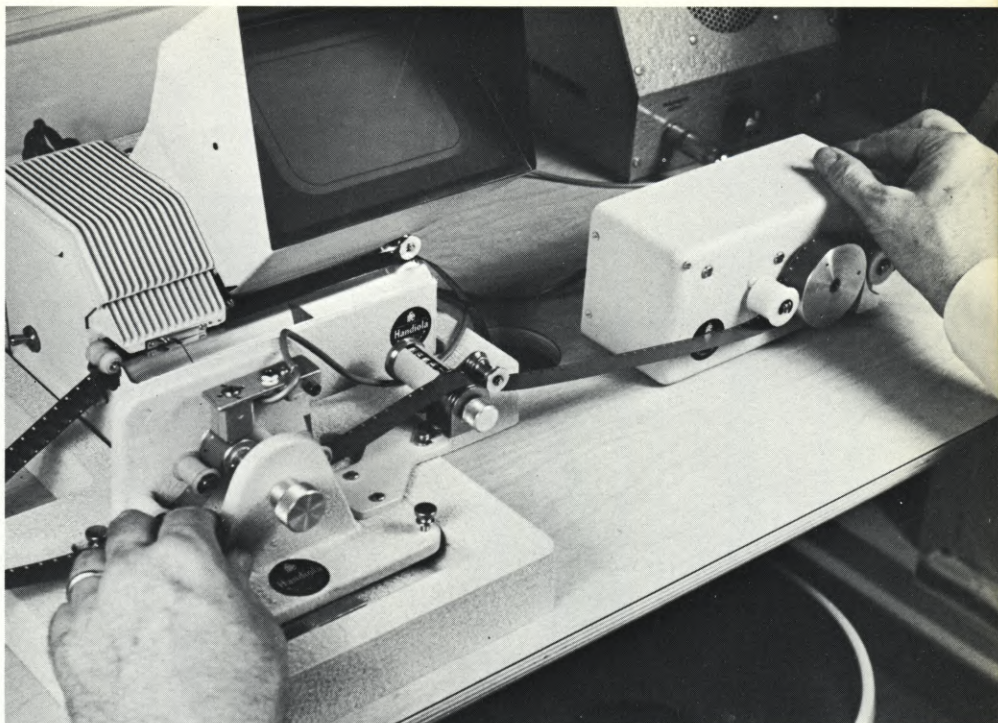


between the film and track, the physical distance between perfs on the two media is not the same; this permits frame-for-frame cutting capability, without having to alter the standard 3-3/4 IPS speed of tape recorders. However, the Super-8 Handiola makes accurate cutting virtually as simple as it would be in a straight-line relationship.

It would be possible to grease-pencil the Super-8 picture frame inside the viewer's aperture simply by lifting the pressure plate, and to similarly mark the tape while on the sound sprocket by simply swinging-away the magnetic head. My own experience with the unit indicates that this technique is occasionally desirable. However, there is another approach which is even simpler under most circumstances. First, the tape is marked between perforations (the "frame line") while on the sound sprocket; there is no danger of fouling the magnetic head with the pencil's residue, since the head does not contact the tape in the perforation area. Then the tape is advanced, moving the picture in sync, until the grease mark falls opposite an indicator on the sound assembly's frame; a similar indicator on the viewer's open film channel indicates the picture frame which corresponds to that tape "frame". The actual differential is only an inch or two, but these reference indicators enable the editor to cut both picture and track with frame-for-frame precision swiftly, and with complete confidence.

Although it is possible to use rewinds for both media in both the Super-8 and 16mm Handiolas, the designer considers it simpler to wind-up only the track, letting picture fall into spill bags or bins. As already described, the winding of track will automatically cause equal movement of picture as a result of the shaft interlock. In general practice, transport is effected by hand; however, a 24 fps sync motor is available as an accessory, for accurate playback of the interlocked materials. Thus, whether the editor is working in Super-8 or 16mm, he can get the same accurate sense of timing and pacing as he can from the big consoles.

The Handiola is the design of Gil Roller, a professional editor and President of IFE Corp., 132 West 43rd Street, New York, N.Y. 10036, which manufactures the system. Mr. Roller's initial purpose was to produce a simple-to-use, inexpensive unit for his own work; but as a veteran of the finest editing consoles, he was determined to retain the high quality and efficiency he had grown accustomed to. The Handiola design was the result. When colleagues



The Handiola is an interlock editing unit for cutting 16mm and Super-8 double-system sound film. It is designed to replace the jury-rigged set-up of a sound reader placed adjacent to a film viewer which many film-makers are forced to use, due to reasons of economy. The Handiola aims to make available all of the efficiency of a high-priced editing console at about 25% of the cost. Rectangular, box-like unit shown at right is optional sync motor.

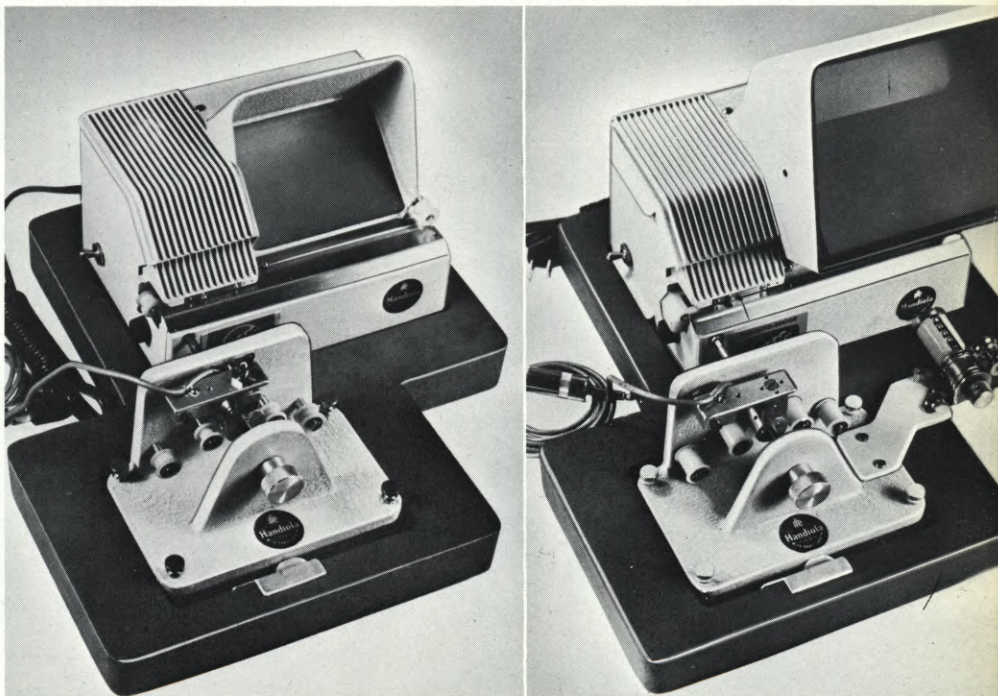
saw his prototype in operation and expressed interest in obtaining units for themselves, Mr. Roller began manufacture of his design. In view of the mechanical and operational simplicity of the concept, it seems almost incredible that so many decades of double-system sound work had to pass before

such a design was born.

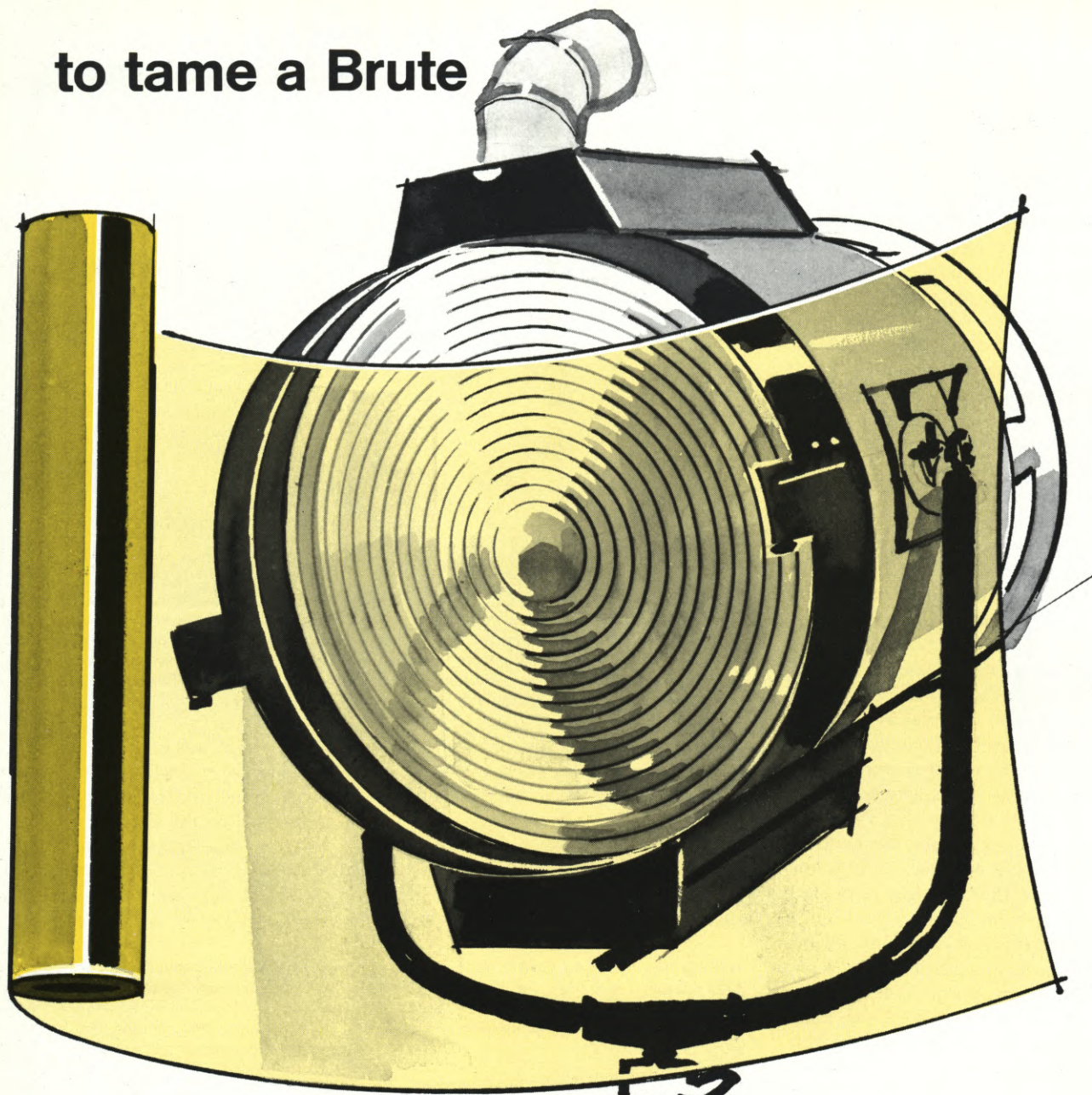
Accessories include the aforementioned sync motor drive, and frame counters. For the Super-8 version, two different tape transports are available. Optasound films can be shot at either 18 or 24 fps, the only difference in

Continued on Page 1112

(LEFT) The Handiola Mark I Basic Editing Unit, incorporating a special Kalart 3 1/4 x 4 1/4 viewer, tape transport and base, for 16mm film and tape. It is also available for Super-8 film and 1/4-inch perforated tape. (RIGHT) The Handiola Mark II Basic Editing Unit, incorporating a 4 x 6 viewer, tape transport and base. At present, it is available only for 16mm film and tape.



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A lot of productions use a lot of different cameras for a lot of different purposes. One camera might be blimped and mounted for sound work. Another might be hand-held for wild shots. A third might wind up on the camera car. And if time-lapse, animation or underwater footage is required, the call might go out for cameras number four, five, or six.

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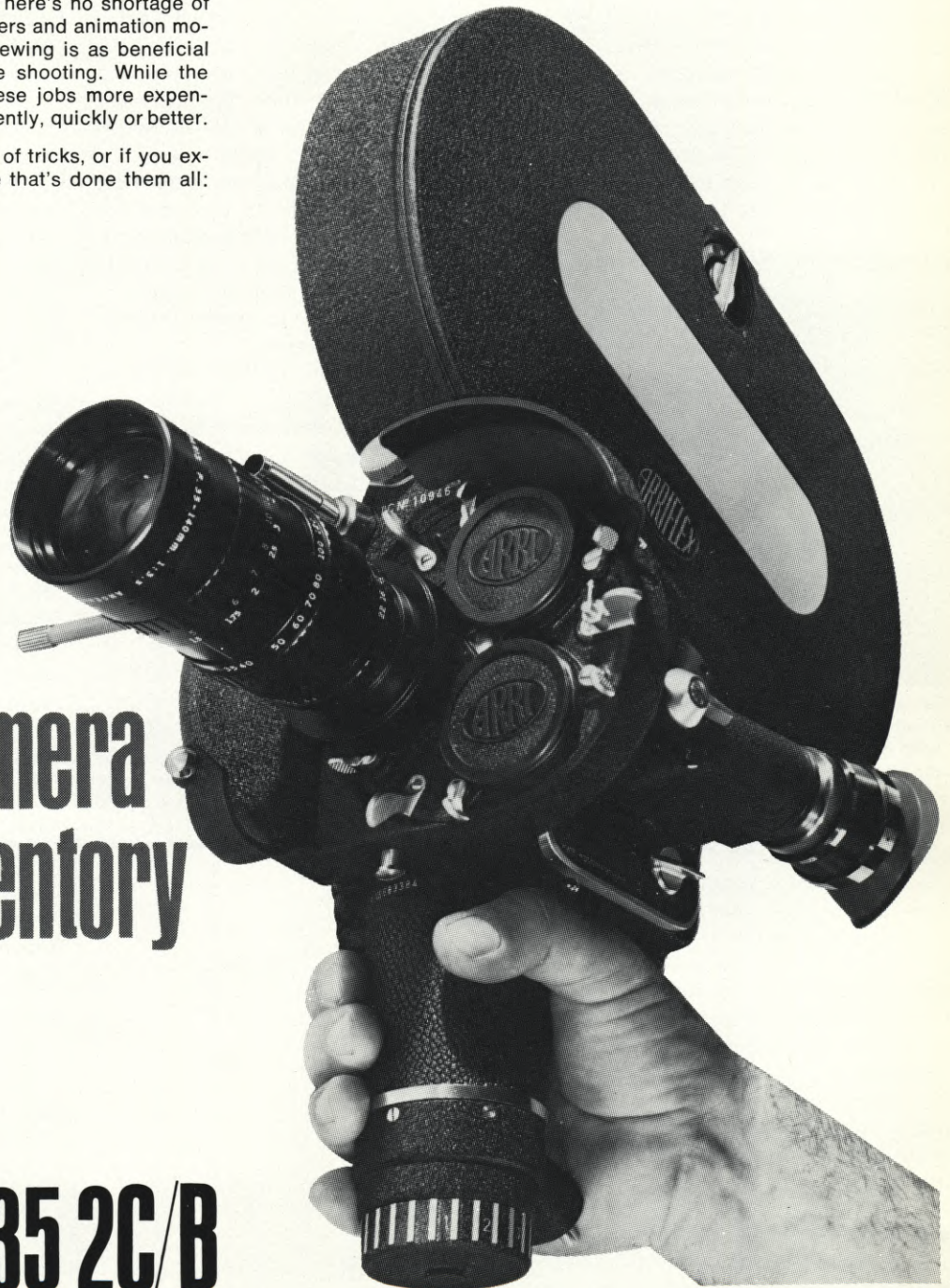
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FILMING THE UNIVERSE ON A LOW, LOW BUDGET

Substituting creative imagination and technical ingenuity for dollars, this film-maker lends scope and excitement to a basically academic subject

By STEPHEN A. KALLIS, JR.

How do you make an industrial film about computers and space probes and not spend a lot of money? That was the problem facing me in doing "ALONG THE SHORELINES OF THE SKIES", and it called for a variety of tricks.

"SHORELINES" concerns the way in which a university research laboratory uses a small electronic computer to aid its participation in space research. The computer is used to help calibrate instrumentation that flies aboard deep-

raphers and the fast emulsions. The laboratory to be used as a "set," like most labs, was not laid out in a way to make things convenient for a cinematographer; and there were enough people working on other projects that the introduction of the bulky old-fashioned lights (not to mention the increased lighting necessary for a low emulsion) would have been intolerable.

The university personnel were most hospitable. I was able to take shots of the computer, the testing equipment, and the instrumentation. I was even able to stage a "before" shot—showing what would happen if the computer were not used. With the exception of one minor mechanical glitch at the beginning, everything went off very smoothly.

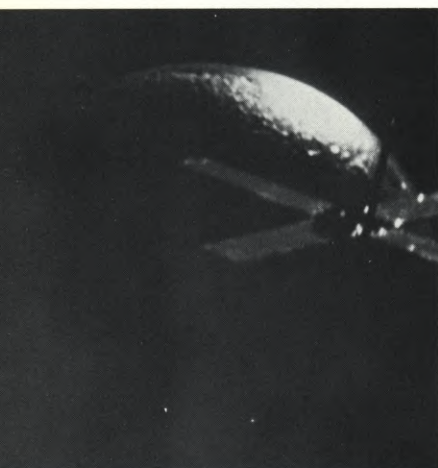
Then back to Massachusetts, and to a quandary. How could the footage taken on location in Colorado best be used? The basic problem is that although a computer is doing things electronically, all the casual spectator sees is a blinking-light face and all he hears is the chattering of a teletype or its equivalent. And although the "before" and "after" aspects of using the computer are interesting, this was intended as an information

film, not a television commercial.

I did obtain about a minute's worth of stock footage of rocket takeoffs from the laboratory and some few seconds' worth of high-altitude stock from NASA. These together with the location footage I shot took up less than 30% of the film, and I still had to tie everything together. And these called for "creative trickery."

At one point in the film, the script called for a closeup of some telemetry equipment (radio instrumentation receivers). None was available to me at the university laboratory, so I arranged a substitute. Almost all instrumentation of this type employs vernier calibration, so I judged that if one saw a vernier dial being manipulated while the narration was talking about telemetry, the natural conclusion would be that one was looking at telemetry equipment.

On that basis, I set up one of my own instruments that had a vernier dial—a signal generator—and positioned the camera for an extreme close-up. Rather than keeping it a static shot, I had a hand make an adjustment on the dial. Its brief appearance—the whole scene is only a few seconds long—made



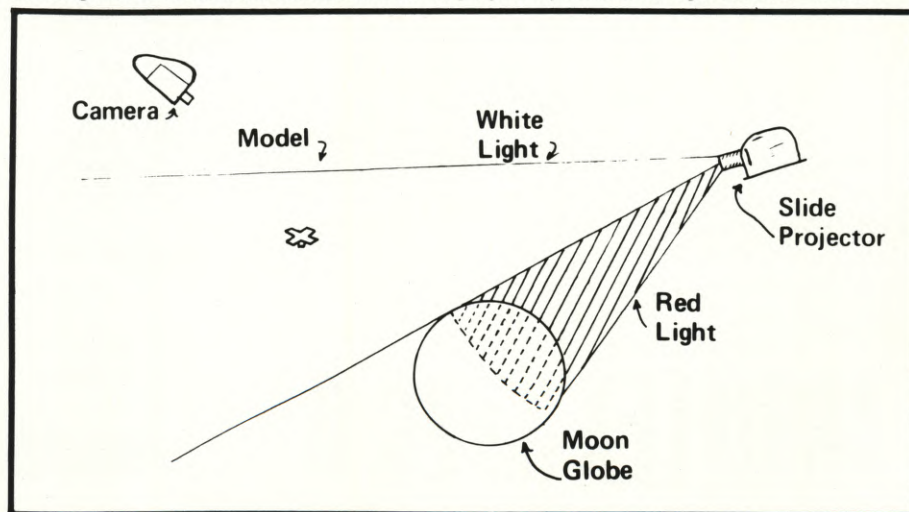
Frame blow-up of Mariner spacecraft passing a cratered Mars. This required the use of the "split light" technique, employing the slide projector as a sole light source.

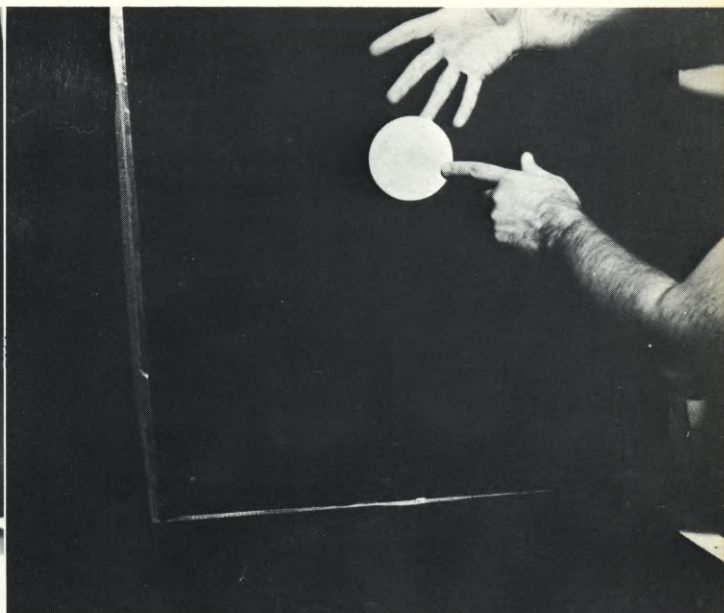
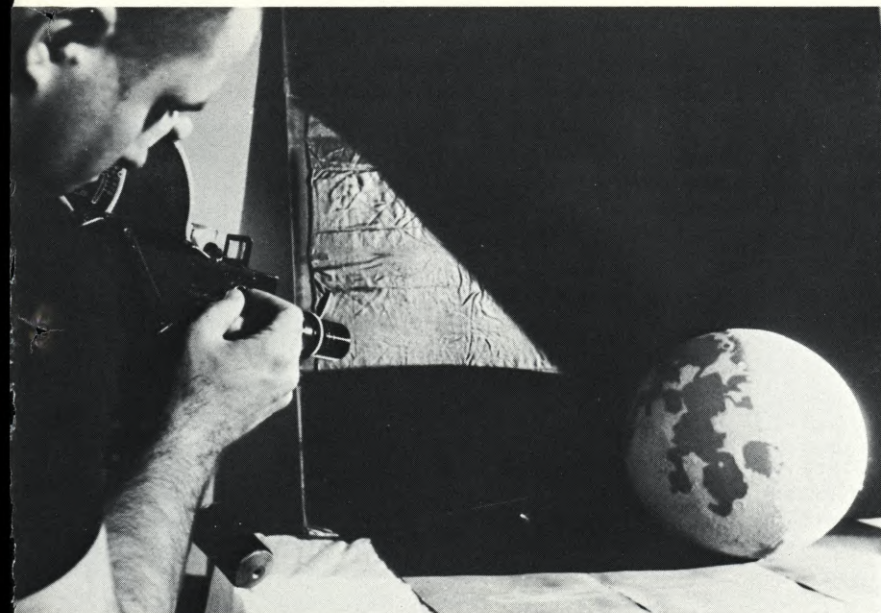
space probes, and the film is aimed at showing scientists, engineers, and computer people this rather unique application of a computer.

Because of the distance I had to travel—Massachusetts to Colorado—I decided to bring a minimum of equipment. My production gear therefore consisted of one of my Cine Specials (and accessories), a set of Smith-Victor quartz lights, and some rolls of EF. This might not seem like much with which to do a film, but I was able to take it all and my clothing changes aboard the jet without going overweight.

The location work, incidentally, has made me very appreciative of both the new lights now available to cinematog-

Lighting setup for the Mariner spacecraft passing Mars. Because of the peculiarities of illumination seen from space, the lighting had to be coming from a single source and it had to cast sharp shadows. A slide projector provided the best simulation of this, and a colored filter covering half the area of the normal slide in the projector provided red light to color "Mars."





(LEFT) The author sets up camera for the "live" Mars shot. For clarity, the scene is shown with intentional sidelighting not present in the actual take. The intense lighting from the projector cast the shadows of the moon globe and its craters in sharp relief, showing the cratered world as a red crescent. (RIGHT) Mars art on glass plate in preparation for the glass shot. Because the art is two-dimensional, it is possible to focus a telephoto lens immediately on the art and let the background drop slightly out of focus. Ordinarily, this would destroy the illusion of a glass shot, but for the particular "space" application, this actually enhanced the effect.

a difficult transition possible.

A similar situation appeared near the end of the film. Originally, there was an abrupt transition from a shot of the computer to a rocket launch. There had to be some sequence to set the stage for the launch other than the narration. The transition proved to be a short scene showing a toggle switch being thrown. A toggle switch on another piece of my gear; I shot it obliquely with a telephoto lens so that only the hand and the switch were in sharp focus.

But from here on, things were a bit livelier. In my original location footage, I had the co-investigator of the calibration project diagram the system on a blackboard. This looked reasonable when shot, but when we viewed the dailies, we saw it left something to be desired.

So, then came the first real trick: we had the diagram redrawn as a standard industrial line block diagram. A large line negative was made of this diagram, giving a black sheet with transparent areas for the lines and lettering. Behind each picture element, I placed colored paper, and then covered the colored paper with white paper.

In the final film, I show the co-investigator starting to outline the experiment's diagram and then cut to the line negative display. At the beginning, it simply looks like a "prettied up" version of the blackboard, but as the narration continues, one by one the white cover sheets are removed, and each picture element turns a different color. This has been keyed with the

narration so that the color change takes place while the particular system element is being discussed.

Earlier, I had needed to show the ascent of a research rocket over the deserts of New Mexico. After a brief stock-shot takeoff, I required some way of showing that the rocket with its instrument package climbed to a height of 50-60 miles. I decided that the best way would be through animation.

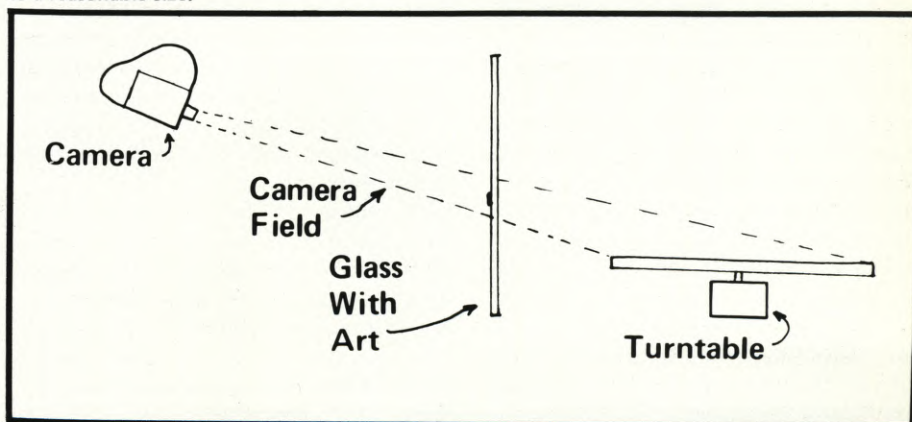
Coming up with a trajectory diagram was easier than I had feared it might be. The earth and the sky were fashioned out of construction paper (a dark blue background with a light tan, slightly curved, overlay covering the lower third of the picture to represent the ground). The trajectory itself was a curve applied by using "chart-pak," a thin tape that artists and draftsmen sometimes use to

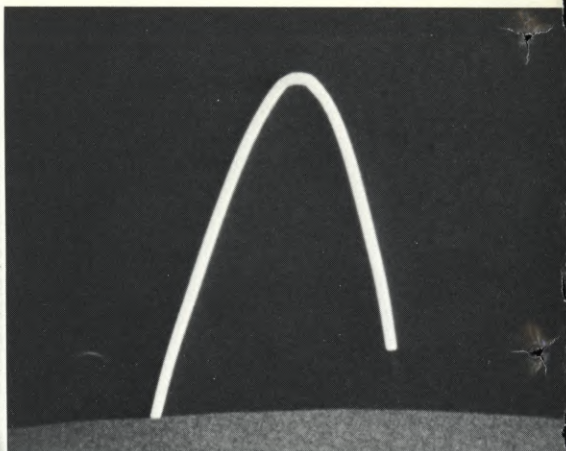
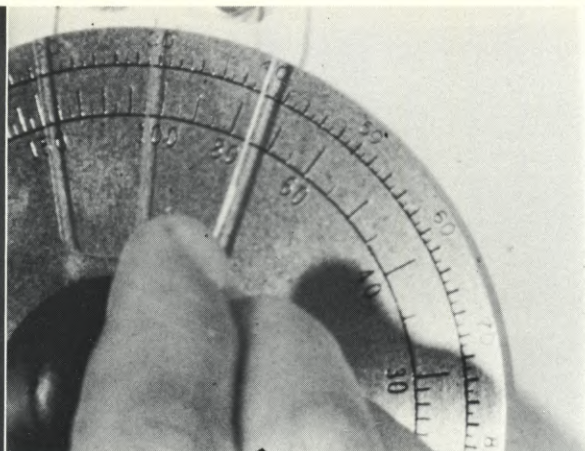
make lines instead of drawing them with pens.

By inverting my camera, it was possible to use the "scratch-off" technique to animate my trajectory. In this method, a little bit of the line is removed between each single-frame take until you run out of line. Because the film is exposed upside down, inverting the film brings the picture rightside up, but with the action reversed. I had to do some mathematical approximation to make the trajectory's speed seem natural.

Besides some more diagrams, I had to have a couple of visual images that would illustrate what the results of the program were and would be. Since the instruments the laboratory calibrates were, and are, used aboard the Mariner space probes that go to Mars, I thought

Glass shot setup for "orbiting" spacecraft. The "Mariner" was actually located on the turntable behind the glass. A telephoto lens kept the camera field narrow, thus holding the turntable down to a reasonable size.





(LEFT) Resulting glass shot of a satellite orbiting Mars. To avoid visual ambiguity, the orbit view was "cheated" slightly: on the return path, the white spot dips slightly behind the upper rim of the planet's disc. (CENTER) Telemetry equipment was not immediately available. "Cheating" was achieved by using other electronics gear with a sufficient close-up so that it could not be easily identified. (RIGHT) Rocket Trajectory via animation. The "scratch-off" technique, chart-pak tape, and construction paper made the art requirements easy. Just how much tape should be removed between frames, unlike many travelling lines, could not be constant. Because rockets are subject to gravity, they accelerate and decelerate. This was approximated mathematically.

a nice touch would be a scene showing just that—a Mariner passing Mars.

Until recently, this would have been pretty easy to simulate, relatively speaking. But the recent information televised back by the Mariners that have already been there have shown that Mars is covered with craters, like the Moon. I felt that it would be important to show that somewhere in the film, but where would be critical.

I obtained a relief-map globe of the Moon; this was to be my Mars. By illuminating it in red light using a backlight, I would get the effect of a red, cratered world. Then I could bring a model of a Mariner spacecraft past it in the foreground.

I ran into troubles. Most of them concerned lighting. In space, regrettably, there's only one light source, the Sun. By the time it gets out to Earth (to say nothing of Mars), the light's rather parallel. Further, in space there's no diffusing atmosphere, so shadows are sharp.

Lighting the scene conventionally would be acceptable for a general audience, but some of the scientists who would see it would probably be turned off by so obvious a fake. To make the lighting as realistic as possible, it would have to cast very sharp shadows.

What I ended up doing was totally unconventional. I used a slide projector to illuminate the scene. I prepared a special "slide" of filter material that covered about 2/3 of the slide's area; the remaining third was left empty. The projector's optics were focused upon the globe so that the red portion of the beam bathed the entire globe. Above the globe was a region of raw white light, and because of the focusing, both the red portion and the white portion cast sharp shadows.

The camera was positioned so that "Mars" appeared as a thin crescent. This both exaggerated the shadow detail (as an actual view from that position would) and made certain that what was seen would not reveal the fact that it was actually a model of the moon. From the camera's position, the model spacecraft was illuminated in white light, as was required.

Finally, the closing scene. Originally, I had planned to show a picture of the craters of Mars, brooding under the sun, while the narrator made his closing remarks, but the scene was too static. Since the narration at that point observed that future spacecraft would orbit Mars, someone suggested that it would be nice if, somehow, some vehicle orbiting Mars could be shown, perhaps by means of a form of animation.

I gave it some thought, because the idea was not bad, but using animation would not really fit with the rest of the picture (as well as being a bit expensive). I found a solution by using a technique I had known about for years, but never thought I'd actually use: the glass shot.

To simplify matters, I decided that the last scene should be a full-face view of Mars. This would not only eliminate my need to worry about shadow detail but would let me include Martian details I couldn't show on the moon globe, such as Mars' polar caps and its darker desert areas.

A picture of Mars was drawn, carefully based upon one of the best color photographs ever taken of the planet. This was mounted on glass. Behind this was placed a turntable with a large black platform mounted on it. A small spot of white matter was placed upon the platform, and everything was carefully

aligned. Seen from the camera's position, the result showed a little something whizzing about Mars in an ellipse (obviously an inclined circle).

Although this last scene was scientifically inaccurate (something at that distance from Mars would actually take more than a day to orbit), it should be accepted by most scientists and engineers who would know this, because they would also realize that at the distance from Mars implied by the camera's POV, they wouldn't be able to see both the planet and the orbiting spacecraft anyway. They would realize it was a diagram only.

"SHORELINES" was a fun film to make because it kept me on my toes in utilizing such techniques as scratch-off, glass shots, and unconventional lighting. "SHORELINES" showed what could be done to keep a low-budget-film within that category, avoiding expensive process shots. It also showed what the newer lighting units and faster emulsions would allow me to get away with. From a production standpoint, what more could a cinematographer ask for in making an "educational" film? ■

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"I WALK THE LINE"

Continued from Page 1075

exposure and by the nature of the light. In many scenes lit for overcast day the fill was probably 50% of the key, but the resulting mood is still relatively somber because the light is diffused rather than bright or crisp and because the general level of exposure was slightly down. Because of the latter the cameraman had some problems in dealing with the lab. The communications with the lab were not ideal, especially when the company was on location, and occasionally the lab would print up scenes and advise the cameraman to give them a denser negative even though the lab had been instructed to print everything at the middle of the printer scale and the scenes were deliberately underexposed. The cameraman conceded that the effect he wanted could be achieved later by printing down a denser negative, but he preferred to alter the original exposure and see the effect in the dailies. The difference was a matter of as much as a half-stop at times, but it usually was such that it simply became apparent that a laboratory estimation of the "proper" exposure for a scene often does not take into consideration all of the factors a cameraman must consider.

The lighting techniques employed were also geared to enhance the sense of realism. The basic goal of the lighting was to create an image on film which approximates the way the scene would appear to the human eye. This implies first of all the use of "source lighting," i.e., the direction of the key light is determined by the position of the ap-

Walsh hand-holds Arri for a walking backwards shot, while assistant pulls focus, grip braces him and electrician holds a Baby spot for fill light on the actors.



A 90-foot track for the Titan crane built within a three-hour period on the crest of a hill in Tennessee. The near end of the track is supported on the bed of a truck. This rig made possible an intricate trucking shot involving zoom movement and an F-stop pull as the actors walked from the bright side to the dark side of the house.

parent light source in the scene rather than by consideration of the most "favorable" angle from which to light the subject. Occasionally a practical light was even added to a set in order to justify a necessary lighting set-up. For instance, one scene played on the stairs in a courthouse lobby at night, but in the actual courthouse there was no fixture which could justify lighting the actor's face. Since there was sustained dialogue and the facial expressions of the actor were crucial to the point of the scene, a light fixture was added. In this case the most appropriate fixture for the rundown courthouse was judged to be a bare bulb hanging in the stairwell. The light was visible in the long or medium shots of the character on the stairs, so that the same lighting on his face made sense in a closeup, even though the light was no longer included in the shot.

In most lighting set-ups, however, the direction of the key light was determined by the position of the strongest apparent source of light already in the set such as a window or practical fixture. The key light would be set with a direct foot-candle reading and the film exposed for this key even though the angle of the key might be such as to

strike a relatively small area of the face. The rest of the lighting would be set by eye so as to yield a natural balance.

The latitude of the film of course affects the amount of fill-light required to produce an image on film which corresponds with a subjective impression of a natural scene. This is the reason why fill-light was used in exterior set-ups, but it is interesting to note that what appears realistic or natural on the screen is not determined purely by our impressions of how the world looks to the human eye. It is also a matter of what the eye and the mind know about the latitude of film. The most obvious example of this occurs in filming day interiors on location. Because of the way in which the eye adapts, one is normally not aware of the extreme difference in the light level inside and outside a window. As a result, the conventional approach to lighting an interior location is to balance the light levels either by raising the level inside or placing neutral density filters over the windows so that the film records detail outside the window as well as inside. In shooting "I WALK THE LINE", however, the director, the cameraman, and the gaffer all agreed that the scenes

Continued on Page 1133



CORDLESS SYNC SOUND

The Eclair NPR's Quartz Crystal Control lets you shoot sync sound with no connection between camera and tape recorder. No sync cord. No AC power line. No radio signal. Nothing.

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So now the NPR gives you 5 second magazine changes with no threading, silent running with no blimp, and sync sound with no cord. Eclair NPR. It really helps you get the job done.

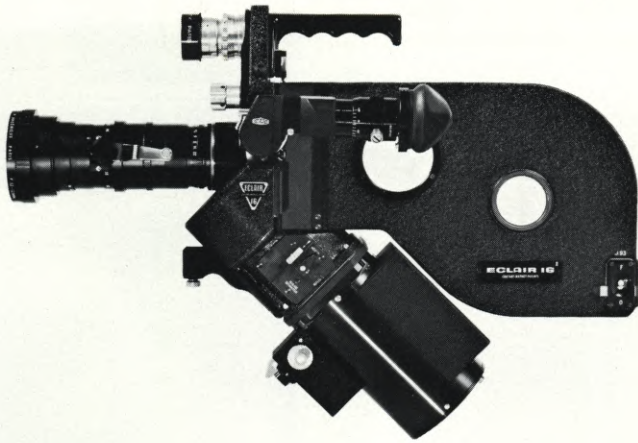
How Eclair Crystal Control works.

With the regular-sync-pulse generator and sync cord system, tape speed is made to conform to the camera's speed when the track is transferred to 16mm magnetic film. With the Eclair NPR camera's Crystal Control system, the camera motor's speed is regulated by a built-in quartz crystal frequency signal generator; and an identical crystal generator at the tape recorder puts a pulse signal on the recording tape, which is used as a speed reference at the transfer to 16mm.

These generators are completely independent of each other; but because the pulses they generate are truly identical, sync is maintained. And since each crystal is independent, any number of crystal-controlled cameras and tape recorders can be used together, without any connection between them and at any distance from each other.

Accuracy is as great as AC power.

Obviously, the whole thing depends on the crystal signals being exactly identical. Although several cordless systems have been in use for ten years or more, none has approached the accuracy



of synchronous motors running on direct AC power. For short or normal length takes and for recording speech (not music) on location, they have certainly been good enough. But they have all to some extent sacrificed accuracy for mobility. The Eclair Quartz Crystal, however, provides the first cordless sync signal that is unequivocally as accurate as the 60Hz pulse of AC electric power. Specifications are: sync error less than $\frac{1}{4}$ of a frame in one continuous 400 foot take. That's $\frac{1}{4}$ frame in 16,000 frames; and that's running the camera continuously for one eleven-minute scene. On shorter takes, of course, sync accuracy is even greater than that.

Proven in use in Europe and U.S.A.

And the Eclair system really *works*. It has been in regular use in Europe since 1966, and in the U.S.A. since 1968. ABC TV's World Of Sports are using it; so are Paramount Studios Special Projects Division; and many network TV Specials are being shot with Eclair Crystal Control. In fact, nearly half of all new NPRs are being bought with the Crystal Control motor. Names of satisfied users are available on request from Eclair, at the address below. Nagra and Perfectone tape recorders can be purchased with the Eclair crystal generator built in, or can be quickly and simply modified for Crystal Control operation. After modification, the same recorders can also be used with regular sync-pulse and sync cord systems.

Universal Crystal Control Motor.

Heart of the Eclair NPR Crystal Control system is this DC phase comparison motor whose

speed is regulated by a quartz crystal time base reference signal generator that attaches to the battery. It combines the portability and efficiency of DC battery operation with the accuracy and reliability of a synchronous motor. It's called a Universal Motor because it can be used with any number of crystal controlled cameras and recorders, or with AC powered cameras or sprocketed recorders using sync motors. It can also be made to keep in sync with a tape recorder playing back a pre-recorded track; which means that you can shoot cordless lip-sync Playback, even with music, even on location. The Universal Motor also functions as a crystal-controlled variable-speed motor, with tachometer. And its built-in sync pulse lets you use it with a sync cord, too.

Camera and Sound. Two one-man units, instead of one two-man unit.

A few of cordless sync's advantages: Shooting unrehearsed action, the soundman can stay where the sound is best, while the cameraman can move spontaneously as the action changes. In crowded places, no sync cord to trip people up. For unsuspected candid shots, the soundman can move close in with his recorder and microphone disguised, while the cameraman stays back out of sight and uses a long lens. Multiple cameras and recorders can cover non-repeating action from different angles, all in sync and all with complete freedom to move around.

The only disadvantage: No start mark. One way around this is for the soundman to visibly tap his microphone at the head or tail of a scene. Various strobe-light buzzer combinations are also available. And, of course, if automatic start marks are more important than complete mobility on a certain job, the Universal Motor can be used with a sync cord, which lets the camera's built-in clapper automatically establish sync when you switch on. Eclair NPR: one camera that really *helps* you get the job done.

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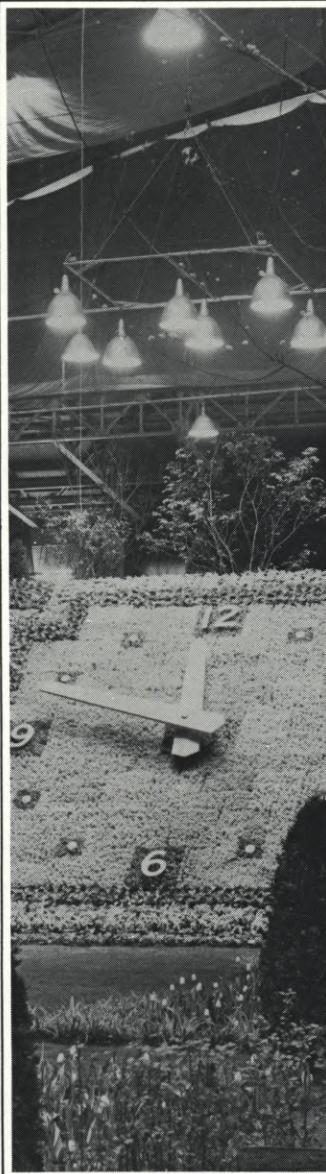
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SUPER-16

BY ANY OTHER NAME ...

They call it "Super-22"—and have recently completed a feature using it—but it's the same new extended frame 16mm format, recently reported in these pages, that is causing a furor among producers of low-budget features

By FERDE GROFÉ, JR.

When Adrian Mosser of Cineservice, Inc., handed me the June, 1970 issue of *American Cinematographer*, which directed considerable attention to *Super-16*, we knew the cat was out of the bag, and that our well-kept secret was now ripe for disclosure—if for no other reason than to relate our own experiences with this format, which may well turn out to be the most important technical development for feature producers since sound.

It all started for me in May of 1969 when, in the course of a conversation with Adrian, the discussion turned to the hows of improving the quality of blow-ups from 16mm to 35mm. Adrian mentioned a theory of his dating back to 1963 which involved shooting with an expanded aperture onto 16mm sin-

gle-perforation stock (as has been so well-described in *American Cinematographer*).

I became very excited about Adrian's idea and indicated my desire to implement the new concept. Our production company had just signed a 13-picture deal with CBS-Television, and I felt we might very well interest them in such a format if we could show that our ideas had merit. We were to produce feature films for initial premieres on American Television, and subsequent theatrical release in the rest of the world market.

Well, to begin with, we took an old Bolex of Adrian's and had a local camera repair shop in Hollywood mill out one side of the aperture 50/1,000ths of an inch. I took the camera on a trip to Colombia, South

America and shot several rolls of ECO with it. When I returned we had the film processed and had the laboratory open up the sound gate on an older model Bell & Howell printer so as to print all the way across through the sound area, permitting us to aperture the full image we had exposed. As Adrian had foreseen, we discovered the problem of picking up a slight vignetting effect with the wider angle lenses. This was due, of course, to the limitations of area coverage on certain lenses and indicated the necessity of re-centering our lenses. At this point we felt the need to consult a professional optics expert, and contacted Chris Condon of Century Precision Cine/Optics. After requesting his secrecy, we moved ahead in two areas; Adrian commenced development on a new gate for his printer, one that would, in effect, bring the new aspect ratio of 1.65 to the film area intact. This actually required a smaller frame area vertically on the 35mm negative, and meant a thicker frame line dividing each frame.

Correspondingly, the finished 35mm print in a 1.65 ratio would make better use of the standard 1.85 wide-screen ratio with less waste top and bottom. Chris Condon's job was to analyze all available cameras and select suitable lenses, with certain requirements in mind. The cameras needed to be relatively inexpensive to buy and practical to modify, suitable for use in conjunction with location synchronous recording, and with steady registration.

We were fortunate in having the help of Deluxe-General Laboratories, and they modified a printer to handle our rushes in the new process.

After a few months of concentrated effort we felt closer to our desired goals. At this point we discussed our ideas with CBS officials and were delighted to find they felt, as we did, that our new idea deserved an opportunity. The next question was what to call our brain-child. The very fact that we started our

On location in the Philippines, the author sights through viewfinder of Auricon Pro-600 Special camera, modified to accommodate the extended frame "Super-16" format—which he calls "Super-22" in order to foil those prejudiced against 16mm blow-ups. Two Auricons and a Bolex were modified by milling out apertures and recentering lens mounts.





(LEFT) Shooting a location sequence for CBS-Television Premiere feature, "RIDE THE TIGER", starring George Montgomery, Marshall Thompson and Victoria Shaw. 35mm blow-up negative for release was made by Adrian Mosser, who began experimenting with the format in 1963. (RIGHT) Action taking place for sequence in one of the exotic Far Eastern locales used as backgrounds for the feature. The new format offers several significant advantages for working in such situations.

whole effort in secrecy was due to the reluctance of feature film distributors to respect or accept the idea that theatrical product could be shot on original 16mm stock. The name "Super 22" is, of course, whimsical. It came about when I observed that an enlarged frame such as ours, if manufactured in proportion to its new size on a different stock, would probably be in excess of 20mm.

And so *Super-22* was born. In effect, *Super-16*, if you like, but cloaked under an alias to avoid prejudice.

Upon the advice of Chris Condon we acquired two Auricon Pro-600 Special cameras, a 10-to-1 Angenieux reflex zoom, a 5-to-1 Pan-Cinor zoom, Arriflex lens mounts and a 16mm Bolex with a complement of three lenses (Switar 25mm, Switar 16mm and an Ivar 75mm). All the mounts were re-centered, the lenses balanced and corrected, and the apertures on all three cameras milled out an additional 70/1,000ths to accommodate our new system.

The first project to be filmed in *Super-22* for CBS was "RIDE THE TIGER", starring George Montgomery, Marshall Thompson and Victoria Shaw. The production schedule was five weeks starting in January, 1970, with locations in the Philippines, Hong Kong and Thailand. Our Cinematographer was my old friend and regular co-worker Remegio Young, one of the best cameramen in the Far East who was as enthusiastic as the rest of us about our new process. And so, our *Super-22* project was, in reality, the first feature film produced in what others call *Super-16* (a rose by any other name).

As director-producer of the film, I've

encountered several minor problems, and made some interesting discoveries. For one thing, because the reflex zoom viewfinder objective on the Auricon is in front of the lens, rather than behind it, you don't get a precisely accurate image of the expanded aperture and, therefore, you must always compensate on one side for detail you don't see until rushes. In addition, you must also compose for television in a standard format (as it is impossible to project 1.65 on TV). This is somewhat tricky, but it appears to me to be quite possible if you take care that, whereas your subjects must be composed for the TV format, you must also take some pains to frequently balance inanimate objects in the corner of your frame which will be seen only in the theatrical version.

Another factor concerns certain details of editing. We used a conventional Moviola and we were required to remember that when an actor exited frame right on the Moviola he was still there on the *Super-22* frame, and so this necessitated an added timing factor, both visually and audibly, from an editorial standpoint. We modified a Bell & Howell projector by milling out the aperture, so as to project the full *Super-22* frame, and this has been a great aid in editing, in that it has helped to confirm our decisions. Another detail is composing titles acceptable to both standard and *Super-22* viewing.

However, all of these added considerations are far outweighed by the fact that with *Super-22* you achieve a true wide-screen format that can also be printed for standard TV projection without expensive scanning or reprint-

ing. From a production standpoint there are many startling and pleasant surprises. Of course, there are the obvious savings: raw stock is cheaper, laboratory processing is cheaper. However, also consider that if you're shooting on location you save considerably on your air freight. You also tend to lessen any delays or restrictions in foreign customs areas, as well as enjoying lower bonding requirements. Another marvelous thing is that you are able to shoot scenes with a greater potential of hidden camera techniques, and frequently avoid red tape because people take less notice of you.

Consider, too, that when you complete your 35mm blow-up negative you can use this for your loanouts to foreign distributors for printing overseas and still have your 16mm original safe in a vault.

I estimate our own savings over shooting in 35mm negative, including the cost of blow-up, to be at least \$20,000 in materials and specific services, and at least 15% in production time.

This may not account for much if you've got a couple of million to spend, but if you're working with less than \$200,000, it's a big saving. And the quality is remarkably good. So good, in fact, that the average film distributor can't tell the difference between *Super-22* and original 35mm.

I'm certainly not going to spell it out for him. As a matter of fact, our *Super-22* would still have been our own private secret, if *American Cinematographer* hadn't spilled the beans about *Super-16*. ■

POTENTIAL METHODS OF ACHIEVING "SUPER-16"

In the wake of the tremendous wave of interest sparked by *American Cinematographer's* recent Super-16 issue, an in-depth survey of the various factors involved—plus alternatives

By JERRY MORE

The June, 1970 issue of *American Cinematographer* contained six articles which related directly to Super-16 production. These provocative articles served to stimulate a tremendous amount of interest among a number of production people since the issue was published. Because this potential has always interested me greatly, I have made a serious effort, after having read these articles, to develop several new systems and to contact those in Southern California who were currently engaged in Super-16 development.

During scores of talks with many people in the industry, I found three typical reactions to Super-16 in general. Some had no use or application for it, whatsoever. Another group I would call the "Wait-and-See" people. And, finally, I encountered a substantial number who felt that this was one of the most exciting and beneficial developments in many years. I also encountered others who were initially lukewarm, but a few days later I found them quite excited and actively engaged in research and development. During the interim, it seems, they had received a number of serious inquiries about the potential of supplying equipment, or services. Most people who saw little application for Super-16 were those who had always been engaged in rather large budget 35mm production and had no reason or motivation to consider any other system. Usually the individuals *most* interested in developing this system to its fullest potential were those who had worked in 16mm or who had approached feature production on a very low-budget, independent basis.

My project during the past several weeks sought to investigate as fully as possible what had already been accomplished in this field and then to create whatever new systems might be potentially possible. I then put each new system into a mathematical comparison with the other systems so that I could fully assess whatever benefits these new

systems might offer. Any new method or system then had to be analyzed to discover the particular problems it might present in a number of different areas: raw stock, camera modifications, laboratory development and work printing, editing equipment, blow-up to 35mm negative, and acceptance by major studios and releasing organizations.

Among all those producers and rental organizations who may wish to consider converting equipment for Super-16 production, there will be many who will wonder whether the existing Super-16 is the best alternative, or whether another method may be devised in the next several months to make their recently converted equipment somewhat obsolete. It was for this reason that I have spent substantial time trying to propose a number of systems so that each can be developed according to its potential. Perhaps, within a rather short time, a standard can be settled upon which will satisfy a majority of those in the industry. Every effort has been made to look toward all possibilities and not to limit the choices at this point. Perhaps there are individuals who will wish to develop some of these systems and then report their experience in the months to come.

I have divided these systems into six categories as follows with accompanying tables in the text. They are briefly:

- I. Standard 16mm
- II. Wide 16mm
- III. 16mm Half Perf.
- IV. 16mm Moving Perforation
- V. 16mm Film with Super-8 Perforations
- VI. 17½mm Film

Since I worked out all the mathematical computations by hand during one long weekend, there may be some errors. I also encountered difficulty developing some of the comparison figures of the existing systems. A lack of information often forced me to interpolate certain figures and I apologize to others if there is some inaccuracy in presenting their systems.



ADVANTAGES AND DISADVANTAGES OF SUPER-16

Richard Patterson in his article in the June issue of *American Cinematographer* (Page 525) gave an excellent summary of the major reasons for utilizing Super-16. Although he has covered the ground well, I would like to add a few additional points and emphasize a few he has already stated.

One of the main comments of those engaged in the production of high-budget pictures is that the monetary advantage of shooting in Super-16 is highly overrated. With even an average studio budget, I'm sure that this would be true. However, the very essence of Super-16 is to provide a method of production for substantial numbers of individuals and companies who may not be able to produce in 35mm color at all. Mr. Patterson's example of the total cost between Super-16 and 35mm color shows a net saving of nearly 50% or about \$10,000. Even more important, I feel, is the ability to produce a feature-length picture through the work-print stage on 16mm for approximately \$4,000. Here is perhaps the greatest saving.

Where is the opportunity today for the group of people who wish to make a picture for even \$25,000, let alone \$50,000 or \$75,000? A number of years ago, this group could shoot in black and white and, if the major cost of their production was film and lab and a few hundred dollars for equipment rental, it was possible. Today, however, with the emphasis on color, these people lack any opportunity for expression in this medium. 35mm remains one of the few sources where admission is charged and a producer can perhaps clear his production costs and even a profit, if possible.

During the past fifteen or twenty years, a number of universities in the country have graduated literally thousands of highly-trained cinema students. Some of these students are eager to have an opportunity to gain experience in the

theatrical field. However, the opportunity offered them to work in individual or independent production has always been a problem.

A further advantage of Super-16 production can be found in the equipment used. Since most people interested in this method are those who have previously been actively engaged in 16mm production, these individuals already have extensive camera and editing equipment which can be utilized in this new medium. They are also experienced in 16mm camera, editing, and sound

problems and can sometimes be far more comfortable with the narrower-gauge film than someone accustomed to 35mm production. A substantial reduction in the weight of all equipment utilized can further the production possibilities.

There are certain types of pictures which would be nearly impossible to produce in 35mm. Many have looked forward to the development of a light self-blimped 35mm camera. However, when this finally appears on the market, it will have one substantial limitation

which can never be overcome. Running at 90 feet a minute, the camera will still probably weigh in excess of 25 or 30 pounds, at best. Presently, in 16mm, we have the Eclair and Arriflex which weigh a little over 20 pounds, and the Auricon conversions which weigh 12 to 14 pounds. Some film producers even respect the difference between 14 and 20 pounds when they are engaged in difficult, hand-held film production. Canon has just introduced its single system sound camera with 200-foot load weighing about 12 pounds and

POTENTIAL SUPER-16 SYSTEMS COMPARED

TABLE I

I. STANDARD 16mm AT PRESENT

Edge	.035
Sprocket	.072
Clearance	.001
Camera Ap.	.404
Clearance	.001
Sound Track	.113
Edge	.002
	<hr/>
	.628

With camera width of .404
 Height of .295 = 1.33 to 1 with area of .11918
 Height of .254 = 1.65 to 1 with area of .09898
 Height of .230 = 1.75 to 1 with area of .0929
 Height of .215 = 1.85 to 1 with area of .08686

II. WIDE 16mm

- * A. Swedish System with Eclair

Normal width	.404	}	.4825 or 1.635 to 1
Extension	.0785		
Edge	.0375		.290 height gives 1.66 to 1
- B. Century Precision with Auricon & Bolex

Normal width	.404	}	.474 gives 1.61 to 1
Extension	.070		
Edge	.046		
- C. Haskell Wexler Eclair

Normal width	.404	}	.500 gives 1.695 to 1
Extension	.096		
Edge	.020		
- D. Camera Development with Auricon

Normal width	.404	}	.505 gives 1.71 to 1
Extension	.101		
Edge	.015		
- * E. Extension of .102 with total width of .506 but reducing height to .290 gives 1.75 to 1
- * F. Extension of .102 with total width of .506 but reducing height to .275 gives 1.85 to 1
- G. Lloyds with Cine Special

Normal width	.404	}	.504 gives 1.71 to 1
Extension	.100		
Edge	.016		

III. 16mm HALF PERF WITH .295 HEIGHT

Edge	.035		
Sprocket	.036		
Clearance	.001		
	<hr/>		
	.072 (Instead of usual .108)		
A. Normal aperture width.	.404	}	.521 gives 1.77 to 1
Extension	.117		
Edge	.035		
B. Normal aperture width	.404	}	.532 gives 1.80 to 1
Extension	.128		
Edge	.024		
* C. Normal aperture width	.404	}	.542 gives 1.85 to 1
Extension	.138		
Edge	.014		

IV. 16mm FILM MOVING PERF TO .020 EDGE

Edge	.020
Sprocket	.072
Clearance	.001
	<hr/>
	.093 (Instead of .108)

A. Normal aperture	.404	}	.521 gives 1.77 to 1
Extension	.117		
Edge	.014		

- * B. Reducing height to .278 gives 1.85 to 1

V. 16mm FILM WITH SUPER 8 PERFORATIONS

Height of Frame			
Short pitch height	.1664	}	.3328
2nd sprocket	.1664		
Regular 16mm, short pitch	.2994		
Regular 16mm, camera aperture height	.295		
Normal frame line thickness at .295	.0044		
Total new height available	.3284		
Additional height available	.0334		

Width of Frame Double Perf.

Edge	.020
Sprocket	.036
Clearance	.001
	<hr/>
	.057 one side
	.057 one side
	<hr/>
	.114 Both Sides

Normal width	.404
Extension	.110
	<hr/>
	.514

- * A. Double Perf. with Height Reduced to .295 gives 1.75 to 1

Single Perf.	
Edge	.020
Sprocket	.036
Clearance	.001
	<hr/>
	.057

- * B. Normal aperture width .404 | } | .536 || Extension | .132 |
| Edge | .035 | | |

Height reduced to .305 gives 1.75 to 1

C. Normal aperture width	.404	}	.536
Extension	.132		
Edge	.035		

Height reduced to .295 gives 1.82 to 1

- * D. Normal aperture width .404 | } | .546 || Extension | .142 |
| Edge | .025 | | |

Height reduced to .295 gives 1.85 to 1

VI. 17½mm FILM WITH .295 HEIGHT and .687 WIDTH

- * A. Normal width .404 | } | .544 gives 1.85 to 1 || Extension | .143 |
| Edge | .035 | | |

**TABLE II
COMPARISON OF BLOW-UP TO 35mm
WITH STANDARD 16mm FRAME**

	Standard 16mm frame width of	.404	
	Standard 16mm frame height of	.295	
	Standard 16mm square area	.11918	
	1.65 to 1	1.75 to 1	1.85 to 1
HEIGHT	.245	.230	.215
WIDTH	.404	.404	.404
SQ. AREA	.09898	.0929	.08686

**TABLE III
COMPARISON BETWEEN STANDARD 16mm
AND PRESENT WIDE 16mm**

	1.65 to 1 Swedish System #I-A	1.75 to 1 #I-E	1.85 to 1 #I-F
HEIGHT	.290	.290	.273
WIDTH	.4825	.506	.506
SQ. AREA	.13593	.1467	.1381
% INCREASE	39%	60%	60%

**TABLE IV
COMPARISON BETWEEN STANDARD 16mm
AND NEW SYSTEMS**

	1.75 to 1 16mm Half-Perf #II-A	1.85 to 1 16mm half perf #II-C
HEIGHT	.295	.295
WIDTH	.521	.541
SQ. AREA	.15369	.15959
% INCREASE	64%	84%
		Moving 16mm Perf #4-B
HEIGHT		.278
WIDTH		.521
SQ. AREA		.1544
% INCREASE		82%
	Super 8—Dbl. Perf #V-A	Super 8 Single Perf #V-D
HEIGHT	.295	.295
WIDTH	.514	.546
SQ. AREA	.15163	.16107
% INCREASE	62%	85%
	Super 8 Singl. Perf #V-B	17½mm #VI-A
HEIGHT	.305	.295
WIDTH	.536	.544
SQ. AREA	.16348	.16048
% INCREASE	65%	85%

there may be other 16mm and 35mm self-blipped cameras on the way soon.

When the cameraman works with a camera weighing no more than 12-14 pounds, and one which is balanced completely on the shoulder instead of out in front, he can function quite well all by himself. If he has a built-in slate-marker with bloop oscillator for the recorder, sync sound can be recorded with only one cameraman.

The Cass-Sync sound recorder has recently been introduced which utilized a cassette tape recorder. This has been substantially modified to run at 3¾ inches per second giving a frequency response of 50-12,000 cycles ±2 db. This recorder uses one track for sound recording and the other for the sync pulse. This unit, complete with large VU meter and slide gain control, weighs only 6 pounds, so that the sound man can usually handle the microphone as well. Utilizing such equipment, it is now possible to shoot with a crew of two or three people, which opens up a tremendous segment of subject matter that has generally extended beyond the practical feasibility of the larger crews in the past. The ability to use a camera and sound crew of two or three people also allows for a substantial potential to experiment, improvise and develop new and different styles of filmic expression.

Individuals shooting in foreign countries will gain substantial advantages by carrying lighter and smaller equipment and may find more cooperation from certain governments who may view their film project as a small documentary instead of a large-budget theatrical enterprise.

Finally, I see Super-16 as a potential which may mean the difference between a picture being made or not shot at all. Certainly it is a worthy approach if it allows people who could never shoot for release in 35mm to gain independent production experience where they are responsible for all segments of production, instead of attaining their feature experience as a small part of a very large crew. In such cases it is difficult for a single technician to gain experience beyond his own immediate job.

The disadvantages lie mostly in the cost of modification. If a producer owns his own equipment, he may not wish to spend this sum of money or to tie up equipment for this specialized use. Fortunately there are a number of rental companies which are already adapting cameras; equipment will be available in the near future.

Shooting on location, however, could be a problem because of damage and repair. Most distant repair organizations will be totally unfamiliar with the equipment should it need adjustment during shooting. Crew members who are used to standard equipment will have to be trained to some extent, and occasionally one might find technicians who are too traditionally oriented to feel comfortable with this new equipment. I know of some who would consider it an affront to be asked to make a feature in 16mm or Super-16. However, it wasn't too long ago that many felt the same about using an Arriflex or Eclair for 35mm feature production. In sound recording during the past 15 years or so we have gone from optical sound to 17½mm magnetic film, to 16mm to

¼-inch pulse-sync tape at 15 inches per second, then 7½ inches, then 3¾ inches, and now cassette. During each step of the way there were always some who felt that each new system was too imperfect to be practical.

An important consideration is the public acceptance of Super-16 for feature use. During the Fifties, the industry actually went in the opposite direction developing many systems for increasing the quality of the projected image through the use of better equipment and larger-gauge negatives. However, in the last year or two we have seen a trend toward public acceptance of much smaller pictures utilizing 16mm such as "FACES", "WOODSTOCK" and portions of "EASY RIDER", "DOWNHILL RACER", "MEDIUM COOL", "HELL IN THE PACIFIC" and "BEACH RED". With these successful endeavors breaking the barrier recently, I feel we will have a great deal more 16mm production in the future.

Although we have already had substantial public acceptance in this area, a critical factor is the acceptance of the major studios and releasing organizations. For the most part, major studios may be inclined to consider these productions if they feel that they have been competently made and have a good commercial release potential. However, unless the individual producer has a substantial reputation already established, he may find difficulty in gaining this acceptance from many companies. There still seems to be some sort of a stigma attached to 16mm and an automatic generalization of inferior quality

Continued on Page 1116

ALASKAN ADVENTURE

Continued from Page 1079

emerging all covered with leeches. I find myself wondering if they have leeches in Alaska.

The others gingerly pick their way about the perimeter of the mud hole and, attempting to do likewise, I slip and fall right into the big middle of it. I am up to my navel in ooze and I can feel the gooey stuff creeping over the tops of my waders and down my legs. The weight of the camera case (now half-submerged in the slime), plus the skin-diver's belt, plus the natural suction of the mud conspire to keep me from pulling myself out of the mess. This is just the laugh the others have been waiting for all day, and they make the most of it.

Somehow (my mind has mercifully blotted out the details), I manage to extricate myself and continue along the trail—a walking mud-pie. The path leads to a crude landing to which is tethered a boat with an outboard motor. We pile ourselves and all of our gear into this doughty craft and go putt-putting downstream, as I give thanks to the Great God Evinrude. But too soon! Up ahead a log-jam blocks further passage—so it's out of the boat and onto the trail again. During that last half mile I have graphic visions of what the Bataan Death March must have been like.

Finally, we are standing on the far bank of the creek, looking across at what appears to be a giant packing crate (the kind pianos are shipped in)—except that it has windows. This, I am informed, is to be our home-away-from-home for the next week or so—the Lake Eva Hilton, no less. It was originally built by some government bureau or other as shelter for a couple of guys



After a hard day over a hot camera, the jolly crew laughs and scratches in their snug Alaskan home-away-from-home. (left to right) Production Supervisor/Second Unit Director Bill Young, Ted Walker, Cameraman Jeb Gholson, Writer/Producer/Director Larry Savadove. (BELOW RIGHT) Walker uses the Beaulieu 4008ZM Super-8 camera for macro-filming of very small subjects, being able to get ultra-closeups of objects one millimeter from the lens.

who had nothing better to do than sit there and count fish all day.

There is nothing for it but to ford the creek, which turns out to be a bracing experience. You inch your way across a bottom covered with slippery boulders, while a torrent of 38-degree water comes roaring at you crotch-high, turning your legs into twin popsicles.

I may, also, now be sterile and not even know it!

It Isn't Much, But We Call It "Home"

The structure that looked like a packing crate from across the creek turns out, on closer examination, to be

Continued on Page 1114



(LEFT) Marooned by the rain outside, Jeb Gholson sets up his Arriflex to shoot some unexpected interior scenes, while Larry Savadove plots out the action. (RIGHT) Walker runs through a series of household chores for the camera. Ordinary 100-watt light bulbs, hopped up in intensity by Gholson's special "tapping" treatment, and backed up with homemade aluminum foil reflectors, augment the ambient exterior light to provide an exposurable level of illumination.



MARTIN HILL & ASSOCIATES PRESENTS.....A RARE OPPORTUNITY!

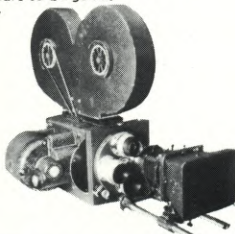
Unusual surplus buys enable us to offer professional motion picture equipment at unbelievably low prices.

CAMERAS

MITCHELL 35mm NC
For one low price you can buy a complete ready to use Mitchell NC outfit for less than the usual price for the camera head alone!
Outfit includes:
Camera head with rackover and built in features.
Two 1000 ft magazines
110v 60 cycle 1 phase sync motor
110v variable speed motor with tachometer
24v DC variable speed motor with tachometer
Erect image viewfinder with accessories
Matte box assembly with accessories
35mm f/2.3 Baltar Lens (coated)
50mm f/2.3 Baltar Lens (coated)
75mm f/2.3 Baltar Lens (coated)
100mm f/2.3 Baltar Lens (coated)
152mm f/2.3 Baltar Lens (coated)
One set of carrying cases for camera and accessories.
Mitchell tripod with friction head.
Condition of camera and accessories is excellent.
Condition of tripod, good.
REPLACEMENT VALUE APPROXIMATELY \$20,000. SALE PRICE WHILE SUPPLY LASTS, ONLY \$4,250.

35mm MITCHELL MODEL GC HIGH SPEED
Same accessories as NC except high speed motor with rheostat instead of sync motor.
REPLACEMENT VALUE APPROXIMATELY \$14,000.
OUR PRICE ONLY \$2,950.

70mm MITCHELL STANDARD
Two lenses, matte box, two 70mm X 1000 ft magazines, erect image viewfinder, 110v variable speed motor, carrying cases.
Condition appears to be good.
PRICE \$3,450.



(Prices are FOB Charlotte, N.C.)

WALL 35mm CAMERAS, LATE MODEL PH-270A
Practically never used by the PENTAGON, these immaculate cameras were bought for a 'song'.

Double pull down, double pin registered movement Rackover and and reflex finder similar to Mitchell.
Outfit includes: Camera, 35mm, 50mm, 75mm, 100mm Baltars, and one 8 1/4 inch Tessar lens.
Four 1000 ft. magazines, viewfinder lenses, carrying cases, filter holders. This is a high grade precision camera capable of highest quality work.
The coated Baltar lenses alone are worth more than our low price of \$995.

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Very good condition
Only \$695

Eastman Type III High speed 16mm camera. Speeds from 1000 to 3200 frames per second. Rheostat controlled, with lens, case.....Good condition
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Eastman High Speed camera similar to Type III but older model. Still in good condition
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Famous Depue combination 16mm contact printers. Prints picture and sound track simultaneously on separate heads. Includes Depue model 152 Light Change Board. A high grade printer in excellent condition.
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Oscar Fisher 16/35mm negative-positive B&W processors Model EH9-A1. With bottom drain built in temperature control. Current model sells today for \$7,450.
OUR PRICE ONLY \$995.

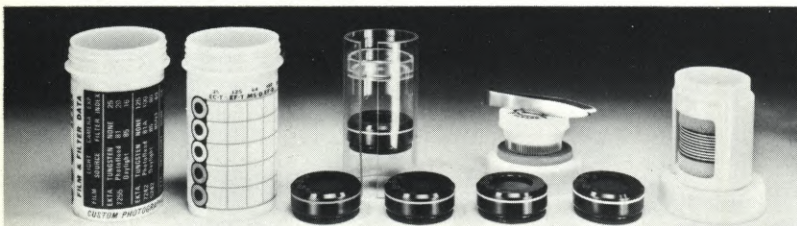
Houston Fearless Model 22-B 16mm negative-positive processor. With bottom drains, two magazines.
OUR PRICE ONLY \$1,250.

PROJECTORS

DEVRY 35mm PROJECTION BOOTH
Includes two Devry Model XD Projectors with lenses, changeovers, pedestals, Devry amplifier with preamps, two Magnarc Arc Lamps with rectifiers. In good condition and ready to use.
PRICE \$1,750

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- 12 - 120
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having either type of Arriflex mount - the regular or the steel bayonet, including the BL; or with the Eclair mount for the NPR and CM3 cameras. Use type AE3GS for these.

We also make the BTL35A holder which fits the 25-250 Angenieux for 35mm Arriflex and Eclair CM3.

Do some of your longer focal length shots appear 'soft focus'? A gel filter introduces less optical interference than a glass one - hence, better resolution.

Have the convenience of a full inventory of filters to meet any filter situation - all at little expense.

THESE FILTER HOLDERS AND KITS ARE REALISTICALLY DESIGNED THROUGHOUT TO OFFER THE UTMOST IN CONVENIENCE AND USEFULNESS FOR THE PROFESSIONAL CAMERAMAN.

A two inch square of Wratten filter gel will make four filters for either type holder. Each holder has a ring of color to identify its place on a filter holder data chart where you can write in the exposure index for the films with which you will want to use it. The holders also have spacers to prevent Newton rings when more than one gel is used to make up a combination filter. They are packaged in kits with gel cutter, tweezer and indexed container for extra gels which has places for eight in each of nine compartments.

And there is a FILM & FILTER DATA CHART for handy reference.

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- Type BTL35A -
- FOUR holders with kit \$65.00
- Type AE3GS -
- Five holders with kit \$40.00
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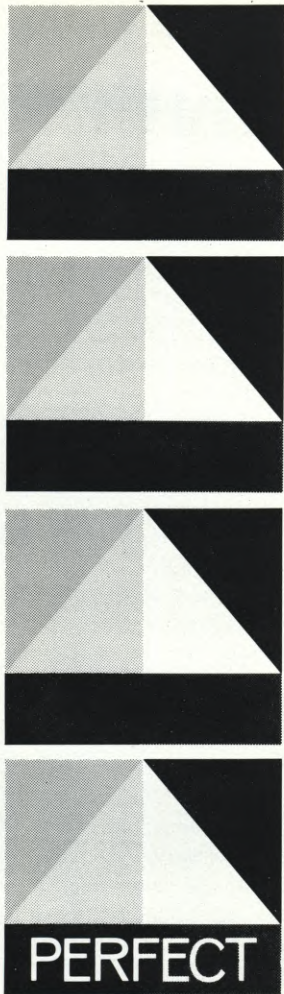


Type BTL35A

For ANGENIEUX

25 - 250





We're the film laboratory with the perfect name.

With virtually all of our facilities under one huge roof . . . the balance in another building only yards away . . . Perfect Film Laboratories provides a full service for clients throughout the United States and Canada . . . with a speed that enables us to cut weeks from the major jobs; days from the lesser ones.

IN DETAIL, OUR SERVICES: **EDITING?** Yes! We have skilled staff editors always available. Or —complete facilities for your own editing use may be rented. **OPTICAL EFFECTS?** Yes! We'll handle your requirements for optical effects, including Wet Gate, Blow-ups or Reductions. **ART SERVICE?** Yes! Oxberry, Hand Lettering, Press and Animation are yours to command. **SOUND?** Yes! There's a complete studio, using the newest R.C.A. 35MM and 16MM equipment. **LABORATORY?** Yes! Here in one location . . . every facility for the finest, fastest film processing . . . Bell & Howell Model C 35MM or 16MM . . . Producers Service 101 High Speed Reduction Printer . . . Fast processing of both 35MM and 16MM Negative, Positive, Black and White and Color film. **DISTRIBUTION?** All major airlines, through Denver and Colorado Springs provide optimum service. Where urgency demands, door-to-door expediting is provided, in Colorado or across the nation.

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A CANDID INTERVIEW WITH A WET PHOTOGRAPHIC ENGINEER

Jordan Klein, internationally famed authority on underwater filming, talks about the new frontiers for cinematography developing in the depths of the sea

(EDITOR'S NOTE: The transcript of writer Bosh Stack's recent interview with Jordan Klein reached our editorial offices too late for publication in the September, 1970 special "Underwater Cinematography" issue of AMERICAN CINEMATOGRAPHER. The interview includes some interesting observations on the current state of the art in this highly specialized field of film-making. Because of the lively interest in the subject expressed by many of our readers, we are publishing the following segments from Mr. Klein's interview.)

STACK: How long have you been actively engaged as an underwater photographer?

KLEIN: Since 1948 and commercially since 1952, starting with stills and motion picture work, then motion picture work only.

STACK: How many hours would you estimate you have spent beneath the water in all that time?

KLEIN: I would guess 3500 to 4000 hours or about six months total.

Jordan Klein fits a modified Eastman K-100 camera into a special housing of his own design mounted on the stern of a camera boat.



STACK: How did you get started in this rather unusual end of the business?

KLEIN: By combining the two things that I love the most—photography and the ocean. When I first started diving in the late 40's, I designed and built my own equipment. This ultimately blossomed into the business that is presently called MAKO Products.

STACK: In the course of the years until now, Jordan, what changes have you seen come about in the equipment and the techniques in underwater photography?

KLEIN: The changes in basic equipment have not moved rapidly. It has been only recently that optical improvements have been made for photography beneath the surface such as our optical dome port correcting system. This system removes the distortion caused by the difference in the reflective index of air and water. In other words, it simply allows an 18mm lens to function with the same angle and resolution underwater as it does in air. Other technical improvements are the removal of electrical power from underwater photo-

graphic units. We are now powering cameras with compressed air. Another important improvement has been our 180° optical finder. Previously, finders had no peripheral vision and in most instances, the cameraman was blind on the housing side of the finder and could not tell when or where the subject would come into frame. With our 180° finder, the peripheral vision allows more than ample time to line up the camera for incoming objects from any direction. The techniques of under water photography are improving steadily. I personally feel this improvement occurs in direct proportion to the amount of exposure the cameraman has to the underwater environment. The prime prerequisite is that the cameraman be a competent diver who does not have to concern himself in this hostile environment; therefore, he can devote 100% of his mental efforts toward obtaining the image on film that both he and the director require.

STACK: You are reputed to be one of the foremost underwater technicians in the country. I have heard of you being referred to as an underwater engineer. What does that mean?

(ABOUT THE AUTHOR: Jordan Klein is internationally recognized as the foremost authority on underwater filming and photography. He currently heads three Miami firms engaged in various aspects of photography and research. They are Underwater, Inc., Mako Products, and Hydronaut, Inc. All are subsidiaries of Bio-Science Resources, Inc., headquartered in New Jersey.

Starting at age 10, Klein has been diving for 30 years. He has logged over 6,000 hours beneath the surface—approximately two-thirds of a year.

He didn't originally intend to concern himself with commercial filming for TV, the movies, or advertisements, thinking he'd be solely occupied with invention and research. In these last two named roles, Klein and his firms have produced many innovations.

Included are the world's largest fleet of two-man, mini-submarines and the Cryo Lung, a liquid air breathing device that sustains man three to four times longer than conventional scuba equipment while weighing 75 percent less.

Klein has developed Mako Products into one of the nation's leading manufacturers of

high pressure air compressors used in the fire fighting, oceanographic, and aviation areas. He produced the world's first popular-priced underwater camera with flash—the Mako Shark.

More than anything else, however, his underwater cameras have been responsible for the emergence of undersea filming, not only for entertainment industry, but governmental and scientific use.

Klein received Oscar mention for the dazzling underwater effects he created and filmed for the movie, "THUNDERBALL". Other film credits include "FLIPPER", "THE CREATURE FROM THE BLACK LAGOON", "12 MILE REEF", "20,000 LEAGUES UNDER THE SEA", "CAPTAIN NEMO AND THE FLOATING CITY", "AROUND THE WORLD UNDER THE SEA", and "DARING GAME", among others.

In addition to the companies mentioned in the accompanying article, Klein has filmed innumerable underwater color TV commercials for such major clients as Ford Motors, Timex, Bic Pens, Pall Mall, Newport and Parliament Cigarettes, and Reynolds Sub Service.)



The two faces of Jordan Klein. (LEFT) The jolly underwater adventurer, puffing his cigar, prepares to explore the deep. Regarded as amphibious by his associates, Klein is sometimes described as "half-man, half-fish". (RIGHT) At his drawing board, the serious designer of highly specialized underwater camera housings and a whole array of submersible vehicles which have been used in many motion pictures.

KLEIN: My interests are primarily technical. I am personally interested in anything that takes place on or beneath the surface of the ocean. The things that interest me the most are underwater problems—either photographic (requiring specialized equipment) or properties and sets, submersibles, propulsion devices, lighting and sound. In other words, while photographic problems are my primary interests, any underwater challenge excites me. MAKO Products, therefore, is primarily a company interested in solving problems or building sets that in many instances have been stated as impossible to construct or function. Designing, constructing and using specialized underwater equipment such as the seven cameras synchronized to create a mosaic for the U.S. Navy of the side of a speeding destroyer, or for a Shell commercial which required photographing the bottom of a boat, including both rudders and propellers, while traveling at 38-miles an hour. The more impossible the photographic task, the better we like it.

STACK: I understand that you hold patents on amateur underwater cameras and have designed housings to solve specific problems. What are some of the special problems you have come up against in underwater photography?

KLEIN: The primary problem that always plagues underwater photography is

water clarity. This problem was proposed to us 12 years ago in the Mississippi River where visibility was less than three inches. We subsequently photographed an area with a format of approximately eight-feet square with crystal clarity at an amazingly low cost. We have done this again for oil companies requiring photographic evidence of structural failure caused by corrosion in highly contaminated water. Problems caused by sea creatures in most cases are minor. As far as I am concerned, the biggest danger is swimming into a man-of-war or getting a mouthful of jellyfish.

STACK: There seems to be a rash of interest in underwater television commercials in recent years. Are you getting more calls for this sort of work?

KLEIN: Underwater television commercials run in cycles. I personally feel that each season, every major house will make at least one underwater commercial, while the following season the emphasis might be on skydiving, snow-skiing, horseshoe-throwing, or some other sport, hobby or interest; however, generally speaking, underwater throughout the cycles has been increasing and we now are enjoying a regular business from both new and old clients on a world-wide basis.

STACK: What sort of service do you perform for the advertising agencies or

their clients other than underwater photography per se?

KLEIN: I can best answer that by giving an example of how we have worked with one major New York Agency over the past ten years. It starts with a request for a rough quotation based on a verbal story board. Within a few days, I am called back and asked for a firm quotation, since I have, in the interim, received the story board. In most cases, the story board involves a prop or a set or both, a support vessel, location and camera crew, as well as the necessary underwater and topside equipment to complete the job. Talent, in most instances, is supplied by the account. From this point we move to the location and complete the entire job supplying our client with exposed footage. In most instances, this is done for this particular client without representation on location. This, admittedly, is a rare account. In most instances, we supply an individual service or group of services, such as designing and constructing a prop, providing the photographic equipment underwater or topside and possibly a support vessel. We regularly supply location scouting via our amphibian aircraft. This permits scouting of the entire Bahamas or Florida Keys within a one day period, since the underwater locations can be looked at directly from the aircraft. Our facility in

Continued on Page 1124

FLASHBACK TO ATLANTA

Correcting the "sins of omission" in regard to award winners at the Atlanta International Film Festival, inadvertently passed over before

(EDITOR'S NOTE: The August, 1970 issue of American Cinematographer carried what we thought to be a complete list of films receiving awards in the 1970 Atlanta International Film Festival. We have just received a communique from Festival headquarters informing us that "in the mad rush of preparing the list of Award Winners for the media, unfortunately, and regrettably, several winning films got left off the list." So, in order to set the record straight, we are publishing here-with an addenda of Award Winners previously omitted. Following that are synopses taken from the program notes of films which we found particularly impressive, but which space limitations precluded our publishing in the August, 1970 issue.)

**Gold Medal
Special Jury Award**
"SKEZAG"
Cinnamon Productions
New York City, New York

**Gold Medal
Special Jury Award for
Outstanding Creativity**
"JACK JOHNSON"
The Big Fights, Inc.
New York City, New York

The magnificent Atlanta Memorial Arts Center complex, which includes Symphony Hall, site of all of the screenings for the 1970 Atlanta International Film Festival. No effort (or expense) was spared to bring in the finest available projection equipment, in order to do justice to the many excellent films shown.

**Gold Medal
Special Jury Award**
"SHOTGUN JOE"
Jason Films
Riverdale, New York

**Gold Medal
Special Jury Award**
"A QUICKIE"
Dick Kortz
San Francisco, California

**Silver Medal
Safety**
"SMOKING: IT'S YOUR CHOICE"
Alfred Higgins Productions
Los Angeles, California

**Silver Medal
Featurette**
"A FEATURETTE ON THE MOTION
PICTURE THE GREAT WHITE HOPE"
Corda Productions
Los Angeles, California

**Silver Medal
TV Commercial-Regional**
"DOCUTELLER"

Burke Dowling Adams
Atlanta, Georgia

**Silver Medal
Lead-Ins**
"WAR & PEACE"
Elinor Bunin Productions
New York, New York

**Silver Medal
TV Commercial-Political**
"POLLUTION"
Guggenheim Productions
Washington, D.C.

**Silver Medal
Atlanta Producer**
"I'VE BEEN LIVING HERE ALL
MY LIFE"
David Moscovitz
Atlanta, Georgia

**Bronze Medal
Lead-Ins**
"DON RICKLES IN BROOKLYN"
Elinor Bunin Productions
New York, New York

CATCH THE JOY

*He who catches the joy as it flies
Lives in eternity's sunrise.
—From the William Blake
poem, "Eternity"*

*The sand dunes, one of nature's most
elegant gifts, are the spacious play-
ground for the fast-growing sport of
dune bugging. "Catch the Joy" is a
capsuled look at the variety of joys able
to be caught while riding the dunes.*

CATEGORY: Sports

PRODUCTION COMPANY: Pyramid
Films

PRODUCER: David Adams

DIRECTOR: MacGillivray/Freeman

NARRATOR: None

SCRIPT: MacGillivray/Freeman

CAST: Jeff Huston, Dean Bonjour, Gay
Brobeck

MUSIC: Val Johns

CAMERAMAN: MacGillivray/Freeman

EDITOR: MacGillivray/Freeman

RUNNING TIME: 15 minutes

COLOR, OPTICAL, 16mm

COLOR SYSTEM: C.F.I.

SOUND SYSTEM: Cinesound

USA



"COME TO YOUR SENSES"

An experimental film designed to take the audience through the work of Bernard Gunther in the field of sensory awareness. Nine people were brought together for five days at Esalen Institute in Big Sur and the film catches the highlights of the experience they had there.

CATEGORY: Documentary—

Educational

PRODUCTION COMPANY: Prana-Mendelson Productions

PRODUCER: Walter De Faria, Bernard Gunther

DIRECTOR: Walter De Faria, Bernard Gunther

MUSIC: Rod McKuen

1st CAMERAMAN: Sheldon Fay, Jr.

EDITOR: Dezsoe Nagy

RUNNING TIME: 25 minutes

COLOR, OPTICAL, 16mm

COLOR SYSTEM: Ektachrome

SOUND SYSTEM: Double

USA

LANGUAGE: English

"A DAY IN THE DEATH OF DONNY B."

A day in the life of a young heroin addict—shot entirely on location in Harlem.

CATEGORY: Social Welfare

PRODUCTION COMPANY: Audio Productions

DIRECTOR: Various

CLIENT: Natl. Inst. of Mental Health

SCRIPT: Carl Fick

MUSIC: Harry Holt

CAMERAMAN: Various

EDITOR: Harold Phox, Dennis Blakeley

RUNNING TIME: 15 minutes

COLOR, OPTICAL, 16mm

USA

LANGUAGE: English

EAGLE HAS LANDED: THE FLIGHT OF APOLLO 11

Tells the story of the historic first landing of men on the moon in July 1969. Depicts highlights of the mission from launch through post-recovery activities of Astronauts Armstrong, Aldrin and Collins, with emphasis on exploration of the lunar surface.

CATEGORY: Flight

PRODUCTION COMPANY: National

Aeronautics & Space Administration

PRODUCER: Clayton Edwards

DIRECTOR: Lynn Moore

NARRATOR: John Flynn

SCRIPT: Walter Whitaker

EDITOR: Bastian Wimmer

RUNNING TIME: 28 minutes

COLOR, OPTICAL, 16mm

COLOR SYSTEM: Eastman
USA

LANGUAGE: English

FIRE MOUNTAIN

A volcanic eruption is one of nature's incredibly spectacular and awe-inspiring events. With no narration to intrude in the visual experience, the course of the most recent eruption of Kilauea, Hawaii, is shown from beginning to end; the rarely seen termination of volcanic activity is included. The fountain reached a record high of 1800 feet. Devastation and beauty are the aftermath of the eruption.

CATEGORY: Documentary—Short
Subject

PRODUCTION COMPANY:

Encyclopedia Britannica Educational Corp.

PRODUCER: Bert Van Bork

DIRECTOR: Bert Van Bork

SCRIPT: Bert Van Bork

CAMERAMAN: Bert Van Bork

EDITOR: Ulf Backstrom

RUNNING TIME: 9 minutes

COLOR, OPTICAL, 16mm

COLOR SYSTEM: Eastman

USA

"THE FIRST FLICKERS"

For more than 50 years, stored on the shelves of the Library of Congress, were more than 3,500 prints of motion pictures produced between 1894 and 1912. These were paper print positives, filed with the Library to copyright the films in an era when motion pictures could only be registered as still pictures. Today, most of the original films, made on nitrate base, have literally disappeared. Until the 1950's, there was no way in which to convert the unprojectable prints to motion picture film. However, today they are now converted to films once again, and a lost period of the movies can be seen again. Appearing in the program are early stars such as Mary Pickford and Mack Sennett, the first film ever copyrighted, and two versions of the "Great Train Robbery."

CATEGORY: History

PRODUCTION COMPANY: WRC-TV

PRODUCER: Bill Leonard

DIRECTOR: Charles Stopak

NARRATOR: Willard Scott

SCRIPT: Bill Leonard

CAMERAMAN: Robert Gelenter

EDITOR: Milton Sink

RUNNING TIME: 24 minutes

COLOR, B&W, OPTICAL, 16mm

COLOR SYSTEM: Ektachrome

USA

LANGUAGE: English

ISRAEL NOW

This film is intended for world-wide distribution primarily to non-Jewish audiences. It is intended to show an aspect of the Israeli people and their country that is not normally seen through conventional news media.

CATEGORY: Travelogue

PRODUCTION COMPANY: Arthur

Wooster Ltd. in association with

Anthony Gilkison Associates

PRODUCER: Anthony Gilkison

DIRECTOR: A. Wooster

NARRATOR: David de Keyser

CLIENT: Israel Government

PRODUCT: Israel

SCRIPT: Anthony Gilkison

MUSIC: Edwin Astley

CAMERAMAN: A. Wooster

EDITOR: Terry Twigg

RUNNING TIME: 21½ minutes

COLOR, OPTICAL, 16mm

COLOR SYSTEM: Technicolor

SOUND SYSTEM: RCA

UNITED KINGDOM

LANGUAGE: English

IT COULDN'T BE DONE

"It Couldn't Be Done" salutes the men and women who completed such "impossible" projects as the Mt. Rushmore Memorial, the Panama Canal, Golden Gate Bridge and Holland Tunnel. The program covers these and other achievements by old and new film, animation, and with filmed interviews of veterans of many of these projects.

The film serves as a reminder that American know-how and ingenuity has overcome past impossibilities and inspires us to look optimistically to the future.

CATEGORY: Documentary TV

PRODUCTION COMPANY: Lee Mendelson Film Productions, Inc.

PRODUCER: Lee Mendelson/Walt De Faria

DIRECTOR: Walt De Faria/Sheldon Fay, Jr.

NARRATOR: Lee Marvin

CLIENT: AT&T-Long Lines Dept.

SCRIPT: Lee Mendelson

RUNNING TIME: 60 minutes

COLOR, 16mm

USA

LANGUAGE: English

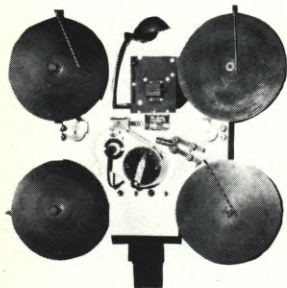
JUNKDUMP

The mounting problem of the amassing of solid wastes is very serious today—but future generations may find themselves totally inundated with the unreclaimable residue of society.

JUNKDUMP vividly portrays one day in the life of a husband and wife

Continued on Page 1128

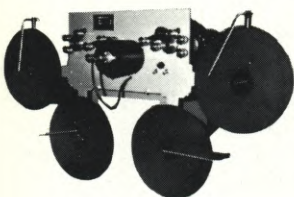
HOLLYCAM Printer Sale



TEL-Amatic 16mm Printer

The Tel-Amatic offers professional quality at low cost. An improved, continuous, sound and picture contact printer for double 8mm and 16mm films, designed for color, B&W, sound or silent films. Has semi-automatic, 13-scene, mechanical light change. 1200 ft. capacity. Speeds to 43 FPM. Four-way aperture. Lamp holder accommodates CC filters. Footage counter. Its many outstanding features make this printer a top buy.

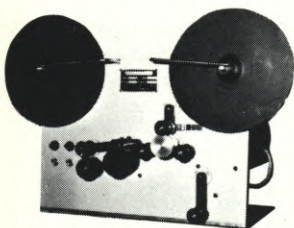
List Price, \$1995.00 **OUR PRICE, LIKE NEW \$1595**



Herrnfeld 1517-B 16mm Sound Printer

Designed as a companion for the Bell and Howell Model J 16mm printer. Ideal for color or B&W, 1200 ft. capacity, speeds to 86 FPM. It is a "B" wind printer, making rewinding of the positive unnecessary when first printing the picture on "A" wound film on a Model J printer. Will make 200 prints from a single negative without increasing background noise by more than 1 1/2 db.

New Price, \$2500.00 **OUR PRICE, LIKE NEW \$1995**



Herrnfeld 1502-A 35mm Loop Printer

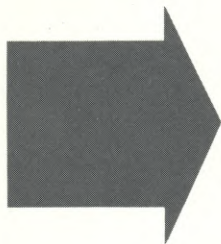
The 1502-A will duplicate a single master loop at 43 FPM up to 9000 times without abrasion. Ideal for making copies of color film strips and slides in large quantities. Holds 1000 ft. of raw stock. Takes a 22-inch loop as a printing master and longer loops can be accommodated with auxiliary rollers. Has two, color-correction filter holders and four apertures. 1000W blower-cooled lamp.

New Price, \$2000.00 **OUR PRICE, LIKE NEW \$995**



Other Printer Specials:

Herrnfeld 35mm w/shotgun color filter
changer\$1195
Arriflex 35mm step printer w/punch tape
control\$1495
Bell & Howell Mdl. J 16mm printer\$4350
Bell & Howell Mdl. D 35mm printer\$2995



H3C Hollywood Camera Co.

6838 SUNSET BLVD., HOLLYWOOD, CALIF. 90028 Telephone (213) HO 6-1318
We buy, sell, consign, trade, rent, repair all new and used equipment.

THE HANDIOLA

Continued from Page 1087

software being the perforation pitch of the tapes. The Handiola tape assemblies are instantaneously interchangeable, permitting films shot at either speed to be edited on the same fundamental unit. The 16mm Handiola is available in two models, both identical except for the size of the viewing screen: Mark I has a 3 1/4" x 4 1/4" screen, while Mark II has a 4" x 6" screen. The Super-8 model is available only with the smaller screen. TV safe-action cut-off masks are available for all models. The units are packaged as complete assemblies, including editing table, amplifier/speaker, and special rewinds. Depending upon optional equipment, all are priced around the \$500 range.

The illustrations show only single-gang models. However, Mr. Roller reports that two-gang models are now being readied. In summation, it seems that the Handiola has effectively filled the gap between the efficient but expensive editing consoles, and the cheaper but more difficult viewer/reader hybrids. All editing functions are performed quickly and easily, in a horizontal layout, with all operations executed in a single location directly in front of the editor. The machine's mechanical simplicity would seem to eliminate need for maintenance, and to cut downtime to nil. With these characteristics, the units appear to be the salvation for small producers who can rely on them as their sole editing facility, as well as larger producers who can employ Handiolas as back-up units during their peak periods. ■

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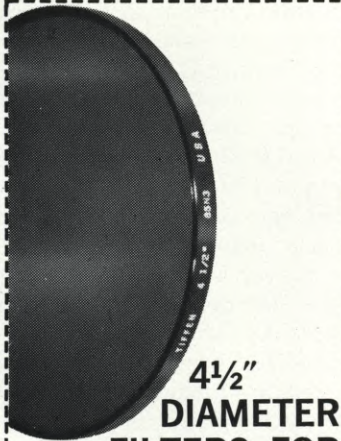
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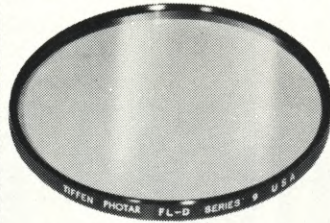
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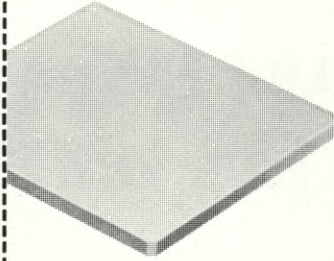
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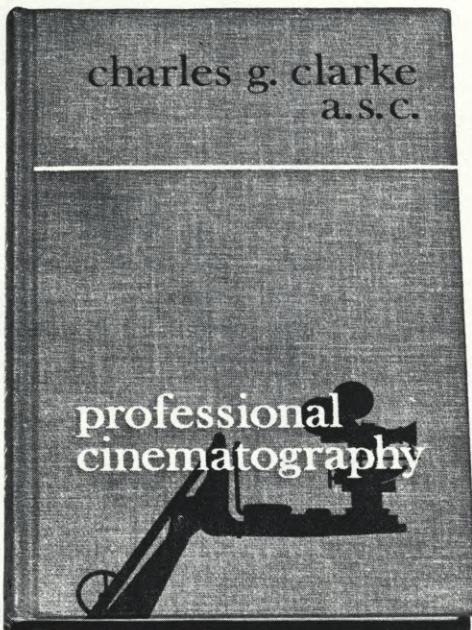
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ABOUT THE AUTHOR: Charles G. Clarke, ASC, a top Director of Photography at 20th Century-Fox for many years, and an ASC member, taught Advanced Cinematography at the University of California at Los Angeles, where he recognized a need for practical professional guidance for students striving to be the industry's future Directors of Photography. It is this need which has given rise to his publication of a book on the subject and subsequently the latest revised edition of Professional Cinematography. The first edition of this valuable book has become required reading at many universities and schools offering courses in cinematography.

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ALASKAN ADVENTURE

Continued from Page 1105

exactly that. It is 10 feet wide and 35 feet long, and is divided into three compartments. Up front is what might euphemistically be called the "kitchen and dining area". It is furnished with a Coleman stove (a two-holer) and a table with benches. There is running water, but it's down in the creek and you have to dip it up in a bucket. The water is, I am assured, completely pure and unpolluted—except that the peat moss had dyed it a nasty yellow color that makes it look like Old Specimen, so it's better to close your eyes when you drink it.

The other two compartments of the packing crate are fitted out with bunk-bed type wooden platforms onto which you fling your sleeping bag and your broken, battered body at the end of the day.

The sanitary facility (a one-holer) is located about 100 feet out behind the main residence and is completely open-air—what is known in decorator circles as "bringing the outdoors indoors". It strikes me as being a particularly humiliating setting in which to get wiped out by a Grizzly bear.

Speaking of bears, we are warned never to go outside the cabin without a rifle, and it is suggested that those of us who are new to the area familiarize ourselves with the weapon and run a bit of target practice. Fresh bear tracks have been noted all over the area and Walker has seen (and photographed) a mother bear with cubs come right up to the cabin and practically pound on the door.

"The Alaskan Brown Bear is nothing more than an overfed Grizzly," says Ted, as if he's giving a lecture in Bear Culture 101, "but it's an animal which is very arrogant and fairly unpredictable in its behavior toward the human being."

Anything that stands 12 feet tall on its hind legs is predictable enough for me, and one need only look around Juneau at the people with limbs missing and the features wiped off their faces in order to figure out what its behavior toward the human being might be. The spawn-minded salmon are beginning to run upstream in droves—which means that very soon the bears will be all over the place. Ted has been busily studying the tracks and terrain to figure out exactly where they will be feeding, so that he can set up his cameras accordingly.

"I hope to set each camera in a place that is quite close to predictable bear

action," he says. "Each bear has his own specific section of the stream where he feeds—and he does his feeding on a sort of timetable and then, having finished feeding, he will move a couple of hundred yards away from the stream and fall asleep. Once you've worked out the timetable for each specific animal, it is possible to get in and set up the camera, or retrieve it, as the case may be, without exposing yourself to a Grizzly bear charge."

I keep wondering what will happen if he goofs on the timetable. In any event, I decide, target practice with the rifle is very much in order.

As Larry Savadove, who has volunteered to be chef, is broiling steaks for dinner on the Coleman stove, Ted catches us up on what has been happening. Though he is friendly and gregarious, it is obvious that he loves being up here all by himself, with nothing but birds, bugs and bears for company. He has added his own homey touches to the packing crate habitat: a shelf of books on every type of Alaskan wildlife, a "lab" in the corner complete with microscopes and allied paraphernalia. Outside the door he has his own little garden of radish seeds growing in petri dishes. He irrigates the seedlings with water taken from different areas of the lake system and documents their growth accordingly.

Ted's only contact with the outside world is a cranky radio which, because of magnetic disturbances, is inoperable during large segments of the day. The palaver that comes over this apparatus is very folksy—very much like one might hear on the partyline in a very small town. Once a week there is a food and mail drop from Sitka. Otherwise, it's total isolation.

Cameras and Lenses and All That

The next morning, as he is readying his camera gear for the day's shooting, Ted fills me in on his background as a scientist-cinematographer.

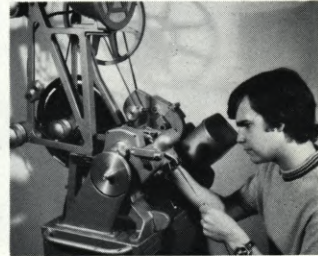
"I'm a professional biologist by training, having received my doctorate in limnology from the University of Wisconsin back in 1948," he tells me. "I sneaked into the back door of oceanography by taking my first job after that with the University of California's branch at the Scripps Institution of Oceanography in La Jolla, where I stayed for the next 21 years. The reason that I gravitated from the study of lakes and streams to that of the ocean is that I spent three years of World War II in the Navy and became so enamored of the ocean that I couldn't quite reconcile

Continued on Page 1134

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SUPER-16 POTENTIALS

Continued from Page 1104

and content for anyone attempting production in this format. Obviously, if the production has already been completed, the results are evident on the screen.

STANDARD 16mm.

Referring to Figure 1, the dimensions of a 16mm frame give us the following measurements shown in Table I. The total width taken up by the edge, sprocket perforation and clearance total .108 thousands of an inch. The standard camera aperture is .404 and the remainder is largely devoted to sound track. In blowing up to 35mm in the past, the camera width of .404 and a height of .295 was the only area which could be utilized. This gave the old aspect ratio of 1.33-to-1, which is rather close to the present television format. In order to establish future comparisons, I have computed the square area of the standard 16mm frame which equals .11918. When someone wishes to enlarge this frame to 1.65-to-1, the only possible alternative in the past was to reduce the height of the camera aperture. Most material was shot full frame and the cropping done by the optical printer during enlargement to the 35 negative. For my examples, however, I will refer to a theoretical reduction of the camera aperture height. The square area is reduced substantially with any wide screen format, but for 1.85-to-1, it must be reduced to .215 which reduces the square area to .08686. In addition to the great loss of area which is desperately needed in a 1.85-to-1 blow-up, there was an additional problem of head room for the substantially different format ratio, unless a wide screen matte was used in the viewfinder during production.

WIDE 16mm

For purposes of this article, I will refer to all present systems of extension which were described in the June issue of *American Cinematographer* as "Wide 16." Super-16 is perhaps a more exciting term and will doubtless be used to designate whatever system eventually becomes the most feasible. For the present, I see what has been done as extending the existing camera aperture to the left and refer to this as Wide 16. Referring again to Table I, II-A, we can see that the Swedish system is quite sufficient for use in Europe, in order to achieve a 1.66-to-1 aspect ratio. According to their figures, they extended 2mm

(or .0785) which would actually give them an aspect ratio of 1.635-to-1. However, some minor cropping during the blow-up would give them 1.66-to-1.

The maximum extension that can normally be employed with this method is .100 of an inch. This was used more or less by Wexler's Eclair (II-C), the Auricon described in the June issue (II-D), Century Precision Cine Optics (II-B), and Lloyds Camera (II-G) issue. These extensions reach a maximum of about 1.71-to-1. If one wishes to go to a 1.75 or a 1.85-to-1 however, the height must be cropped, resulting in a consequent loss of area for the enlargement.

These ratios can be understood more easily by referring to Table II. Here we see the standard 16mm camera aperture extended to the three aspect ratios and the previously mentioned loss in square area. When the Wide 16 systems are utilized, a substantial increase in the area is gained. Just what degree of increase may have been confusing in the June issue because some authors referred to an increase of 25% while others mentioned nearly 40%. Actually there are two increments of increase to be considered, and it is actually quite legitimate to combine both of them. All of the tables in this article refer back to the standard 16mm frame represented in Table II, so that we have what was normally lost in the original blow-up from 16mm plus the additional area that we may add with any extension of new material.

Referring to Table III, we can see that for 1.65-to-1 the total increase is close to 40%. However, if we move to 1.75-to-1, these systems will gain a 60% increase which holds true at the 1.85-to-1. (see also Table I, example II-E and F) In short, if one wishes to release in 1.65-to-1, the present Wide 16 is ideal and has already been developed to a great extent. For 1.75-to-1, it is still a rather good system with a 60% improvement over the old 16mm. However, for 1.85-to-1 there are a number of other alternates which add substantially more area.

III. 16mm HALF PERF

Of all the additional methods of expanding and increasing the 16mm frame, this method may prove to be the most feasible. Referring to Table I, Example III, it can be seen that by reducing the width of the standard 16mm perforation, we can gain an additional .036 thousands-of-an-inch. While this additional material may not be of too great importance for the 1.65 or 1.75-to-1 aspect ratios, it becomes an

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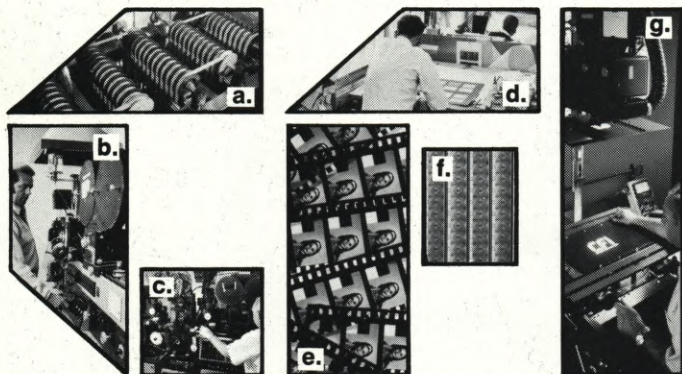
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ideal way to achieve a true 1.85-to-1. Example III-C shows such an extension of .138 thousands-of-an-inch or a total aperture width of .542 which still leaves an edge of .014. Table IV, Example III-C, shows that this system utilizing the full .295 height with an aspect ratio of 1.85-to-1 is an increase of 84% over the standard 16mm frame.

IV. 16mm FILM MOVING PERFORATION

Table I, Example IV, shows a standard 16mm perforation width, but with the perforation moved to the right leaving an edge of .020. This method retains the full width and bearing surface of the 16mm perforation and provides us with an additional .015 thousands-of-an-inch. Example IV-B shows this method for obtaining 1.85-to-1 by reducing the height to .278. This would give us an 82% increase in area.

V. 16mm FILM WITH SUPER-8 PERFORATIONS

This system would require rather extensive equipment modification but surely offers a great deal of potential frame area for extension. It can be used with either double perforations or single perforations, providing the camera mechanism can properly move the film of this width utilizing a sprocket hole of this size. Table I, V, shows the height of the Super-8 frame with a short pitch sprocket configuration. Allowing two perforations per frame, we actually have a total height that somewhat exceeds the standard 16mm frame, however in working through a number of examples it will be found that this additional height is of no benefit at all with the present wide screen applications. Therefore, the height will normally be reduced to at least .305 or the standard .295 during the blow-up process.

Double-perf film, Example V-A, will give a 1.75-to-1 aspect ratio, and Example V-B shows the same aspect ratio with single-perf film. Example V-D shows 1.85-to-1 with an increase of 85% over 16mm. Each example in Table I with an asterisk will also be found in the comparison Tables III and IV.

VI. 17½mm FILM

This method produces a full 1.85-to-1 aspect ratio with substantial ease, but investigation will have to be made into camera and printer modification. While this may prove to be an easier modification than adapting to Super-8 perforations, it is certainly more extensive than merely reducing the width of the 16mm perforation as in the half-perf example.

RAW STOCK AVAILABILITY

Eastman Kodak has been quite cooperative and receptive during my several visits recently. Mr. Chip Wilkenson of their Los Angeles office has sent a number of teletypes to Rochester for information and is currently forwarding a complete proposal for additional information. Since Eastman does an extensive amount of work for the Armed Forces and has numerous industrial accounts which call for odd sizes and perforations, they often have a great deal of flexibility in meeting some demand which may not be apparent at first. In each case they would like a proposal stating the use of the film, the equipment to be used, etc. Since their manufacturing process is quite complicated, it is nearly impossible for an individual to anticipate what problems may be encountered in meeting his demands. In some cases the material may be on hand and in other cases the changes might be extensive and would require a minimum Dope Roll order. A Dope Roll is 54 inches wide and a thousand feet long and when slit for 16mm approximates an order of about 77 thousand feet. Another problem might lie in using Super-8 sprocket holes which may not have the tolerance of 16mm or 35mm perforations.

The new reversal ECO 7252 is the obvious choice for many producers who will be working with exteriors or who have at least some lighting capability inside. The obvious advantages of this emulsion have already been amply explained in the June issue. It was also stated that a 16mm negative 7254 might prove to be somewhat difficult and expensive to blow up to 35mm. The obvious choice if a producer needed an advanced film speed shooting with natural light inside, would be the reversal emulsion 7242. This film is balanced for tungsten at ASA 125 and seems to be the answer for interior shooting. Although it is only available in 100-foot daylight loads, any longer length may be obtained by placing a minimum \$100 order.

A far greater difficulty with 7242 is encountered when this film stock is blown up to 35mm inter-negative. The problem lies in the fact that there is no inter-negative material for 7242 and the inter-negative which is available does not correspond well because of the masking agent. I finally discovered that if this film stock is flashed prior to (or just after) being exposed, it will overcome this masking problem and the current inter-negative materials can be successfully used. This flashing process



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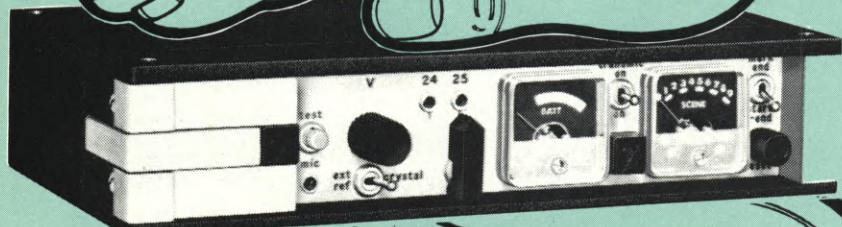
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was described in the February issue of *American Cinematographer* and some labs are now set up to do it if the cameraman does not wish to flash the stock himself before exposure. It is not likely that Eastman will come out with an inter-negative for 7242. It is much more likely that they may eventually improve the speed of the 7252.

The difficulties of the production may dictate using a faster emulsion, but a short test is the only way to tell whether it will work in each individual case. The 7252 will give colors that are a little more intense than the 7242 and individual preference will play a large part in this case. If the production wishes to emphasize color, such as in the case of a product being filmed for advertising purposes, then the 7252 would obviously be better. However, the 7242 might be a softer and more pleasant stock for documentary features.

The 7252 has somewhat better resolution and a direct comparison shows the following;

7252 at test object contrast level of 1.6-to-1 gives 80 lines per millimeter.

7242 at test object contrast level of 1.6-to-1 gives 36 lines per millimeter

With much greater contrast (such as a bar chart) a comparison of the two films would indicate the following;

7252 at a test object contrast level of 1000-to-1 gives 125 lines per millimeter.

7242 at a test object contrast level of 1000-to-1 gives 80 lines per millimeter.

In going to a film with an edge of only .020 of an inch, you would have to request smaller edge numbers because the standard height is .023. However, smaller numbers *are* available.

Normally this motion picture film uses a triacetate base. Employing a Super-8 perforation may put stresses on the sprocket holes which could not be borne by this material. Eastman has a polyester base in several thicknesses which could be employed if necessary.

CAMERA MODIFICATION AND LENSES

A number of Eclairs have already been modified and used in production. Because of its construction, this camera is very well suited to Super-16 conversion. I spent several hours with J.B. Carson, Jim Friedman, and Sinvan Goldis of Eclair in their Los Angeles office and found them to be quite enlightened and progressive. They are currently engaged in performing several modifications, and will probably offer this service to others for \$1000 to \$1200, depending on the individual camera. (All prices for camera conver-

sions which I quote in this article are quite tentative at this time, and everyone wishing a more precise quote should contact the companies directly.) Enlarging the aperture plate on an Eclair will probably chip the black paint on the opposite side and this should be cleaned up and repainted before the aperture plate is replaced in the camera. Otherwise small flakes of paint may eventually work their way into the aperture.

Chroming the front side of the aperture plate would be a mistake as it would not reduce the reflections as the black paint does. Since the Eclair has reflex focusing, any zoom lens which covers the field will work and it is not necessary to have a zoom with a reflex focusing pellicle. A further advantage of the Eclair is its ground glass view finder which sees more than the standard 16mm camera aperture, thus making the extension rather easy.

F & B/Ceco in Los Angeles is well along in modifying one of their Eclairs. I found manager Carl Porcello and shop foreman John Russell to be quite interested in the potential of Super-16. They expect to have their camera available for rental shortly.

Frank Kelly at Jack Pills Camera Rental in Los Angeles is also modifying three Eclairs and expects to have them ready in the near future.

Several Auricons and a standard Bolex have been converted some time ago by Century Precision Cine Optics of North Hollywood, California. President Chris Condon is very knowledgeable about the conversions and offers a similar service for under \$400.

The Bolex-Rex camera conversion might be possible. However, there are many challenges that would be encountered in the reflex focusing system which have not been actually attempted as yet.

A Doiflex might be possible because its shutter system differs somewhat from that of the Arriflex.

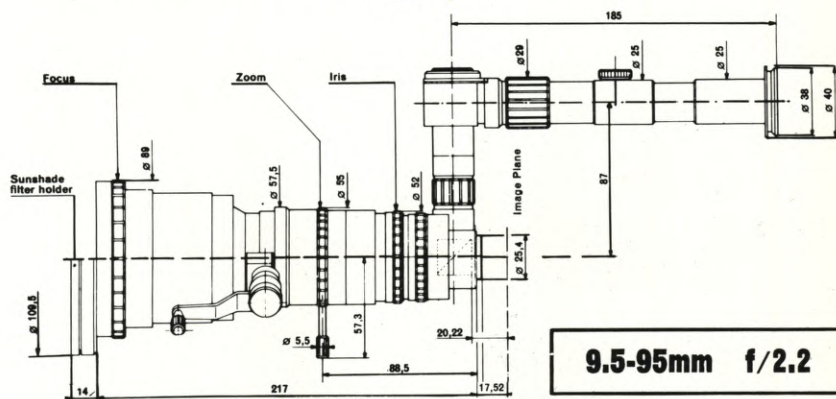
A Beaulieu might be possible. However, there are also problems with the reflex focusing.

An interesting possibility is the Canon-Scoopic. Initially, most people felt that this conversion would be completely impossible because the zoom lens is an integral part of the camera and the lens axis could not be moved to the left. However, during a substantial amount of investigation, I have found that the lens presently covers 5/8 of an inch or .625 which should accommodate most extensions, if the lens were re-centered. However, the lens can actually cover 20% more than this or .750. Actually, we can only use half of this

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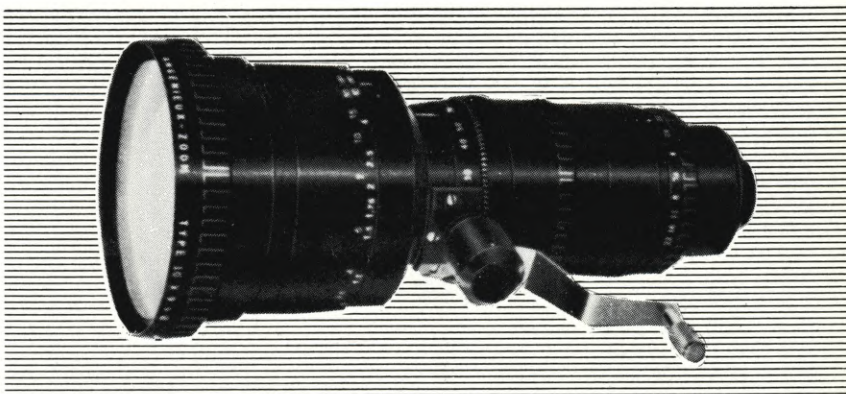


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increase or .150, which would give a total width of .554 without re-centering the lens. The lens could actually cover a full inch, but anything over $\frac{3}{4}$ of an inch drops off rather rapidly.

Perhaps one of the most attractive features of the Canon is the existing zoom lens and reflex focusing. It is an ideal length for hand-held shots and the cost of the lens is included with the camera. With all other camera conversions, the cost of a zoom will normally be \$700 to \$1000. If this zoom is used on a camera such as an Auricon or Bolex which does not have reflex focusing, then an additional \$300 or more would have to be added to the lens cost for a reflex finder. The cost of modifying a Canon may even be less because the lens will not be re-centered.

For a light, self-blimped camera, the Auricon conversions are quite good and usually cost from \$2,500 to \$3,200. I particularly like the Nomag 200 by Sol-Lux in Los Angeles (February, 1970 *American Cinematographer*, p. 154) because it weighs only 11½ pounds and costs about \$2,600. The conversion in the June issue (p.530) by Camera Development Company also uses a magnesium body, but costs a little more money. Both cameras will require a zoom lens with reflex focusing, however.

LENSES

The Taylor-Hobson Pan Cinor 17mm-85mm F/3.8 may cover the field for exterior shots if the lens does not have to be too fast. Most regular motion picture zoom lenses will *not* adequately cover the field of any of the wide-screen systems without vignetting. The only possibility is to use existing Vidicon lenses or have motion picture lenses made to the larger Vidicon specifications. Already available are the Canon Vidicon lenses in the following lengths:

6.5mm-95mm F/2.0 with a retro-focus of 22.54mm which retails at \$749.

15mm-150mm F/2.8, which retails at \$775.

15mm-120mm F/1.3, which retails at \$1595.

15mm-170mm F/2.5, with a retro-focus of 43mm which retails at \$995.

Canon also has the following standard fixed-focus Vidicon lenses:

13mm F/1.5

25mm F/1.4

50mm F/1.4

75mm F/3.2

and 100mm F/2.0

At the recent National Press Convention, I saw a remarkable demonstration of the new Canon zoom lenses. The

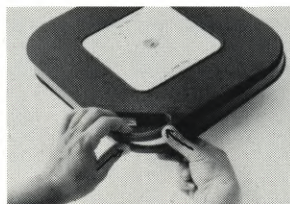


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demonstration lens utilized a "FLUORITE design which allows total correction for spherical aberration, astigmatism and coma and *completely* eliminates apochromatic aberration." This may sound like a promotional sales description. However, the lens was truly remarkable. It was mounted on an Arriflex and could actually focus sharply on material placed 3/8 of one inch from the front component of the lens. This process allows the zoom lenses to be very compact and light. Many people have stated that Vidicon lenses have lacked the resolution of standard motion picture lenses. However this is not the case. Vidicon lenses are made to have high contrast ratios, but the resolution will equal that of any motion picture lens.

One of the substantial benefits of the new FLUORITE elements is that they add a third dimension of color correction. This process will be available on all Canon lenses within a few months and will give all lenses the remarkable property of macro focus. In addition to the superior color correction, the new lenses will have both T-stop and F-stop calibrations, which will be quite close together. The average lens' efficiency is about 78%. However, that of the new FLUORITE lenses will exceed 93%. Perhaps the best news of all is that the new lenses will only cost about 15% more than ordinary lenses.

Mr. Paul Powers at the Los Angeles Canon office is very knowledgeable about Super-16 and the requirements for filling the field properly. He suggests that one of the best ways to test a zoom lens is out of doors at infinity shooting a telephone pole two or three blocks away. Approach the pole a distance of about 50 feet and then shoot again and work all the way up to the pole. This will give a very good indication of how the lens focuses at infinity and may be much more valuable than shooting a bar chart. When shooting for Super-16 it may be advisable to use a neutral density filter outside instead of stopping down on the lens. Most lenses have *greater* resolution when they are opened up and less resolution when they are closed down.

For those cameras which lack reflex focusing, a pelicle must be added to the Vidicon zoom lens. Unfortunately Vidicon lenses seldom have reflex focusing since it is not needed in the TV industry. Therefore, a pelicle must be added which can be done with lenses which have enough retro-focus to allow this installation. The pelicle will usually de-

Continued on Page 1126

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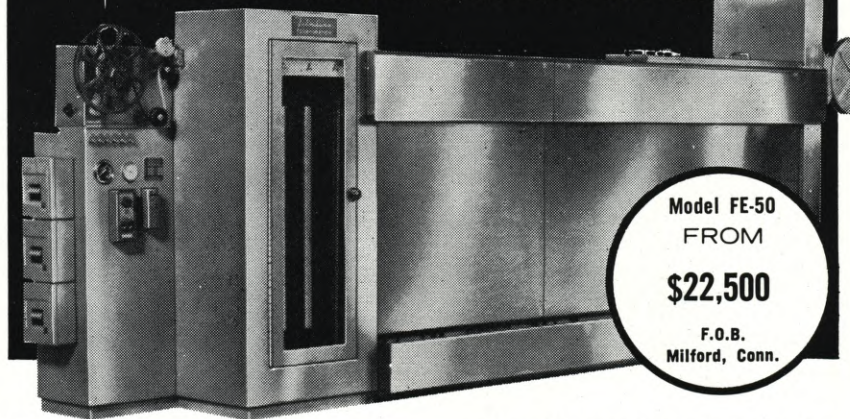
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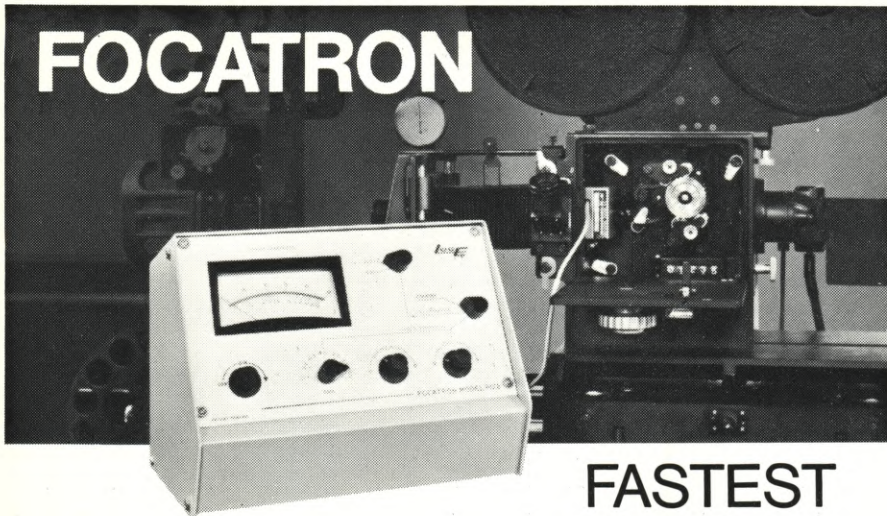
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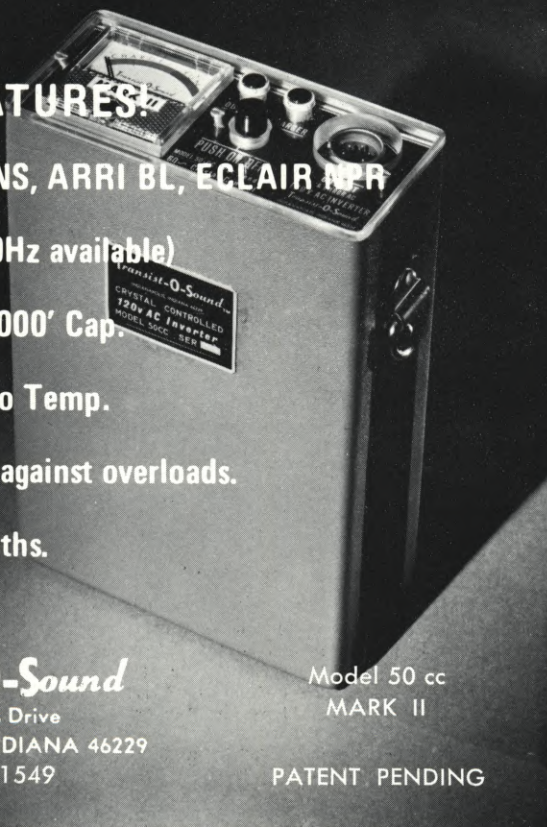
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Continued from Page 1109

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STACK: Probably the best known movie that you worked on is "THUNDERBALL". What exactly did you do on that one?

KLEIN: On "THUNDERBALL" I was director of Underwater Engineering, which boils down to providing the mechanical design and constructing all of the underwater vehicles, the seven sleds with headlights and spear-guns, as well as the spectre bomb carrier and atomic bombs. This was a major submersible weighing 3800 lbs. and powered by 12 HP motors. It was constructed within 5½ weeks. We also constructed the James Bond back-pack which had a headlight, two spear-guns, one explosive, a smoke screen, and a propulsion device. I also functioned as an underwater cameraman on the picture.

STACK: How about television? Weren't you involved in the FLIPPER series?

KLEIN: I was Director of Underwater Photography on the FLIPPER series. MAKO Products also constructed numerous props for this Ivan Tors T.V. series.

STACK: Have you done any other movies?

KLEIN: The most recent one was completed for Universal Studios called the "AQUARIANS", where I was Director of all the underwater props for this film. Other films are "HELLO DOWN THERE", "THE DARING GAME", "AROUND THE WORLD UNDER THE SEA", "COME SPY WITH ME", among others.

STACK: You seem to have worked on a great many motion pictures Jordan. Which is the earliest one you were involved in?

KLEIN: "THE CREATURE FROM THE BLACK LAGOON". In this picture, Ricou Browning played the creature. Ricou is now President of Ivan Tors Studios. Right after that, "TWENTY THOUSAND LEAGUES UNDER

THE SEA" which Don Fleisher directed.

STACK: In your opinion, what are the potential growth areas in the future of underwater photography?

KLEIN: They are innumerable and increasing daily. Two of the largest single requirements for upgrading technology and technique are Off-Shore Oil and Oceanography. In both instances, the camera is an important tool to the engineer or scientist involved. They record and document information that cannot otherwise be obtained, since it is impossible for you and I to relate something seen at a later date or show it to other people. Also great depths are involved and specialized equipment is required. The average piece of equipment for theatrical work is an Arriflex 35mm with a 400 foot magazine, compliment of lenses from 9.8mm through 50mm with a dome port corrector and optical finder system. This package will weigh approximately 82 lbs. and will supply 98% of the requirements for underwater theatrical filming aside from lighting.

STACK: Jordan, it would appear that you touch on many things in your business from underwater photography to engineering. I wonder, how would you describe yourself?

KLEIN: A wet photographic engineer.

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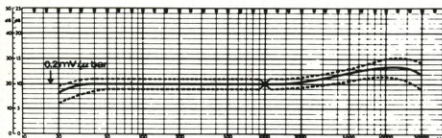
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SUPER-16 POTENTIALS

Continued from Page 1123

crease the light by about 8%.

A standard motion picture zoom lens of 12mm-120mm becomes a 15mm-150mm in the Vidicon format.

LABORATORY DEVELOPMENT AND WORK PRINT

Developing the original reversal or color negative is not much of a problem. Eastman Kodak can accomplish this, as well as a number of other labs which have processing machines *without* sprockets. If you are dealing with Wide 16 and are not changing the perforations at all, then any laboratory can process your material. Some labs are already set up to print a work print in Super-16. This is done by using a Bell & Howell Model J printer which will print the full aperture gate. The printer has to be modified slightly to remove some of the bearing surfaces on the sound track area, however. Consolidated Film Industries in Los Angeles has been developing and printing Super-16 for some time, and Lou Mansfield is well equipped to deal with this new format. He has modified his machines so that the left edge is only .010 of an inch wide in order that he can accommodate extensions up to .102-thousands-of-an-inch, allowing a few mils for clearance.

For other perforations, however, additional work will have to be done. I have found that some of the smaller labs are sometimes willing to do this. Most laboratories make their money on printing large numbers of release prints, so there is not a great deal of motivation for a laboratory modifying its equipment for just a work print, unless they can also participate in the blow-up to 35mm. If someone is expecting to utilize the Super-8 perforations, several calls to some of the labs who specialize in Super-8 development and printing might be of benefit.

EDITING EQUIPMENT

This type of modification is far easier than most camera modifications because the tolerances are less critical. Since a work print is all that is shown, certain liberties can be taken. It may even be possible, in some cases, to utilize a standard 16mm work print and have the original in some other type of format.

BLOW-UP TO 35mm

Since this aspect of the problem was rather extensively covered in the June issue, I will only add a few notes here. Both Cineservice and Consolidated are

presently set up to do liquid gate optical blow-up to a 35mm negative in the present Wide 16 format. The liquid gate process is a substantial help toward minimizing the scratches in the reversal original. However, there is some slight loss of resolution when these liquids are applied. I have heard that Pathe lab uses a "total emersion" process which overcomes this loss of resolution.

If anyone contemplates using any of the new systems beside Wide 16, they will have to obtain the cooperation of some of the organizations which are equipped to do this type of work. It will probably cost several thousand dollars to modify any equipment to utilize a different perforation or sprocket hole configuration.

MAJOR STUDIOS

In the past, releasing organizations have often confined themselves to a 1.65-to-1 ratio when enlarging from standard 16mm. With the Wide 16 and Super-16 potential however, it will be rather easy to obtain a good 1.85-to-1. Although there may be individual differences, most studios would certainly prefer to release in 1.85-to-1 if they had the choice. This would certainly indicate that substantial effort should be made to obtain a 16mm original which can be enlarged to this size and give the best results possible.

It is hoped that others who may venture into any of these new systems will report their experiences to me or to *American Cinematographer* so that the best approach can be determined by actual performance. ■

CINEMA WORKSHOP

Continued from Page 1060

discussion (and graph) on voltage applies without exception. Furthermore, the tungsten-halogen reaction occurs at the normal operating temperatures of the lamp. However, the voltage could be dropped to a point where the temperature is no longer sufficient to facilitate the tungsten-halogen reaction and the lamp will begin to function as a conventional tungsten bulb. Thus, tungsten deposits on the glass could occur at sufficiently reduced voltages. Fortunately, these adverse reactions will be reversed once the bulb is returned to its proper operating voltage.

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Continued from Page 1111

who go about their "normal" activities in the midst of the accumulation of waste material. It is a comedy in that it deals with the family's relation to society but is also a tragedy since both characters seem to have resigned themselves to the terrible conditions in which they live.

The broad humor of the fantastic situation is brought up short upon the realization that we are witnessing what might well happen, and quite soon, if the solid waste disposal problem is not rectified.

CATEGORY: Experimental
PRODUCTION COMPANY:

Communico

PRODUCER: Communico

DIRECTOR: John Camie

SCRIPT: Bob Armstrong

CAST: Peter Bonners, Julie Payne,
Michael Sgroi

MUSIC: Arthur Custer

CAMERAMAN: John Huston

EDITOR: David Howard

RUNNING TIME: 20 minutes

COLOR, OPTICAL, 16mm

UNITED STATES

LANGUAGE: English

THE MAN HUNTERS

Moving backward in time, the film traces what is currently known about man's evolution. In historical footage and original film shot at excavations and universities around the world, the "man hunters" are shown at work, piecing together the story of our ancestors: Neanderthal, Homo Erectus, and Australopithecus, a form of man-ape now shown to be as much as 3½ million years old.

CATEGORY: Documentary—Television
PRODUCTION COMPANY: MGM

Documentary

PRODUCER: Nicolas L. Noxon

DIRECTOR: Nicolas L. Noxon

NARRATOR: E.G. Marshall

SCRIPT: Nicolas L. Noxon

MUSIC: Leonard Rosenman

CAMERAMAN: Andre Gunn

EDITOR: Bud Friedgen

RUNNING TIME: 51 minutes

COLOR, OPTICAL, 16mm

COLOR SYSTEM: Ektachrome

USA

LANGUAGE: English

MAN IN FLIGHT

The world's top ski jumpers compete in this classic motion picture filmed in Europe during the 1969 competition.

Stop-action cameras and slow motion present an insight into the sport of jumping, heretofore not achieved in filming.

CATEGORY: Sports

PRODUCTION COMPANY: Trans World International

CLIENT: Pontiac Motor Div., GMC

PRODUCT: Pontiac

RUNNING TIME: 27½ minutes

COLOR, 16mm

USA

LANGUAGE: English

MEN AT BAY

A case history of the near-destruction of San Francisco Bay, which implies that man must control his technology before it destroys his planet. Part of the impact of this film comes from the visuals showing man destroying a beautiful, useful and well-loved natural resource. But the narration is perhaps even more telling. It consists of the angry, frightened or confused voices of San Franciscans trying to understand what is happening to their bay. At first the arguments of the conservationists, industrialists, officials and ordinary citizens seem confusing and contradictory, but then we see a saddening pattern. Each faction wants to save the Bay, but in its own way. They will not agree on how to do it.

CATEGORY: Documentary

PRODUCTION COMPANY: King Screen Productions

PRODUCER: D. Gilbert/J. Halpin

DIRECTOR: Dick Gilbert

NARRATOR: Man of the Street

SIDE-SHOW

There are still dark corners in this the age of "Enlightenment." This film illumines one of those dark corners . . . a place where profit is made by the exhibition of deformed bodies. But, more than that, this film is an attempt to demonstrate the voyeur that is, unfortunately, in all of us . . . the strange ability that we all seem to have to avoid accepting the misfortune of others. The film is structured so as to make the viewing audience realize, gradually, that their reaction to the freaks is exactly the same as the crowd at the carnival.

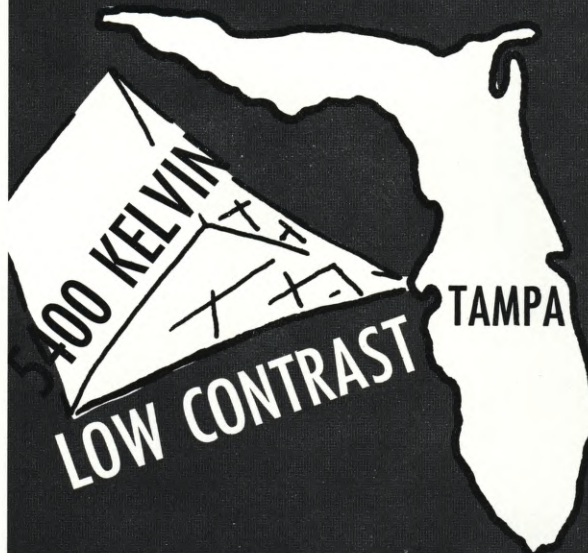
CATEGORY: Graphic & Cultural (Student)

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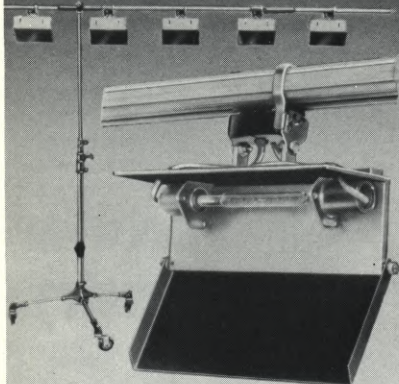
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PRODUCTION COMPANY: None
PRODUCER: Michael Bloebaum
DIRECTOR: Michael Bloebaum
CAMERAMAN: Richard McKee
EDITOR: Michael Bloebaum
BLACK & WHITE, 16mm
SOUND SYSTEM: Optical
USA
LANGUAGE: English

"SKEZAG"

A clash between two white middle class filmmakers and Wayne Shirley—a dope dealer, Black, Vietnam veteran, hustler, self-styled entertainer; his roommate Sonny—a 20-year-old junkie ex-convict, and an unexpected guest—a revolutionary. The film focuses an emotional tightrope between the seductive world of drugs and the straight one of success and money.

CATEGORY: Feature

PRODUCTION COMPANY: Cinnamon Productions, Inc.

PRODUCER: Joel Freedman, Philip Messina

DIRECTOR: Joel Freedman, Philip Messina

CAST: Wayne Shirley, Louie Berrios, Angel Sanchez

MUSIC: Rolling Stones

CAMERAMAN: Joel Freedman, Philip Messina

EDITOR: Joel Freedman, Philip Messina

RUNNING TIME: 71 minutes

COLOR, OPTICAL

USA

LANGUAGE: English

"STICKY MY FINGERS, FLEET MY FEET"

"Sticky My Fingers, Fleet My Feet" is the first film of Obie Award-winning stage director John Hancock. It tells the story of a group of Madison Avenue touch football buffs—and especially of Norm, the "sticky-fingered antelope"—that meets on Sundays in Central Park to play out their dreams of youth and glory. The nephew of one, a scrawny high school student, is included in the game. He skunks them. They feel their age; Norm decides to quit; but soon, other dreams are born—of tennis championships.

CATEGORY: Short Subject—Live Action

PRODUCTION COMPANY: American Film Institute

PRODUCER: John Hancock

DIRECTOR: John Hancock

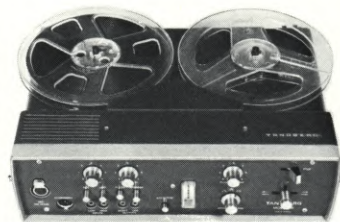
CLIENT: A.F.I.

SCRIPT: From a New Yorker short story

RUNNING TIME: 20 minutes

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COLOR, OPTICAL, 16mm
COLOR SYSTEM: Eastman
USA

LANGUAGE: English

SHOTGUN JOE

This is the story of a juvenile delinquent who seems destined to spend the rest of his life behind bars. Filmed on location in prison.

CATEGORY: Educational
PRODUCTION COMPANY: Jason
Films

PRODUCER: Joel Levitch
DIRECTOR: Joel Levitch
COLOR, OPTICAL, 16mm
USA

LANGUAGE: English

"THRESHOLD"

During the brief "Threshold" of time and space between life and death, the love that was denied during life comes briefly. "Death" as personified by John Carradine allows one last afternoon of love and peace before claiming with devastating finality.

CATEGORY: Short Subject—Theatrical
PRODUCTION COMPANY: Hollywood
Film Associates

PRODUCER: J. Maynard Lovins
DIRECTOR: J. Maynard Lovins
CAST: John Carradine, William
Rothlein, Carol Young
MUSIC: (Original) Weiss & Martinez
CAMERAMAN: Sigmond, Knox,
Lovins

EDITOR: Lovins & Glenn Wentzel
RUNNING TIME: 25 minutes
COLOR, OPTICAL, 35mm
COLOR SYSTEM: Eastman 1:185
SOUND SYSTEM: Glen Glenn
USA

LANGUAGE: English

WHY MAN CREATES

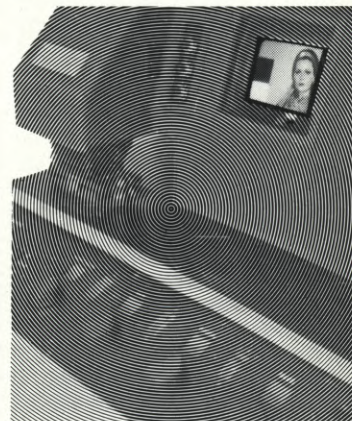
The film is a series of explorations, episodes, and comments on creativity. Each segment of the film makes its own statement in its own style and technique (live action, animation, documentary, etc.) They are: "The Edifice", "Fooling Around", "The Process", "Judgment", "A Parable", "Digression", "The Search", and "The Mark". The film attempts to be illustrative of the richness, variety and importance of the creative vision.

CATEGORY: Industry & Business
PRODUCTION COMPANY: Saul Bass
& Associates, Inc.

PRODUCER: Saul Bass
DIRECTOR: Saul Bass
NARRATOR: Peter Hansen
CLIENT: Kaiser Aluminum & Chemical
Corporation
SCRIPT: Saul Bass & Mayo Simon

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MUSIC: Jeff Alexander
CAMERAMAN: Eric Darstaad
EDITOR: Albert Nalpas & Kent Mackenzie
RUNNING TIME: 24 minutes
COLOR, OPTICAL, 16 mm
USA
LANGUAGE: English

"THE WONDERFUL WORLD OF PIZAZZ"

An entertainment/documentary look at the world of fashion, from the U.S. to such places as Sidney, Paris, Hong Kong, London, Rome, Stockholm, and Moscow, featuring some of the world's leading designers and the world's most beautiful models.

CATEGORY: Documentary Fashion

PRODUCTION COMPANY: Lee

Mendelson Film Productions, Inc.

PRODUCER: Lee Mendelson & Walt De Faria

DIRECTOR: Walt De Faria & Sheldon Fay, Jr.

NARRATOR: Carl Reiner, Michele Lee

CLIENT: Timex

SCRIPT: Larry Marks, Charles Einstein

CAST: Harper's Bazaar, Cowsills, Pat Paulsen

MUSIC: Perry Botkin

CAMERAMAN: Sheldon Fay, Jr.

EDITOR: Sheldon Fay, Jr.

RUNNING TIME: 50 minutes

COLOR, OPTICAL, 16mm

USA

LANGUAGE: English

YOUTH IN THE TENDERLOIN

"Youth In The Tenderloin" is a documentary on young people who live in San Francisco's Tenderloin district.

The program looks for answers to the human misery found in the Tenderloin through the eyes of three people, whose lives are bound to the Tenderloin.

The first person was a prostitute in the Tenderloin; the second person was a male prostitute who had a sex-change operation; and the third person is a homosexual.

CATEGORY: Documentary Films

PRODUCTION COMPANY: KRON-TV,

1001 Van Ness Ave., San Francisco

PRODUCER: KRON-TV

NARRATOR: Frank Johnstone

SCRIPT: Ricardo Diaz

CAST: Yvette, Roxanne, and Roger

CAMERAMAN: Sam Lopez/Walter Nash

EDITOR: John Bradley

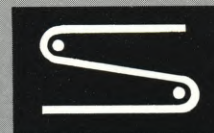
RUNNING TIME: 23 minutes

COLOR

COLOR SYSTEM: Lo Ban VTR

USA

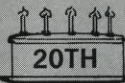
LANGUAGE: English



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"I WALK THE LINE"

Continued from Page 1095

outside a window should be considerably hotter than those inside even to the point of burning out completely. While this preference might be expressed as purely a matter of taste, it does reflect a complexity in the conception of what is photographically realistic. The point is that there is a sense in which a burned-out window is more realistic on the screen than a window through which everything is properly exposed because the viewer knows that if he were to take a picture without artificial light or filtering and expose for the interior, anything outside a window would probably burn out.

There were, of course, limits to the interest in this effect. While shooting in a hardware store when the normal exposure for the street would have been F/8, the level inside was raised to permit an F-stop of 4.2 on the lens, and no filters were placed over the windows even though they occupied a relatively large area of the background. Had the level outside been higher, filters would have been placed over the windows as they were when shooting in the interior of the courthouse on a sunny day. In both cases the color temperature of the artificial light was corrected to balance with daylight. In the courthouse .60 neutral density filters were used over the doors and windows.

Once filters were placed over the doors, it was necessary to pour light through them to create light patterns on the walls and floors inside. At first glance it seems contradictory to put neutral density filters over a window to cut down the amount of light passing through them and then to place a carbon arc outside the window to pour light through it, but one must distinguish between the brightness of a subject seen through a window and the light coming through the window illuminating something inside. The neutral density filter reduces the effective brightness of the subjects outside the window, but it also cancels the effect of the light striking the wall and floor through the window. If the scene outside the window is considerably hotter than the interior, the effect would appear unnatural if there were no light patterns inside caused by the light coming through the window.

When shooting in the studio with translite backings behind windows, it was difficult to get the backings hot enough to yield the same effect. On two occasions in the studio, when the

Continued on Page 1136

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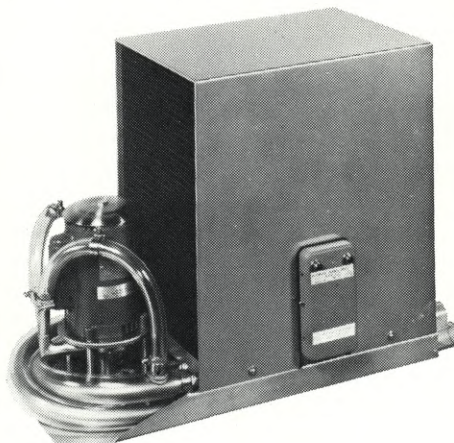
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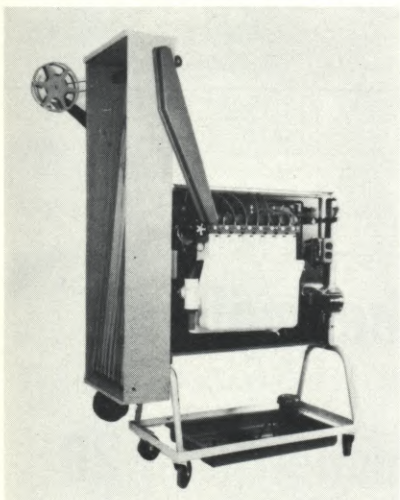
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ALASKAN ADVENTURE

Continued from Page 1115

myself to going back to a freshwater assignment.

"While at Scripps, I got involved in the study of the California Gray Whale and it was in that connection that I realized, for the first time, that one really owes it to science to document the behavior of animals on film, so that other people can judge their behavior equally with you. My first contact in the movie industry was with Ivan Tors Productions. They provided me with a movie camera and film for the second of my five expeditions to the camping grounds where the Gray Whales bear their babies. In the course of shooting this, a film on the California Gray Whale was eventually produced for the National Park Service, in conjunction with the University of California.

"This led to a two-winter assignment with Jacques-Yves Cousteau on the Desert Whale, which was the subject of one of his documentaries. As a result of that experience, I became terribly interested in what one could do with both educational TV and film—to a degree where I began to think that I might like to change my career from the straight scientific to one involving filming.

"For many years I had been deeply involved with still photography, but once I began to film animals I realized that still photography is not the way to document their behavior—that one really needs to do it with movies. My contact with Alan Landsburg, who had produced the Cousteau series, eventually led to this assignment at Lake Eva."

He shows me the motion picture equipment he is currently using, which consists of three Beaulieu 16mm cameras, one Beaulieu 4008ZM Super-8 camera and one Eastman K-100, which he uses only for underwater photography. The Beaulieu 16mm camera is his workhorse and he's extremely happy with it.

"In the course of the previous film work which I've done, I've had occasion to use just about all of the standard 16mm cameras," he tells me, "but on this assignment I'm wearing three hats. I'm the technical consultant, the subject and the cameraman—which calls for a considerable amount of ingenuity. I'm obliged to use camera equipment which is as nearly automatic as possible—and yet, it must produce footage of completely professional quality. We are producing a show which must meet the highest professional standards and the challenge to me has been whether or not I could deliver the quality of footage



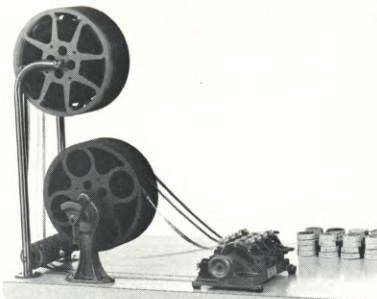
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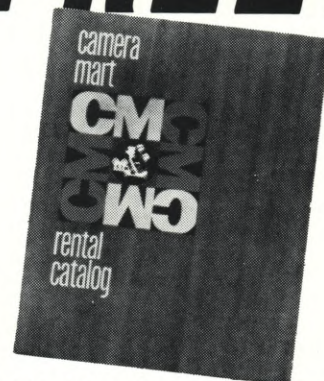
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"The Beaulieu system I've been using has turned out to be just magnificent. I've had absolutely no problems with it and the lab hasn't been sending back any nasty film reports. I especially like the large viewfinder which allows me to see the action clearly as it's developing and gives me, as a student of animal behavior, a chance to monitor what I've been filming without any vagueness.

"But the feature I find most essential is not having to take time out to make any adjustments. The problem we have with animal photography is that once you get into camera range of the animal, unless you are extremely well-hidden and the camera is very quiet, the animal is going to be alarmed at your presence—which means that the moment of contact for filming is too brief to permit fiddling around with adjustments. That's why I find the automatic exposure control and the other automatic features of this camera to be so tremendously helpful."

Filming by Remote Control

Some of the more spectacular footage which Ted has sent back for processing has been shot by him "indirectly"—that is, by means of wireless radio remote control.

In preparation for such filming, two large clear plexiglass boxes had been built, designed in such a way that they could be mounted on conventional tripods or suspended from some overhead support.

A Beaulieu 16mm camera is set up inside one of these boxes, so that it may be protected from the elements, and it may then be operated from a considerable distance away by means of Remo-Rad, a wireless radio transmitter and receiver combination manufactured by Technical Photomation Instruments, of Sun Valley, California.

The Remo-Rad receiver is attached, by means of a universal connector, to the motor of the camera. Ted carries the small Remo-Rad transmitter with him, slung over his shoulder. When he wishes to film something, he simply activates the transmitter. The receiver picks up the signal and turns the camera on. The transmitter is provided with both an ON/OFF switch for sustained running, and a manual transmission button which operates the equipment as long as it is depressed. Two or more cameras, fitted out with separate receivers, may be operated from a single transmitter.

"The remote radio control allows me the opportunity to film myself going

Continued on Page 1137

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"I WALK THE LINE"

Continued from Page 1133

cameraman wanted a silhouette effect in front of a window, there was as much as four stops difference between the window and the exposure inside. In one instance, there were 40 foot-candles of bounce light on the actress in front of the window, the lens was set at F/3 and the window read F/12.7. The window was dirty with a white card behind it, and light was poured directly through the window as well as onto the white card. On another similar occasion it was estimated that the difference between a window and the character inside may have been as great as six stops.

Another means of getting a realistic "look" conceived by the director was to have ceilings built on the sets in the studio. This would have not only improved the atmosphere for the cast but also forced the cameraman to light the set in exactly the same way he would light a location rather than using scaffolding. The cameraman originally slated to do the film agreed to accept this self-imposed limitation, and the sets were designed to have ceilings even though they were to have wild walls. This decision again reflects the complexity of the concept of realism in film. The director wanted to force the cameraman to work under conditions found on location because he knew that scenes shot on location generally look different from scenes shot in a studio, and he felt a location "look" was more realistic.

When David Walsh came on the film, he assured the director that he could give him the same look using scaffolding and save 1½ to 2 hours of production time each day. In the end scaffolding was constructed above only two of the eight sets built in the studio, and considerable use was made of clamps and plates as well as stands for mounting the lights. Of course the fact that the speed of 5254 allowed the use of smaller lighting units greatly facilitated working without scaffolding. Most of the lighting was done with Juniors and Babies and 750-watt cones, with larger units used only for sunlight or moonlight effects through the windows. Even the scaffolding was rigged with Juniors rather than Seniors. The key to duplicating a location "look" in the studio even with scaffolding was, of course, to apply the same principles in setting the lights and not to let the relative ease of lighting from scaffolding result in touches or refinements in the lighting which could never be possible on a location. ■

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through the various scientific chores involved in developing the story," Ted explains. "I'm able to set the camera up on a tripod and go off and film the actual scientific activity when the situation and the light are right, without having to bring in accessory camera crews to film these scenes. The remote radio control has turned out to be a very neat trick for this purpose. It's a lot better than starting the camera and then running into the scene to act out the part. I've had to do this on a couple of occasions and it's a complicated way of making a film. The radio control works a lot more smoothly."

This is only one way in which he uses the Remo-Rad equipment. An even more important application has to do with the filming of the various animal "performers" in the picture, particularly the bears.

"In terms of filming animal behavior, I've arbitrarily divided the shooting into three stages," he explains. "One film stage concentrates on the stream, another film stage is at the estuary, and a third film stage is at the lake. These are all defined positions and it has been possible, by waiting patiently in blinds day after day, to work out timetables for when the various animals will appear and disappear. On that basis, I can shoot my closeups from a blind and spot in a second, remotely controlled camera to shoot the medium shots from another blind perhaps a quarter of a mile away. My binoculars serve as a spotting scope and with this technique I'm able to shoot the same scene from two different angles simultaneously—which works out very well indeed. In the case of the Grizzly bears, the remote radio control unit enables me to get some very close and dramatic shots without exposing myself directly to their charge."

One Silly Millimeter

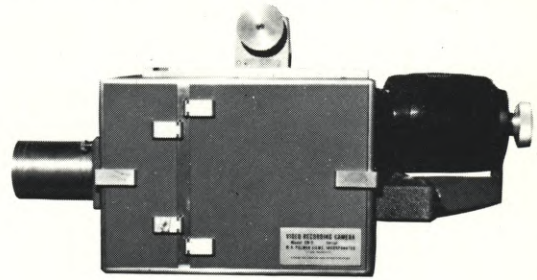
Meanwhile, back at the piano crate after a hard day of filming in the forest, the troops are grumbling about aching backs and mosquito bites, Savadove is trying to get the stove to operate and Ted is outside cheerfully watering his garden of radish seedlings. Having irrigated them with waters from an array of labeled jugs, he then whips out his Beaulieu 4008ZM Super-8 camera and sets it up to film macro-closeups of what must be the most pampered radish seedlings in the world.

The unique macro-zoom capability of this camera makes it possible to shoot ultra-closeups of a subject as little as one millimeter from the lens, a characteristic which delights Ted.

"In the study of the ecology of a



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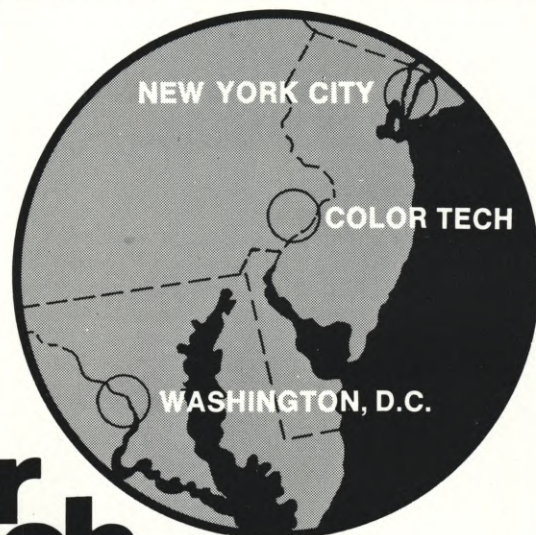
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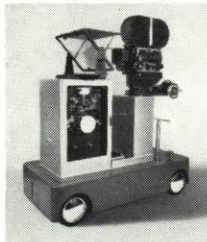
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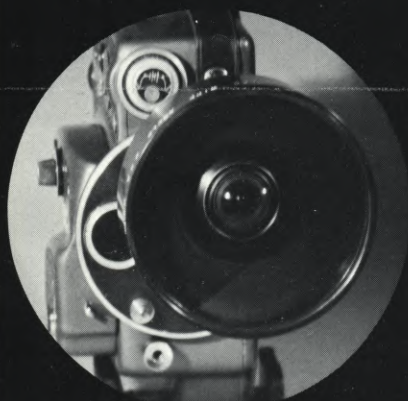
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stream, a lake, a forest, or any biological system, most of the animals you are dealing with are insect-size or smaller," he explains. "And, of course, a lot of the plants and their interesting features fall within the macroscopic-size range. So, this camera opens up a tremendous number of photographic subjects for filming—ecological interactions that I wouldn't be able to shoot easily with a 16mm camera. I'd have to set up extension tubes and go through quite a bit of extra work. This feature of the Super-8 Beaulieu for getting into the macro-range extends the versatility of the camera by a magnitude of 100, in my opinion. It's just unbelievable what you can do with it.

"Of course, the thing we're not absolutely sure about yet is whether we'll be able to blow the Super-8 footage up to 16mm and still retain professional quality—but we're hard at work on it."

We discuss variations in frame-rates for the filming he has been doing and he tells me that some animals move so slowly—slugs, snails and certain insects, for example—that he's had to slow the Beaulieu down to two or four frames-per-second in order to get them to look alive.

He has also sent back some extraordinary time-lapse sequences of such things as weather changes, tide fluctuations, scurrying clouds, etc. I ask him what he's been using for an intervalometer.

"I'm the intervalometer," says he. "I've shot quite a few sequences where I've clicked off a single frame with the cable release every 50 seconds for periods up to ten hours. In that way, I've been able to compress a very long phenomenon into the space of about a minute. The weather here is so variable that I sometimes get three or four snow squalls or brief rainstorms in a single sequence. It's terribly tedious, being an intervalometer, but it's worth it to be able to capture the illusion that overwhelmed me when I saw it and filmed it."

When in Doubt, Improve . . .

One morning we get up all inspired to sally forth and shoot spellbinding scenes of salmon jumping rapids, Bald Eagles swooping down and Grizzly bears lumbering around.

But it's raining—vertically, horizontally and on the bias. A bummer.

So it won't be a total loss, Savadove suggests that Gholson uncork his Arri-flex and shoot some interior scenes of Ted going about his daily household chores: shaving, cooking breakfast, washing dishes—all those little things

IMAGINATION IN IMAGES



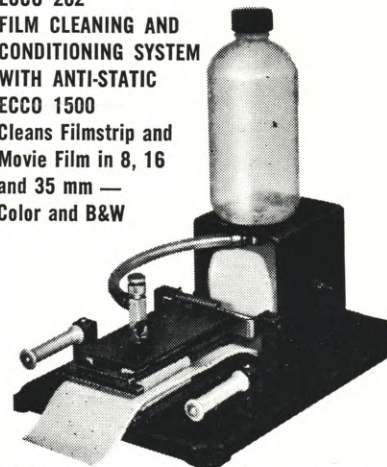
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that make a piano crate a home.

Gholson is willing, but not having been contracted to shoot any interiors, he has not brought along any lighting for this purpose. However, that doesn't stop him. He now proceeds to work a miracle such as I've never seen during all my years of hanging around behind a camera.

The hut *is* provided with electricity, thanks to a noisy generator which some poor soul has lugged through the jungle on his back. It is used mainly to re-charge the Beaulieu camera batteries, but it also powers three anemic 100-watt bulbs which provide mood lighting for the "dining salon."

Gholson proceeds to tap these lighted bulbs in such a way that, before my startled eyes, they double in brightness and soar in color temperature. Instant photofloods!

"It takes a delicate touch," he tells me. "I'm an old bulb-flicker from way back."

So saying, he backs the bulbs up with homemade reflectors improvised from aluminum foil. The resultant illumination, reinforced by the ambient exterior light filtering through the windows, is sufficient to give him an exposurable level,—and he shoots the scenes.

Nothing to it.

The Underwater Challenge

Since salmon and trout are such an important part of the feeding chain of the lake system, an effort is being made to get some good underwater scenes of their activity.

Ted has had a certain amount of success in this so far, by dint of donning a heavy foam wet-suit and more or less anchoring himself with SCUBA gear and camera at points where the fish jump the rapids on their way upstream. The current flow is very strong and he has to fight constantly to hold his position in the water.

The camera equipment he is using is about as simple as it can get—an Eastman K-100 in a small plexiglass housing. It has the advantages of being an easy camera to load and operate and the capability of running 40 feet on a single manual wind.

"This is a compact little camera," Ted admits, "but I sure would be thrilled to be using a Beaulieu underwater instead. It would simplify the exposure problem, which is a serious one—especially when you're changing depths all the time. The Beaulieu would eliminate the big nuisance of having to carry a special underwater light meter. It dangles off my left arm and I have to take my attention away from the cam-

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era to look at the exposure meter and hand-set the exposure."

He has another frustrating problem arising from the fact that all of the water flowing into the lake has been dyed a deep amber color by the decaying peat moss. This acts as a sort of filter, virtually absorbing most of the light below the surface and forcing him to shoot with the lens wide open most of the time.

Jeb Gholson has brought with him a very sophisticated underwater filming rig of his own design, the Gholson "2000" Self-contained Camera and Lighting Unit (see *American Cinematographer*, September 1970), with which he hopes to illuminate the depths and get some clear shots.

He and Ted don their wet-suits and we head for the lake. From above the surface, the salmon, now a beautiful red color and huge in size, can be seen moving in droves and occasionally leaping out of the water. Bill Young is functioning as salmon-wrangler, using the outboard motorboat to herd the fish toward the cameras. However, every time Gholson turns on his powerful lights, they bolt in the opposite direction.

To make matters worse, the spawning salmon, in the throes of their frenzied courtship rituals, have been raising hell on the lake bottom—digging nests with their tails and stirring up the mud so furiously that the water is now about as translucent as a loaf of pumpernickel. Getting a clear shot of anything farther than two inches from the lens is obviously impossible under these conditions.

The others decide to sweat it out for another couple of days, hoping that the water will clear—but duty calls and I have to leave.

Back at the shack we crank up the Mickey Mouse radio and request a plane from Juneau to pick me up. It lands on the lake the next morning, a little Cessna 180 floatplane.

My tons of gear are loaded aboard and my erstwhile crate-mates, shouting cheerful obscenities, bid me farewell. We soar aloft, the super-cool bush pilot chomping on a sandwich and gulping soda pop from a can as he slides the tiny plane between two snow-capped mountain peaks.

I take one last look at the water-laced landscape below, so beautiful, so untouched—and I miss it already.

I keep telling myself that I'm going back to the Big City—back to "fabulous, glamorous" Hollywood—back to the bright lights and dancing girls—back to Civilization.

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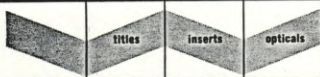
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WHAT'S NEW

Continued from Page 1050

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Keystone will continue to sell the K-250 editor separately; however, the 6 piece editor-viewer outfit is ideal for chain stores, discount houses, etc., any place where there is a limited amount of sales help. It's a self-selling merchandising idea.

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The Brooks Cinefix Chestpod is fully adjustable to individual preference, is foldable for storage (a mere 13" x 9" x 2" package) and is extremely rugged despite its lightweight (1 lb.) construction. Supplied complete with a rugged ball and socket head, the chestpod is attractively finished in beige enamel and retails for \$19.95 list.

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The availability of a new photolamp catalog was announced today by the Photolamp Division of Sylvania Electric Products Inc. Sylvania is a subsidiary of General Telephone & Electronics Corporation.

The catalog includes data on Sylvania's recently introduced Magicube and SG9 Sun Gun movie light, in addition to all current lines of photoflash lamps; projector lamps for 16 and 35mm projectors; movie lights; super-flood lamps; dark-room lamps; enlarger lamps, and Sun Gun movie lights. The booklet has a complete projector and lamp reference guide and a projector lamp substitution guide.

The photolamp catalog can be obtained at no charge by writing Sylvania Electric Products Inc., 70 Empire Drive, West Seneca, N.Y. 14224.

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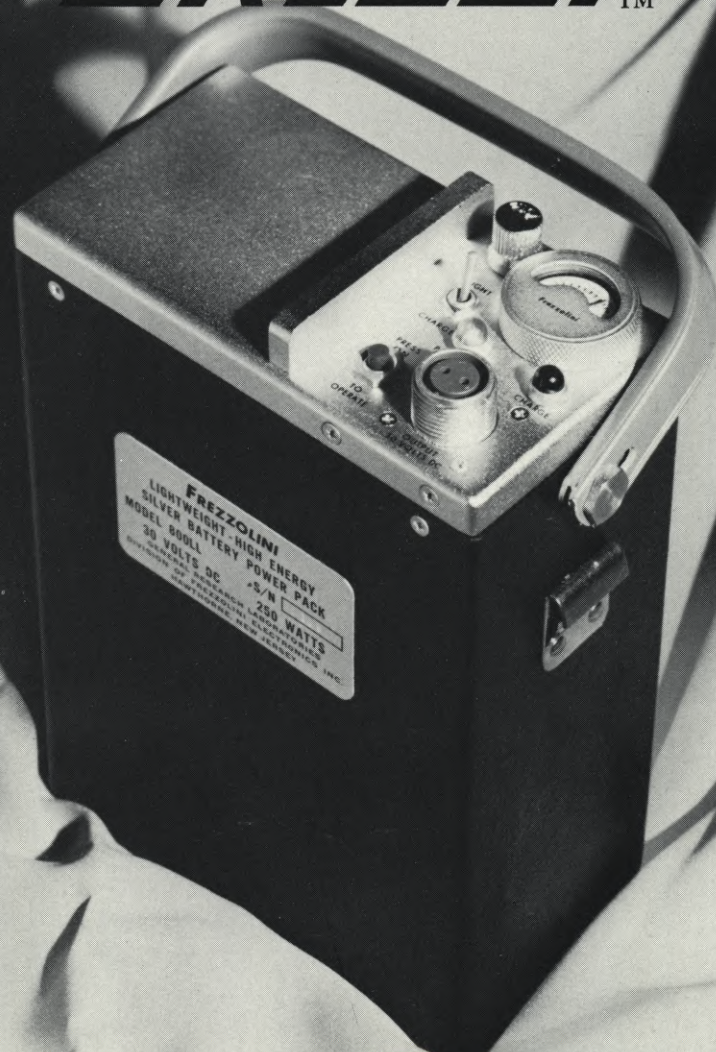
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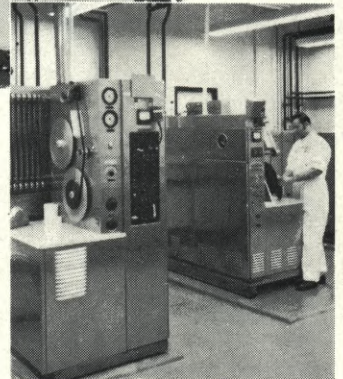
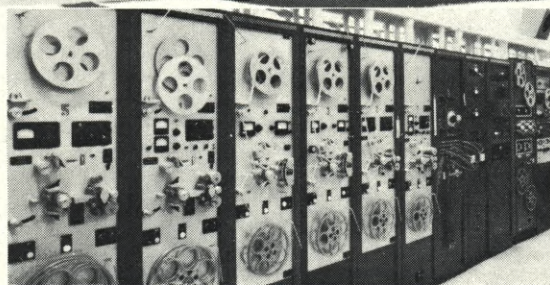
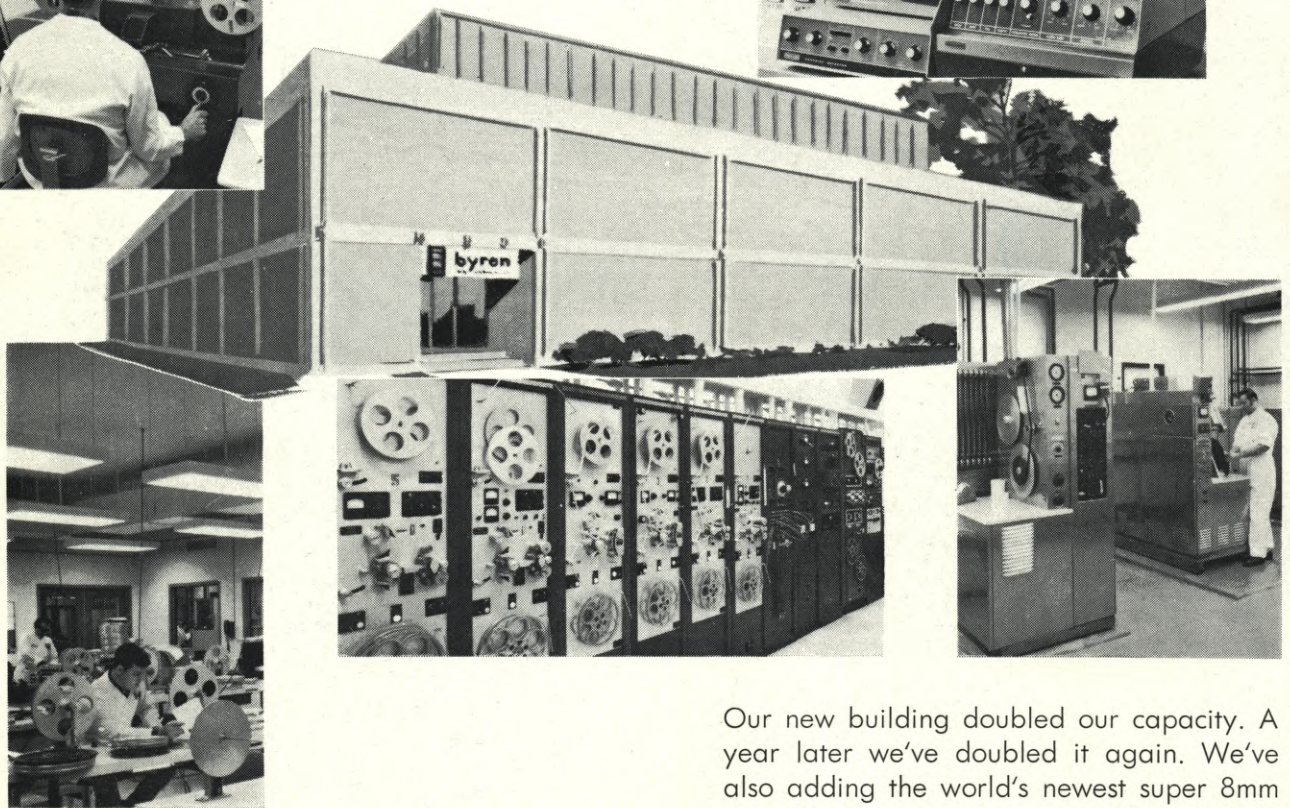
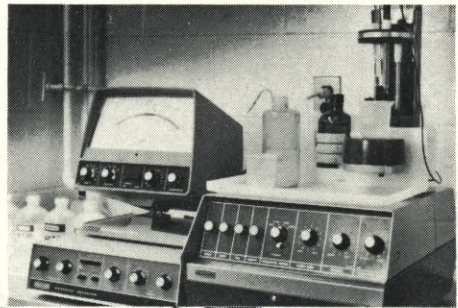
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