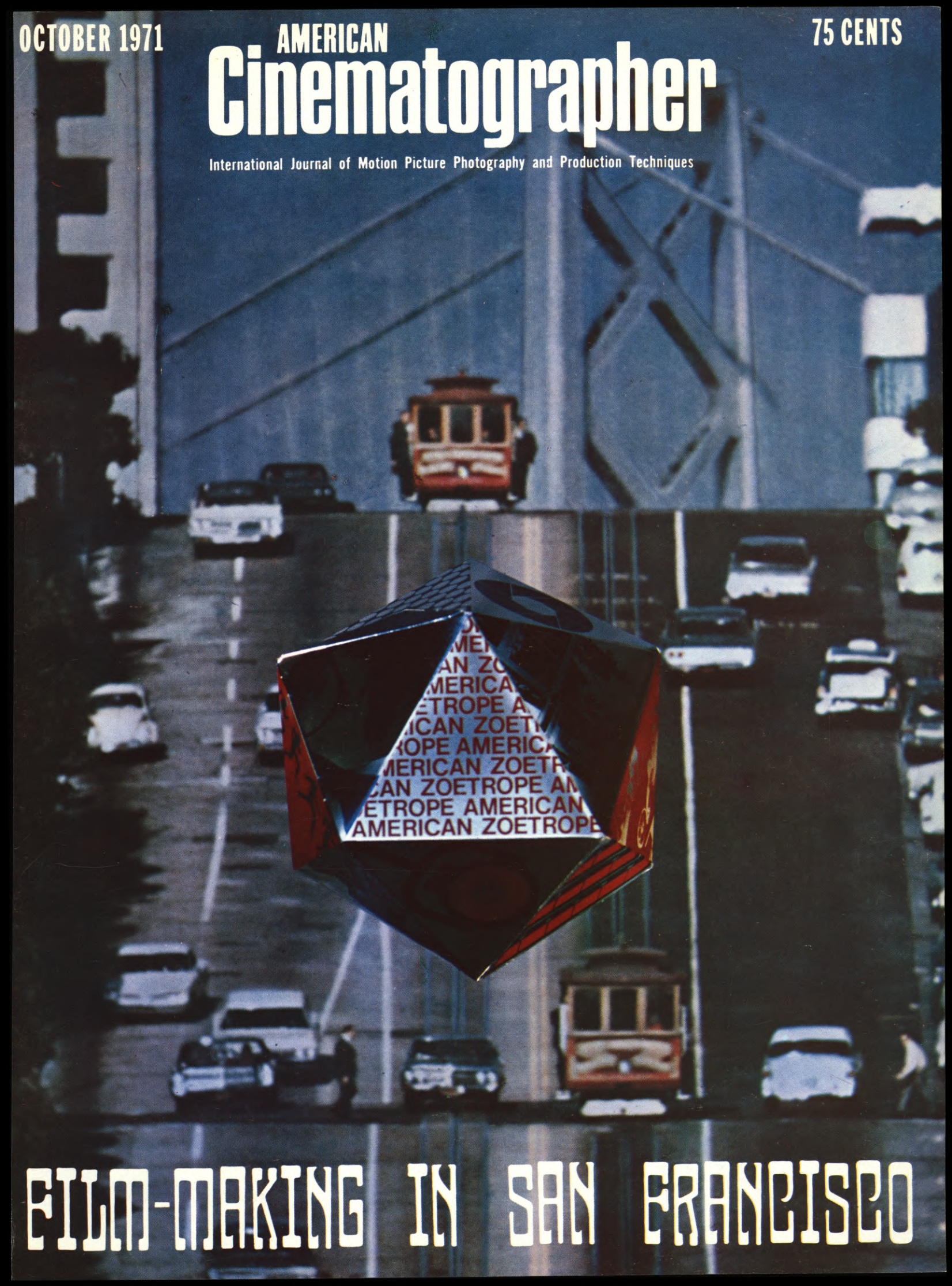
OCTOBER 1971

AMERICAN Cinematographer

75 CENTS

International Journal of Motion Picture Photography and Production Techniques



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camera service center inc.

Wall St. drops ban on cameras for crew with unobtrusive NPR.

Wolper demonstrates that the NPR is no more noticeable than a briefcase, gets OK to shoot.

For their documentary Special "Wall Street," sponsored by Xerox and screened by ABC TV, Wolper Productions obviously needed to shoot the action on the trading floor of the Stock Exchange. But because a Hollywood feature crew shooting there with its dollies and cables had previously caused a drop in trading, the Governors of the Stock Exchange had ruled that cameras would never again be allowed in there.

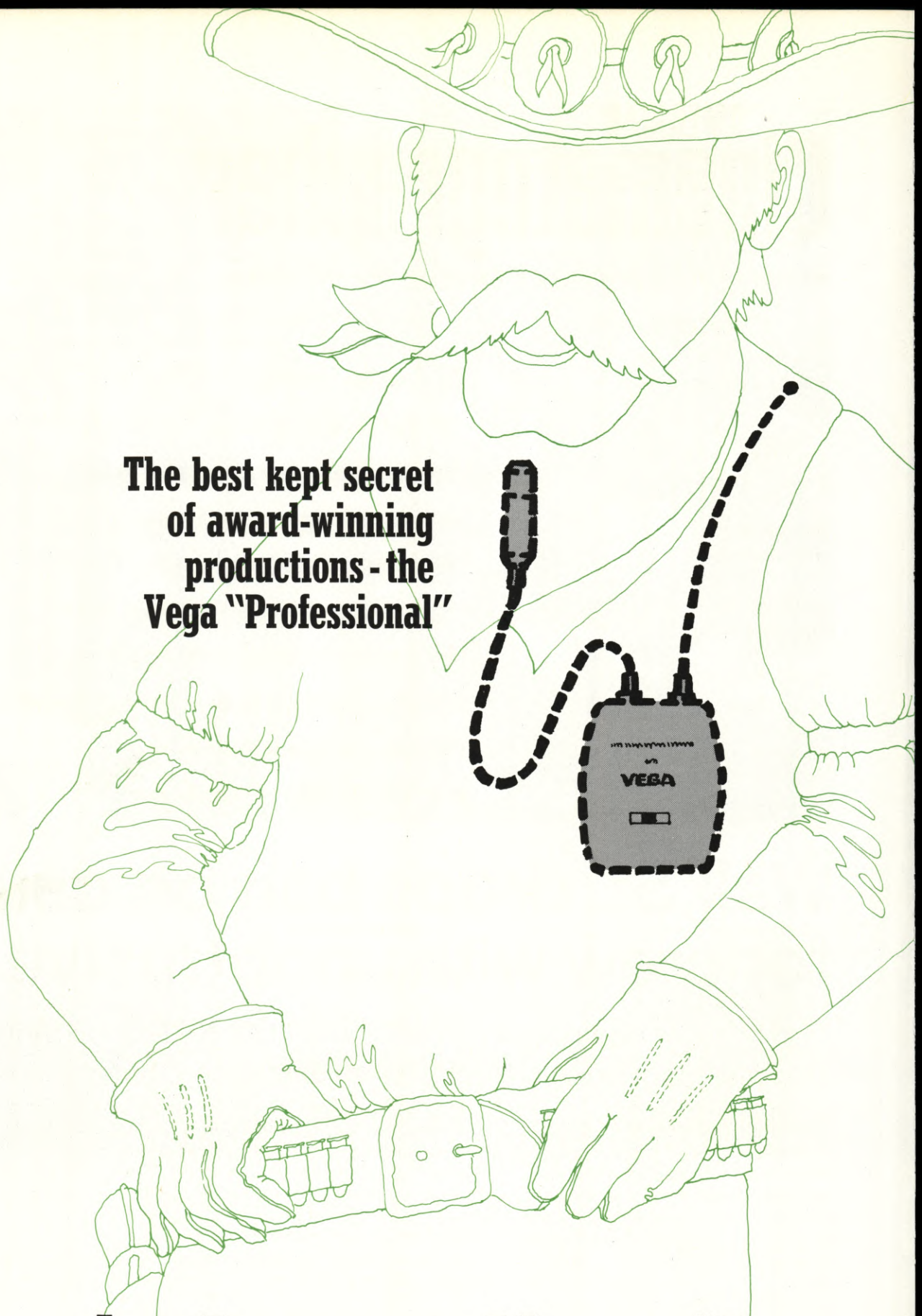
They had since made an exception: Life magazine had been allowed to send a still photographer onto the floor with a Leica. Wolper told the Governors that sync sound film footage could be shot with a camera no more obtrusive than the Leica, that no lights, tripods, clapsticks or AC power would be needed, and that business would not be interrupted.

The Governors were sceptical. So the Wolper crew took an NPR and a Nagra to the office of the Stock Exchange's President. The Wolper cameraman, wearing a dark suit, demonstrated that the NPR could be carried in one hand, like a briefcase, that it ran in total silence, and that he would need no other equipment. So the Governors gave their permission, and "Wall Street" got made.

For a free NPR brochure, write to us at 7262 Melrose Ave., Los Angeles, Calif. 90046; or at 73 S. Central Ave., Valley Stream, New York 11580. No obligation, of course.

eclair

NPR: THE SUPER 16 CAMERA



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AMERICAN Cinematographer

International Journal of Motion Picture Photography and Production Techniques

OCTOBER, 1971 VOL. 52, NO. 10

Editorial–Business Offices
1782 North Orange Drive
Hollywood, Calif. 90028
876-5080

Advertising Representative
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• FEATURE ARTICLES

• DEPARTMENTS

ON THE COVER: Floating above a steep San Francisco street, complete with classic cable cars and bridge in the background, is a geometric play-pretty symbolizing the many-faceted activity of the Bay City's unique film-making "commune", *AMERICAN ZOETROPE.* Graphics courtesy of the San Francisco Convention and Tourist Office and *AMERICAN ZOETROPE.* Cover conceived and photographed by Herb A. Lightman.

AMERICAN CINEMATOGRAPHER, established 1920, in 52nd 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. $7.00; Canada, foreign, including Pan-American Union, $8.00 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.

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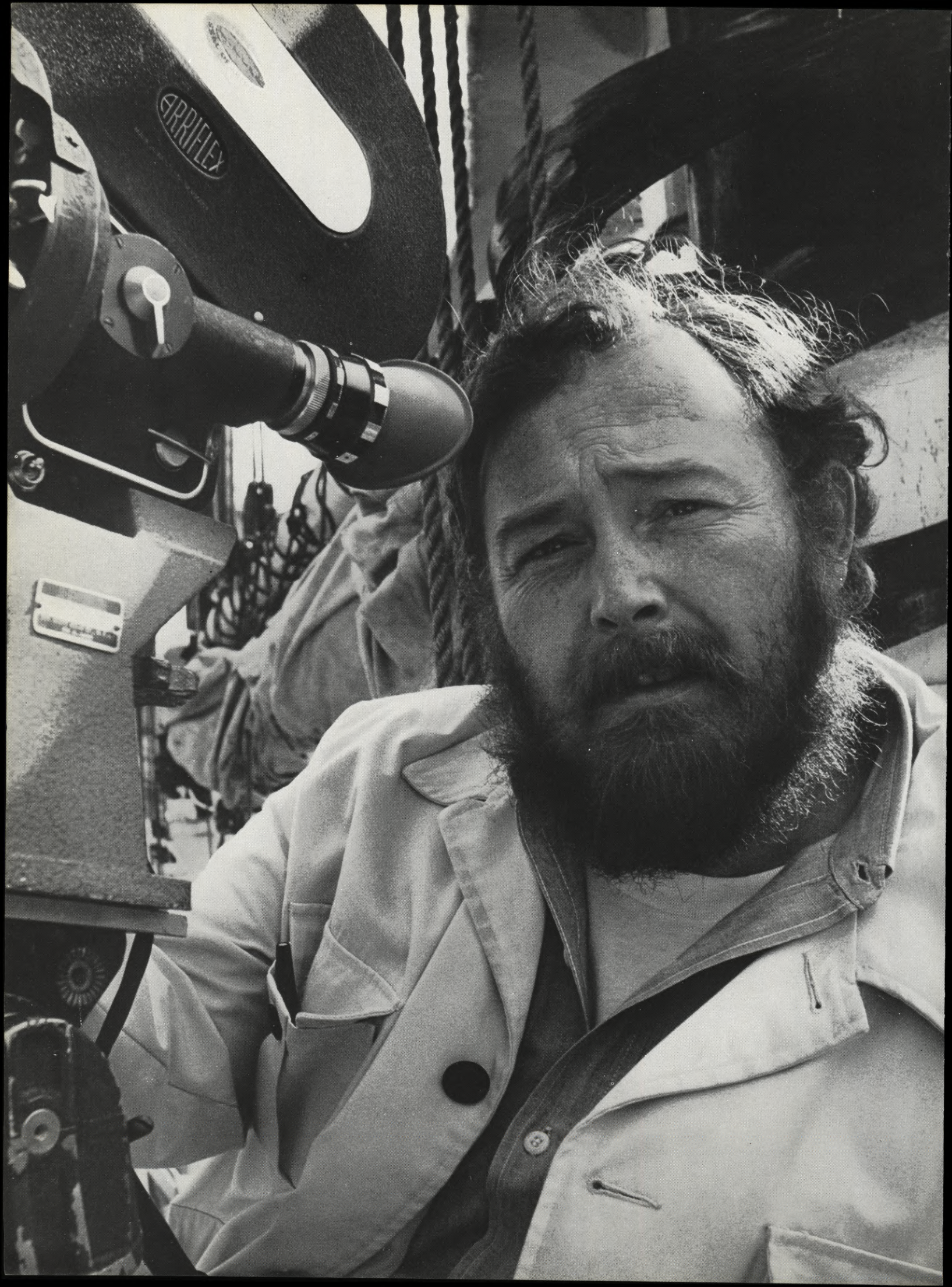
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...but as soon as we saw the rushes, we all felt we had a winner...and as it turned out, we were right...I worked harder on that film than any I've ever shot...maybe it's because I had more freedom...the director trusted my judgment and used me as his eyes and sounding board...we pored over movies and stills for months, looking for that flat, shallow effect in the images... I used special lenses to capture the same kind of visual texture on film...and we took no chances with film quality, either ...we used the total Eastman Color System throughout— from first negs to final release prints...and this included Eastman's technical help whenever we needed it...and it really paid off—not only at the festivals, but at the box office ...and that's what it's all about..."

When your microphone becomes the industry standard, what do you do for an encore? Something even better!

the LITTLESHOT

an innovative new condenser microphone with the best virtues of cardiod and shotgun

and the BIGSHOT

worthy successor to the famous MKH 805

You did it. You and your fellow professionals. Made our MKH 805 shotgun condenser microphone the industry standard.

While we're not particularly surprised, we *are* grateful. Grateful you appreciate our MKH 805's unusually wide, flat response, extreme directionality and high overload resistance. Grateful you appreciate its ruggedness, compactness and light weight. And most of all, we're grateful you use it so widely, both in studio and field-recording, that it's become the most talked-about microphone success story in decades.

But the MKH 805 shotgun microphone was a hard act to follow, especially since we don't bring out new products for change's sake. Now, however, we are pleased to bring you our new MKH 415 and 815—the "littleshot" and the "bigshot"—two remarkable microphones representing a third generation of Sennheiser condenser microphone design.

the littleshot

Not too long ago, we discovered our shotgun microphone being used for applications beyond our original intentions. Because of its small diameter and longer-than-normal size, reporters used it for interviews at normal miking distances. And because of its flat response and high directionality, studios often used it to pick up performers and to actually "close-mike" instruments from a distance, due to its lack of proximity effect, and "pop" reduction.

"Why not," we reasoned, "create a new condenser microphone especially for these diverse applications, where extreme directionality is not required?" The MKH 415, "the littleshot" is the result.

Using an improved combination of pressure-gradient and interference principles, the MKH 415 is truly a remarkable microphone. Directionally speaking, it behaves as a super-cardiod below 2 kHz; at higher frequencies, it exhibits a beam-type (or baseball-bat) pattern. Besides reducing leakage, this design provides higher on-axis conversion efficiency, with two more benefits. First, pops and wind-noise are reduced, even without its accessory windscreen and shockmount. But even more important in many applications, is the MKH 415's virtually total freedom from proximity effect, which, coupled with its unusually flat response, makes possible "close-miking" of singers and instruments without need for bass attenuators. Beyond these features, the extremely wide response, low ambient noise, high output and overload resistance characteristic of all Sennheiser microphones have also been retained.

Physically, the MKH 415's 10″ length provides reporters and other outdoor users with the added "reach" they seek, while performers will find the design less fatiguing to use and more aesthetically pleasing, since they need not hide their faces to project their sound.

the bigshot

In the MKH 815, all the good things that made its predecessor's reputation in filmmaking and broadcasting have been retained. And another advantage has been added: through an improvement in the microphone's interference design, by increasing the number of slots along the microphone's sides (to reduce the area of individual ports), the MKH 815 has additional resistance to pops and wind noise. Thus, in many situations formerly requiring additional precautions, the MKH 815's accessory windscreen and shockmount will not be required.

more encores

Besides the amazing new "littleshot" and the improved "bigshot," there are many more new things on the way from Sennheiser. While we'll be talking about them in the future, you can find out about them now by requesting the second edition of our Micro-Revue—which contains a good deal of useful audio information besides. Please write or call:

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4. Manual Zoom	4. Manual or Power Zoom	9. Price Approx. $3,000	9. Price less than $350
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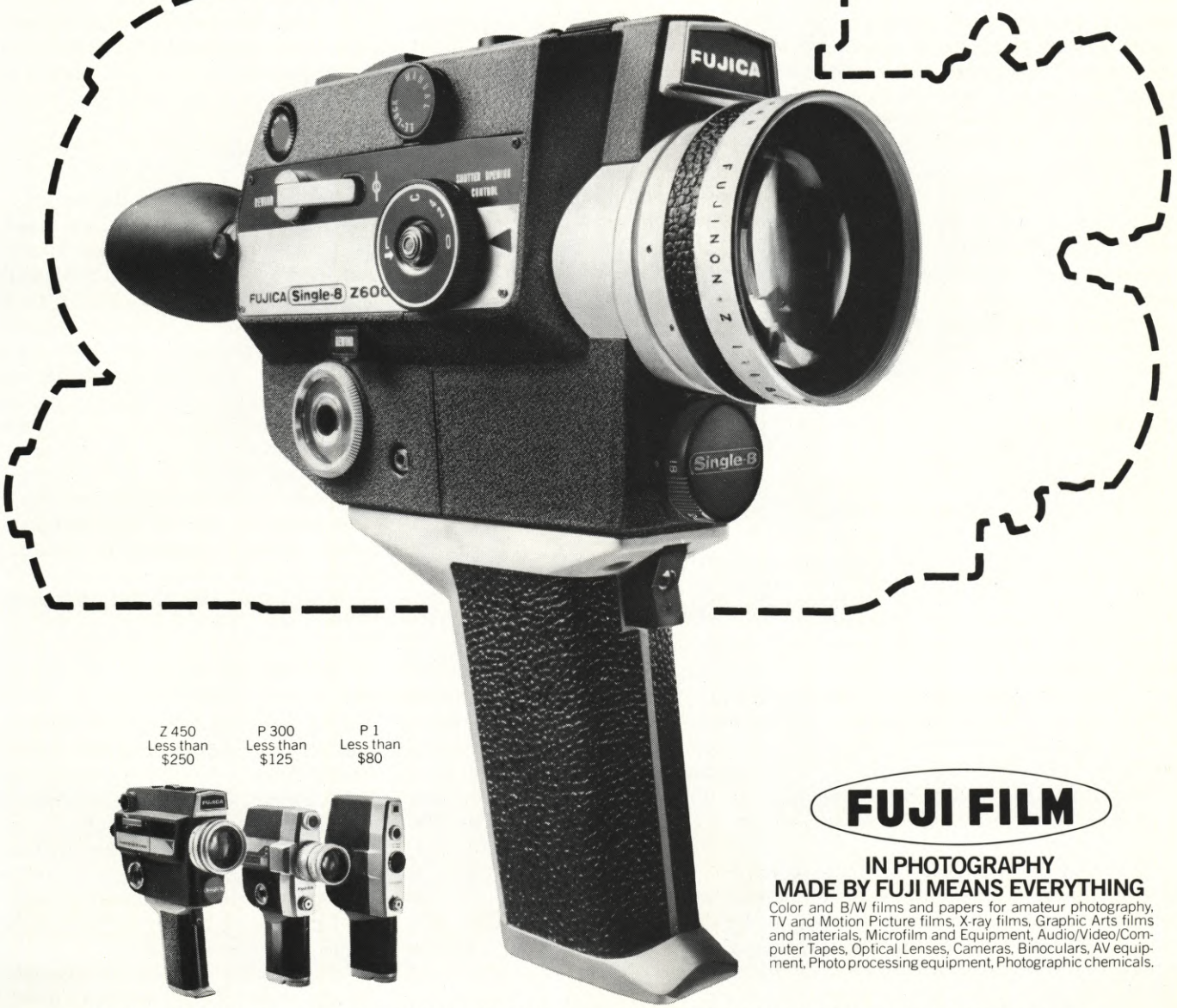
If you've always dreamed about owning a 16mm camera, but thought you had to settle for Super 8, there is an alternative. The Fujica Single 8 system with cartridge loading Fuji Film. It does many things 16mm can do, and Super 8 can't. And will let you produce professional quality high-budget films on a low budget.

Compare catalogs for complete details.



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Manufacturer's U.S.A. Subsidiary: Fuji Photo Film U.S.A. Inc., 350 Fifth Avenue, New York, N.Y. 10001. U.S. Distributor: Ehrenreich Photo-Optical Industries, Inc., Garden City, New York 11530/In Canada: R & H Products, Ltd.

WHAT'S NEW

IN PRODUCTS, SERVICES AND LITERATURE

UNIQUE LIGHTING FACILITY OFFERED TO FILM-MAKERS

A novel facility for film-making, offering 600 footcandles of light in a non-studio setting, made its debut in the filming of a television commercial by Communications Group for Dancer-Fitzgerald-Sample and its client, Best Foods Inc.

The facility is the Light Bulb Center, at 16 East 56th Street, a unique showcase for the varied collection of incandescent, fluorescent and specialty bulbs manufactured by Duro-Test Corporation of North Bergen, New Jersey.

A feature of the center is the 30x30 meeting room, in which 240 four-foot 40-watt fluorescent bulbs, recessed into the ceiling, make studio lighting fixtures unnecessary. The fluorescent lights are shielded by non-glare, removable acrylic diffusers, and are surrounded by overhead spotlights in flush fixtures.

Available for special uses as a courtesy when not in conflict with Duro-Test group programs at the center, the room offers a casual setting particularly appropriate for candid-camera situations.

The Light Bulb Center is operated under the direction of Sergei Marketan, a lighting engineer active in Illuminating Engineering Society programs.

•

LIQUID GATE FOR OPTICAL PRINTERS

A liquid gate for use with optical printers is introduced by Producers Service Corp. Following the basic design of Howard F. Ott and manufactured under a patent license from Eastman Kodak Co., the system is known as the PSC/Ott Liquid Gate. It is available as original equipment or retrofit for 16mm and 35mm Acme optical printers and is adaptable to Oxberry, Research Products and other printers using the Acme type film movement.

The principal advantages of the PSC/Ott Liquid Gate are concealing scratches on original film, eliminating dirt, reducing film damage and increasing film life. The film is vacuumed when entering the gate to remove all loose dirt. Then, both sides of the film are wetted and, while in the printing aperture, it is completely immersed in perfectly-controlled, uniform layers of liquid. The film is vacuum-squeegeed upon leaving the gate, so it is dry both when it enters and when it leaves the gate.

Precise position of the film is constantly controlled. Film travels at speeds from hold-frame to 640 frames/min. with ease in either direction. Splices pass through freely. The liquid gate is interchangeable from one printer to another.

The liquid support system for the gate is mounted on wheels and can be used with any printer equipped with the PSC/Ott Gate. Of closed-loop design, it is comprised of supply and replenishment systems, heater and thermostat, bubble traps, liquid pump, filters, check valve, liquid trap, vacuum pump, vacuum gage, exhaust and drain.

The PSC/Ott Liquid Gate is especially valuable in printing CRI film, small format, large aspect ratio films, and new, sharper print materials. It is necessary for maintaining quality in extracting a large amount of information from a small unit area of original. With the use of highly specular light sources to improve detail and sharpness in printing, the liquid gate is essential in preventing enhancement of defects.

Manufactured by Producers Service Corp., 1200 Grand Central Ave., Glendale, Calif. 91201.

•

ALLIED IMPEX CORP. ANNOUNCES BAUER C ROYAL 6-ZOOM . . . SUPER 8mm MOVIE CAMERA

Allied Impex Corp., a division of AIC Photo, Inc., has announced a new Bauer C Royal super 8mm movie camera. The new camera, the Bauer C Royal 6, offers a 6:1 zoom lens, as well as the exclusive lap dissolve feature which brought fame to the original Bauer C Royal—the first super 8 cassette movie camera to offer the amateur this professional technique. The new Bauer C Royal is available at a price under $400.00.

To ensure maximum sharpness, the new C Royal is equipped with cross-hair focusing and a large viewfinder. The power zoom lens (Neovaron f/1.8/8-48mm) offers a 6:1 ratio. And the camera promises to be one of the easiest to operate of its kind, making it ideal for beginners as well as for the experienced movie-making enthusiast.

The lap dissolve feature is achieved with a variable shutter and an automatic back-winding mechanism. A built-in computer in the camera registers the frames during the fade-out and then stops the camera. When a button is depressed, the camera transports backwards the same length of film as used for the fade-out (up to 90 frames). During the following scene, the variable shutter is gradually opened for a perfect lap dissolve.

The variable shutter can also be used for increasing shutter speeds . . . which is of great value for shooting fast-moving objects. This will also achieve sharper image and decrease depth of field if a particular area or object is to be in focus, while the background or foreground is blurred.

A Trick Set/Intervelometer accessory is available for the Bauer C Royal 6. This easily-attached item provides fully-automatic fade-ins and fade-outs as well as single frame operation at intervals up to 60 seconds for time-lapse photography.

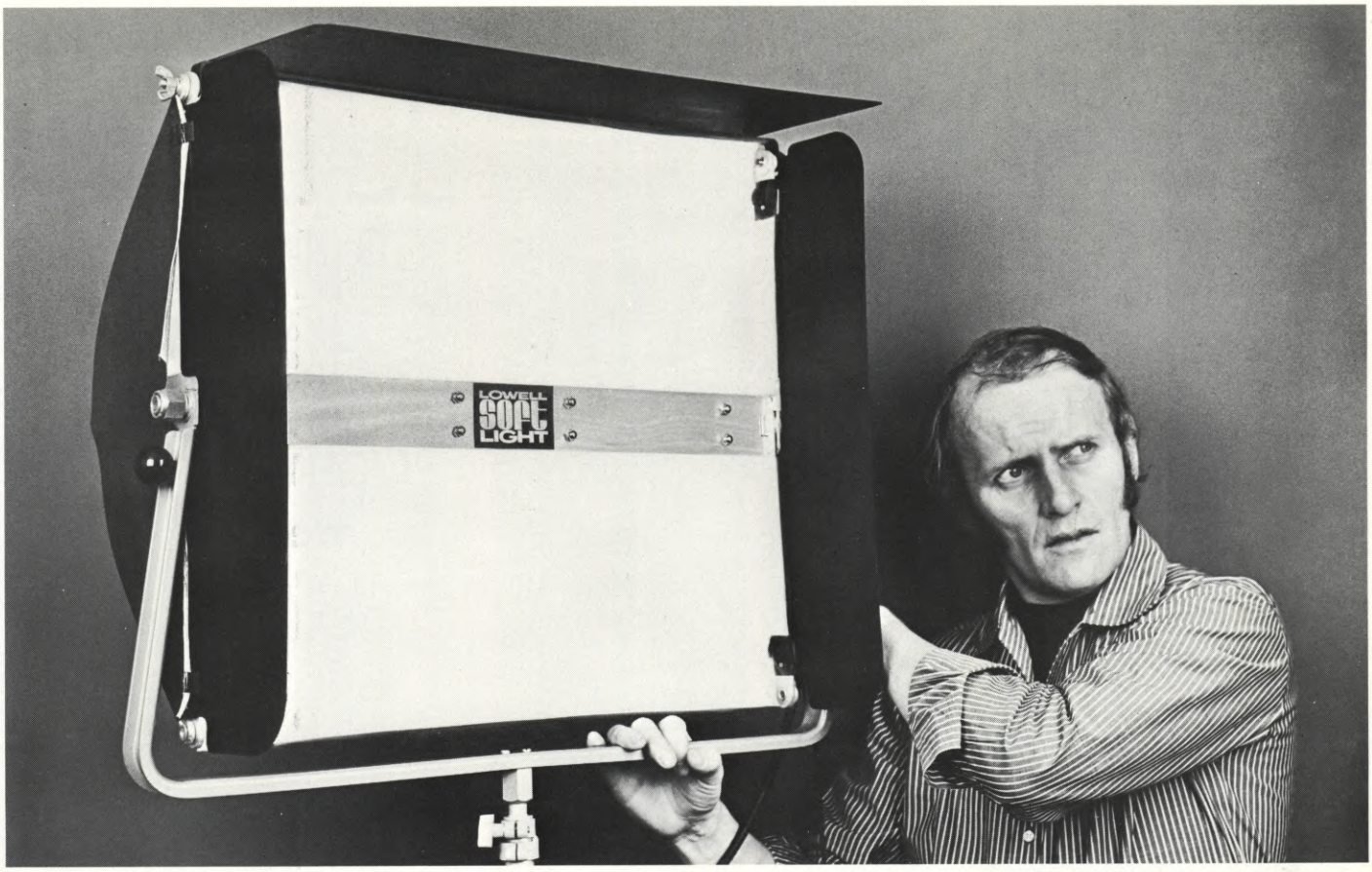
Detailed specifications for the Bauer C Royal 6 are as follows: Built-in rewind computer for lap dissolve, up to 90 frames; variable shutter, for fade-in and fade-out; power zoom lens: Neovaron f/1.8/8-48mm, 6:1 ratio; diameter of lens: 49X0.75mm; focus from 5 ft. to infinity.

In addition, giant size reflex viewfinder, with cross-hair rangefinder system; adjustable eyepiece, 5 to -5 diopters; behind-the-lens cds—exposure control system; manual override of exposure control system; visible controls in viewfinder: F-stop, battery condition, film transport and film end, and signal when variable shutter is in operation. Speeds: 12, 18, 24 fps.

ASA range from 25-160 ASA; single frame cable release outlet; remote control continuous run cable release outlet; electric drive by 4 penlight (AA) batteries; accessory show mount for movie lights; film type indicator window; resetting film footage counter; built-in type A filter.

Suggested list price for the Bauer C Royal 6, complete with lenshood, two eyecups: $399.50. Suggested list price for the following accessories—deluxe carrying case: $19.95, and for the slip-on-light bracket: $1.95. List price of the Bauer Trick Set is $99.95.

For further information, contact: Allied Impex Corp., division of AIC Photo, Inc., 168 Glen Cove Road, Carle Place, L.I., N.Y. 11514. ■



Lowell Softlight weighs only 7 lbs and folds flat into an attache case.

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"IT'S ONLY NUMBERS"
Producer/Director — Gerard Lemieux

Jet Propulsion Laboratory
"MARINER MARS '69"
Producer/Director — Frank Bristow

KLM Royal Dutch Airlines
"SURPRISING AMSTERDAM"
Producer/Director — Andre de la Varre, Jr.

Lawrence Radiation Laboratory, University of California
"CONTROLLED PHOTOSYNTHESIS"
Producer/Director — James Halverson

winners used Arriflex cameras!

winners* of the Industrial Film Awards used than all other makes combined! Proof of this unique capabilities as a filming tool.

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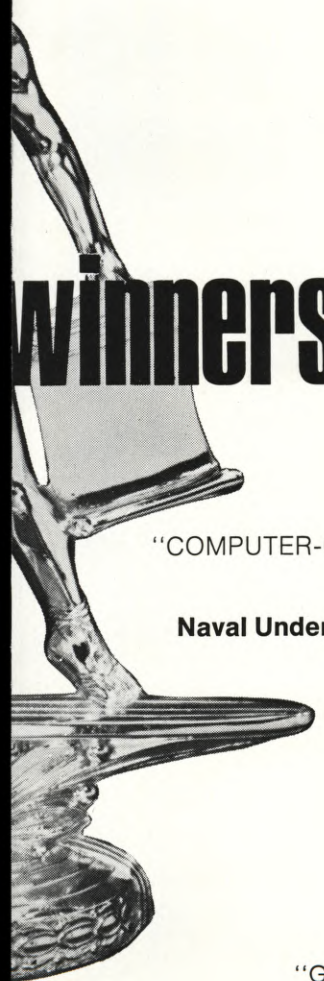
conducted by Industrial Photography Magazine



winners who won with ARRIFLEX®

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"COMPUTER-GENERATED FLOW VISUALIZATION"
Producer/Director — Arthur Laufman

Naval Undersea Research & Development Center
"DEEPLY SUBMERGED TERRACES"
Producer/Director — Max Hutto

The Ohio State University
"TRICUSPID STENOSIS"
Producer/Director — William Buccalo

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Union Pacific Railroad Company
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Producer/Director — Ralph Burrell

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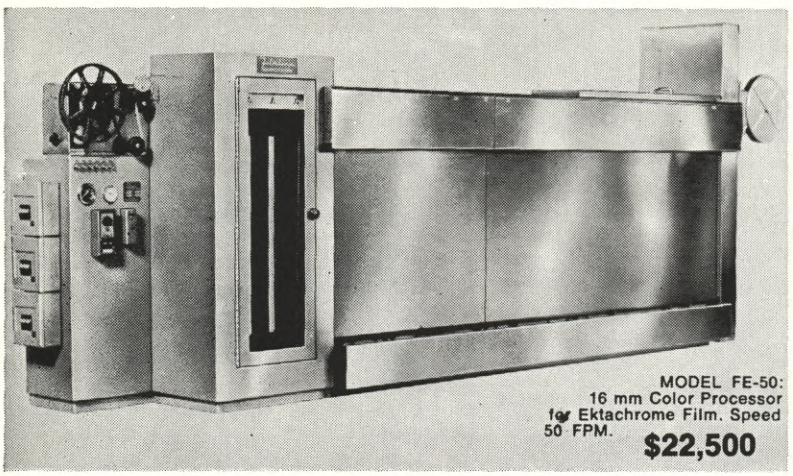
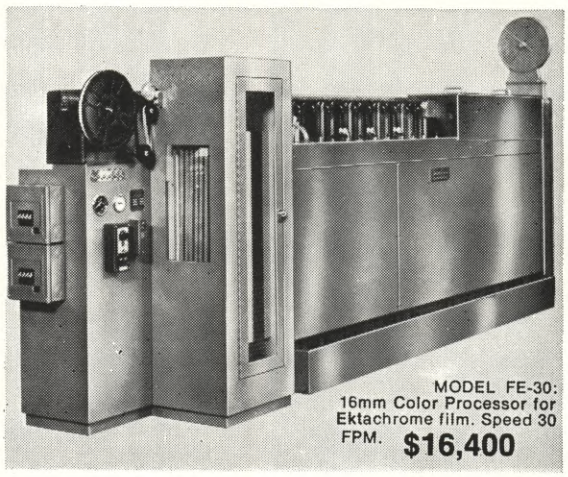


MODEL FE-50: 16 mm Color Processor for Ektachrome Film. Speed 50 FPM. **$22,500**



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Compare Filmline features to other processors costing more money. Feature-by-feature, a careful evaluation will convince you that Filmline offers you more for your investment.

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Magazine load, daylight operation ■ Feed-in time delay elevator (completely accessible) ■ Take-up time delay elevator (completely accessible) ■ Red brass bleach tank, shafts, etc. Prehardener solution filter ■ Precision Filmline Venturi air squeegee prior to drybox entry ■ Air vent on prehardener ■ Solid state variable speed D.C. drive main motor ■ Bottom drains and valves on all tanks ■ Extended development time up to two additional camera stops at 50 FPM ■ Pump recirculation of all eight solutions thru spray bars ■ Temperature is sensed in the recirculation line ■ All solutions temperature controlled, no chilled water required ■ Built-in air compressor ■ Captive bottom assemblies assure you constant footage in each solution ■ Change over from standard developing to extended developing can be accomplished in a matter of seconds ■ Impingement dryer allows shorter put through time.

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Laboratories: De Luxe Labs, General Film Labs (Hollywood), Pathe-Labs, Precision Labs, Mecca Labs, Color Service Co., Capital Film Labs, Byron Film Labs, MGM, Movie Lab, Lab-TV, Technical Film Labs, Telecolor Film Labs, Guffanti Film Labs, A-One Labs, All-service Labs, NASA Cape Kennedy, Ford Motion Picture Labs.

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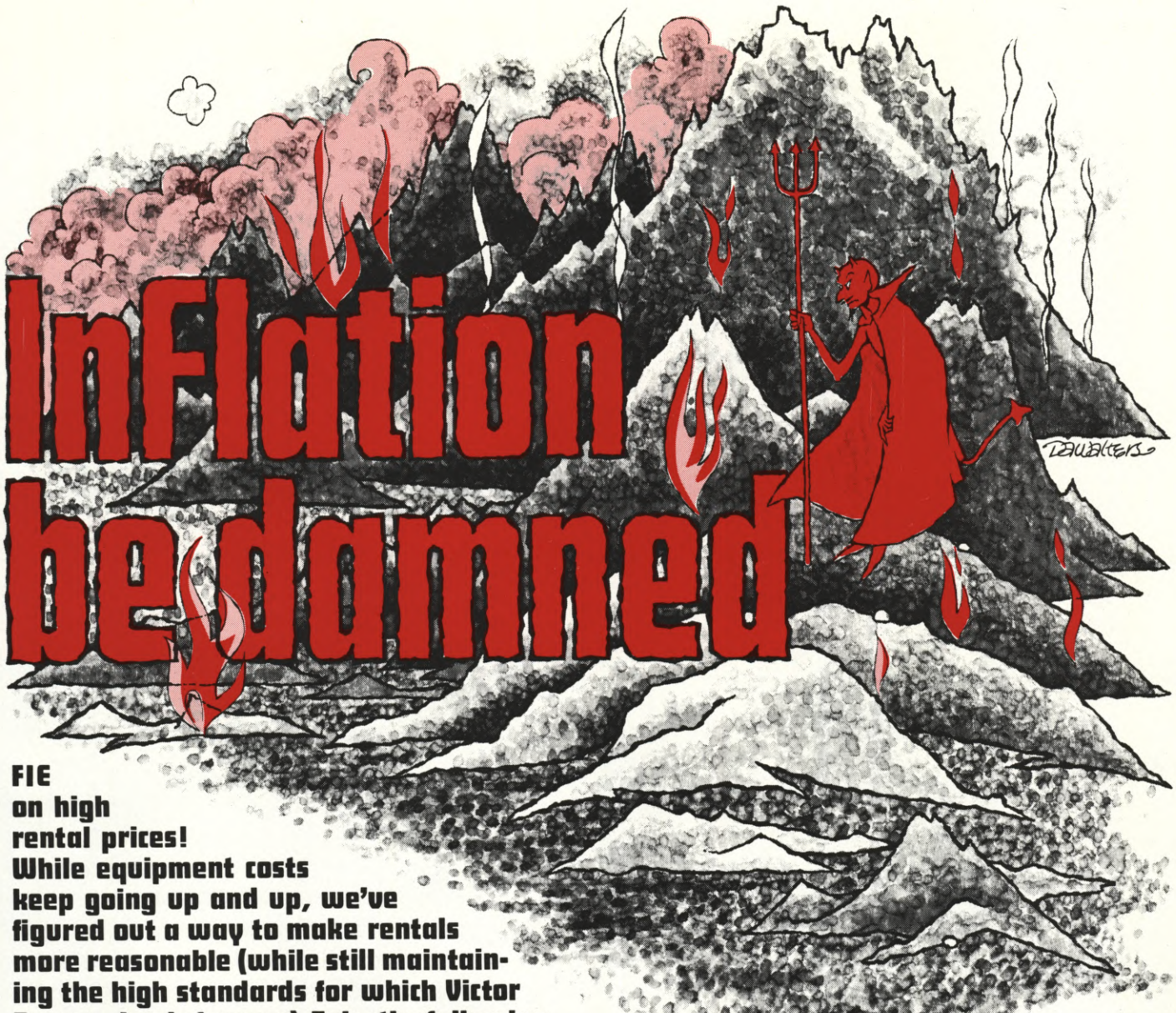

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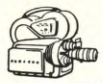

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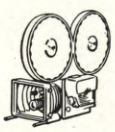

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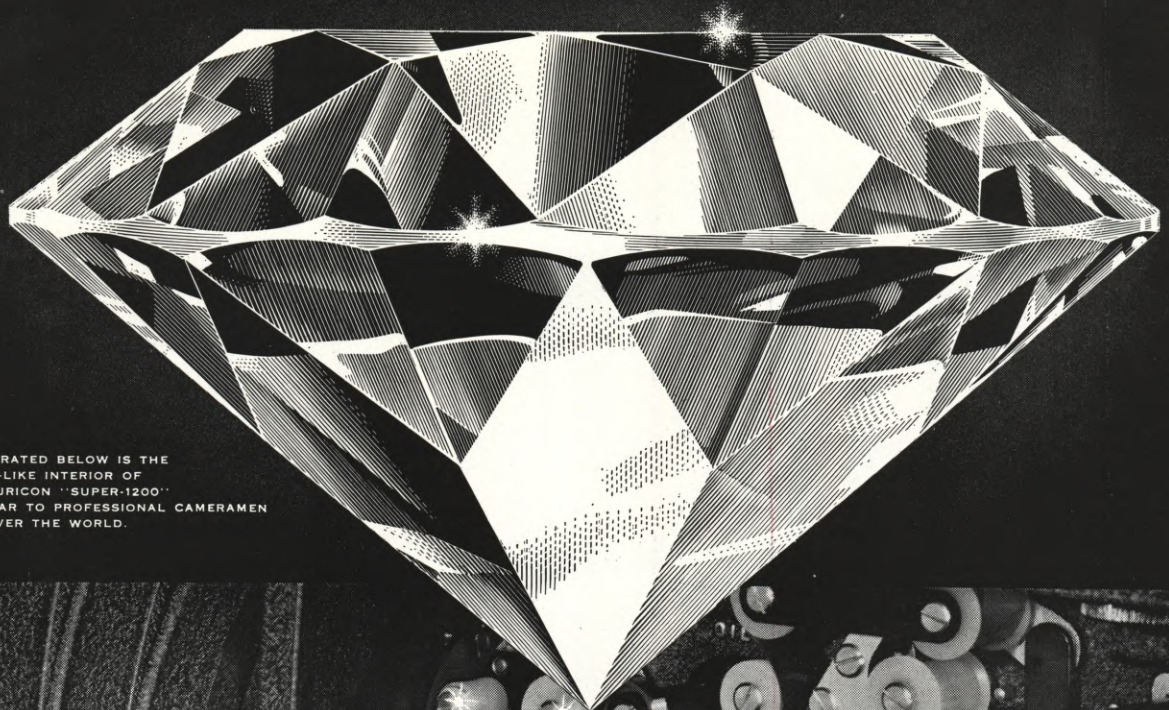

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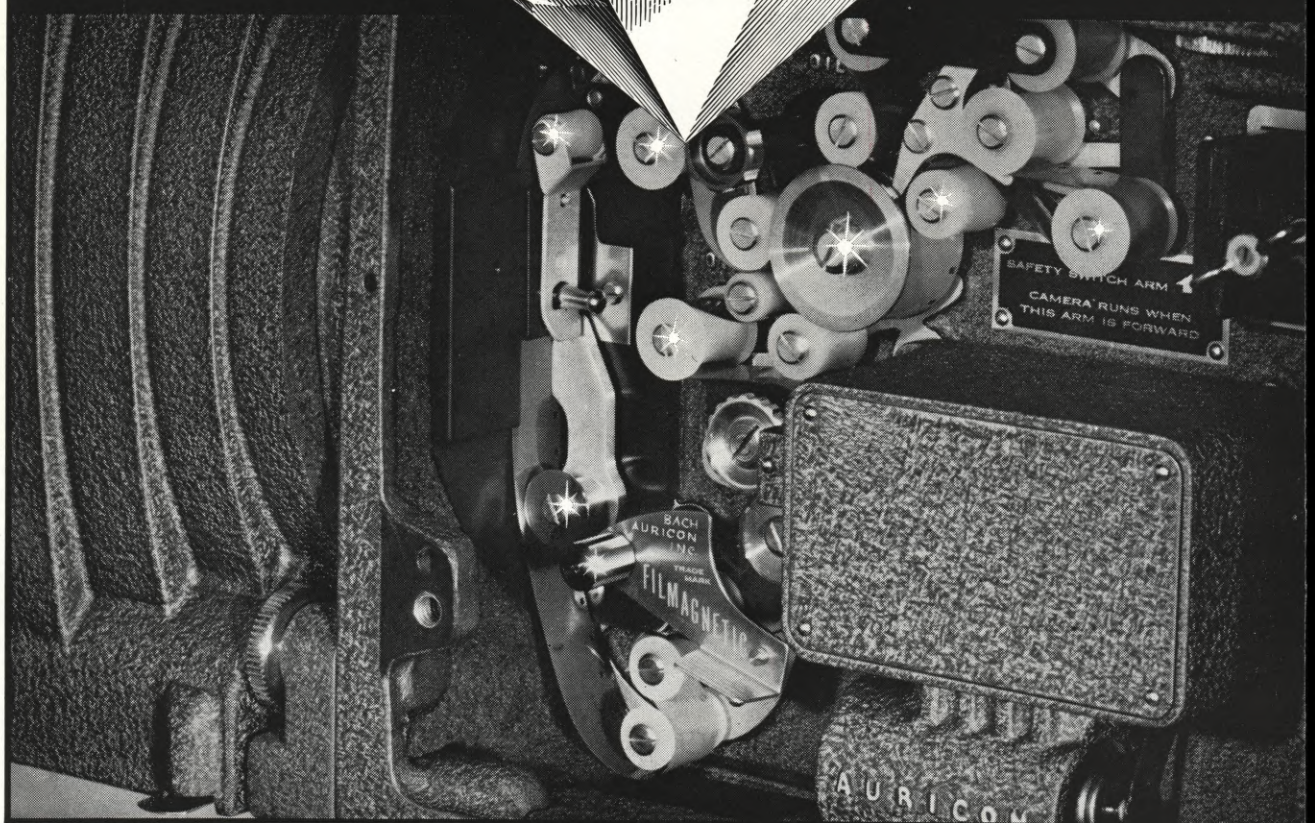

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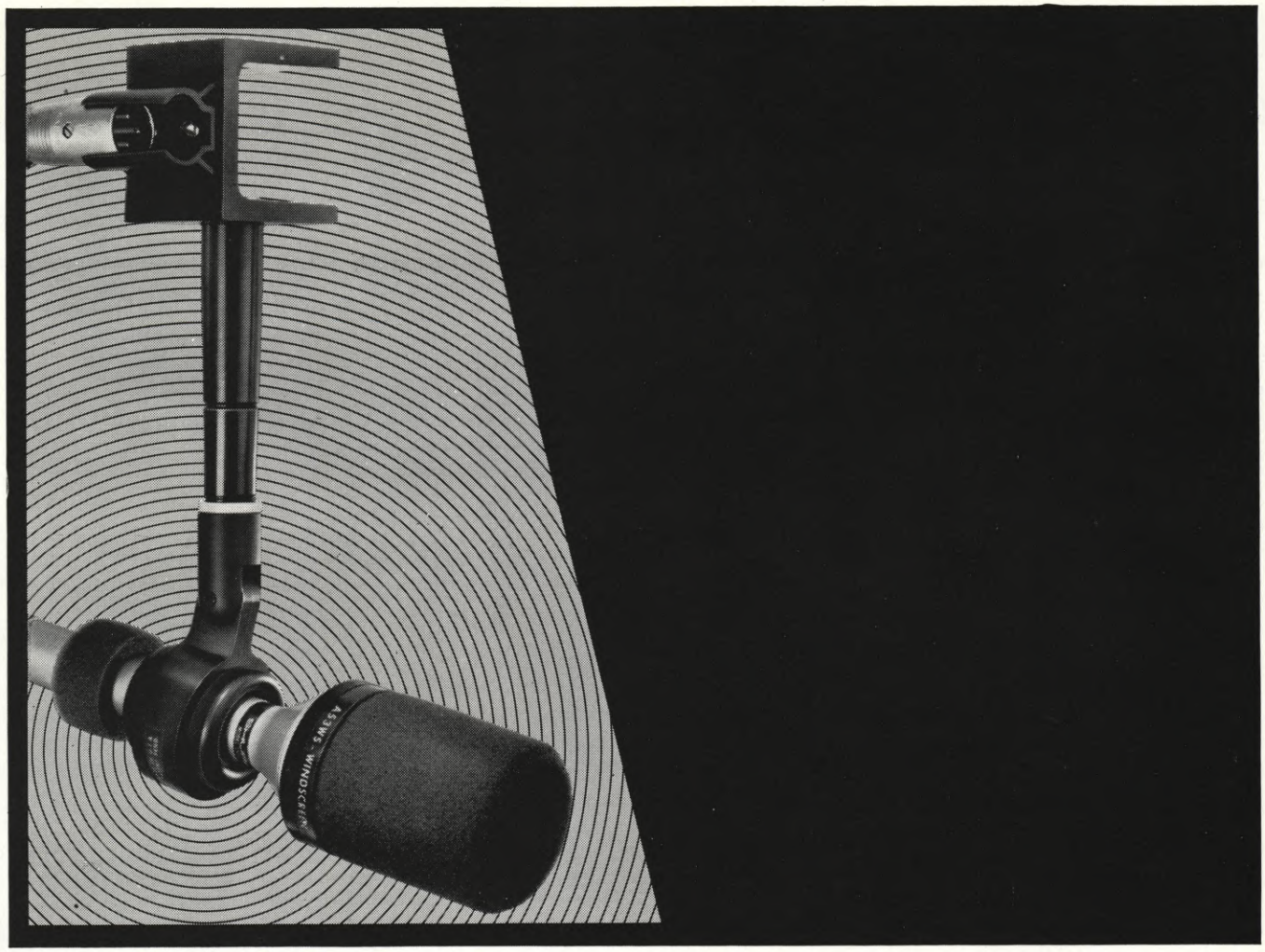

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SHURE

CINEMA WORKSHOP

By ANTON WILSON

SOUND RECORDING TAPE

The portable magnetic tape recorders used by the motion picture industry are considered the finest machines available. Reflecting the most recent state-of-the-art electronic designs, they are capable of producing recordings of extremely high quality. In fact, these recorders have achieved such a high level of sophistication that, in many instances, the recording tape becomes the limiting factor in terms of overall quality of reproduction. To ensure optimum results from the recorder, the magnetic tape should be selected with great care. An improper choice will not only impair the quality of the recording, but can also damage the machine and recording heads.

The recording tape consists of basically two parts; the magnetic layer and the base or "carrier." The base determines the mechanical properties of the tape while the magnetic layer actually retains the recorded signal.

MAGNETIC EMULSION

The magnetic layer consists of an emulsion of iron oxide particles. A professional recording tape must not only incorporate a high quality of iron oxide, but the size and shape of the particles and the distribution of these particles will also determine the recording characteristics of the tape. The iron oxide is usually processed into tiny "needles" only one micron in length. This oxide is then dispersed in a vehicle which contains binders and adhesives. The resultant liquid is used to coat the base material. This is a very critical process, for the coating must not only maintain a precise and uniform thickness, but the oxide must also be orientated in the longitudinal direction. During this process it is also critical to maintain uniform density of the oxide particles within the emulsion. If careful control is not maintained at this point, the particles may group together forming pockets of high density with corresponding areas of almost plain vehicle, while continuing to maintain the uniform thickness.

On a high-quality professional tape the coating is then polished to a super mirror-smooth finish. This is a very important step. It is critical during the recording process that the tape maintain a very intimate contact with the recording head. A tape that does not have a smooth finish will not maintain a consistent, close contact with the head (much like an old car on a bumpy washboard road). A tape with a mirror-smooth surface will slide smoothly over the head and maintain the necessary contact. This improves high-frequency response and almost eliminates drop-outs. Another important aspect of polishing is its effect on the recording head itself. Premature head wear is the typical result of tape abrasion which is caused by inferior polishing.

It is the magnetic layer that determines the recording quality of the tape. Almost all brands incorporate similar backing materials, but it is the magnetic layer that separates a professional tape from that which is mediocre and inferior. It is false economy to purchase an off-brand or "discount" brand of tape. Invariably these tapes are not well polished and will irreparably damage the recording and playback heads. In addition, the frequency response is not as flat or consistent as the professional product. The professional tape is usually more sensitive; that is, it will retain a stronger signal for a given set of conditions. Upon playback, this tape provides a higher output signal requiring less amplification—thus providing a better signal-to-noise ratio and a greater dynamic range.

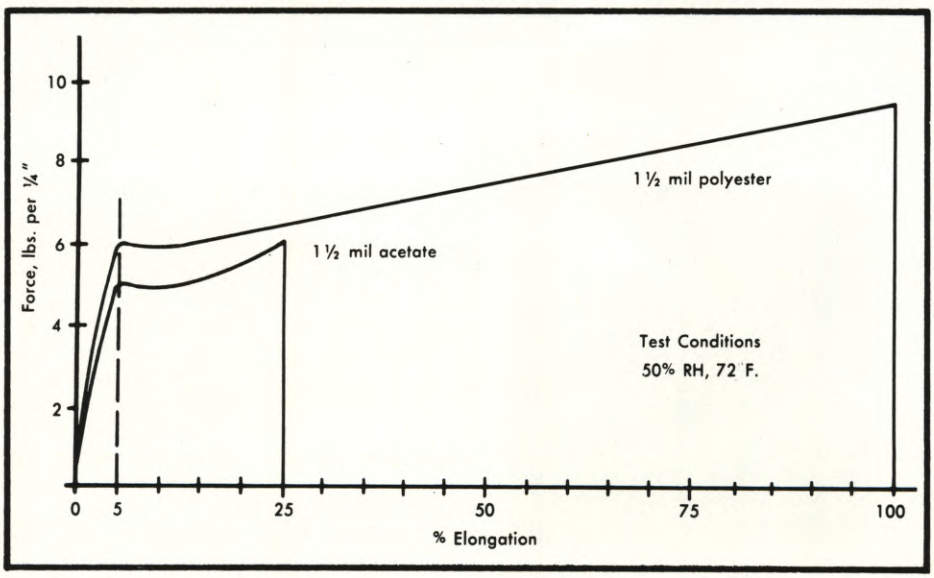
BASE

The base material is the carrier of the oxide coating. It must be very supple to facilitate an intimate contact with the head, and yet it must possess considerable strength to withstand the stress and shocks of fast rewinds and sudden stops. Audible range magnetic tape is available in two types of base materials: acetate and polyester. Some recordists have arbitrary preferences. However, there exist major differences in both stability and strength of these two materials.

The base material should maintain dimensional stability throughout changes of both temperature and humidity. Both acetate and polyester are thermally stable to the extent that this aspect becomes relatively unimportant. However a significant difference does exist in the respective reactions to humidity and moisture. The acetate is eight times more sensitive to relative humidity than the polyester. For example, with a change of 60% in relative humidity, an 1800-foot roll of acetate tape will change more than five feet, or

Continued on Page 1049

FIGURE 1—TENSILE PROPERTIES OF 1½ MIL BACKING



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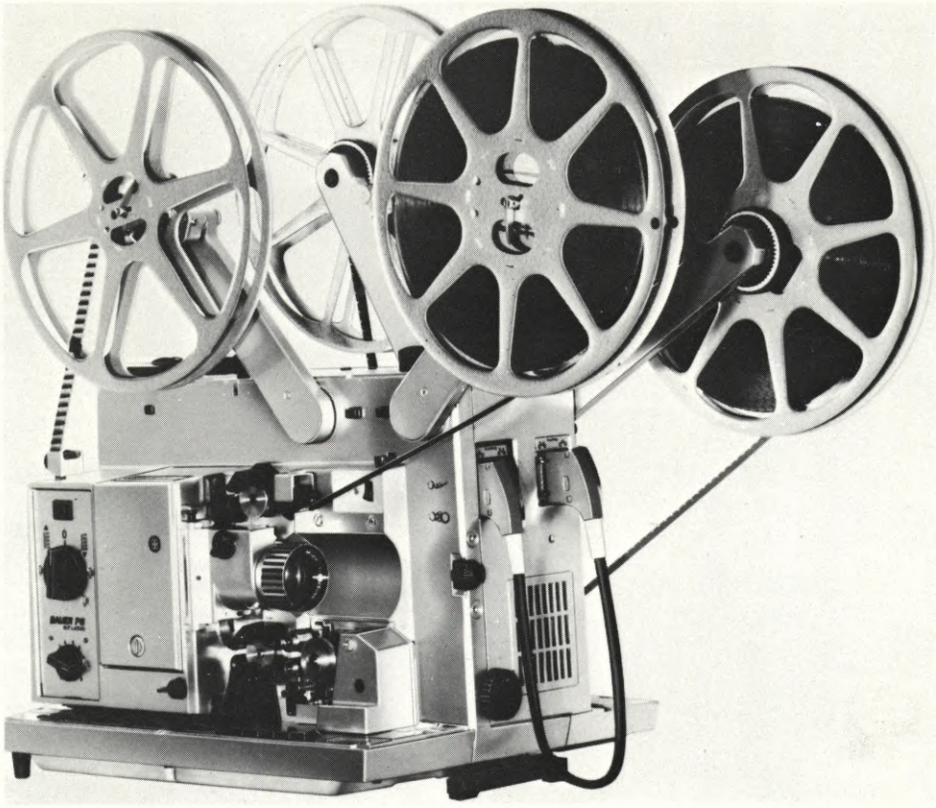

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TECHNICAL DATA	BAUER P6 STUDIO
Reel Capacity	2.000 ft. (600m)
Film Threading	manual; for picture film and perforated 16mm tape.
Projection bulb	24V-250W quartz iodine
Brightness	approximately 600 lumens
Power Requirements	115V-60 cycles A.C./450 Watt
Drive	Synchronous motor
Speed	24fps. or 25fps. forward or reverse running
Aperature	7. 16mm X 9, 6mm
Take-up assembly	load controlled, self compensating friction
Power Rewind	fast rewind for picture film, rewind for magnetic film by driving motor
Shutter	2 blades
Claw	3 tooth. special hardened
Film pull down ratio	1:6.9
Adjustment of frame line	by moving claw assembly
Picture Steadiness	±0.1%
Tilting	+7
Cooling system	double fan on motor shaft
Emergency stop	if film tears, complete power cut-off
Hour counter	built in
Reel Capacity of separate deck	2,000ft. (600m)
Sound Reproduction of separate deck	from either center track or edge track (chosen by switch)
Sound recording of separate deck	on either center track or edge track (chosen by switch)
Sound reproduction picture side	either optical or magnetic sound from picture film edge track
Sound recording	on picture film edge track
Magnetic sound track widths (sep. deck)	center track: 2.2mm edge track: 4.8mm

TECHNICAL DATA	BAUER P6 STUDIO
Sound heads on sep. deck	individual magnetic heads for erasing, recording and reproduction
Sound monitoring while recording	Yes
Sound monitoring amplifier	plug-in type with outputs of 1.5V and 5-15ohm. With switch for either picture film or tape deck side
Fly wheel on sep. deck	on start of projector, automatically speeded up. On stop of projector, automatically slowed down
Central feeding sprocket on sep. deck	can be disengaged for easier positioning of tape film to start mark
Amplifier	solid state, with silicone transistors. Built in projector base
Amplifier output	20W. sinus; 25W music power
Built in speaker	3W (can be switched to off-half-power-full power
Exciter lamp	6V/1A DC
Silicone photo element	type Siemens BPY 11
Trick recording control	for superimposing sound on sound for either picture film or magnetic deck tape
Inputs Phono Microphone Pre-amp	150mv/500kilo ohm 0.5mv/200ohm 1.5v/600ohm (6db)
Outputs Speaker Pre-amp	8ohm/15Watt 1.5volt/600ohm +6db 1.5volt/600ohm, adjustable
Frequency response	optical sound −5 cycles . . . 7,000 cycles ±3db magnetic sound −50cycles . . . 12,000 cycles ±3db
Signal to noise ratio	45db
Wow and Flutter	picture film — ±4% (DIN) tape deck — ±3% (DIN)
Weight	approximately 66pounds

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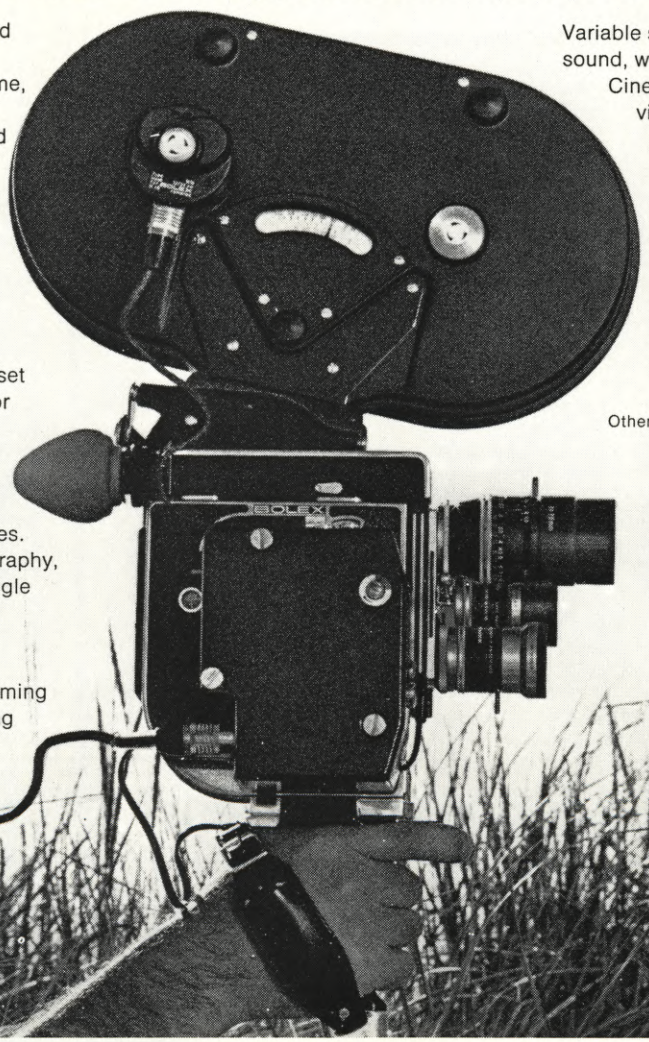

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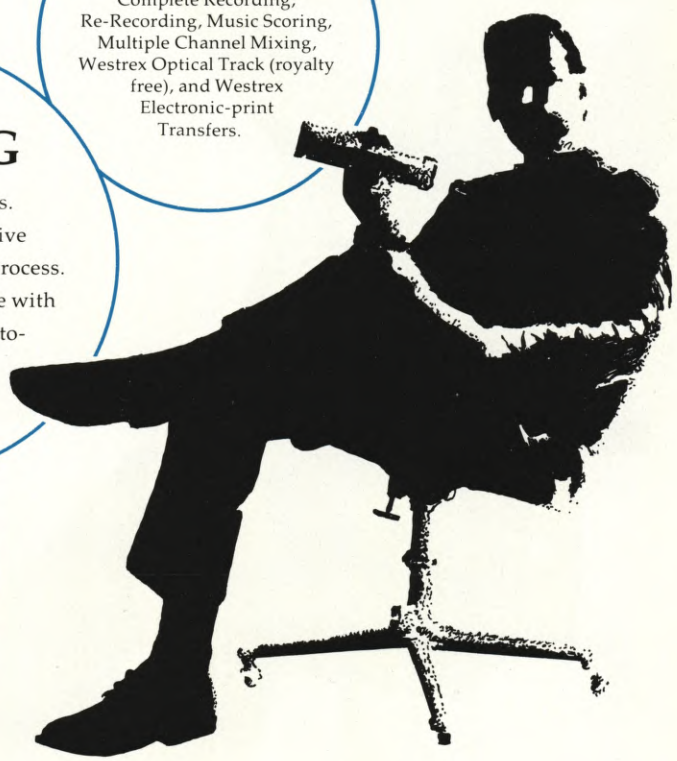

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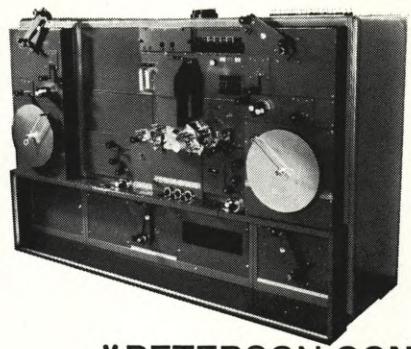

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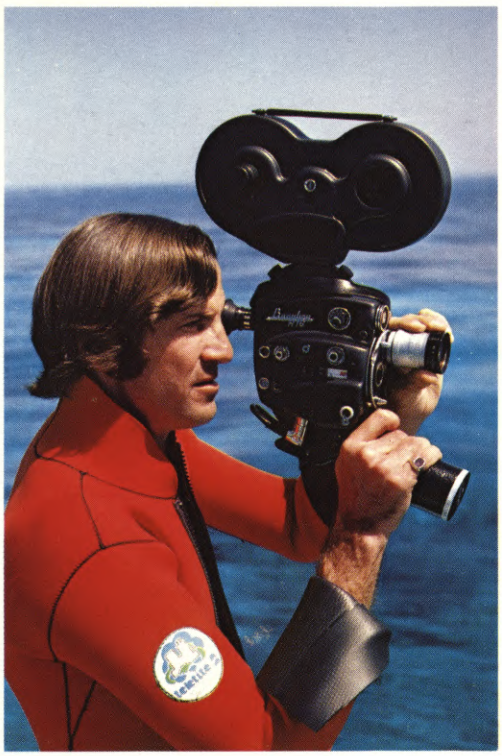


Flip Schulke—Photojournalist/Cinematographer/"Photonaut"

☐ TEKTITE II Photographic Mission Leader & Director of the one-hour long TV-film study of human adaptation to an underwater habitat titled "Man in the Sea—Tektite II" ☐ Contract photographer for LIFE magazine ☐ Seven-time Award Winner/News Pictures of the Year Competition ☐ Feature photo stories for National Geographic, Fortune, Ebony, Time, Playboy, Sports Illustrated, etc. ☐ Underwater Photographer of the Year Award—1967/10th Annual International Underwater Film Festival.

"The Beaulieu R16B is my own *personal* camera.

I like it because of its light weight, the advantage of the 200′ daylight loads, and the fact that it can fit easily into the underwater plexiglass camera housing I had designed and built for it. The R16B requires no external battery connections or separate battery inside the housing, except for the Beaulieu integral battery handgrip. So the R16B handles as a *single* unit going into and coming out of the underwater housing, which makes it a much easier package to load and unload in difficult water conditions on the surface. The thru-the-lens exposure meter on the Beaulieu works well underwater also.

I use primarily Angenieux wide angle lenses in my underwater work, because it is of utmost importance to be as close to the subject as possible—so as to cut out most of the blue filtering of the water between the camera and the subject. I also use dome-optic correctors, of my own design, built into the front of the underwater camera housing which compensate for the magnification factor of the water.

Besides utilizing the Beaulieu 16mm camera in my underwater photography, I also use it in documentary 'on-the-surface' cine projects for industrial clients and advertising agencies on assignments all over the world. The Beaulieu R16B has made it quite easy for me to make a transition from doing mostly 'still' journalistic photography, to where a large percentage of my photographic work is now in the cine documentary field."

THE FILMING OF "LE MANS"

Short on plot, but long on action, this picture captures the full dramatic (and violent) sweep of France's annual racing classic that runs for 24 hours

The Solar Productions Cinema Center Films motor racing feature, "LE MANS", will inevitably be compared to the real *Vingt-Quatre Heures du Mans* run annually on the Sarthe Circuit in France. The question as to whether or not the film could be regarded as a documentary has been raised repeatedly.

The comparison is valid and welcomed by the producers, but the film definitely is not a documentary. It is, in fact, a fictionalized version of what occurs during the festive two days in June each year when the world's fastest cars and the world's best drivers become a magnetic attraction to more than 300,000 racing fans from all over the world.

It is a dramatization of what happens to a select few of the 300,000—specifically the drivers, their cars, their mechanics, their mentors and their women.

Originally conceived and planned two years ago by its star, actor-racer Steve McQueen, "Le Mans" was temporarily stymied by the student riots in France in 1968, but the delay providentially allowed additional time for research and preparation of the project.

McQueen transported a writer, producer and camera crew to the 1969 running of *Vingt-quatre Heures du Mans* where more than 30,000 feet of film was exposed. Experiments were made with camera placement, angles and lighting.

The same team attended races at Daytona, Laguna, and numerous other American racing sites as part of the complex pre-production preparation for the multi-million-dollar film.

SOLAR VILLAGE

Before any actual filming could get underway, however, arrangements had to be made with France's Automobile Club de L'Ouest and with officials of the Department of Sarthe for use of the circuit, which includes public highways as well as private track facilities.

The French were duly impressed and resultantly cooperative when the producers agreed to pay $30,000 for the use of the track facilities and told all concerned that some $4,000,000 would be spent by the production company in Le Mans and its environs.

Soon thereafter a site adjacent to the track was selected as the film's operational headquarters and construction of what became known internationally as Solar Village was begun on March 23. Remarkably, it was completed 11 days later on April 3.

It covered an area of 100,000 square feet with the principal structures three office buildings, 30 meters long and six meters wide, forming a "U" around a graded and surfaced parking area. Other buildings of the complex included a sanitation facility with showers, a food tent, kitchen and storage building. Cost: $30,000.

THE 38th VINGT-QUATRE HEURES

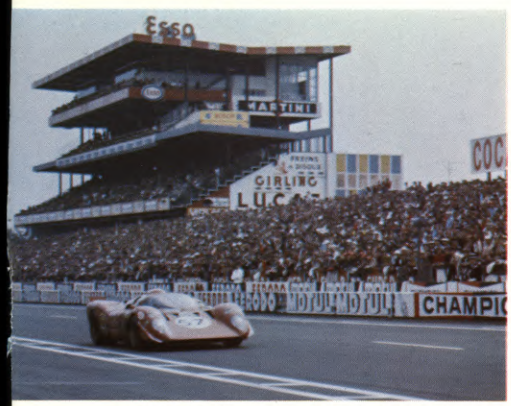
Filming began on "LE MANS" at dawn on June 13, 1970, when the first of 500,000 spectators began to filter into the city. Cameras at many vantage points recorded the influx of cars, bicycles, motor bikes, campers, hikers, planes and the mass of humanity.

Nineteen other cameras, manned by 45 cameramen, were positioned around the race course. The three most important cameras were placed on special mounts created by Hollywood specialist, Gaylin Schultz, fore and aft of the Solar Productions Porsche 908 racing car which competed in the race. (See Page 990.)

Driven by professional drivers Herbert Linge and Jonathan Williams, the Solar entry, surprisingly enough, was the first car across the finish line at the end of the race at 4 p.m. on June 14, the actual winning car, a Porsche 917, having crossed the line a bit before 4 p.m. Solar's Porsche 908 camera car finished 8th among 15 finishers. It had

Continued on Page 1038

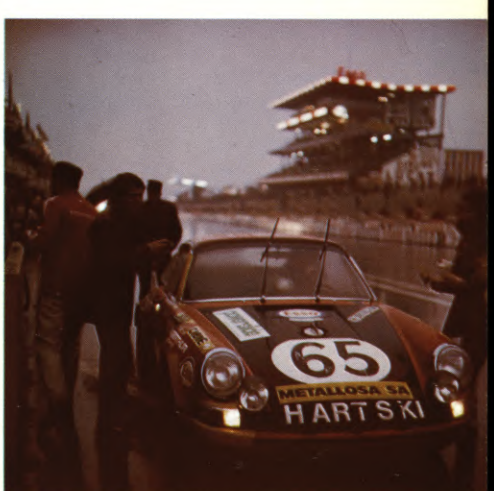
(LEFT) Wives and close associates of the drivers watch the race from a specially designated spectator area. (CENTER) Steve McQueen has *tête a tête* with widow of driver killed in previous running of Le Mans race. Sequence was filmed inside an acutal Rotary Club, rigged by Director of Photography Robert Hauser, ASC, cast, according to French procedure, in unaccustomed role of "Lighting Cameraman". (RIGHT) Trailers used by race drivers offered little room to hide lights for filming.



(LEFT) Main grandstand at Le Mans was packed with spectators. An estimated total of 300,000 watched the race "live". (CENTER) The pit area was focal point of furious activity, especially during the rainy night. (RIGHT) The actual race was filmed by the production company as background material. Dramatic scenes and special racing sequences for inter-cutting were filmed later.

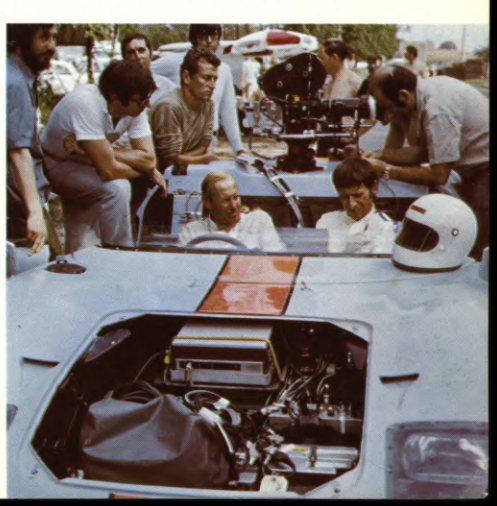
(LEFT) McQueen makes trial run to test feasibility of using helmet camera. The idea was rejected. (RIGHT) The picture features a full complement of spectacular flaming crashes.

(LEFT) As rain begins to fall, the fast-moving cars, with lights turned on, become glowing blobs. (RIGHT) Assistant on one of the many camera crews located around the track, slates scene.



(LEFT) Steve McQueen, who did his own driving for the filming, takes a rest next to camera crew set up to shoot another sequence. Shown is French equivalent to FAY-type quartz-cluster light. Cinematographer Hauser discovered, to his dismay, that it had been rewired to half-power, so that lamps would last longer. (CENTER) Car-mounted camera, within streamlined cowling to cut down wind resistance. (RIGHT) At dusk (the cinematographer's "magic hour") the action takes on a fascinating character.

(LEFT) Cameras which will shoot the race from many vantage points around the track, are brought out of their storage facility and set up for the day's work. (CENTER) Filming of staged racing sequences for inter-cut with the real thing, required a daily quota of extras to fill the spectator areas. (RIGHT) Specially converted GT-40 camera car about to make a run. Port in foreground, with cover removed, is for storage of complex air-control equipment used to pan, tilt and focus, while operator watches image on TV monitor.



"LE MANS"

SPEED WAS OF THE ESSENCE

The car-mounted cameras, ingeniously rigged by a top expert, put the audience right into the race, and are the film's real stars

By MARLENE NICHOLSON

The bright red and blue and orange cars flash by the screen at blinding speeds, the densely packed crowds visible along every possible inch of the track; the helicopter pulls back and reveals an even greater mass of people . . . and, as usual, the visual sense has, in a matter of only moments, encompassed and totally devoured what took months and months of work to achieve. Nothing new for a movie, right? But then, even for the *blasé* studio technician, mounting cameras on race cars driving at actual speeds had to pose new and frightening problems. Now add to that a car, not only loaded with cameras but entered in the world's toughest competitive race, THE 24 HOURS OF LE MANS, and the technician's problems have only just begun!

Problems follow one another until they almost stumble into each other, compounding themselves before even being solved. Steve McQueen has committed his 908 Porsche to actually compete in this race. So now, besides the "usual" camera technician's problems, you have to come up with solutions that will satisfy the French engineers, the Driver's Association and the French Automobile Club. The pressures increase further when you're told that you have the dubious honor of even being allowed to film on this track, because one of your predecessors rather casually installed a camera that fell off on the crowded track, resulting in dire consequences amounting to considerable damage and danger to the participants of a prior race.

Now the problems are really getting tough . . . so many people to satisfy. Add to this the requirement that no camera or camera equipment may be placed in the cockpit of the race cars, because part of their qualification requirements state that a certain amount of cubic space remain "empty" in each car; space which you would be infringing upon if you put a camera in the car.

There's more yet to come. Other cameras from other vantage points around the track and in the air will also be photographing this spectacle, which means that any cameras mounted on the race car must be hidden from view and in such a manner that whatever device is used to camouflage will be aerodynamically safe and totally convincing to the onlooker as being all part of this car. And the heat is on!

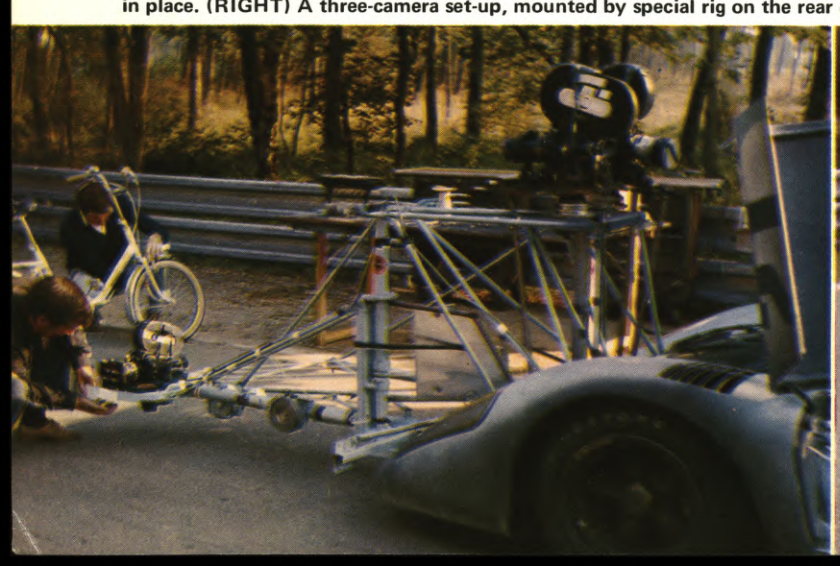
Now we are reminded that this is, as its name implies, a 24-hour race, going from light to darkness and back to light again, intermixed with a little bit of French *savoir-faire* that throws in sunshine and rain as well. The problems of filming while actually racing can be tallied *ad infinitum,* but now race day is upon you and all your homework is behind you and you have only to worry about whether all your thoughts and all your backup systems are as good in practice as they seem to be in theory. The moment of truth has arrived!

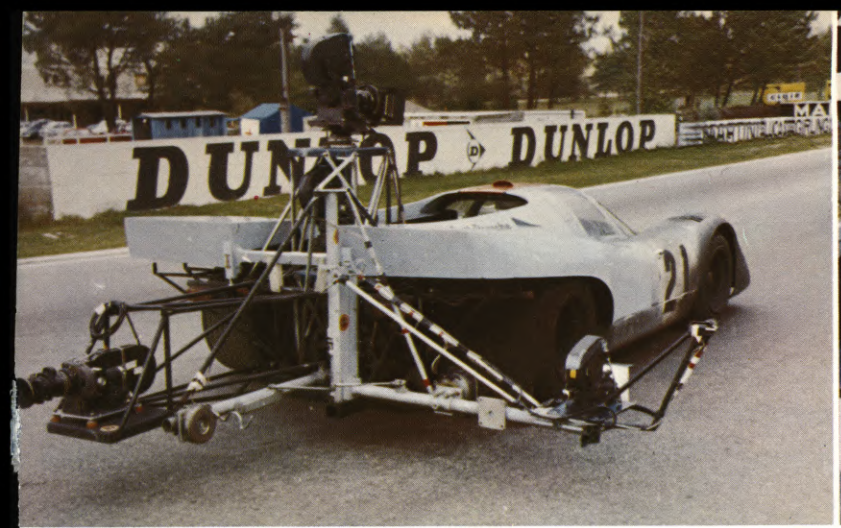
The drivers, understandably, are not only skeptical of what you have created, they are downright belligerent about the aerodynamic changes you have wrought, because they have resulted in such drastic handling attitudes in relation to the car. And not to be neglected is the intrinsic attitude that these are men used to driving cars to win, not to film! To leave each man to solve his own problems, or as one might say in the current vernacular, to "do his own thing," you do the best you can toward getting footage that will be impossible to account for in any way other than being right there.

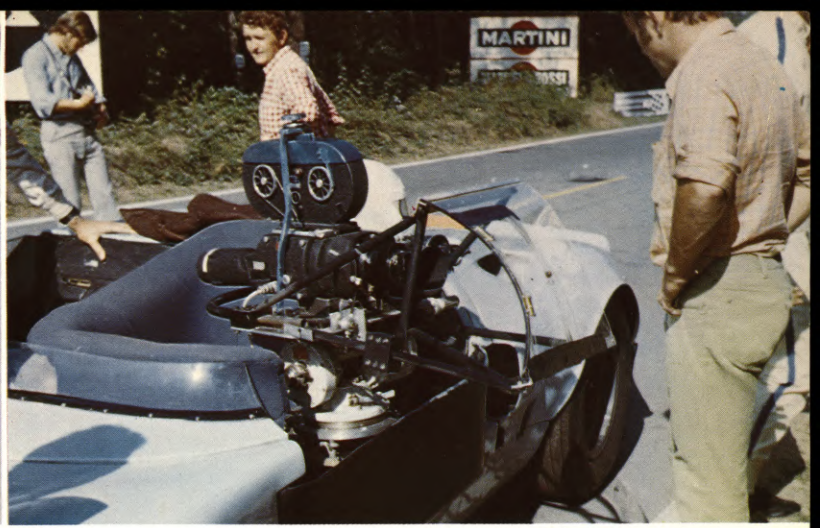
To minimize possible camera failure, you have arranged your mounts so that the entire camera will be removed during each pit stop, allowing a technician

Continued on Page 1036

(LEFT) Swinging mount on front of car, designed by Gaylin Schultz, to permit another car to bump camera and nudge it out of the way. Mount is held in initial position by powerful magnet. When it has swung to second position, at right-angle to original, a second magnet takes over and holds it in place. (RIGHT) A three-camera set-up, mounted by special rig on the rear of a Porsche 917 racing car.

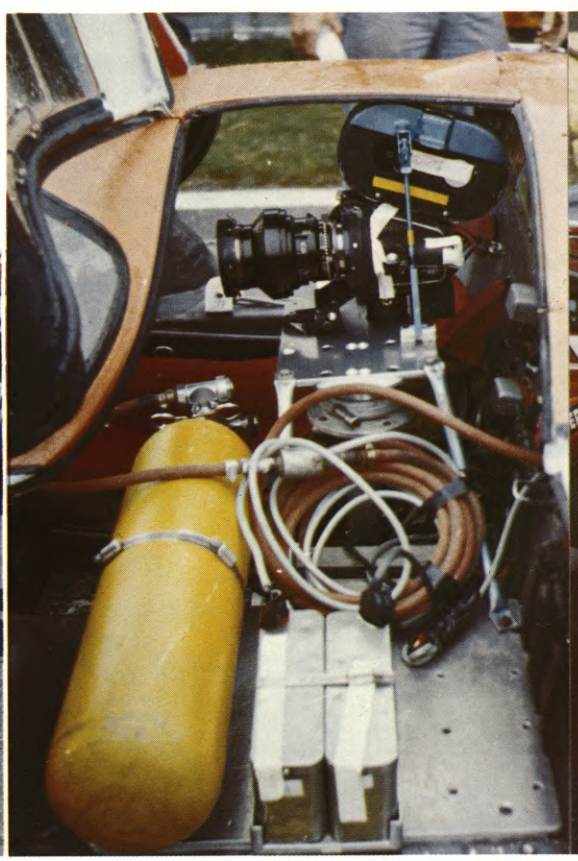






(LEFT) A rear swing mount, similar in construction to the front mount described. On side of mount for second camera pointed straight back can be seen powerful magnet, which will hold swinging camera in place after it has been bumped. (RIGHT) Camera mounted on GT-40 camera car, to be manually run by operator in car for point-of-view shot through window.

(LEFT) GT-40 camera car, with camera mounted on side and operator in special padded cockpit. (CENTER) Remotely-controlled camera, operated by air pressure for panning and tilting, is shown installed in car. In foreground is air bottle which provides the air pressure and operates air-ring that keeps rain off of lens. (RIGHT) Camera mounted to film close shot of rear tire going flat.



(LEFT) Location van used by camera mount specialist Gaylin Schultz to construct mounts and other special equipment right on the spot. The van accommodates a complete miniature machine shop which Schultz used to build a vast variety of different mounts, dreamed up on the spur of the moment by the director and cameraman. (RIGHT) Schultz (wearing sunglasses) listens to debate about proposed camera mount. When the argument is over, he will make it—whatever it is.

"THX 1138"

MADE IN SAN FRANCISCO

A group of young film-makers from *American Zoetrope,* most of whom had never worked on a feature, turn cameras toward a chilling "Brave New World" vision of the future

Warner Bros.' "THX 1138" is a mind-bending look into a future century and into a civilization that exists totally underground, its hairless citizens computer-controlled, euphoric with compulsory drugs and having arrived at the ultimate in human conformity under a robot police force.

The *American Zoetrope* production for Warner Bros. release was directed by 25-year-old George Lucas, produced by Lawrence Sturhahn and written by George Lucas and Walter Murch. Francis Ford Coppola, head of *American Zoetrope,* was the executive producer. The film editor was George Lucas, the art director Michael Haller and the cameramen were Albert Kihn and David Meyers.

The story is concerned with the efforts of Robert Duvall, who plays THX 1138 in a society where a prefix and a number suffice for a name, to escape his drug-induced state, which leads to love, an unknown and even forbidden emotion in his dehumanized surroundings, and finally his attempt to escape completely from the subterranean world itself.

The "THX 1138" company traveled to no less than 22 locations in the San Francisco Bay area, filming in such places as the Oakland Coliseum, the San Francisco Pacific Gas and Electric Building, the Marin County Civic Center in San Rafael and the various tunnels and tubes of the a-building Bay Area Rapid Transit system, scheduled to go into operation in 1972.

One of the chilling scenes shows Robert Duvall undergoing a medical examination of the future. To simulate this, director Lucas moved the company to a tumor research center in San Jose, where a four-million-volt linear accelerator and a laser treatment machine provided the necessary appearance of the medical machines of centuries hence.

The "THX 1138" company left the San Francisco area for one week to film a sequence involving a stark prison of the future without walls. The set, best described as absolute whiteness in all directions, served as a futuristic confinement facility without borders or boundaries.

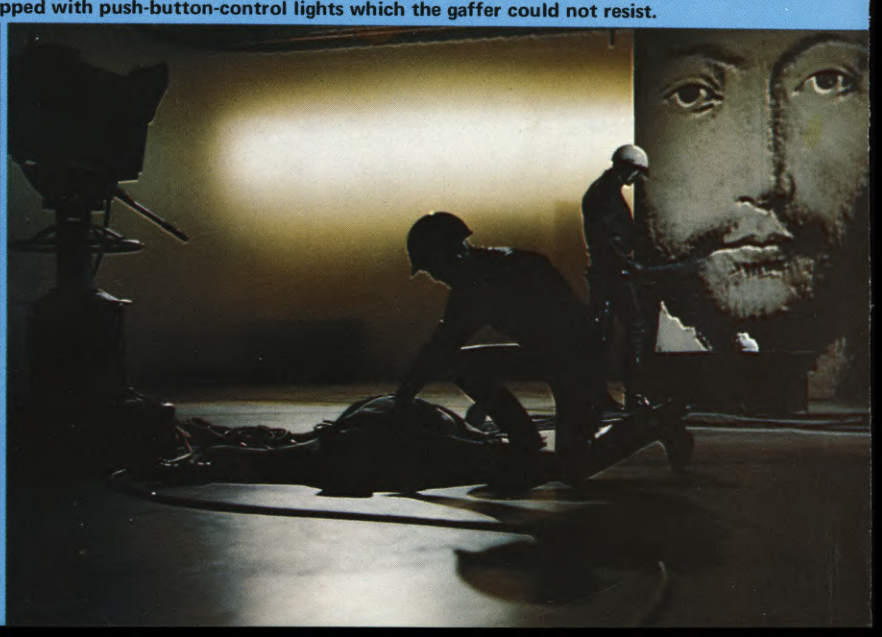
Director George Lucas grew up in Modesto, Calif., and became interested in films while attending the University of Southern California. "THX 1138" is his first feature picture, either as a writer or director, but it is based on a short he made while at USC which took the grand prize at the National Student Film Festival. Lucas has several other films planned for *American Zoetrope* production.

Francis Ford Coppola, the executive producer and creator of *American Zoetrope,* is only 30 but has had a decade of experience in motion pictures, much of it as a writer. He attended Hofstra University in New York before going to UCLA for his master's degree in filmmaking, where he won first prize in the 1962 Samuel Goldwyn writing competition. He made his professional debut in 1967 as writer and director on the highly acclaimed "YOU'RE A BIG BOY NOW", then directed Warners' "FINIAN'S RAINBOW" and wrote and directed "THE RAIN PEOPLE" for the same studio. It was while he was in the post-production phases on that film that he realized his "ultimate dream" with the founding of *American Zoetrope* and its ultra-modern film facility in San Francisco. Coppola won an Academy "Oscar" last year for his screenplay of "PATTON". He has recently completed co-scripting and direction chores on Paramount's "THE GODFATHER" and is currently in the process of editing the picture at *Zoetrope.*

The production of "THX 1138" was unique in several significant respects, among which were the following:

(1) Though financed and released by

(LEFT) Zombie-like workers of futuristic underground society, at work in a control room fitted with monitors to spy on other workers. Film shown on monitors was shot on 16mm film specifically for the picture by American Zoetrope crew. No attempt was made to eliminate shutter bars from monitors. (RIGHT) Sequence of a "cathedral" with telecast photo-mural of deity-figure in background was the sole fully-lighted sequence in picture—and only because it was shot in actual TV station fully equipped with push-button-control lights which the gaffer could not resist.



(LEFT) Crew sets up to shoot in not-yet-operational control center of the Bay Area Rapid Transit system. Aside from a few small quartz units bouncing light off the ceiling, entire sequence was filmed by available light. (RIGHT) American Zoetrope's mobile filming unit was used extensively during shooting in 22 locations throughout Bay Area. It is basically a converted Ford Econoline van compartmentalized to store the company's filming gear for maximum safety and efficiency.

(LEFT) Budding drones of the future, with heads freshly shaved and brains freshly washed, are herded about by instructors. An entire class of children volunteered to have their heads shaved in order to participate. (RIGHT) Low-angle shot emphasizes contours of futuristic interior and is part of the off-beat style of cinematography designed by Director George Lucas, who is very knowledgeable about the "graphics" of photography.

Warner Bros., the film, in its creative concept and execution, was in no way a "major studio production"; on the contrary, it was totally the product of *American Zoetrope,* the San Francisco-based film-making "commune", founded and funded by Francis Ford Coppola for the purpose of attracting, encouraging and utilizing talented young film technicians new to the industry. (See Page 1002.)

(2) Except for a couple of short sequences requiring set elements that did not exist locally, the picture was produced, photographed and completed entirely in San Francisco, with post-production utilizing the highly sophisticated technical facilities of *American Zoetrope.*

(3) Only one small "set" (an austere apartment of the future) was actually built for the production. Enormous production value and an atmosphere of great scope were achieved by utilizing carefully selected structures and locations existing in the San Francisco area.

(4) "THX 1138" was made by a relatively small crew of primarily young technicians, most of whom had never before worked on a feature film.

(5) The picture, filmed in Technicscope, is highly stylized in its photographic treatment. A distinctive visual aura, perfectly adapted to the subject matter, was achieved by breaking established photographic rules—not haphazardly, but with a high degree of skill and control.

Following are the accounts of several key technicians relating to their respective functions in the production of "THX 1138":

THE CONCEPT OF "THX 1138"
By GEORGE LUCAS
Co-writer/Director

My primary concept in approaching the production of "THX 1138" was to make a kind of *cinema verité* film of the future—something that would look like

Continued on Page 1018

A man, his work, and his camera

Merl A. Dobry Aerial and Underwater Cinematographer ☐ Parachutist and Skier ☐ Independent Documentary Filmmaker ☐ Director of the Motion Picture Dept., Brooks Institute of Photography (Santa Barbara, California)

"The camera I use in my aerial cinematography is the 16mm Beaulieu. This is a very light weight camera—the body weighing only 4¼ pounds—and this low weight aspect is a tremendous asset when you are in a chase plane, or attaching the camera to a wing-tip of an airplane, or free-falling during a parachuting sequence. The G-forces are not too great when you're handholding the Beaulieu, and there is also very little wind drag.

"Some time ago, I was involved in shooting a film which called for a parachute sequence with a series of free-falls. I started off doing the series using a 'gun-camera' mounted on my jump helmet. When that parachute opens, the extra weight of the helmet-mounted camera transmits quite a sudden shock to your neck. So I began using my 16mm Beaulieu during such free-falling parachute jumps by putting my hand through the top strap and tethering a light nylon cord around the bottom. In parachuting, by the way, I prefer to use the Beaulieu pistol grip, and I place the nicad battery and remote battery container in my shirt pocket . . . running the battery cord down my sleeve so the wind doesn't tear it off. I just jump out of the aircraft at about 18,000 feet, letting the Beaulieu blow back against my arm. When it comes time to shoot, I just move into position and reach it with the other hand—using the Beaulieu just as I would for normal hand-held shooting on the ground. And, I've never faced any problems with a dislocated neck due to a camera helmet by shooting my free-fall sequences this way."

"I always seem to get back to the aerodynamics of the Beaulieu 16mm camera body design . . . it was probably never deliberately wind-tunnel tested when they first designed the basic camera, but you can't deny that the Beaulieu 16mm turned out to be an extremely compact and smoothly styled camera. I find it ideal for all types of aerial filming."

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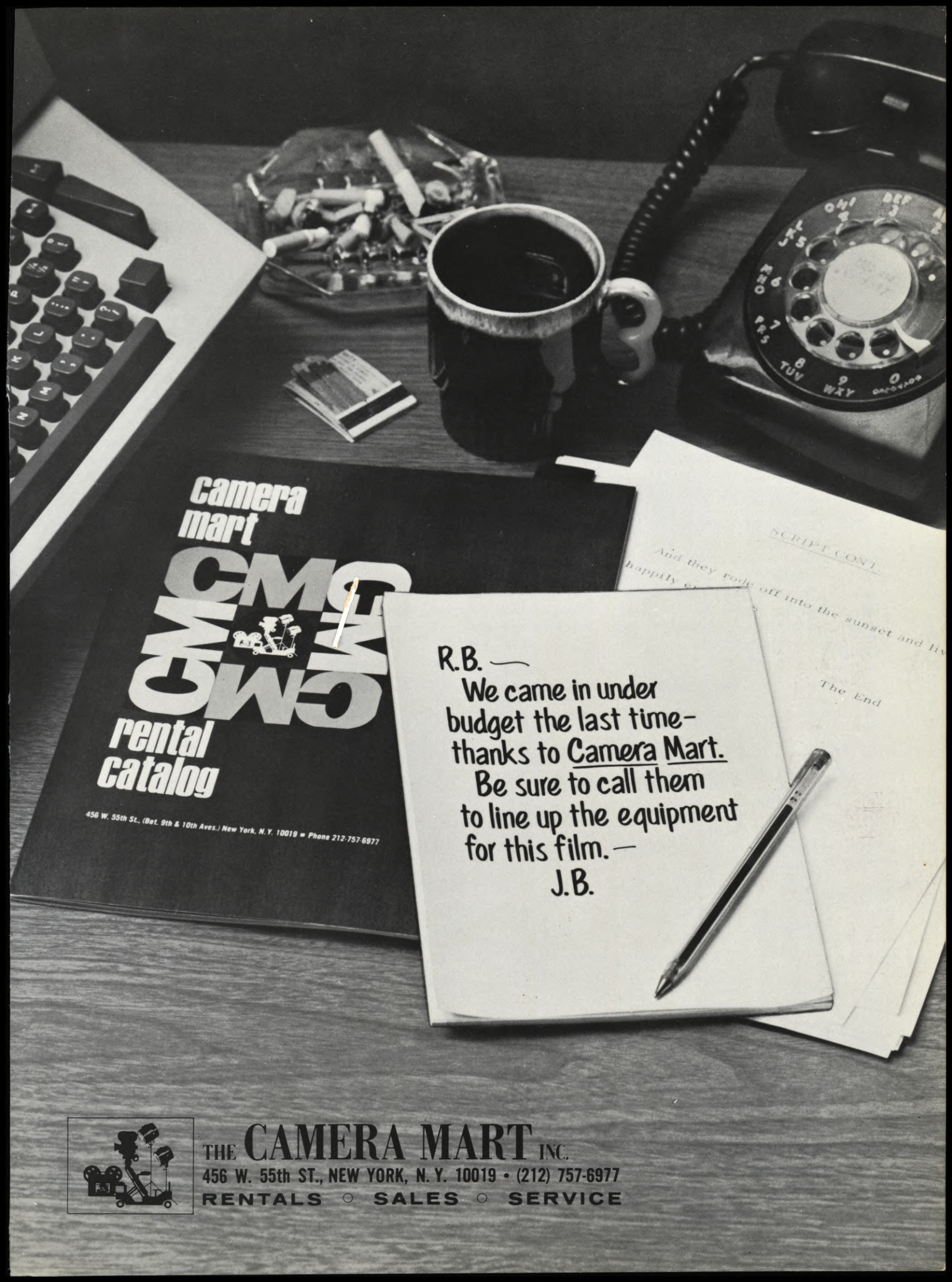
To receive literature on the Beaulieu 16mm camera, visit your finest camera store or write Cinema Beaulieu, General Office: 14225 Ventura Blvd., Sherman Oaks, California 91403.



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FILM-MAKING IN SAN FRANCISCO

The romantic city by the Golden Gate presents a myriad of different locations for the motion picture camera lens

By VAUGHN SHANER

Sales Manager, Pacific Northern Region
Motion Picture & Education Markets Division
Eastman Kodak Company

It was the beginning of a typical winter day in San Francisco.

The cold bite in the morning air encouraged some tourists to wear their topcoats, but the natives knew that by noon the sun would burn off the low-hanging clouds that drifted overhead. On world-famous Nob Hill, three filmobiles from Warner Brothers were parked, while the production crew worked inside an apartment building where a scene for "CROSSCURRENT" was being filmed.

A cable car with tourists headed for Fisherman's Wharf was obligingly stopped, so the people from Kansas and Nebraska (which, incidentally, is my own home state) could gaze at the Hollywood stars for awhile. Many focused their Kodak Instamatic still and movie cameras on the film-makers.

Behind the camera, Director of Photography Fred Koenekamp, ASC, quickly lit the scene so the crew and talent could finish their jobs and move to the financial district, where the next scenes were scheduled to be filmed.

Two San Francisco policemen, assigned to control traffic and guarantee the privacy of the crew, chatted quietly, barely paying attention to the now-familiar sight of a "Hollywood" film being made in the streets of San Francisco. With the exception of the tourist-laden cable car, the film crew and actors received only glances from the residents on their way to work.

Even automobile drivers, seeing the filmobiles, klieg lights and reflectors, tended to make their own detours to avoid possible traffic jams. San Franciscans have apparently become so *blasé* about film-making on their streets that they often pass right by.

The time of the year was January. "CROSSCURRENT" was scheduled for television release to help fill the need for feature-length films. And San Francisco newspapers were already reporting that it was a pilot for another Bay-area TV series, joining "AIRPORT", whose programs for the year were already in the can.

Several other feature-length films were in production while the "CROSSCURRENT" crew was at work. In San Mateo, Cameraman John Alonzo was filming Paramount's "HARRY AND MAUD", under the direction of Hal Ashby. That day, some 500 local people were hired as extras. Across the Bay in Napa Valley, "OLD MAN'S PLACE", a Cinerama production, was ending eight weeks on location.

All told, some 15 to 20 feature-length films, including "FOOLS", "ALL-AMERICAN BOY", and some made by foreign producers, were started in Northern California in 1970. That doesn't include the increasing number of television, commercial and nontheatrical productions originated in the same area.

In a sense, San Francisco has become a thriving film industry "suburb" to a center-city Hollywood. Several successful young directors, including Michael Ritchie ("DOWNHILL RACER") and Francis Ford Coppola ("THE GODFATHER") make their homes in the Bay area. Coppola not only lives here, he also works here—heading American Zoetrope Studios that provides a downtown production center where screening and editing facilities are available for rental.

There are also other measures of the penetration that the film industry has made in San Francisco. Our division of Eastman Kodak Company, for example, had one full-time engineering service representative assigned to San Francisco for many years. Now there are seven of us available to consult and provide

Fisherman's Wharf is a familiar sight, not only to San Francisco visitors, but to millions of moviegoers, as well, since it has been used countless times as a location in feature and television films. The Bay City's climate, though changeable in mood, is considered to be generally favorable for motion picture production.

technical advice to Northern California film-makers. In addition, Kodak's new $7 million distribution center in nearby San Ramon allows producers to order color negative film from our warehouse on 24-hour notice.

San Francisco, of course, is just an hour's flight from the major Hollywood laboratories and optical houses. Even so, a thriving Bay-area laboratory business has developed. There are at least a half-dozen excellent 16mm film laboratories. The newest is the 35mm color processing and printing facility of Cine-Chrome Labs in Palo Alto.

This company is headed by Burton Smith, a veteran film industry technologist. Smith opened Cine-Chrome Labs in 1957 because he sensed a growing local need for 16mm color film processing and printing. His initial clientele were mostly industrial film departments servicing the then burgeoning aerospace industry.

In recent years, as the demand for film processing services slackened among its original customers, Cine-Chrome has continued to expand in order to better service independent business and industrial film-makers now locating in the area.

Davidson Films, Lee Mendelson Film Productions, and Snazelle Productions, Inc., are among the scores of local independent film-makers who have created a demand for improved lab service. However, until the mid-1960s the stress was all on 16mm, according to Smith.

"About 1966, producers began making serious inquiries about our capabilities for processing 35mm Eastman color negative film," he says. "The following year we noted that 13 feature-length films were produced in San Francisco (with 'BULLITT' the best known), as well as about 200 35mm color commercials. Also, we were getting some requests for service from independent Hollywood producers, who were only anticipating short-run orders—maybe 12 to 15 release prints."

San Francisco's wide variety of exterior locations—cobblestone streets, "hippie" communities, harbor, skyscrapers, beaches, nearby fishing towns, mountains and desert—have attracted many film-makers, as have its distinctive ethnic neighborhoods, such as Chinatown.

Cine-Chrome expanded to larger facilities, and installed faster equipment for processing and printing from 35mm color negative film. "Our business grew 30 percent in 1970," reports Smith, "and we think that is just a beginning."

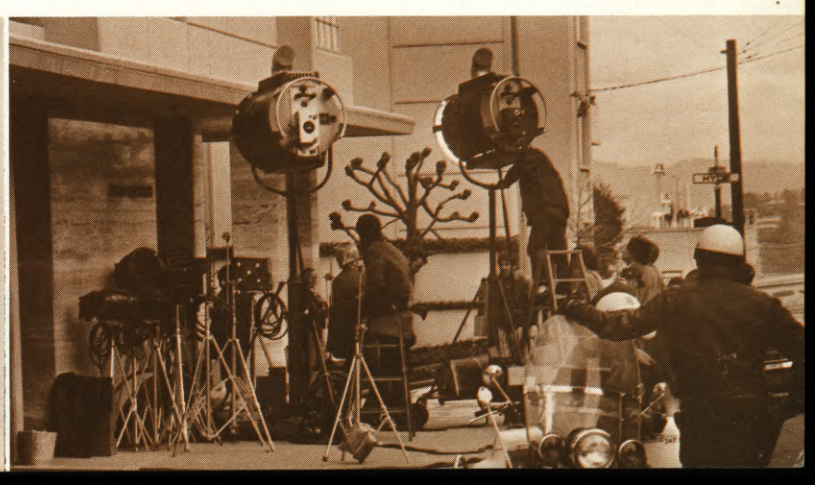
The surge of film production in San Francisco is at least partially symptomatic of what is happening in the movie industry in general. Developments include the demand for lower-budget films; the trend toward location, instead of studio productions; the emergence of TV-trained directors, cameramen and crews, who are used to shooting 60 to 70 setups a day, instead of 10 or 12; "faster" negatives and an improved Eastman color film system; more mobile cameras and lighting equipment, and the growing popularity of the Cinemobile that Fouad Said first took on the road in 1966 to produce the "I SPY" television series.

All these developments tended to encourage the drift from Hollywood. The effect has been felt in New York, Dallas, Chicago, Florida and New Mexico, which have all undergone periods of explosive film industry growth.

Even during the heyday of the studio-made film in Hollywood, however, San Francisco's unique weather, talent pool and rich choice of locations made it the site of many theatrical-type films. "VERTIGO", "EXPERIMENT IN TERROR", "THE DAYS OF WINE AND ROSES", "PETULIA", "THE GRADUATE", and "GUESS WHO'S COMING TO DINNER" were all filmed in San Francisco.

The coastline near San Francisco was also the location for the "Cape Cod" scenes of "THE RUSSIANS ARE COMING". Tony Curtis played the Boston Strangler while roaming through a San Francisco tenement district. And during the production of "SKIDOO", the city simulated a typical midwestern town.

(LEFT) A crowd gathers in the lobby of "The San Francisco Experience", waiting for the next show to begin. The dazzling multi-media spectacle presented in Ghirardelli Square drew an audience of more than 300,000 in its first year. (RIGHT) San Francisco police assigned to traffic and crowd control during filming of this street scene for "CROSSCURRENT" find themselves with little to do, as San Franciscans rarely stop to see what is happening.



(LEFT) Fred Koenekamp, ASC, and his camera crew set up for a scene inside the lobby of a high-rise apartment building in San Francisco's Nob Hill district. (RIGHT) Kodak's Ray Grant, foreground, shares a light moment with San Francisco film producer, E. Gregg Snazelle, whose company, Snazelle Productions, Inc., tripled its business in 1970. Eastman Kodak has assigned seven full-time engineering representatives to the Bay Area to consult and provide technical advice to the many film producers attracted to San Francisco in recent years.

Stand on any street corner near City Hall and you are within minutes of a 1,000-acre park, cobblestone streets, a typical financial district, skyscrapers, "hippie" communities, a Chinese city-within-a-city, a harbor, a classic skid row, a yacht club and so on.

With these choices of natural locations, who needs a studio?

The same thought occurred to San Francisco Mayor Joseph Alioto shortly after he took office in 1966. The mayor is quick to discuss his own long-time interest in the film-making industry. His law firm has represented major studios and his family owns movie theaters in Utah.

After his election, Mayor Alioto organized the San Francisco Film Production Office to help out-of-town film-makers working in the city. One of the first efforts of this volunteer group was an arrangement negotiated with Solar-Warner-Seven Arts, the producers of "BULLITT".

The city provided no-fee licenses, full police support and the use of various public-owned facilities. In exchange, the producers guaranteed that they would train and hire a group of unemployed city residents. They also built and donated a $25,000 swimming pool in a specified low-income community.

One of Fouad Said's Cinemobiles, parked along a San Francisco street during the filming of a Warner Bros. feature, brings the studio to the location. Such mobile equipment is especially well-suited to this city whose steep and narrow streets render the use of a large number of conventional studio trucks impractical.

"BULLITT" was something of a trend-setter in that more local talent was hired for cast and crew than had been the habit of movie-makers working on locations away from Hollywood. Also, Arriflex cameras were heavily used for the first time on a major theatrical production. The tremendous mobility gained by the film crew more than made up for the inconvenience of using comparatively limited 400-foot film rolls compatible with the camera system.

Mayor Alioto's administration has openly solicited film-making campaigns. As a result, the active cooperation of the police has been assured.

"All it took was one phone call for us to be able to close off a public street to traffic while we were working there," says one director.

He tells how an officer assigned to traffic control had knocked on the door of a warehouse and asked for permission for the film crew to work inside the building because the director saw an opportunity for a unique shot.

"There was no quibbling and no delay. Everyone was glad to cooperate," he says. "It took two minutes for us to get the clearance we needed."

Another director was amazed at the cooperation he received when he set up to shoot a street scene in a suburban area. "The police went around with our script girl and asked people if they would mind not walking in and out of their homes while we were shooting—

which took several hours. Housewives actually went shopping early or late, and husbands left for work from their back doors. And, no one asked us for a thing," he says.

Head of the mayor's committee to encourage film production is Claude Jarman, a one-time Hollywood child star and currently a motion-picture entrepreneur in his own right. Jarman—who is one of the owners of Medion, Inc., a San Francisco-based production house that has so far specialized in industrial, educational and political film-making (they are reading theatrical scripts now)—describes the mayor's committee as a clearinghouse. Jarman is the chairman of the successful annual San Francisco Film Festival, which attracts world wide attention each year to its program of outstanding film productions.

"If you know how to find it," he explains, "there is practically any type of location that you could want either in San Francisco or within easy reach. You are an hour away from snow and mountains, fishing towns, beaches, factories and desert. You name it.

"Our committee advises producers on the availability of locations, housing, permits, police support and where to hire local talent."

There are some 5,000 persons, including models, child actors, stagehands and camera crew members, registered with local agencies and unions, according to Jarman.

There is also a definitive "clean," sophisticated look to San Francisco models, according to E. Gregg Snazelle, whose success story in San Francisco film-making has established guidelines for newer companies. Snazelle started as a fledgling cameraman-director in the Bay area during the late 1950s.

From the beginning, he was sold on the unique opportunities in the city's abundant choice of locations and pool of talent. Committed primarily to 16mm production at first, Snazelle Films, Inc., created an excellent track record in commercials, TV specials, and industrial films.

Despite the steady growth of his firm, Snazelle admitted to feeling at times that he was fighting an endlessly uphill battle. Although he campaigned hard to convince East Coast ad agencies to select the area as the site for location commercials, he estimated that as much as 80 to 90 percent of the $3-4 million spent annually by local agencies on film production was going out-of-town.

"I just couldn't see searching the country for production sites or settling

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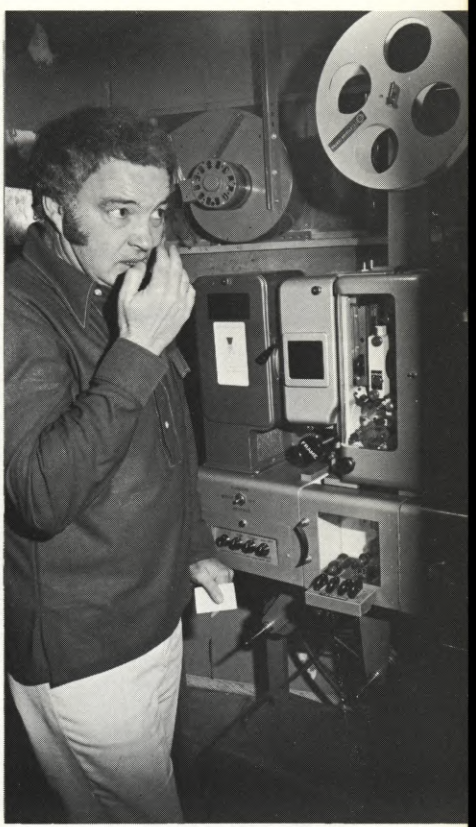

(LEFT) A Warner Bros. crew rigs booster lights for exterior location filming in the streets of San Francisco. (RIGHT) Producer E. Gregg Snazelle reviews color commercial footage in his studio's 35mm preview room.

(LEFT) Burton Smith checking a run at Cine-Chrome Labs in Palo Alto, which has been expanding its capability for processing and printing 35mm color film. (RIGHT) Claude Jarman, Director of the San Francisco Film Festival, heads the mayor's committee to bring film-making to the city.

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.

ARRIFLEX® 35 users use accessories where other-camera users use other cameras

Arriflex had a better idea — one rooted in logic, convenience and economy. Why not use one camera and a choice of accessories to do many jobs, instead of many cameras to each do one job?

The idea's validity has been pretty well substantiated over the past three decades. An Arriflex 35 is a 200′ or 400′ camera that can be hand-held, that squeezes into any corner its operator can, that leaves some room in the camera car for the cameraman. And that same Arriflex is also a blimped 1000 footer, with sync generator and automatic slate, if you wish. There's no shortage of underwater housings, intervalometers and animation motors; and Arriflex mirror-shutter viewing is as beneficial on the animation stand as in live shooting. While the single purpose cameras do all these jobs more expensively, none do them more conveniently, quickly or better.

So if your writers call for all kinds of tricks, or if you expect the unexpected, pick the one that's done them all: Arriflex 35.

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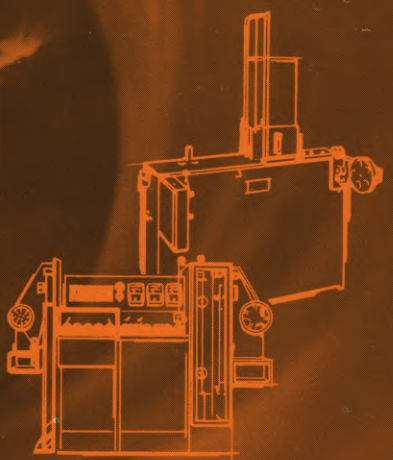
NEW TREISE PROCESSORS FEATURE

SBR™ drive!

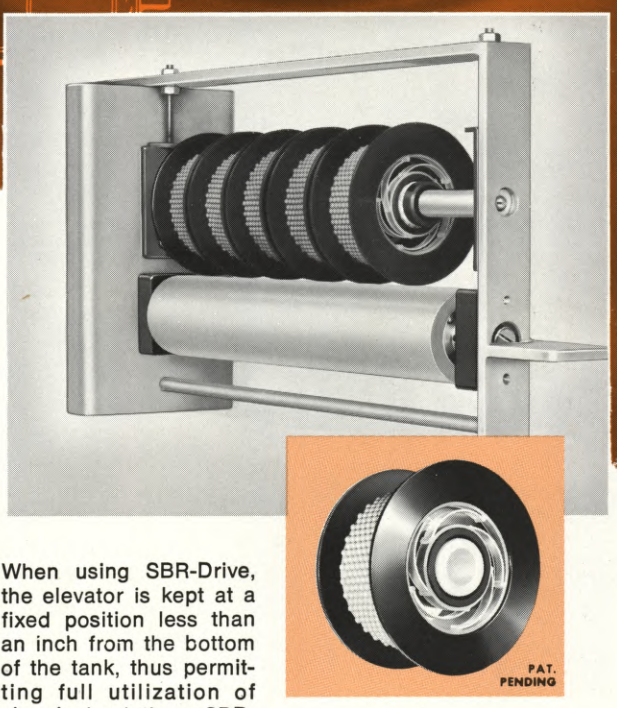


Now you can change film sizes ...and still maintain uniform tension and constant speed!

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

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

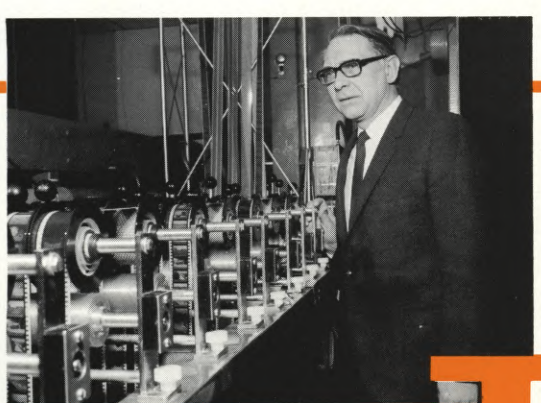
All SBR are equipped with "soft touch tires" that firmly grip the film and smoothly move it along without the slightest scratch or abrasion. Treise processors operate smoother, too, because they feature heavy-duty gear box drive and torque motor take-ups.



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

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

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



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

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

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SAN FRANCISCO'S OWN AMERICAN ZOETROPE

A unique *atelier* in the Bay City established to attract and utilize the skills of new and talented young film-makers

By CHRISTOPHER PEARCE

General Manager, American Zoetrope

American Zoetrope was formed about two and a half years ago by Francis Ford Coppola, using his own money. He moved to San Francisco from Los Angeles and brought with him a group of people that included George Lucas (who has since directed "THX 1138"), Bob Dalva (a fine editor who is now running our commercial division), and Bart Patton (who had been a producer in Hollywood). They all came together and started *Zoetrope.*

Francis wanted to establish a unique facility for film-makers and film-making. He decided to put this whole thing in what is known as the "warehouse-wino" district of San Francisco—basically because this was an inexpensive area in which to find real estate. Most of the film-makers I know sit around and say: "Wouldn't it be marvelous if we had our own projection room where we could go and sit and watch film any time we wanted to?" or "Wouldn't it be great to have our own editing machine?"

So what Francis did was put all of these dreams together in the form of a facility which I think is one of the most modern in the country. The people who came to San Francisco from Hollywood to be part of *Zoetrope* did so, not because Los Angeles is a horrible place to live or that there are horrible people there, but because of the fact that it is very difficult to work in a studio atmosphere. It's very difficult to create where there are people running in and out of little offices all the time and phones are always ringing. Also, it's very easy to over-socialize in this business and I think there is too much of that in Hollywood.

What we've tried to do with *Zoetrope* is keep it very relaxed and establish a free-flowing atmosphere around the place. Basically, we've attempted to cut out the aura of mystique that the studios have—the high walls that surround them and the feeling of *you-can't-go-in-there* that is so intimidating

A forerunner of the motion picture, the Zoetrope (1834) featured strips with figure drawings that seemed to move when revolved and viewed through a slot.

Francis Ford Coppola, founder of American Zoetrope, is a former UCLA Cinema student and recent Academy Award-winner for his screenplay of the film "PATTON".

(LEFT) The lobby of American Zoetrope's main facility in the "warehouse-wino" district of downtown San Francisco, features a rococo pool table and a formidable piece of plumbing that brews espresso coffee—both very functional as elements of the relaxed atmosphere that pervades the place. (RIGHT) Film editor operates controls of 16mm-35mm KEM (Keller) editing console, one of two such machines owned by Zoetrope. The organization, featuring $300,000 worth of highly sophisticated film-making equipment, is one of the most modern such facilities in the world.

Bart Patton, former Hollywood producer and one of the original Zoetrope personnel, directs actor in screen test. The camera is a blimped 35mm Eclair CM-3.

to a young guy who is trying to get into the industry. People can come and go freely at *Zoetrope,* and we're not going to turn anybody away because he's not a "groovy" film-maker or because he hasn't had three years in the industry, or anything like that.

At the same time, the place is kept reasonably quiet and relaxed, so that people can come in to work and shut themselves in an office for a day, free of the usual incredible noise and confusion. We've tried to keep the place very, very open. Francis is extremely good at that. He's a very easy man to talk to.

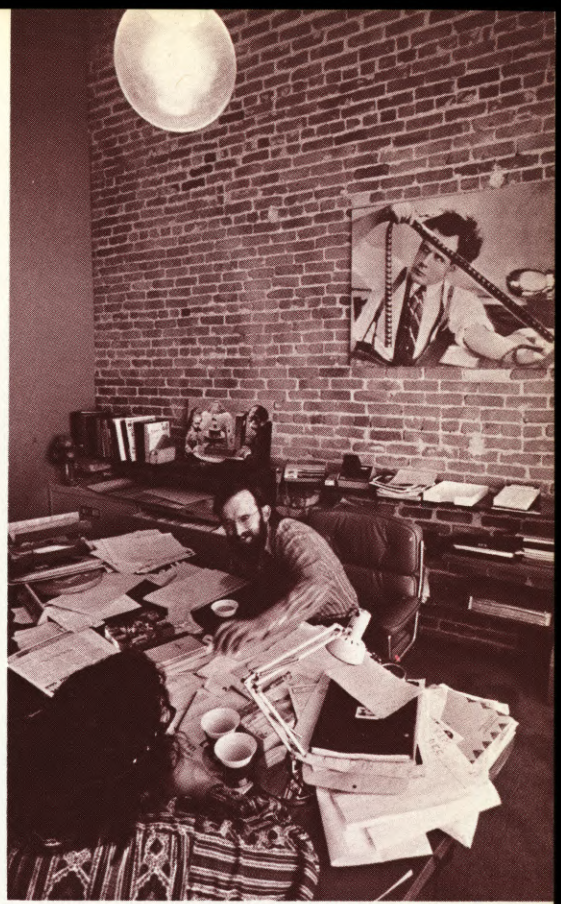
For reasons of overhead, the basic staff at *Zoetrope* is kept very small—five or six people—but we have what we call "Associates of *American Zoetrope*". This is a group of people who can come in whenever they want and play pool or drink coffee and talk and see what is going on. Depending upon our production requirements, these are the first people we pull from. Director Michael Ritchie now lives in San Francisco and we sort of like to think of him as an "associate" of *American Zoetrope.* But there are a lot of people like that who can just use the place. They can have phone messages left there and that sort of thing. It gives them a base of operations. It's very rough, for example, to be a free-lance cameraman and operate your own office—especially if you're young and just starting out. So we try to help in this way. We attempt to control it, because it does cost money, but we do allow a lot of people to just use the place.

As I said before, *Zoetrope* represents a very modern facility for film-making. We have around $300,000 worth of extremely sophisticated equipment—which represents a major investment by Francis Ford Coppola. We have a small but very nice full-screen theatre equipped with 16mm and 35mm interlock projection. This theatre doubles as a combined screening room and mixing-dubbing studio.

There are six or seven editing rooms equipped with Keller and Steenbeck "flat-top" editing machines. We have a total mixing facility which consists, again, of Keller equipment from Germany. One of the reasons for having such a complete installation is that, despite the incredible insecurity of this industry, you know that, whatever happens, you can go on making films. You need relatively little money if you have all of that equipment sitting there. You know, for example, that you can mix your own film for nothing, because the equipment is there—it's paid for. I think that's the basic philosophy behind why it was set up in this way.

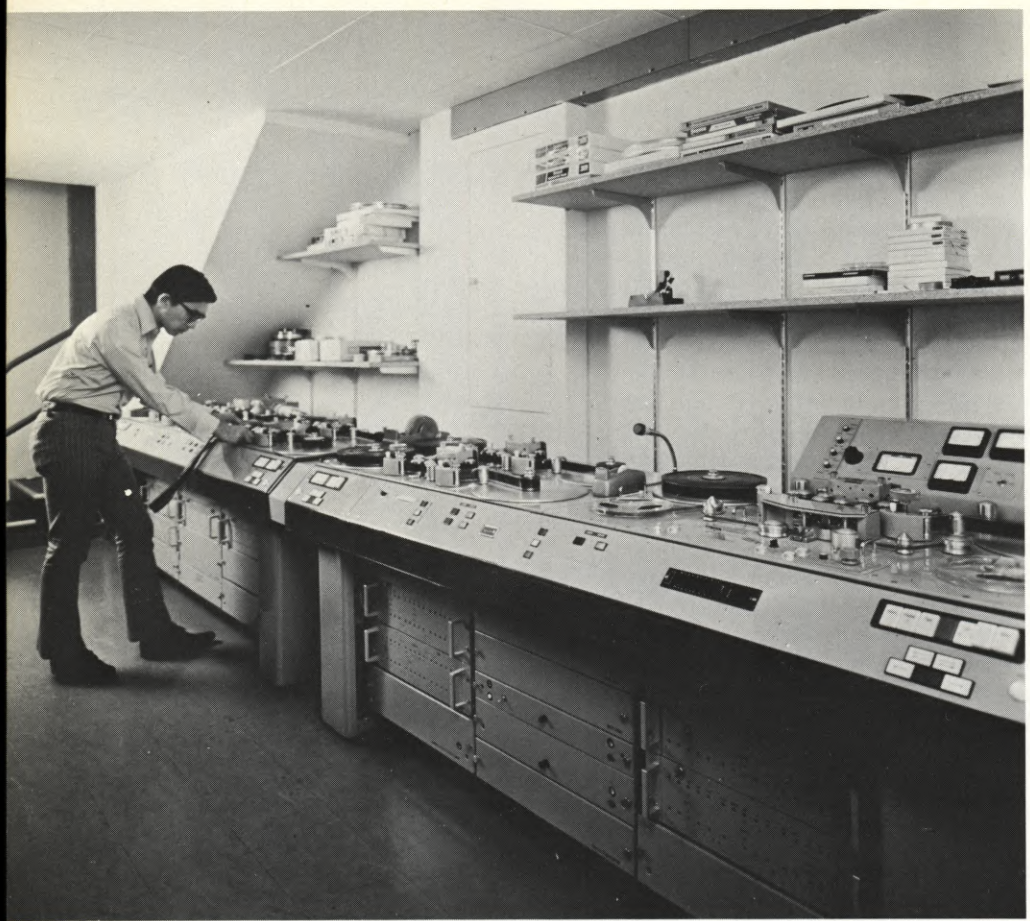
There is, of course, a certain risk attendant to having such a unique installation, but it's the sort of risk that Francis takes all the time. He is an innovator in the industry and suffers the consequences to some extent. For example, the Keller mixing system which we have—a flat-top console like the editing machine—is the only one of its kind in this country. If it breaks down, you have to pull in a man from Hamburg, Germany to repair it. An integral part of the machine is a Telex circuit, whereby you can just Telex Germany back and forth to find out why your machine is not working properly. We have reams of paper between here and Germany on Telex, regarding the equipment.

As soon as you put in equipment like Keller or Steenbeck editing machines, or the Keller dubbing system, you run into problems of maintenance. The equipment was difficult to install. No one here really knew how to do it, and all of the instructions—what little existed—were in German. Once it was installed, we couldn't find anybody who knew enough about the equipment to be able to repair it—so our first year was very rough because of that. People would come to *Zoetrope* and complain that the equipment didn't work very well. It



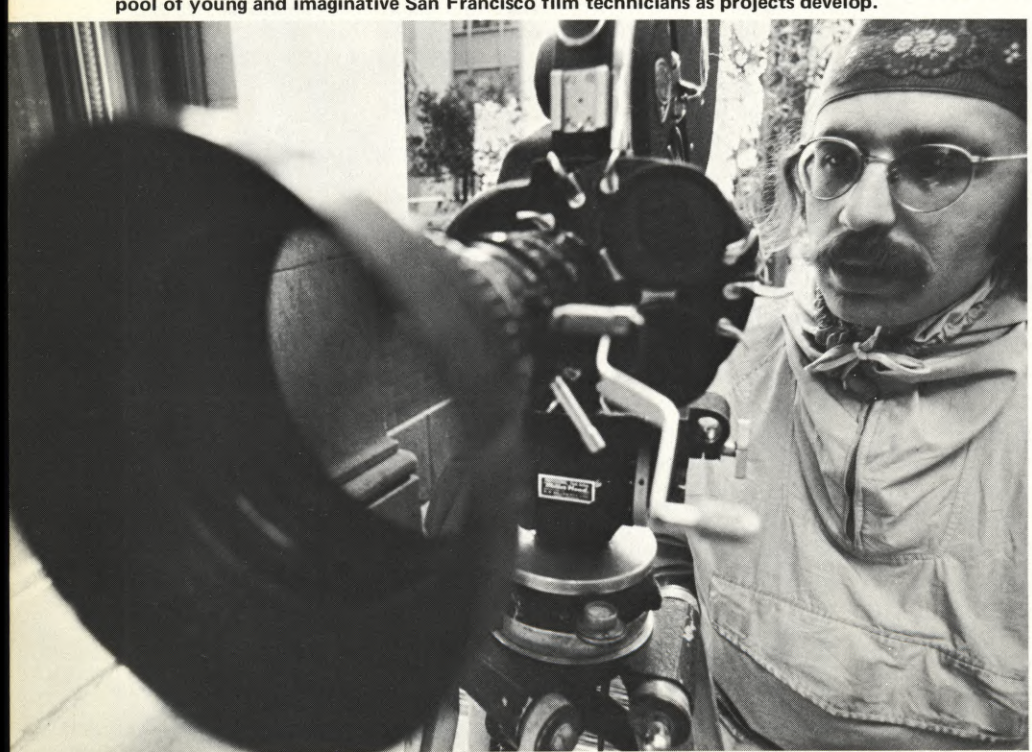
The author, Zoetrope General Manager Chris Pearce, holds a coffee klatsch with film-maker in his office. Pearce, who believes that the company's expensive equipment should be kept busy, has encouraged Zoetrope's diversification, most notably in the production of TV commercials.

Bart Patton and secretary hold a floor-based conference under the dreamy gaze of a giant photo-mural used to represent a deity-figure in Zoetrope's futuristic feature production for Warner Bros., "THX 1138". Young film-makers find the informal atmosphere of Zoetrope conducive to creativity.



Sound Engineer Peter Moore threads 35mm magnetic tracks onto dubbing units of KEM "flat-top" mixing console. The only one of its kind in America, this extremely sophisticated German unit presented difficulties when first installed because no one could be found to maintain it properly. Such problems have since been solved.

Tom Glass, a free-lance Art Director associated with American Zoetrope, checks a camera set-up. To keep its overhead low, the company maintains a small permanent staff but draws from a large pool of young and imaginative San Francisco film technicians as projects develop.



wasn't that it was poorly designed, but only that we didn't know how to maintain it properly.

That problem has been solved, however, and the equipment is working extremely well. We have been fortunate to have with us the same engineer, Mr. Peter Moore, for the last two and a half years. He is absolutely invaluable. He knows the place better than anybody and knows how to fix all of the little things in it. We had a lot to learn about this equipment, but in two and a half years you can learn almost anything—and that's what we've done.

We have what I believe is one of the few Steenbeck editing consoles adapted to the Panavision format, and recently it almost met with catastrophe. Michael Ritchie had requested that we send it to him for use on location in Canada. After some investigation, we decided that the best way to ship it was on our own truck, with somebody driving it up to Calgary. So, I simply had it loaded onto the truck, sent it off and forgot about it, assuming that it would arrive safely in Canada in three days. A day later I got a call from the driver telling me that he had rolled the truck in the desert with our Panavision Steenbeck on it. I immediately thought: "Oh, my God—it'll take 18 months to get delivery on a new machine!"

The truck was a total write-off, but I told him to put the remains of the Panavision Steenbeck in a U-Haul trailer, rent a car and drive it back. Well, he drove it back and we examined it. The total damage to the machine was $100—which was incredible. We had it running again on the following day. Then we shipped it back up to Canada. It's very good equipment.

We have our own camera equipment and have standardized on Eclairs because of their relatively small size and quick-change magazines. We use Eclair CM-3's for 35mm production and NPR's for 16mm work. We designed and built our own mobile unit, which is basically a Ford Econoline van with extra doors. It is compartmentalized to accept our equipment and is an aid in keeping our crews as small as possible.

"THX 1138" was shot with a small crew because, basically, it's just easier for the type of film-makers we are to use small crews. Perhaps this is due to the fact that it takes more experience to handle a large crew. At any rate, the I.A.T.S.E. in San Francisco has been extremely cooperative along those lines, especially during the filming of "THX". Their Business Agent, Eddie Powell, has bent over backwards to help us in every way.

In addition to its headquarters in central San Francisco, *American Zoetrope* has bought a large house in Mill Valley and set it up as a sort of writing-editing center away from the main facility. It sits on a couple of acres of redwoods and is a very pleasant place to work. It's very helpful to have such a place, and we are now attracting a lot of production to San Francisco because of our facilities. Sidney Poitier has just finished cutting a picture there. Mike Ritchie, currently directing "KANSAS CITY PRIME" in Canada, will bring that picture back to San Francisco for editing. "WARD CRAFT", a co-production we are now involved in with James Coburn's company, will also be edited at *Zoetrope.* Just now a lot of our space is being devoted to post-production on "THE GODFATHER". That is a Paramount production and *Zoetrope* has no connection with it except for the fact that Francis directed it. We did supply some of the pre-production equipment and Mario Puzo spent some time there re-writing the script with Francis, but basically we are functioning simply as a post-production facility on the film. It's nice for Francis, of course, because it's a great luxury for a director to have his own editing set-up.

When Francis started *American Zoetrope,* it was with the idea of concentrating on feature film production. He was not, at that time, personally interested in any other type of film-making. However, going into it on as large a scale as he did, and with the incredible overhead involved in a company of that size, he eventually decided to expand into other areas of film-making. This decision was made, not simply to pay the overhead, but to provide opportunities for as many San Francisco film technicians as possible. There are 300 or more film-makers in the area, but very little film work. There is hardly any commercial or documentary production and the features filmed there have been made mainly with crews from Hollywood or someplace else. So we've been trying to generate new business in the area in order to help utilize the local technicians. We feel that San Francisco people are *Zoetrope's* people—or the other way around—because they are the source from which we want to draw our talent.

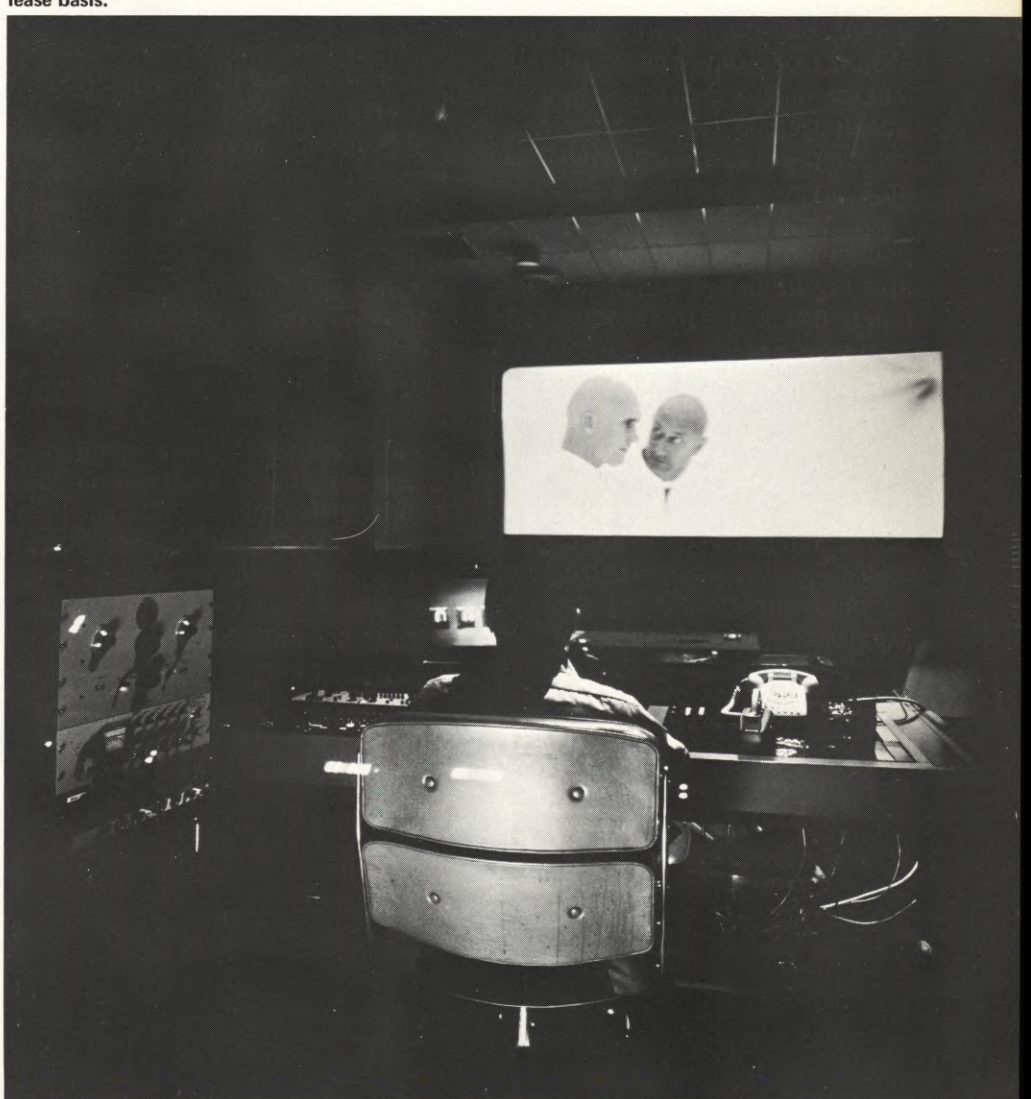
So, after about a year of operation, we went into production on two films for the Office of Economic Opportunity. They were 16mm educational films, but rather ambitious ones, and they were quite successful.

Since I've been General Manager, I've

Continued on Page 1050

Togged out in their freakiest threads, staff and associates of American Zoetrope assemble for a far-out "family portrait", with Coppola (extreme right) clutching his symbolic zoetrope. Despite gag situations like this, the film-makers are thoroughly dedicated and highly professional in attitude.

Sound Engineer Walter Murch does a re-mix on sequence from "THX 1138" in American Zoetrope's screening theatre, which doubles as a mixing-dubbing facility. Theatre is equipped for interlock projection in 8mm, 16mm and 35mm. Facilities are available to outside producers on a lease basis.



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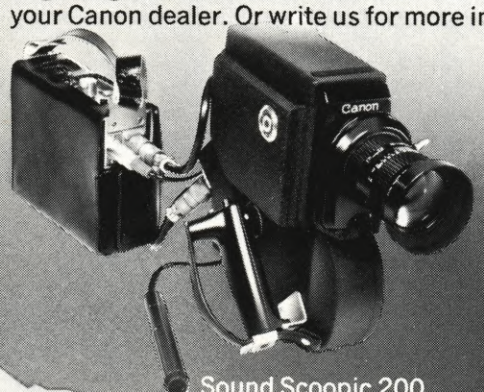
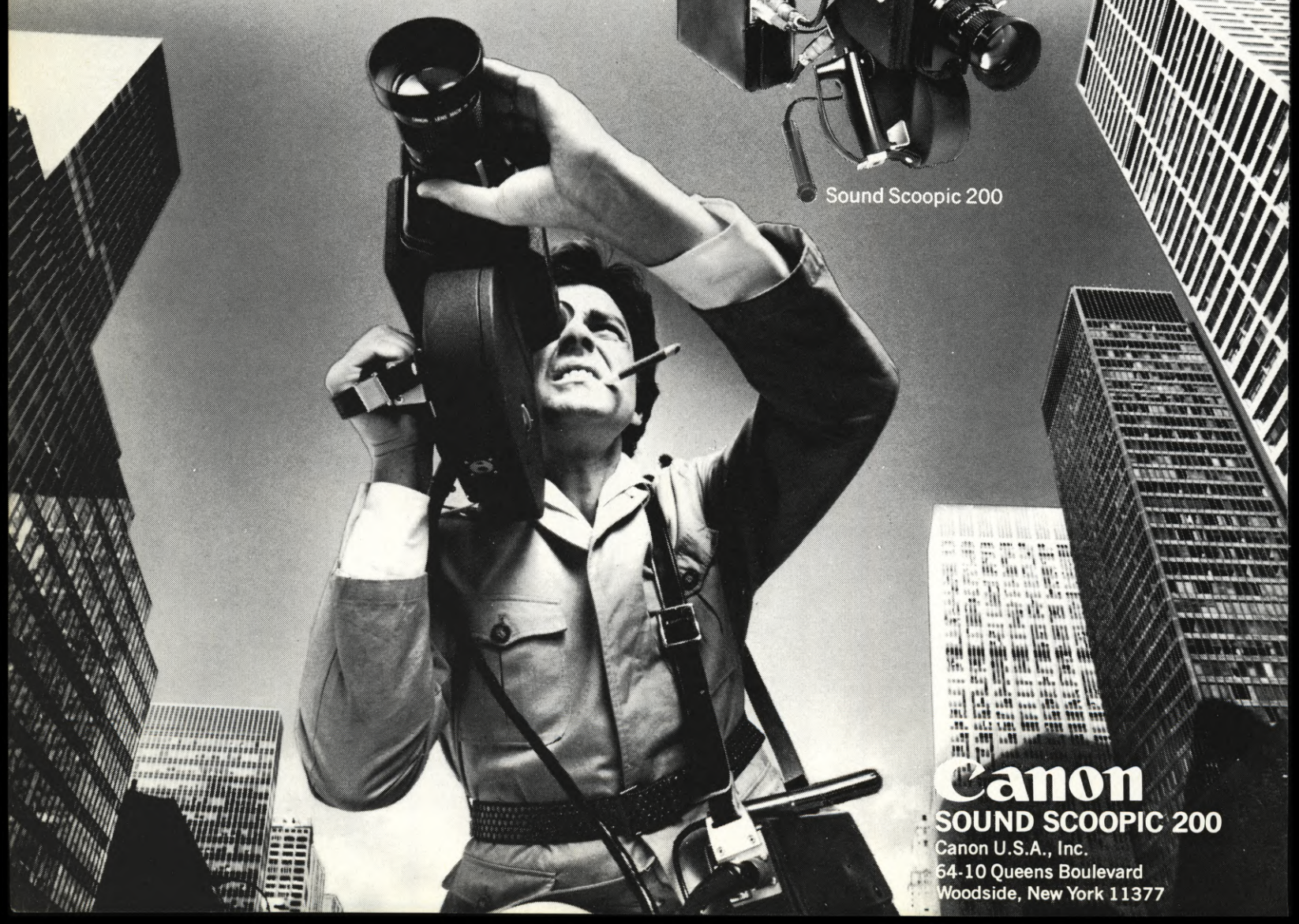


Sound Scoopic 200



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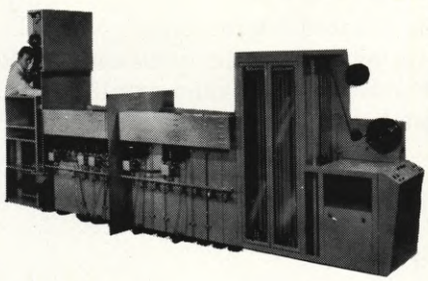

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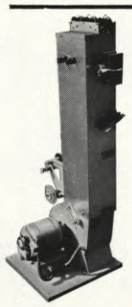

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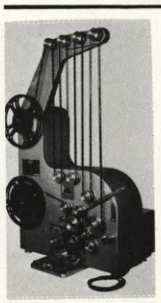

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The senior citizens clearly are amazed as they file into the minitheater at Ghirardelli Square. They slip into the swivel seats, their eyes moving quickly from the free-form stretched nylon screen, which forms a near 180-degree angle, to the press of the eager youngsters.

Also filtering into the 236-seat theater are many out-of-towners who were probably at the tourist-saturated Ghirardelli Square when the electronic countdown clock advertising the program caught their eyes. Soon all of the seats are filled, and people outside are already beginning to line up for the next performance.

The audience hushes as the lights dim, the first images appear dancingly on the screen, and the sound begins. It is the story of San Francisco—rich with some 200 years of history, and told in the media of the times.

Twenty-nine Kodak projectors—three 16mm Pageant movie and 26 Ektagraphic slide projectors—are linked by a computer into a multimedia marriage of sight and sound. The last is complemented by 30 special effects, including "scented fog," bubbles, the rumble of an earthquake (the quake of 1906), and a light show.

The 45-minute program moves swiftly with a virtual panoply of sights and sounds that combine to express the feeling, as well as the history, of the city. Images pop onto the screen as fast as one every 2/10ths of a second, blending with motion pictures, flashing colored lights, stereophonic sound, and even the feel and smell of San Francisco fog.

Sitting at the side of the theater, one can watch the audience turn in their

seats, their growing involvement revealed on their faces by the reflection of light from the nylon screen. Many have forgotten who is young, old, native or tourist among them. All are caught up together in a common experience that may well reflect the possiblities for the theater of tomorrow.

After 45 minutes, the lights come on and the buzzing audience leaves through one set of doors, while the new viewers are ushered in from the other side. Bing Crosby's San Francisco Experience, which opened for the first time in June, 1970, starts a new show every 45 minutes, seven days a week.

David Sacks, the former ABC-TV vice president who heads Electrovision Productions, Inc., producer of the multimedia program and the operator of the theater, states that in the first year its audience topped 300,000. Many nearby school districts include a visit to the theater in the curriculum for field trips. A teacher's lesson plan is available. Special consideration is also given to senior citizen groups; thus, it isn't unusual for an audience to contain both the oldest and the youngest members of society.

However, the great bulk of the audience consists of tourists and natives who have read or heard about the theater, or who are attracted by the electric countdown clock high above Ghirardelli Square. The clock advertises the number of minutes and seconds until the next performance begins.

Sacks says the idea for Electrovision was born at the 1967 World Exposition in Montreal, Canada, where a multimedia theater at the Czechoslovakian pavilion was a major attraction. People waited in line six to eight hours to see the program, which has since been expanded widely with uniform success at other world's fairs.

"I realized that what I was seeing wasn't a novelty, but the beginning of a new entertainment medium, aimed at appealing to, and saturating, as many senses as possible at once," the theater operator says.

Sacks, who had spent some 30 years in broadcasting, including the last 20 at ABC-TV, began discussing his idea for a multimedia theater with others. Among those who listened were Bing Crosby and Basil Grillo, Crosby's business manager.

San Francisco was selected as the site for the first Electrovision theater for a number of reasons, including the massive flow of tourist traffic throughout the year. From the beginning, however, there was no intention to produce a travelogue.

(OPPOSITE PAGE) Producers of "THE SAN FRANCISCO EXPERIENCE" stand against stretched nylon antron screen to check presentation in Electrovision theatre. (ABOVE) Superimposed film and slide images flash at a brisk pace across segments of the free-form screen, presenting a stunning visual panorama of San Francisco's colorful history.

"We definitely aimed at capturing the feeling of the city—its heartbeat—more than anything else," stresses Sacks.

Before production could begin, a tangle of technical problems had to be solved, such as the design and size of the theater, shape of the screen, selection of seats, and the operation and control of the projectors and related special effects.

"We believe that we jumped five years ahead of the time and designed a theater and projection system that could become typical by 1975," says Sacks. "There was nothing simple about it, since we were dealing in all new experiences."

An essential key was the linking and computerized control of the Kodak projection equipment.

Each program is started with the push of a single button, which not only controls the sights and sounds, but also the special effects and the theater lights. The projectionist's job is painstaking, since his eyes and ears must detect even minute variations in the system, so all necessary adjustments can be made between shows.

The system has proved itself. With at least 100 performances a week, there

The spectacular Electrovision presentation in no way resembles a travelogue. It is, instead, an audience-involving total "experience"—with images popping onto the screen as fast as one every 2/10ths of a second, blending with motion pictures, colored flashing lights, stereophonic sound and even the feel and smell of San Francisco fog.

Projection booth in San Francisco's Electrovision theatre houses 29 Kodak projectors—three 16mm Pageant movie and 26 Ektagraphic slide projectors—linked by a computer into a multi-media marriage of sight and sound. Each performance is activated by the push of a single button which controls not only the visuals and sound, but special effects and house lights.

Electrovision production staff (C. Patterson, Rusty Russell and Judith Patterson) shown receiving award from the Mayor of Honolulu, after premiere performance of new multi-media show, "Bing Crosby's Hawaiian Experience". The spectacle is playing in a specially-designed theatre in the Waikiki's Beachcomber Hotel.

has never been even a minor breakdown during a show, according to Sacks.

Electrovision's production staff creates and continually updates the show. (One of the major advantages of multimedia is that it is so much easier to update and edit than a straight motion-picture film, Sacks notes.) The production staff includes Judith Patterson, who was associated with television's "Playhouse 90" and in ABC-TV programming in San Francisco; Bob Novak, former director of the Pittsburgh Playhouse and program director at KGO-TV in San Francisco; and "Rusty" Russell, a leader in the emerging multimedia production industry.

With its first program "in the can," Electrovision is now beginning to realize its own vision of the future. In early May, the second Experience minitheater opened at the Waikiki Beachcomber Hotel on the island of Oahu, Hawaii.

The program there, of course, is "Bing Crosby's Hawaii Experience." An innovation incorporated into the new theater, along with the idea of installing it inside a hotel, is the ability to change sound tracks for special groups. In this case, since the expected flow of tourists from Japan will be so heavy, the engineer can switch from an English track to a Japanese track to suit the occasion.

Entry from the hotel lobby brings the visitor into the 150-seat intimate theatre with ultramarine blue and golden orange carpeting that reaches up the walls.

Instead of the normal stage, first view is of the 180 degree arched, translucent screen, made of nylon antron. It is 60' x 25' stretched from one end of the intimate theatre to the other and up into the front rafters.

Upon locating a comfortable swivel seat, in an involvement theatre where every seat is good for viewing, a brightly contemporary walk-in refrain establishes the mood for Bing Crosby's personal welcome.

Crosby introduces the audience to an Electrovision theatre by pointing out the projection booth in the rear of the theatre and special effects visible throughout the house.

In the booth there are seven equipment islands, each housing four slide projectors; next to three motion picture projectors; which cross project thousands of images onto a seven screen area. These 31 projectors, in addition to 12 special effects projectors, are operated by a digital computer. During the kaleidoscopic performance, the visuals include panoramas, individual slide views throughout, and sometimes other scenes are "burned over them."

The storyline is authentic in keeping with Electrovision's efforts to maintain the integrity of their subject matter. The show contains historic and present-day photos of the islands, their people and activities, as well as graphic artist representations of now-trademarked symbols of Hawaii.

The 12 special effects projectors provide over 30 special effects such as:

- Bubble machines and a cloud machine.
- Oriental lanterns that lower over the audience and light.
- Gunshot strobes that explode from behind the screen.
- Criss-cross strobe lighting simulating lightning.
- Kaleidoscopic projection of flowers and fish, using special color wheels and technimated slides.
- Giant star, used in the sequence showing entrance as 50th state, filled with hundreds of minute lights, is connected to an alternating color organ. It alternates supply of electricity to the tune of "Star Spangled Banner."
- Car horns, ship and fog horns blare from every direction during statehood sequence.
- Multiple repeating strobes and small search lights scan audience during the Pearl Harbor attack.
- Directional infrared lamps beam during volcanic sequence.
- The quadraphonic sound system employs sound source from unique bass expander system, increasing depth and vibration into the sound.

The stereo sound effects relay authentic chants and innumerable sounds from one speaker to another, eliciting a feeling of total involvement.

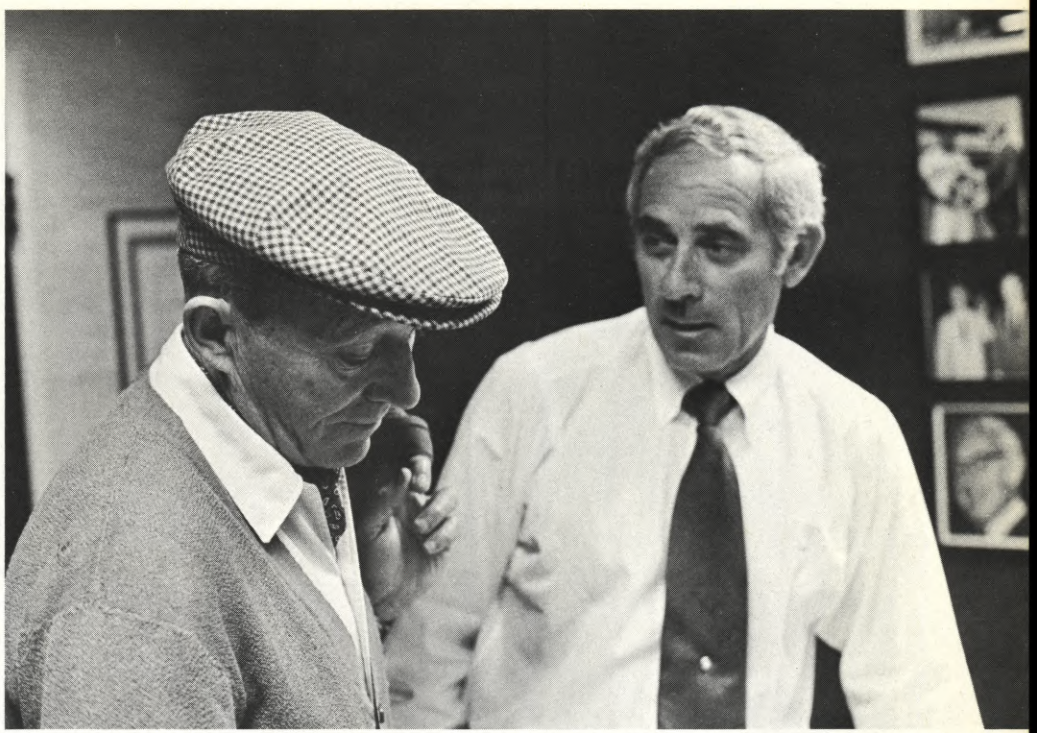
Sacks reports that the Electrovision office is being besieged with inducements from a wide range of civic spokesmen urging the opening of Electrovision theaters in their communities.

"We are investigating all possibilities," notes Sacks, "and will probably move soon into other locales. While we like the city history concept, we are not necessarily married to it. For example, we are studying the idea of a program entitled 'The Legislative Experience' for capital cities. The Legislative Experience will graphically depict the channels through which state government must operate.

"Also," he continues, "there is absolutely every reason why we should start thinking about producing pure entertainment multimedia shows—a new kind of movie—that could be cycled from theater to theater."

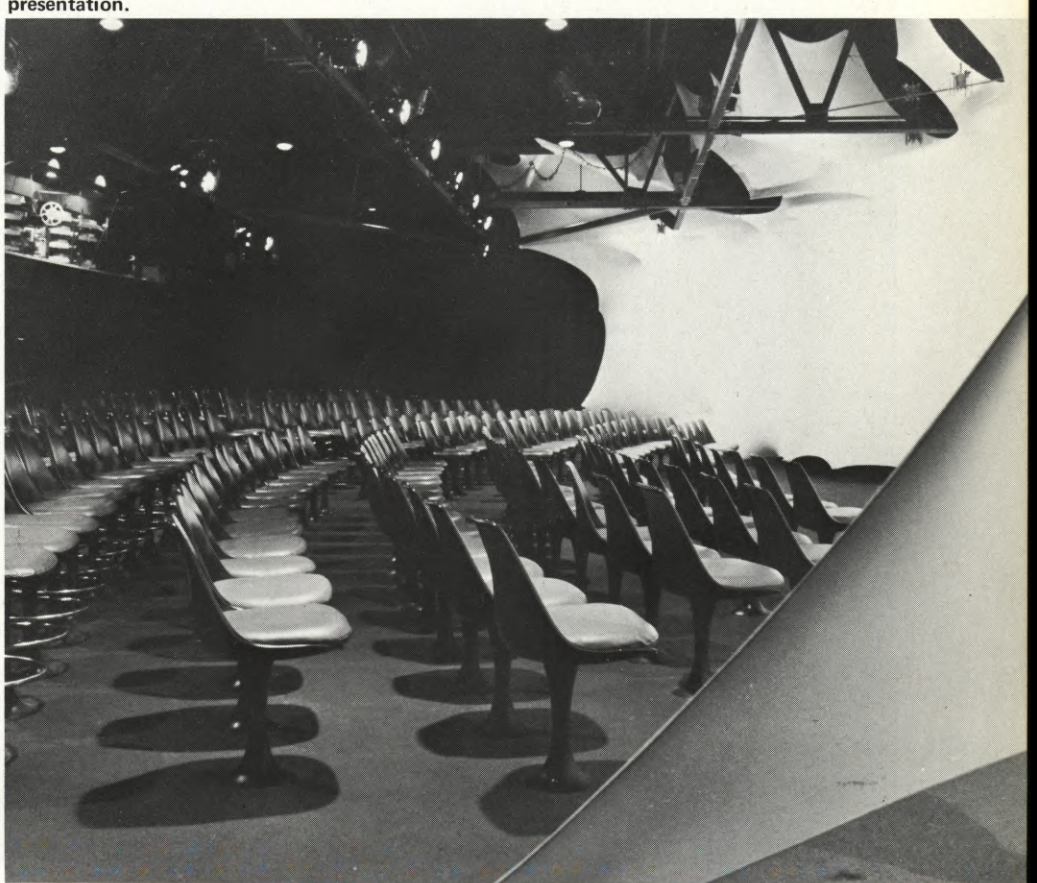
To this end, Electrovision has been

Continued on Page 1054



David Sacks, the former ABC-TV Vice President who heads Electrovision Productions, Inc., discusses programming with Bing Crosby, who has backed the company financially and whose show business intuition and experience is invaluable to the project. Crosby, recorded on tape, welcomes audience at each presentation.

Electrovision's 236-seat theatre in Ghirardelli Square was specially designed for the unique multi-media presentation. It incorporates comfortable "bucket" seats on slanted tiers to insure that each member of the audience will get an excellent and unobstructed view of the presentation.



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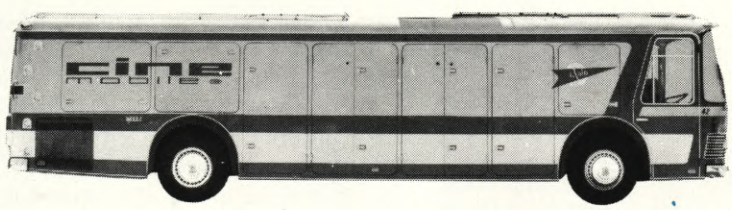

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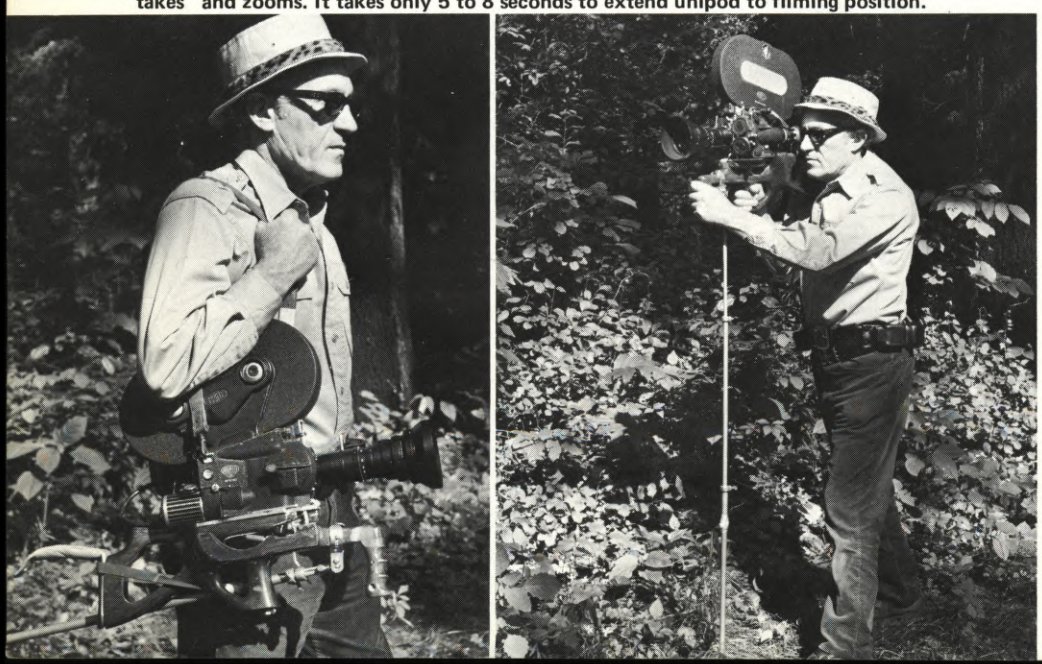
A MODIFIED GUN STOCK FOR TH

by ROY ZEPER

A snake won't wait until you set up your tripod to frame a nicely composed shot of him, and neither will most of the other wild creatures encountered during expeditionary or hunting trips. A gun stock mount assures quick-trigger shooting of a steady picture.

(LEFT) The gun stock mount does not interfere with easy portability of the camera. (RIGHT) The extended unipod takes the weight off the forward end of the camera, permitting steady long "takes" and zooms. It takes only 5 to 8 seconds to extend unipod to filming position.



Filming under the rigorous field conditions of an expeditionary or hunting trip presents several problems. Portraying field members in unrehearsed action as events unfold, or filming elusive wild animals in the brush requires that the camera be ready for instant use. The tripod will most often prove limiting and cumbersome, as well as time-consuming to set-up on uneven terrain in the excitement of the moment. Filming with the heavier 400-foot magazines makes hand-holding impractical for steady pictures and long takes, particularly with telephoto lenses. The restrictive body braces do not lend themselves to heavy underbrush, climbing, running, driving, or walking for long periods of time.

While preparing for an extended field assignment, I decided to modify a Bolex gun-stock for my Arriflex camera. By employing the principle of a single-leg support, the camera-unipod could be rested on any uneven surface with its single point of contact; it is lightweight, portable, and available at a moment's notice.

The unipod which I used is actually the three center post sections of a light-weight aluminum light stand, having wing-bolts for tightening the sections when extended or retracted. The top section is secured to the forward end of the gun-stock with a swivel-head and can be pivoted in any direction. The three sections are retracted when carrying, secured horizontally alongside the gun mount by means of a heavy rubber band. By simply slipping this rubber band off the butt end of the stock, the unipod swings free into a vertical position. The two wing-nuts are loosened and extended until they reach the ground and are then simply tightened.

I first extended the butt end of the stock with a metal 1¼"-wide bar, bent to fit over the shoulder. Rubber foam wrapped with gaffer tape acts as a soft cushion. This shoulder-support bar bears most of the camera weight when filming without the unipod, and proves satisfactory for short takes, especially with the zoom lens at the wider-angles. As most cameramen know, this filming method

E EXPEDITIONARY CAMERAMAN

When hand-holding the heavier cameras is impractical and a tripod is too cumbersome, this gun stock mount draws a steady bead on nature's more elusive creatures

becomes tiring over extended periods of time, and this is when the front-support of the unipod proves invaluable.

To provide a flat bed for accepting the Arri, I shaped and cut out a ¼"-thick aluminum plate. An oversized ¼" hole was drilled to accept the ¼", 20-thread bolt which is 4½" long. This bolt secures the camera to the plate. A wing-nut welded to the head of the bolt permits hand tightening without need for a screwdriver.

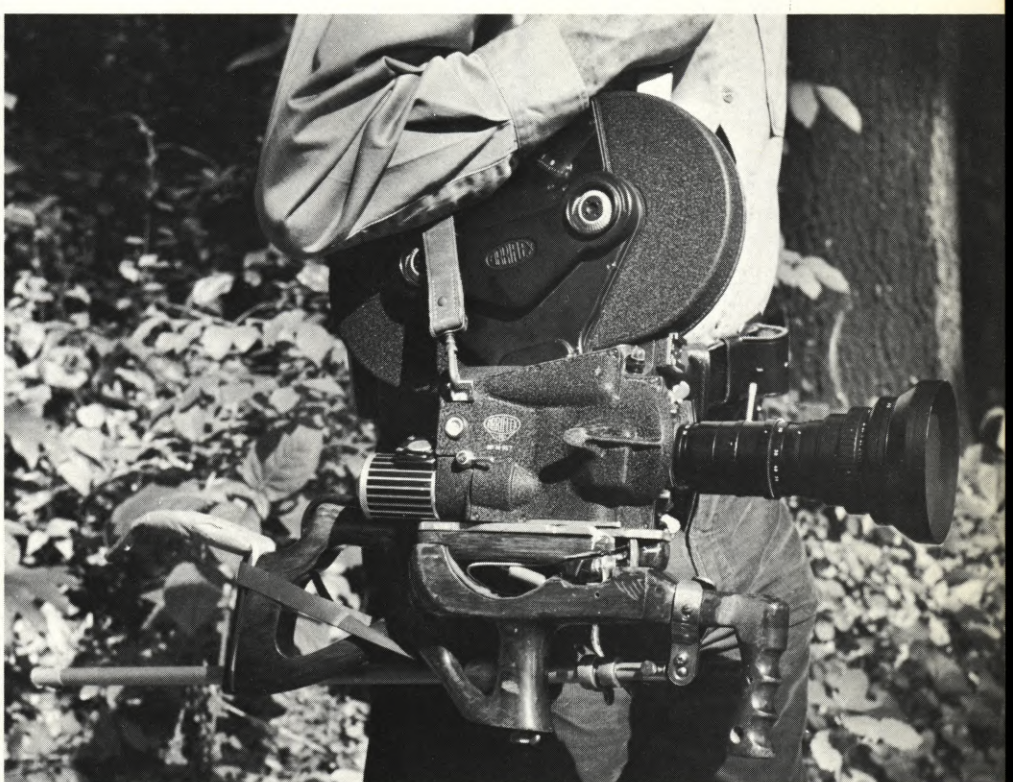
The Arriflex camera has a 3/8" European tripod socket in addition to the standard ¼" American-type socket, adjoining each other on the bottom of the camera housing. Recessed within the 3/8" socket is a pressure-sensitive microswitch, designed to operate the camera in addition to the conventional switch on the side of the door. I secured the shaft end of a cable-release in the aluminum plate within a hole that would align with the 3/8" socket of the camera when it was secured to the plate. I then permanently attached the other end of the cable-release behind the gun-stock trigger extension; so, by depressing the trigger, the cable-release plunger is extended to press against the microswitch and run the camera.

An electrical press-switch, also behind the trigger extension, will make or break electrical continuity to a small jack. Consequently, any electrical device plugged into this jack, such as a portable Sun-Gun light, can be activated by the trigger simultaneously with the operation of the camera.

When desirable, a bolt and nut secure the remote-control zoom unit on the forward handle. This is easily detached for manual operation of the Angenieux zoom lens.

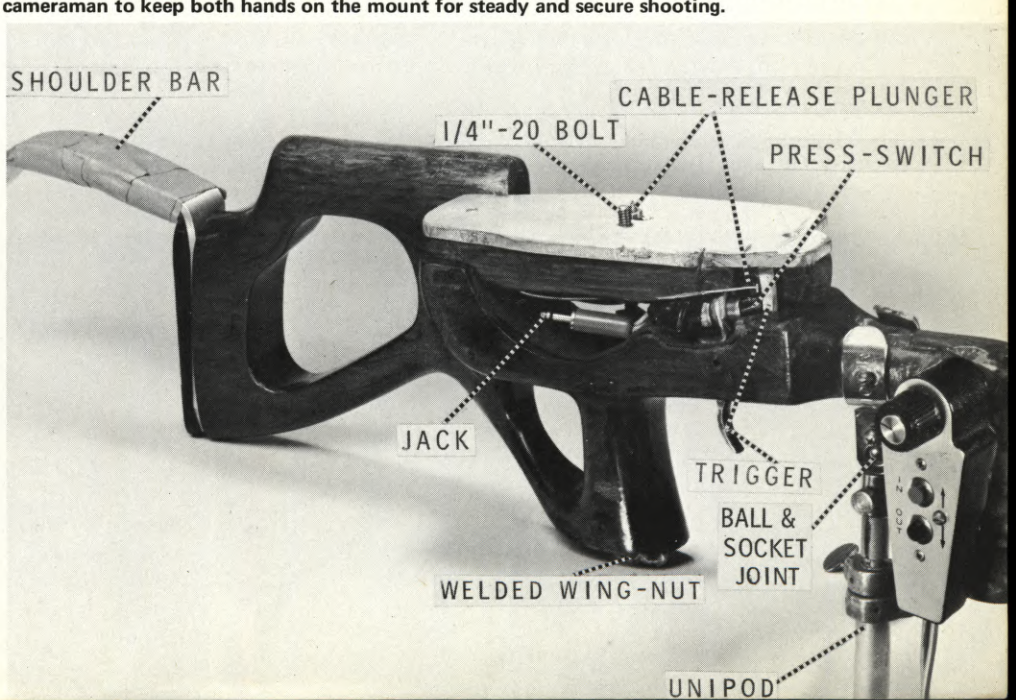
A rifle shoulder strap permits carrying the camera mounted onto the gun-stock. Slung across one shoulder, both hands are free. This rifle strap has a swivel snap on each end, hooking onto the two eyelets of the Arri body.

I have found this modified gun-stock extremely satisfactory for filming in the field, and believe it would prove advantageous in the cinematography of documentary productions. ■



A rifle shoulder strap permits carrying the camera while it is mounted on the gun stock. Slung across the shoulder, it leaves both hands free. This rifle strap has a swivel snap in each end that hooks onto the two eyelets of the Arriflex camera body.

Labeled photograph indicating various elements of the modified gun stock mount described by the author. Cable-release plunger activates microswitch to run the camera, while allowing the cameraman to keep both hands on the mount for steady and secure shooting.



"THX 1138"

Continued from Page 993

a documentary crew had made a film about some character in a time yet to come.

However, I wanted it to look like a very slick, studied documentary in terms of technique. I come from a background of graphics, photography, art and painting—and I'm very graphics-conscious. So, I don't believe that a documentary has to look bad because it follows a *cinema verité* style. It can look good and still look real. Simply stated, that was my approach to every element of the production—the sets, the actors, the wardrobe, everything.

At the same time that I wanted the picture to look slick and professional, in terms of cinematic technique, I felt that the realism of the film's content would be enhanced by having the actors and their surroundings look slightly scruffy, even a little bit dirty, as they might well look in the society depicted. They wore no makeup, which helped to keep them from appearing too slick and clean.

I had in mind a certain "honest" look for the film, which I felt could best be achieved by using documentary cameramen. However, the main approach would be in the lighting. The idea was to not light anything unless it was absolutely necessary. Only if we walked into an area where there was no light at all would we put up a few low-wattage lights here and there. Otherwise, we would just let everything go the way it really was.

Another graphics concept in the film would be very flat lighting, with everything quite two-dimensional. Aside from its stylistic value, I knew that the no-lighting approach would enable us to move very fast in shooting. Obviously, we would have to do something to compensate for the lack of light, and that led to our decision to force-develop practically the entire film. We decided to "push" everything, except for the shots to be used for making opticals. By not pushing those shots, we hoped to achieve a consistency of graininess throughout the film.

I was well aware that there would be those in the audience who would be shocked by the graininess at first, but I was sure that after the first minute or two they would get used to the grain and simply accept it as part of the stylistic concept, the documentary approach.

As I said, I felt that "THX" should be photographed by someone with a very thorough documentary background, someone who was used to thinking fast and making quick technical decisions—also someone who had a feel for riding focus on unrehearsed action, without having to measure things off.

When production-planning first began on "THX", I was living in Los Angeles. Haskell Wexler, ASC, is an old friend of mine from the time when I was going to school at USC. He's a great guy and a real friend of the student. While I was writing the script in L.A. I asked him if he would be interested in photographing the picture and he said that he would be. But by the time we were ready to go into production, I had moved up to San Franicsco with *American Zoetrope* and, because we were a San Francisco company, the decision was made to use only San Francisco technicians.

Later, when we came down to Hollywood on location, Haskell was our standby cameraman. He did some of the shooting (three Directors of Photography, no less!) and helped us out of some of the tight situations that can break you on a low-budget feature. He was always there when we needed advice.

As for our two full-time Directors of Photography, both of whom live in San Francisco—Al Kihn had worked as a TV newsreel cameraman for four or five years and had shot a few documentaries for the USIA. Dave Meyers, who is older than Al, has had a great deal of experience and is highly respected in San Francisco as a documentary cameraman. He shot many of those fine documentary sequences in "WOODSTOCK".

We talked to every cameraman in San Francisco and looked at their film. We selected these two primarily because I liked the way they "thought" on the screen and the way they followed the action. They were both obviously good technicians who knew how to make the best of a situation. These things are important because it's tough doing a documentary. It's a real exercise.

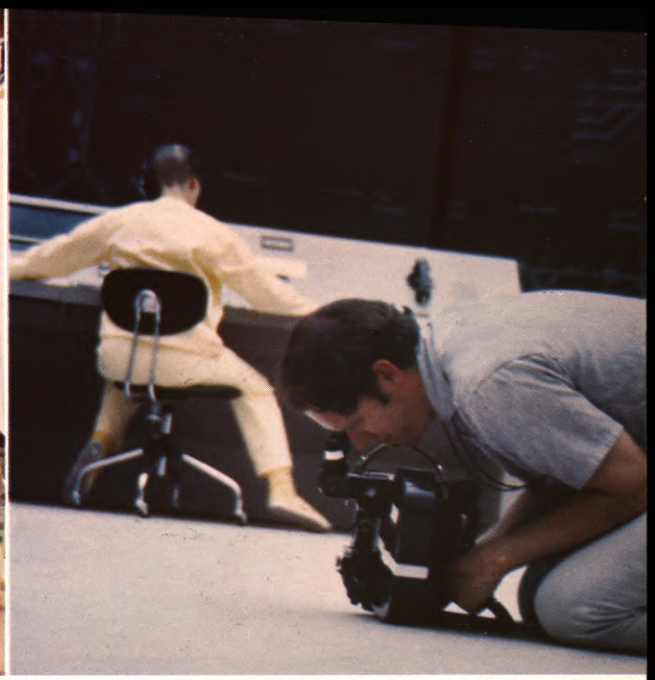
As an example of what I mean, when we got into the actual shooting, I would set up a scene and rehearse it maybe once. A lot of the time I didn't rehearse at all. There were no marks and no measurements. The cameramen just had to guess where the actors were, while riding focus blind in a lot of cases. We were shooting at such low light levels and with such a shallow depth of field that it was very hard to keep things in focus, but they did an excellent job. Very often we'd get it in one take, and I almost never shot more than three takes on a scene. This was due mostly to the fact that I had a very professional cast of excellent actors.

If a take was acceptable, but not perfect, I would move the cameras before doing it over, instead of making take after take from the same positions. This gave me a vast number of different angles for each scene. Since I planned to edit the picture myself, I wanted to be able to "make" the film in the editing. The shooting was designed for me to end up with a lot of documentary coverage so that, hopefully, I would be able to cut together a perfect performance in every case.

I got so that I knew which actors gave their best on the first take and

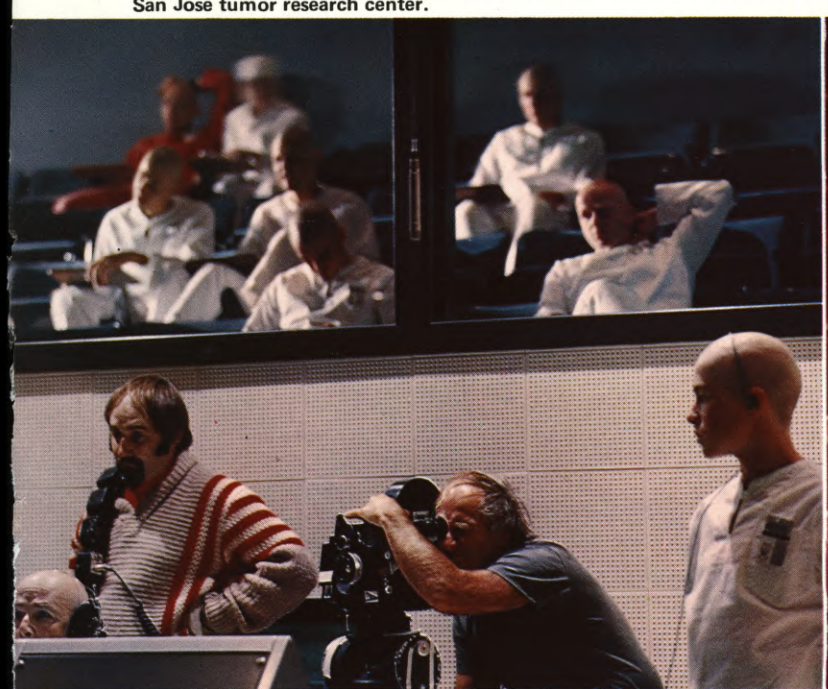
Continued on Page 1031

(LEFT) Robot policeman moves relentlessly through throngs of dronelike workers in pursuit of fugitive THX 1138, sentenced to be "liquidated" by the State. (RIGHT) Robert Duvall, playing role of THX, clambers up seemingly endless ladder of shaft, which eventually leads to freedom in the surface world. Shaft is one of several tunnels under excavation by the Bay Area Rapid Transit (BART) agency in San Francisco, which gave permission for their use as "sets" in the film.

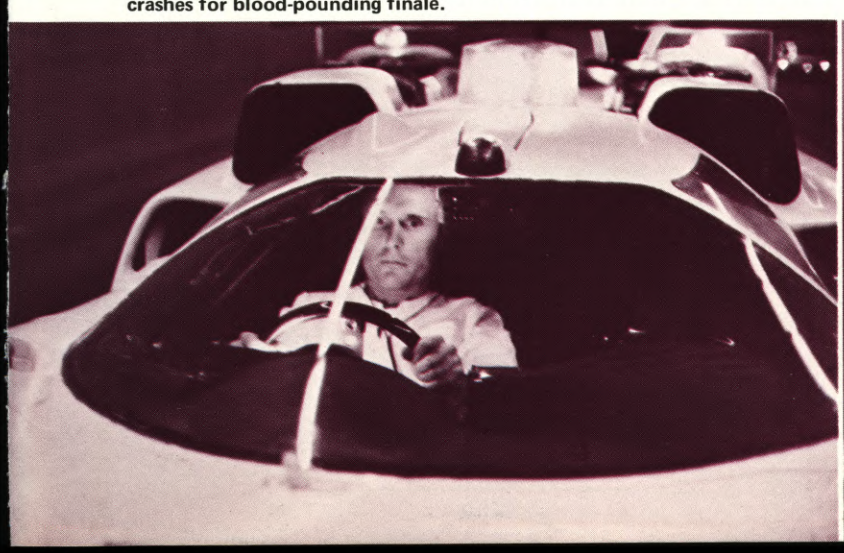


(LEFT) Utilization of existent ultra-modern structures in Bay Area as sets for drama of a futuristic society, lent an enormous degree of apparent production value to the picture, at very low cost. (RIGHT) Camera was often placed directly onto the floor for shooting of extreme low-angle shots. Rotatable eyepiece of Eclair CM-3 viewfinder fortunately made possible viewing of composition from above.

(LEFT) Co-director of Photography David Meyers sets up camera for shooting of tribunal sequence. (RIGHT) THX manipulates mechanical arms in "hot" chamber of actual radiation laboratory, used as a set. Even more futuristic equipment was evident in medical examination sequence, filmed in San Jose tumor research center.



(LEFT) Racing car, with shell redesigned to simulate vehicle of the future, was used as escape "transportation" by THX during climactic chase sequence. A single ordinary flashlight rigged inside car to shine "dashboard glow" onto actor's face, constituted total illumination of scene, other than available light in tunnel. (RIGHT) Robot police, riding "jet-propelled" motorcycles at actual speeds of 140 mph, are involved in spectacular crashes for blood-pounding finale.



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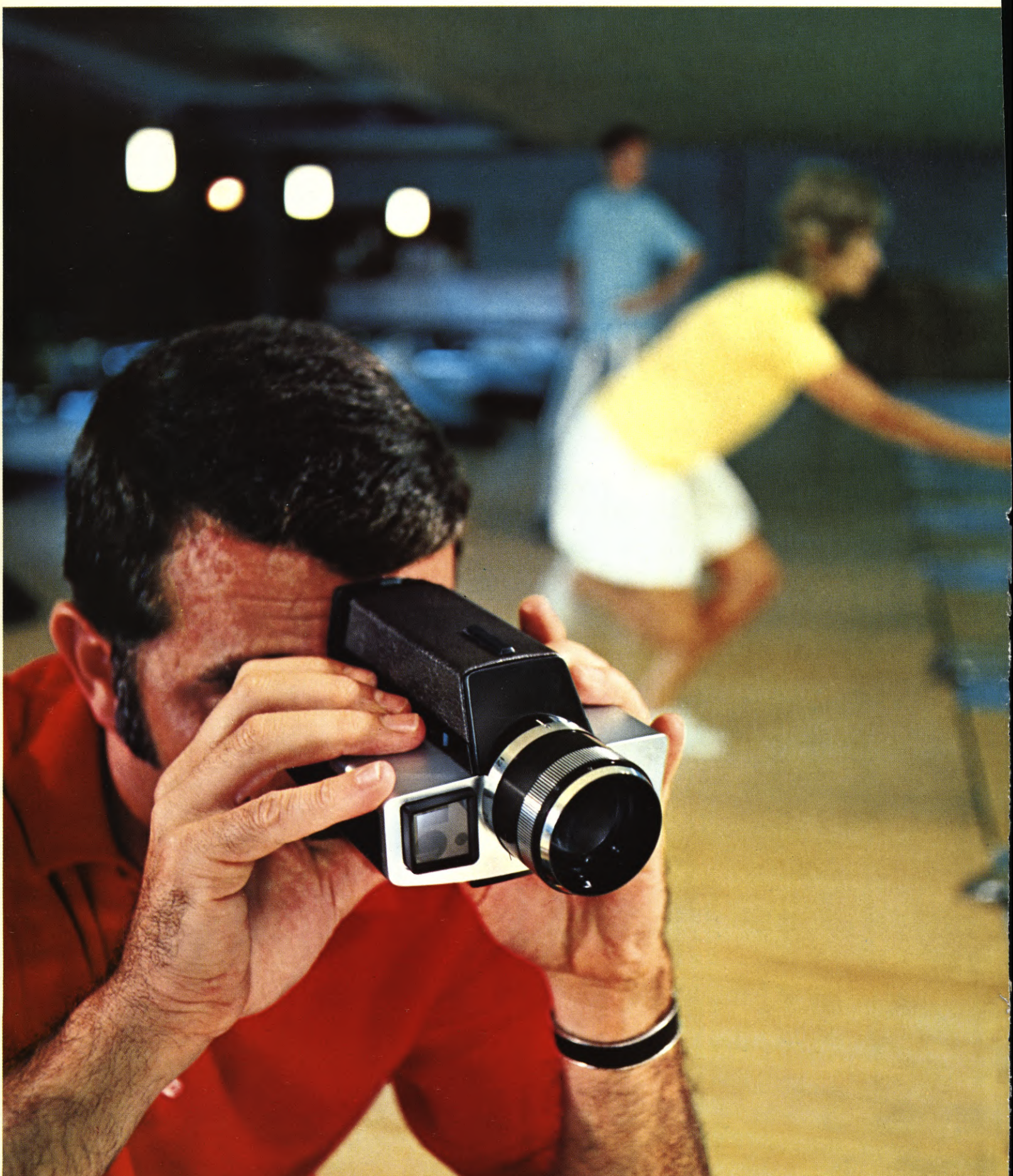

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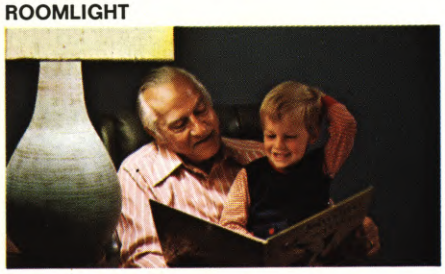

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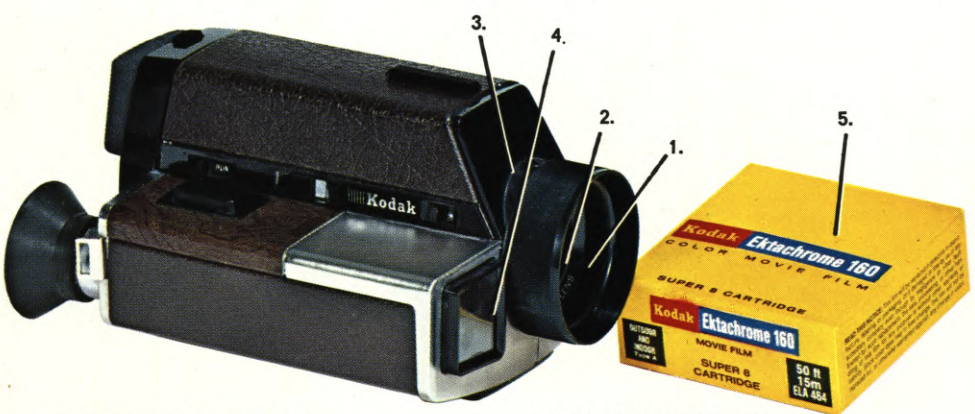
There's more

Low-light filming isn't the entire story. We continue on the next page. ▶



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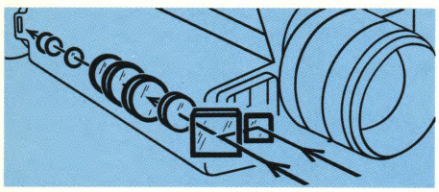
KODAK EKTACHROME 160 Movie Film. E. I., 160.

Now you can make truly candid movies by the light you live in.

A superimposed-image rangefinder in the XL55

Focus down to 6 feet with the XL55. Get sharp movies to less than 2 feet in bright light.



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The XL55 zooms from a wide-angle 9mm to 21mm telephoto.

The XL33 has a fixed-focus lens. Keeps images sharp from 17 inches to infinity in bright sun.

No overexposure in the sun

A neutral-density filter automatically slides into place as the light increases. Effective minimum aperture is *f*/36. But without the usual image-degrading diffraction effects of small aperture.

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Just open the back door. Drop in the film. And you're ready to shoot. A footage indicator lets you know how much film is left. Also, end-of-film indicator is visible in viewfinder. Both XL Cameras have a built-in Type A filter that makes it easy to move from tungsten to daylight illumination.

"Movies by the light you live in"

No movie lights. No gadgets. No special adapters or accessories. No cords. No bother—to you, or your subject!

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Kodak Ektachrome 40 Movie Film (Type A). An exposure index of 40; 25 outdoors with Type A filter—the same speed as *Kodachrome* II Movie Film. Gives you the choice of a second fine-grain color-movie film. The XL Cameras have a key slot to accept a movie light when shooting indoors with *Ektachrome* 40 or *Kodachrome* II Films.

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FROM THREE DAYS TO THREE MINUTES

The critical pre-printing analysis that used to take considerable time and careful "eyeballing" can now be done in a flash, with increased precision

By HAL SCHEIB

President, Cinema Research Corp.
Hollywood, California

Who in the motion-picture and television industry ever has enough time? Almost nobody in these frantic days, when costs are continually escalating. However, in an optical house, such as ours, time is a particularly precious commodity.

Optical work and titles, though they are so essential to the overall impact of a picture, are about the last post-production steps. In other words, we receive the work when release deadlines are perilously close, and when money is running low but tempers are running feverishly high. The problem always is: How do we accomplish the meticulous work required of us without nervous breakdowns either for our customers or our staff?

An invaluable asset in meeting this dilemma has been our purchase of an Eastman 1635 video color analyzer. Every piece of film we receive goes through the analyzer, and with this one piece of equipment, we have solved some of our most pressing problems.

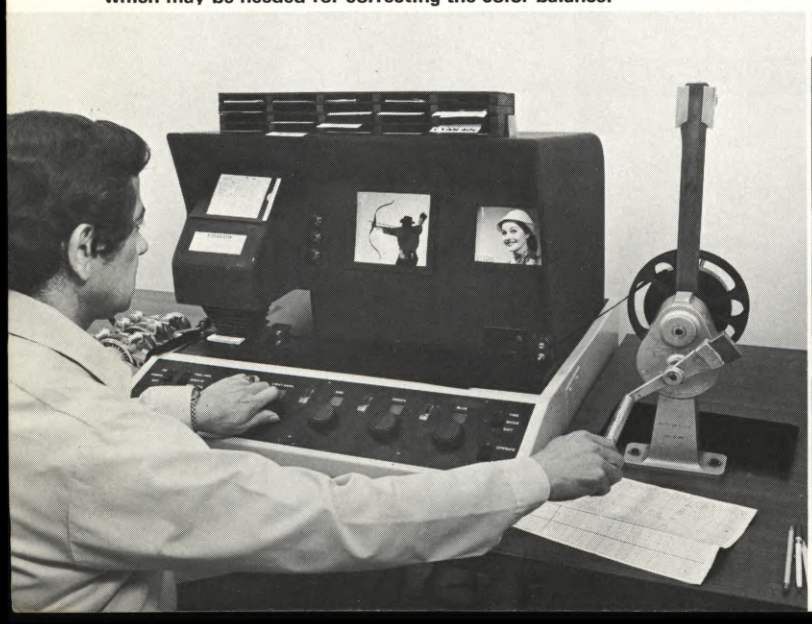
The Eastman 1635 video color analyzer is a solid-state console, easy to operate, maintain, and repair. To some extent, it resembles the familiar Moviola editing table. Our color-timer technician loads film onto the analyzer much as he would load a reel for editing.

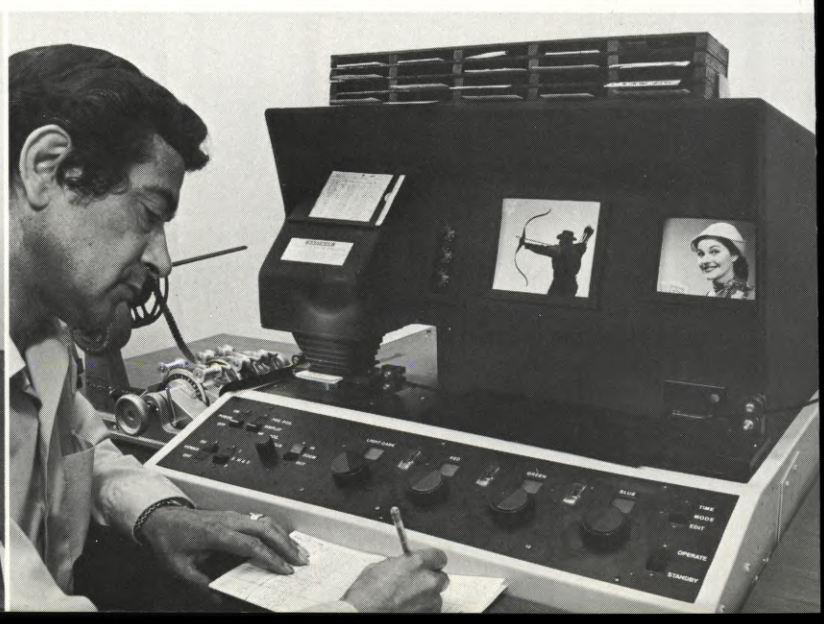
The analyzer electronically scans and

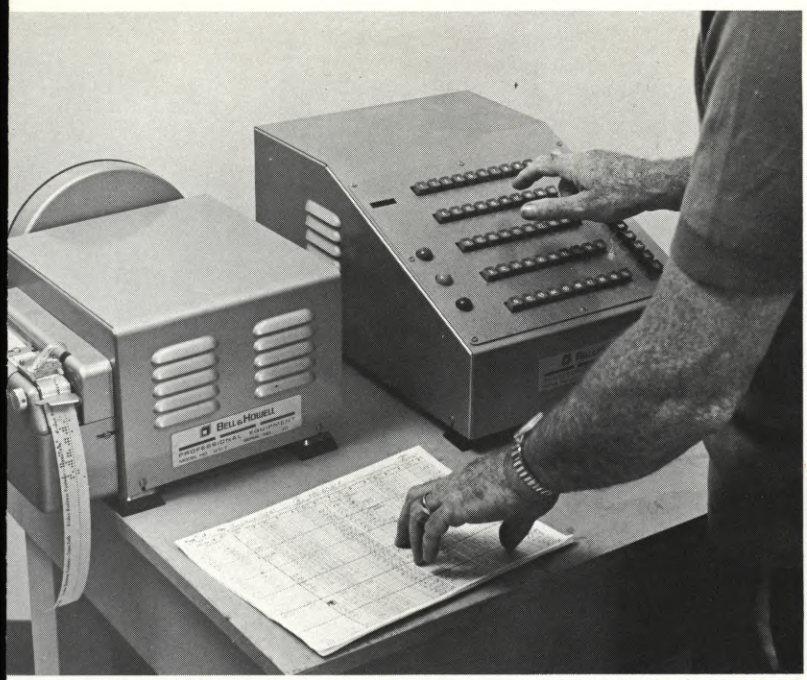
The author, Hal Scheib, organized Cinema Research Corp. in 1947, mainly to provide optical effects and specialized film services to independent producers.

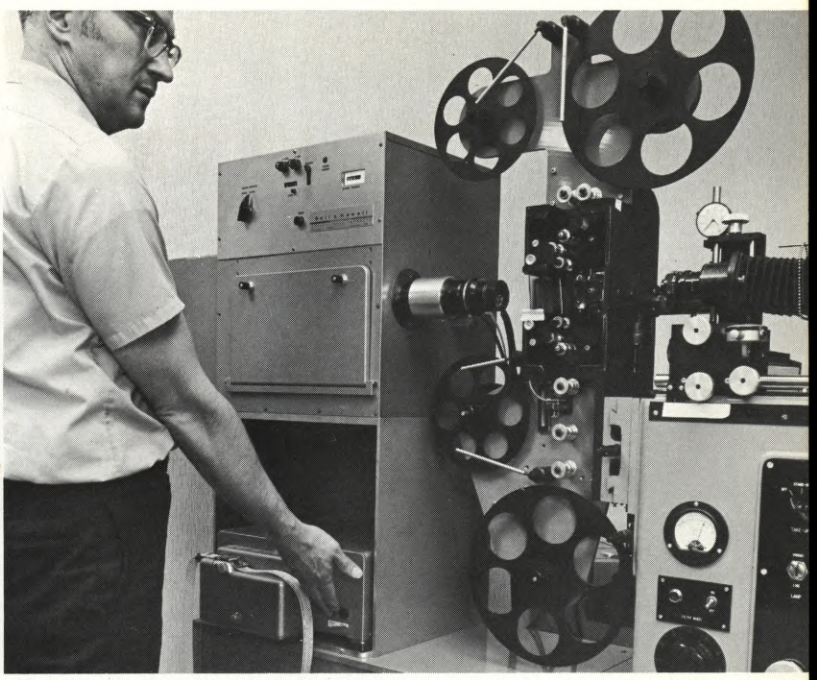
(ABOUT THE AUTHOR: Hal Scheib worked in Detroit and Chicago for an industrial filmmaker prior to World War II. He first came to Hollywood as an employee of the War Department to help produce military training films. Later, he saw some of the films that he had helped to make when the Army drafted him and sent him to the Asiatic Theater, where he served in the Philippines and in Korea. His ties to Hollywood dictated his return there after his release from service in 1947. The major thrust, at the time, was the production of standard format (35mm) black-and-white theatrical films. Very little was being done to meet the special needs of independent producers of industrial, educational, or religious films. At the same time, these less-established producers were the very ones who were experimenting in 16mm color and innovative techniques, and foreseeing the impact of television as a communications medium. Consequently, Scheib organized Cinema Research Corp. in 1947 to provide optical effects film services for independent producers. The firm has specialized in such techniques as 16mm and 35mm blowup and reduction printing, multipanel screen, and wide-screen formats. Through its association with Research Products, Inc., it has had available the latest equipment for specialized needs, and has become an outstanding contributor of special effects and titles for both movies and TV.)

(LEFT) Every film, whether it be negative, reversal, interpositive, 16mm or 35mm, is timed with the aid of the Eastman 1635 video color analyzer. (RIGHT) Operator of the color video analyzer notes on a work sheet the values of the density of each scene, plus the red, blue and green filters which may be needed for correcting the color balance.









(LEFT) The data from work sheets prepared by the color-timer are put onto punched tape. (RIGHT) The resultant punched paper tape is used to automatically operate the Research Products additive optical printer, employing Bell & Howell head—or it can be translated for use with a printer using the standard subtractive light source.

displays the color frames on a 5 x 5-inch cathode-ray tube (CRT). All the technician does is select one of three gammas, depending solely on whether he is viewing negative, reversal, or interpositive film.

The console also provides a rear-projection screen next to the CRT. The timer uses the screen to view and compare any reference while color balancing a film. There are only four other dials. One controls the density of the printing light to allow the timer either to dim or to brighten the film; the other three dials regulate the intensities of red, green, and blue light. The timer simply dials to the value that he thinks each color should have. After viewing the image, he makes the necessary adjustments until he gets the density and color rendition he wants.

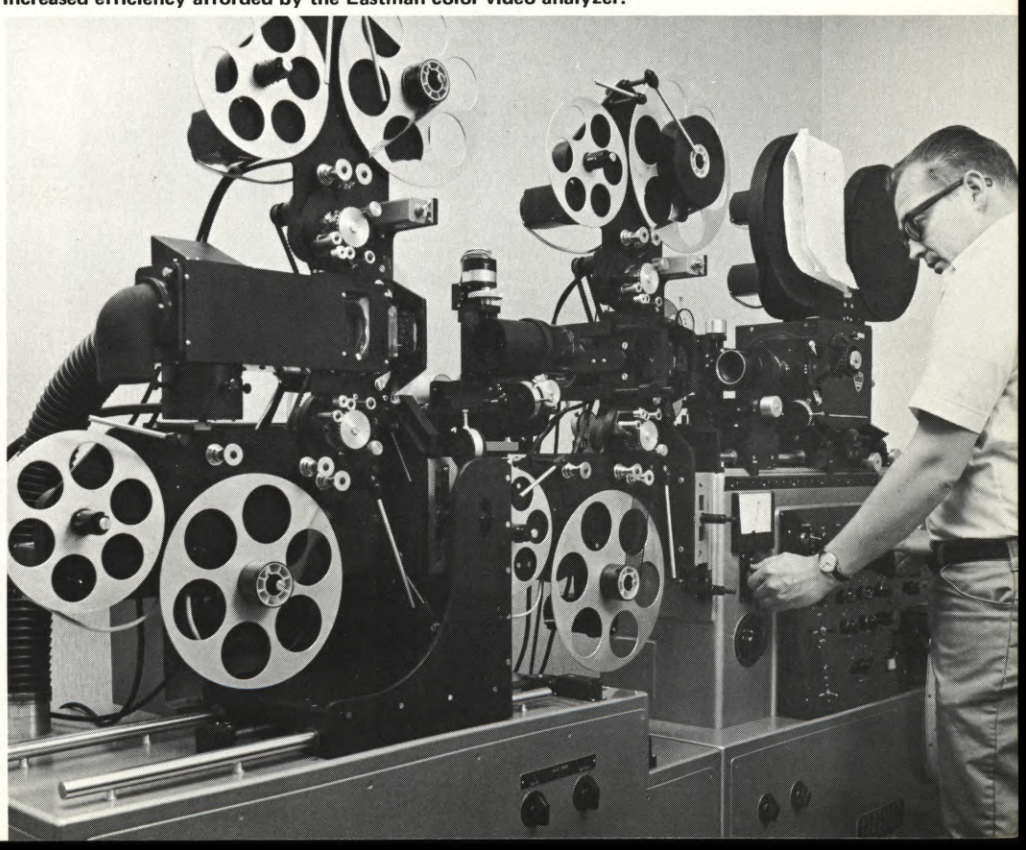
Using the time sheets that the lineup department has prepared (giving such information as scene placement, length, and required fades, dissolves, or other optical effects), the timer then records the density and filter values he has selected with the video color analyzer for each scene. The written record becomes the master that guides the optical printer operator. The information on this master record can be punched into a control tape for use on the Research Products' optical printer employing the Bell & Howell additive head. Or, it can be translated for use with a printer using the standard subtractive light source, depending on the individual job requirements.

For a vivid comparison, contrast this current procedure with the methods we had to use before we acquired these modern tools. In reality, some color scenes used to take longer to "time" than to shoot. This was because a color-timer, who needed at least a year's apprenticeship in the work, had to evaluate every scene for exposure and color rendition by a method called "eyeballing."

The color-timer would look at the film on a light table. If he thought the color balance should be improved, he would check the scene by holding various combinations of filters in front of the film. Not only did this technique

Continued on Page 1064

On short runs—commercials, for example—the work sheets may be used by optical printer operators. The same process which used to take days can now be done in minutes because of increased efficiency afforded by the Eastman color video analyzer.



New Eclair ACL: half the size and half the weight!

Sync sound and silent running in a camera that weighs 8½ pounds and is less than a foot long.

Ken Nelson has made a short documentary film with an ACL. "In the past, I've always looked around for a place to rest the camera between shots," says Mr. Nelson. "But with this new one, I found it didn't occur to me to put it down."

With its 200 foot magazine and without a lens, the ACL weighs less than 9 pounds and measures 11½ inches from front to back. Half the size of its competitors. Less than half the weight.

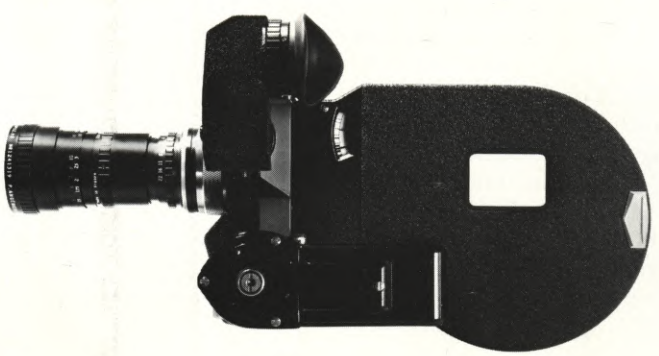
This is the most *inconspicuous* camera on the market. It's completely silent, of course. Hand-held, it's much smaller and lower than your head, as you can see. The battery weighs about a pound and fits into your pocket.

And the ACL is *fast*. You can change its clip-on magazine in less than five seconds. No threading; no need to touch the film at all. Film maker Eric Saarinen says: "This is the first silent camera you can *run* with."

The ACL has a crystal-control motor. Sync sound with no connection whatever between camera and tape recorder. Fantastic accuracy. Sync error is less than ½ frame in one *continuous* 200 foot take. That's 8,000 frames.

What else? A universal lens mount that lets you use any lens with any mount. Extremely bright and precise reflex viewing, with a viewfinder that rotates 360 degrees. And a price that's considerably lower than the competition.

For more information, ask us for our free ACL brochure — *and* the price list.



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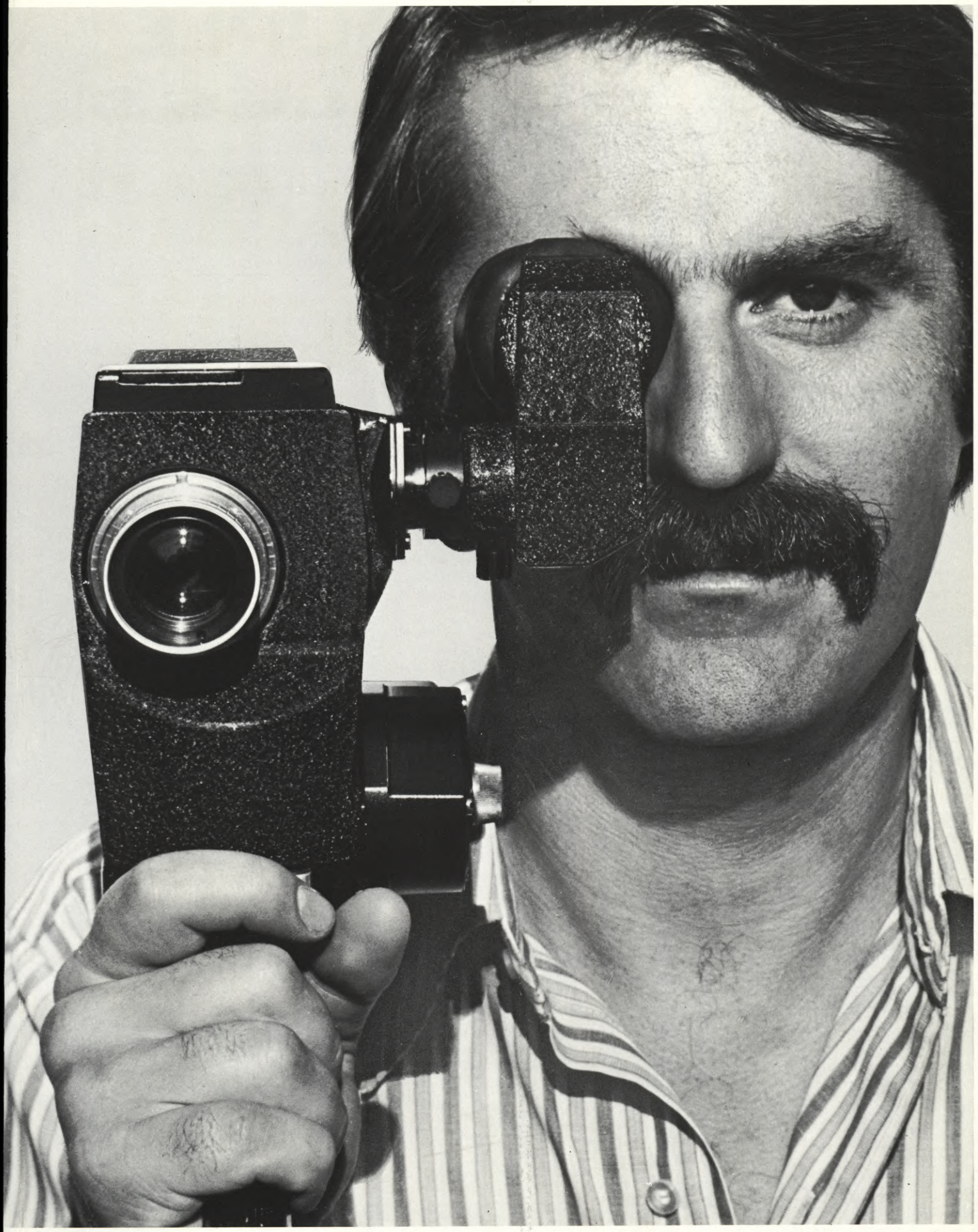


"THE ODD COUPLE" GOES CORDLESS

After all these years of wrestling with cables during the filming of multiple-camera TV shows, a way is finally found to cut the cameras loose from their umbilical cords

By HERB A. LIGHTMAN

For many years now—almost since the advent of commercial television in America—the multiple-camera filmed TV show has been a staple of the medium.

Utilizing (almost always) three standard film cameras, in what was essentially an imitation of live video technique, this method has made possible the "straight through" filming of action segments up to 11 minutes in length and (even more important to the performers) has made it practical for these shows to be filmed before live audiences, with resultant spontaneous audience reaction recorded on the sound track along with the dialogue.

Among the dozens of shows to utilize this method have been such successful series as "THE DANNY THOMAS SHOW", "I LOVE LUCY", "THE MOTHERS-IN-LAW", "THE MARY TYLER MOORE SHOW" and "THE DICK VAN DYKE SHOW", to name just a few. Last year, after an initial season of conventional single-camera filming, ABC's "THE ODD COUPLE" joined the ranks of the multiple-camera shows.

Though the multiple-camera technique has proved successful, it has, up until now, remained in the horse-and-buggy stage. From the technical standpoint, the incredibly cumbersome method has changed little in the last couple of decades. Characteristically, three standard Mitchell BNC cameras have been utilized—their movements sharply restricted by thick umbilical cords of cable providing camera power, camera-sound recorder sync linkage, intercom connection, and power for the "obie" light (a small lamp mounted on the camera to serve as a catch-light for the eyes and a bit of fill in the closeups).

The system has required the services of a cable-puller on each camera (to keep its wagging tail out of the way) and, if (God forbid!) one camera was required to cross in front of another, a grotesque ballet ensued for the purpose of throwing the cable of Camera "A" over the top of Camera "B" (including its dolly and crew). When the cameras returned to their original positions, it was necessary to repeat this clownish choreography in reverse.

To add to the confusion, the sound stage was cluttered with one or more monstrous sound-boom pedestals and, in a few cases, floor-based lighting units. Hapless members of the live audience, sitting in bleachers and expected to laugh uproariously at the comedy of it all, were lucky if they could see any of the action through this jungle of technicians and equipment.

Then, at the start of the current TV filming season, the brain-trust behind "THE ODD COUPLE" series revolutionized this whole miserable procedure by streamlining its multiple-camera filming system into a completely "cordless" operation. Just how and why this long-overdue surge of progress came about is best expressed in the following comments by key technicians of the crew.

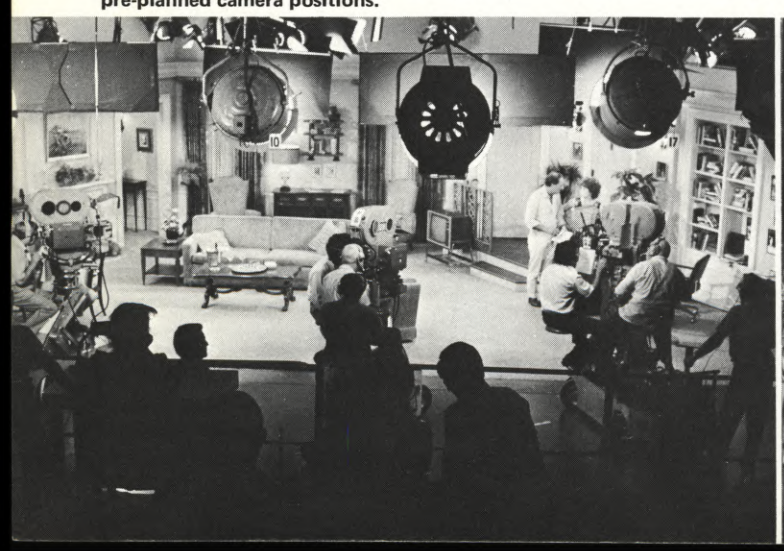
LESTER SHORR, ASC—Director of Photography:

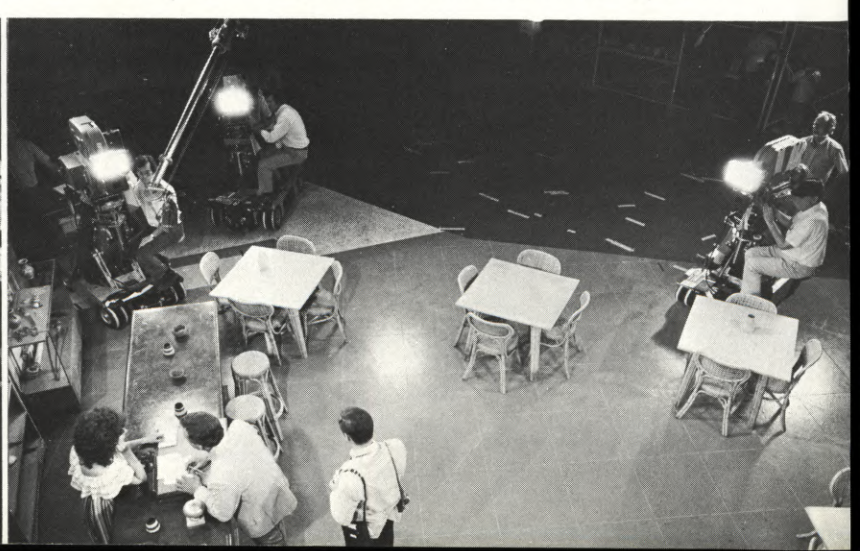
I guess it all really started when some of us watched the Apollo moon flights on television and noted that the astronauts manage to land, move about the lunar surface and take off again without being tied to cables, cords or wires. Perhaps that's a poor analogy, but it did make us wonder why camera mobility on shows such as ours had to be restricted by being tied to cable umbilical cords.

Our Production Manager on "THE ODD COUPLE", Sam Strangis, had apparently been thinking along the same lines, because he called me in, a couple of months before filming began, and said: "I want to modernize our operation and I'd like you to take charge. Do whatever you can to streamline us."

I told him that the first thing I would like to do is eliminate all cable ties to the cameras, so that we would have complete freedom of operation and greatly increased camera mobility—including the facility of dollying through doorways and down hallways and shooting through windows from behind the set.

(LEFT) Audience, sitting in bleachers above floor of Paramount Studios sound stage, observes three-camera filming of "THE ODD COUPLE" television series segment. (RIGHT) Three cordless film cameras, with "obie" lights glowing, move in for shots of actors in barroom set. Microphone boom, now operated from overhead catwalk, can be seen upper left. White strips on floor in background are marker tapes designating various pre-planned camera positions.





Lester Shorr, ASC, (checkered shirt), Director of Photography on "THE ODD COUPLE" series, poses proudly with his three "cordless" camera crews in one of the sets. Shorr was assigned by Production Manager Sam Strangis to "streamline" the filming operation. After he suggested that cameras be rendered entirely free of cables and that sound booms be operated from overhead, Paramount technicians found ways and means of implementing the changes, making this company the most efficient multiple-camera operation in Hollywood.

The second thing I felt should be done was to figure a way of getting our sound booms up off the floor.

Sam said, "Go ahead. I'm in favor of anything you fellows can do, soundwise or photographically, to streamline the operation."

We were already one up on most of the other multiple-camera shows in that we would be using Paramount's Mitchell BNC's, which had recently been reflexed by Cinema Products for through-the-lens viewing—an important aid toward precise framing with cameras that are constantly moving.

The recent development of crystal-sync for interlocking the cameras with the sound recorder had eliminated one important wire connection, but we were still stuck with the cable for the intercom system (connecting camera operators and dolly grips with the Set Coordinator) and for the operation of the obie lights on the cameras.

I had a meeting with key technicians of Paramount's Electrical Department and they agreed to tackle the problem of the obie light. What they came up with was a 350-watt quartz lamp in a rectangular housing lined with metal foil to break up and spread the light. To power it, they designed a battery pack which is good for at least 25 minutes of continuous use on a charge. This is more than adequate for our operation, because we start the filming with two of these fully-charged battery packs and, when we're better than halfway through the show, we switch to the second pack—which takes about 30 seconds—and that carries us the rest of the way. So much for the obie light.

The remaining problem—and a really sticky one—had to do with eliminating the cable connections for the all-important intercom system. There was no simple way around this, but our Sound Mixer, Jim Wright, went into a huddle with his partner, Electronics Engineer Harry Flagle, and they devised a highly sophisticated, but very compact wireless "package" to fit neatly onto the camera dolly.

At last—we were completely free of the limiting cables. The umbilical cord had been cut!

What remained was the problem of eliminating the sound booms from the floor area, and this was done simply by mounting them on the overhead catwalks. The boom operators manipulate them from above and they are completely out of everybody's way.

All of the top brass from ABC were present in the studio on the night we filmed the first show of the new season —using our cordless system—and they were all most impressed by the speed and mobility with which we worked. They told us later that it looked as though we had been doing it this way all our lives.

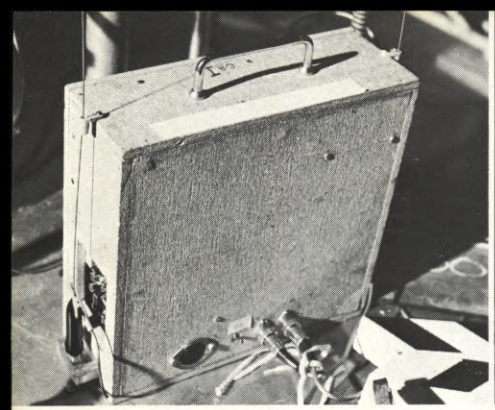
The new cordless system has made a tremendous difference in the efficiency of our operation. For the first time we can move about freely without the tie-up of the cables, and we have a minimum of pick-up shots later. For the Director, it has opened up a much wider scope of creativity. He can now put cameras anywhere in the set that he wants.

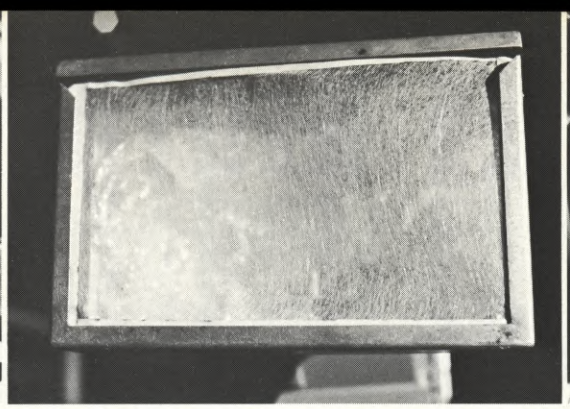
JIM WRIGHT—Sound Mixer

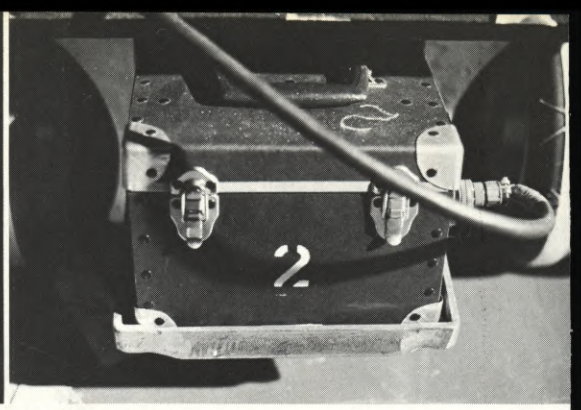
There were several problems to solve in changing the multiple-camera filming of "THE ODD COUPLE" into a completely cordless operation. The cameras, formerly, were connected by cable to the booth from which the Set Coordinator controls the show. He used to keep track of things with a footage-counter and start and stop the cameras. All of this has been eliminated by the crystal-control motors, which are powered by 30-volt battery packs.

Les Shorr had a lot to do with designing the rig that the boys in the Electrical Department worked up to eliminate the cables powering the obie lights. This idea works fine, as far as it goes—but I am now working with them on a remote-control dimmer for the obies and also a switch that will permit the obie light to go on only when the camera is on, and not at any other time.

We now have the placements of all of







(LEFT) First model of wireless intercom receiver-transmitter unit developed by Sound Recordist Jim Wright and Electronics Engineer Harry Flagle to replace cable system previously used for talk-back linkage between camera operators, dolly grips and Set Coordinator. (CENTER) Battery-operated quartz obie light mounts above camera lens to provide eyelight and closeup fill. (RIGHT) Battery used to power obie light is stowed away under the dolly.

our microphones above the sets. We have six Fisher booms, with the big arms, mounted on the catwalks and the boom operators pick up all of the sound from there, which leaves the floor completely clean, without any cables running across it.

By far the greatest problem in going cordless had to do with the PL intercom system, which is the talk-back facility linking all of the camera operators and dolly grips with the Set Coordinator. After we had eliminated all of the other cables, this was the only one left standing in the way of complete freedom for the cameras.

When we investigated, we found that two or three different companies had tried to devise such a cordless intercom system and had failed to come up with one. Either it was enormously expensive or they just couldn't do it.

After discussion with Sam Strangis and Les Shorr, Harry Flagle (a very skilled Electronics Engineer) and I decided that we would pool our technical resources and give it a whirl ourselves.

The unit that we were finally able to design meets all of the requirements for such a system. The Set Coordinator, who might be regarded as the "main station", can hear and talk to all of the camera operators and dolly grips, and vice versa. The main requirement of such a wireless intercom, so to speak, is that it be able to transmit and receive simultaneously and continuously, without the necessity of a cut-off. I'm happy to say that we managed to solve that problem and the system works perfectly.

HARRY FLAGLE—Electronics Engineer

There were many technical difficulties involved in designing a cordless intercom system that would permit free transmission and reception between several stations without anyone having to take their hands off their camera or dolly equipment to push switches. There are several approaches to doing this and I assume that a lot of people have tried it, but I came up with a new method of doing it, which is now up for patent.

Off-the-shelf equipment is not suitable for such an application, but we've taken some standard equipment and applied extensive modifications to it. This includes a new type of switching circuit which I developed specifically for this purpose.

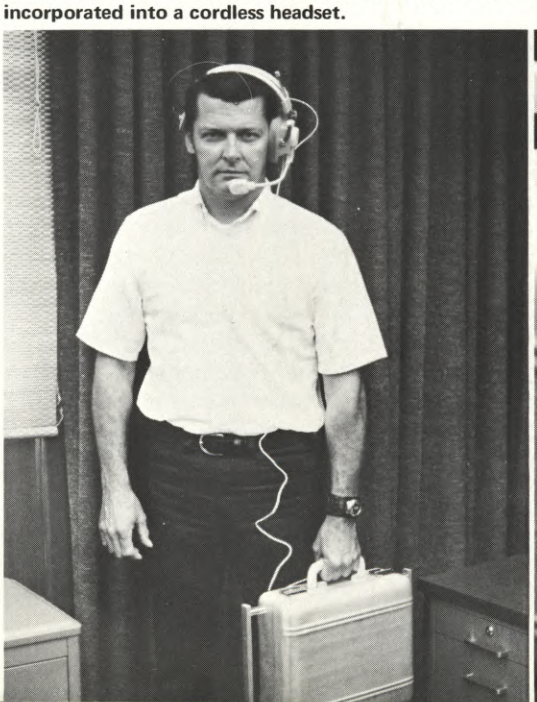
We have put a rechargeable type of battery into the unit and a plug, so that you don't have to take the battery out to re-charge it. We have a charger and every night, after the units have been used all day, we put them on the charger so that they will be ready the next day. We are currently using these units two days a week, for a three-camera show. A charge will usually last for two weeks, but we keep them up to full charge anyway. We also have back-up units on hand, so that if anything happens, it's simply a matter of taking the unit out and putting another one in.

The very first units we put together looked a bit crude and there was a slight problem with the antennas. As the technicians moved about during the show, the cables from their headsets had a tendency to wrap around the antennas and break or bend them back. We solved that by enclosing the unit in a solid aluminum case, with the antenna an integral part of it that looks like handles. It's now a rugged little package that is quite handsome.

However, we aren't going to stop there. Jim was talking to a couple of the cameramen and they asked about the possibility of incorporating all of the components of the unit into a headset arrangement. Such a configuration is *possible. Both the transmitter and the receiver could be made small enough to enclose in the two parts of a headset. We have plans to do exactly that in the future—although perhaps not for a year or two, because it would involve designing and making a special transceiver.*

In the meantime, the current model is working at full efficiency and we're happy that we could provide the final link that has made it possible for "THE ODD COUPLE" show to lead the industry in going completely cordless. ■

(LEFT) Electronics Engineer Harry Flagle, shown with latest model of wireless intercom transmitter-receiver unit contained in handsome aluminum case. (RIGHT) Sturdy antennas, which look like handles, extend from either side of case. Entire unit will eventually be incorporated into a cordless headset.



"THX 1138"

Continued from Page 1018

which ones needed a couple of takes to warm up. We would zero in on their closeups accordingly, using long lenses, so that the actors literally never knew when they were being filmed in closeup. This resulted in more natural performances, because they were playing to each other all the time (instead of to the camera) and they didn't get uptight, as actors often do when they know they're in a closeup.

While we shot with available light almost exclusively, this wasn't always as difficult as it sounds. We were shooting mostly modern interiors, which usually have ten times more light than they really need. It's just an architectural phenomenon of the sixties and seventies to way over-light interiors.

However, sometimes we'd walk into places where it was so dark that we'd have to turn on a flashlight just to read the needle on the exposure meter. Very often the meter didn't indicate any reading at all, but we didn't let that stop us. Our pet phrase during the entire shooting was: "Just put on your fastest lens, open it up all the way and shoot."

Despite all that, we kept getting back dailies that looked good. Everyone kept saying: "Gee, I never thought we'd get that one." But as long as it kept coming out all right, we kept doing it. We always ordered one-light dailies—never a timed print—and, incredibly enough, almost the entire picture printed on light 12.

I wanted to shoot "THX" in a wide-screen format because it is, basically, an environmental film and I felt it was essential to get it as big as possible. I chose Techniscope over the available 35mm anamorphic processes because we could use faster lenses and our Eclair cameras could easily be switched over to the Techniscope format. Also, while the Eclairs normally carry 400-foot magazines (which are awkward for the shooting of a feature), the Techniscope format gave us the equivalent of an 800-foot load of straight 35mm. I wasn't afraid of the blow-up involved, because I had shot a lot of 16mm that had been blown up to 35mm. To me, Techniscope is just another form of Super-16. Or maybe "Super-duper-16" is more like it.

There was one sequence in the picture that we went all out to light completely. That was the "cathedral" sequence near the end of the picture that was actually shot in a TV studio. They had all of these lights electronically controlled by push buttons so that we could do whatever we wanted in the way of lighting. We sort of ran amuck with back-lighting and everything else we could think of. It was a lot of fun, and it relieved the frustrations of the gaffer. It gave him a chance to actually light something.

No film ever ends up exactly as you would like it to, but, with minor exceptions, "THX" came out pretty much as I had visualized it, thanks to some excellent assistance—and a whole lot of luck. ■

SHOOTING "THX 1138" WITH (ALMOST) NO LIGHT

By DAVE MEYERS.

Co-director of Photography

There has been considerable comment that the photography in "THX" has a unique look to it, a distinctive texture. If so, that can be credited to George Lucas. George has a terrific sense of graphics. He knew what he wanted and it was, fundamentally, *his* style. It wasn't something I dreamed up or Al Kihn dreamed up. We collaborated with him in order to get it onto film, but I was personally very much impressed with his graphic sense. It resulted in a very interesting visual style.

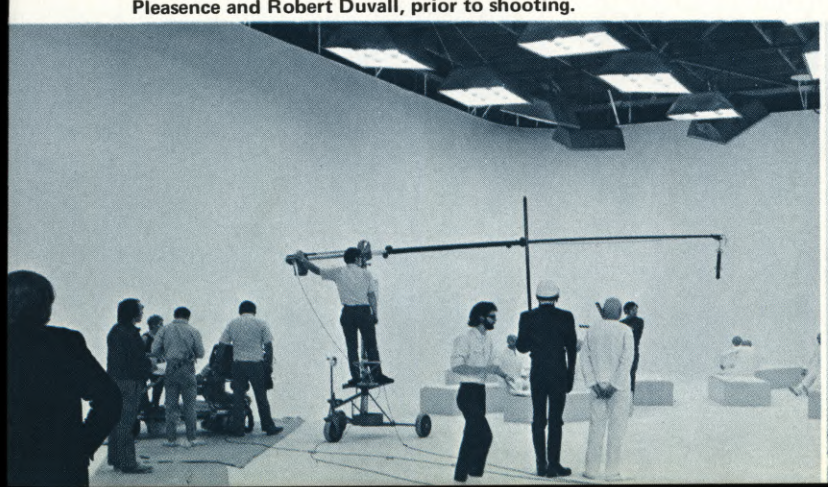
We shot practically everything in the picture with two cameras. That's the way it was set up. They wanted two cameras operated by two people who could sort of wing it individually. I suppose that's why they hired documentary cameramen. George would tell Al and me what the scene was to be and we'd decide which lenses were to go onto the two cameras. Then each one of us would wing it through the scene on our own. Surprisingly, this method worked out very well.

We were tied down to using equipment owned by *American Zoetrope.* That included Eclair CM-3 cameras, which I'd never operated before. I knew that Haskell Wexler owns one and that he likes it—but he had also worked his over considerably. I was basically against using that particular camera because it is noisy and hard to blimp, but after a while I became quite fond of it. The basic camera is good, the finder is great, and it is fairly easy to adapt to the Techniscope format. Blimping was a problem, but we had a couple of blimps custom-made by Carroll Ballard, and they worked out quite well.

We used an Angenieux 25mm-to-250mm zoom lens (T-stopped to 4.2) a very small percentage of the time. For most of the shooting we used a complement of Nikkor prime lenses ranging from 21mm to 300mm—the same lenses made for Nikon still cameras. They have remarkably sharp resolution, good color correction and are very consistent with each other. The only annoying characteristic is that the helix is exactly the opposite of that of the zoom lens. I would find myself instinctively flipping in one direction, but going completely the wrong way. It was very hard to get used to.

We used available light as much as possible in shooting the location interiors, working at as low a light level as

(LEFT) Against huge white "limbo" cyclorama on Hollywood sound stage, preparations are made for filming of prison sequence, which could not be shot in San Francisco because no such facilities exist there. Over-expose of almost three stops resulted in a flat glare, through which white-clad inmates wandered, looking like disembodied heads. (RIGHT) Director George Lucas discusses scene interpretation with lead actors, Donald Pleasence and Robert Duvall, prior to shooting.



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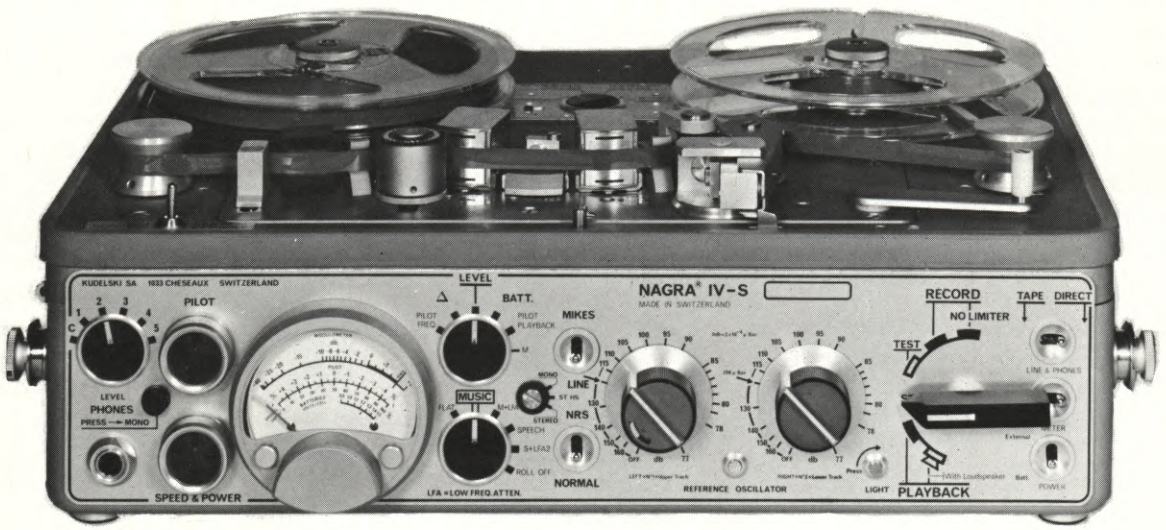

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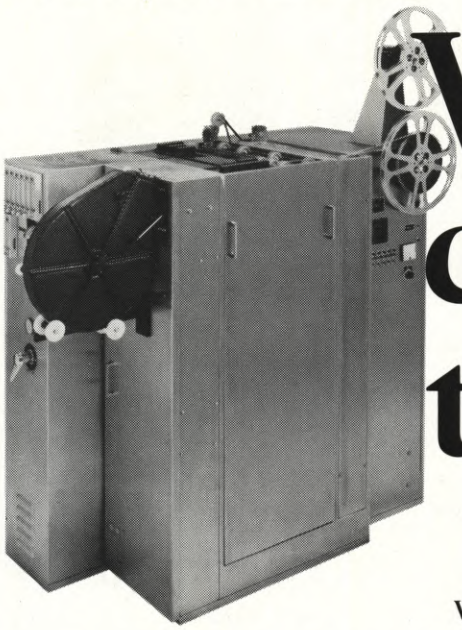

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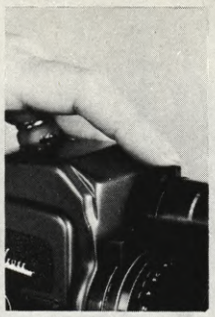

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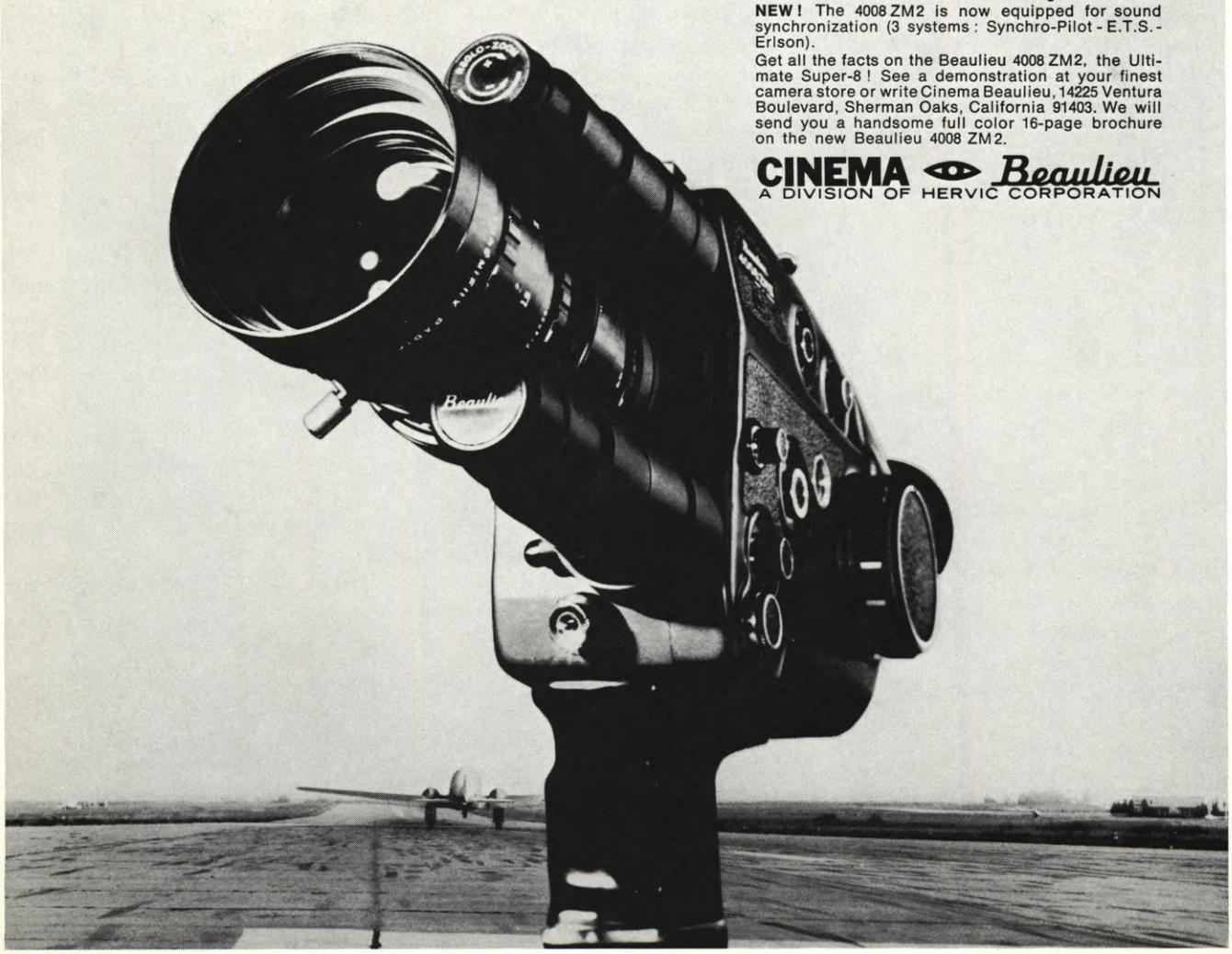
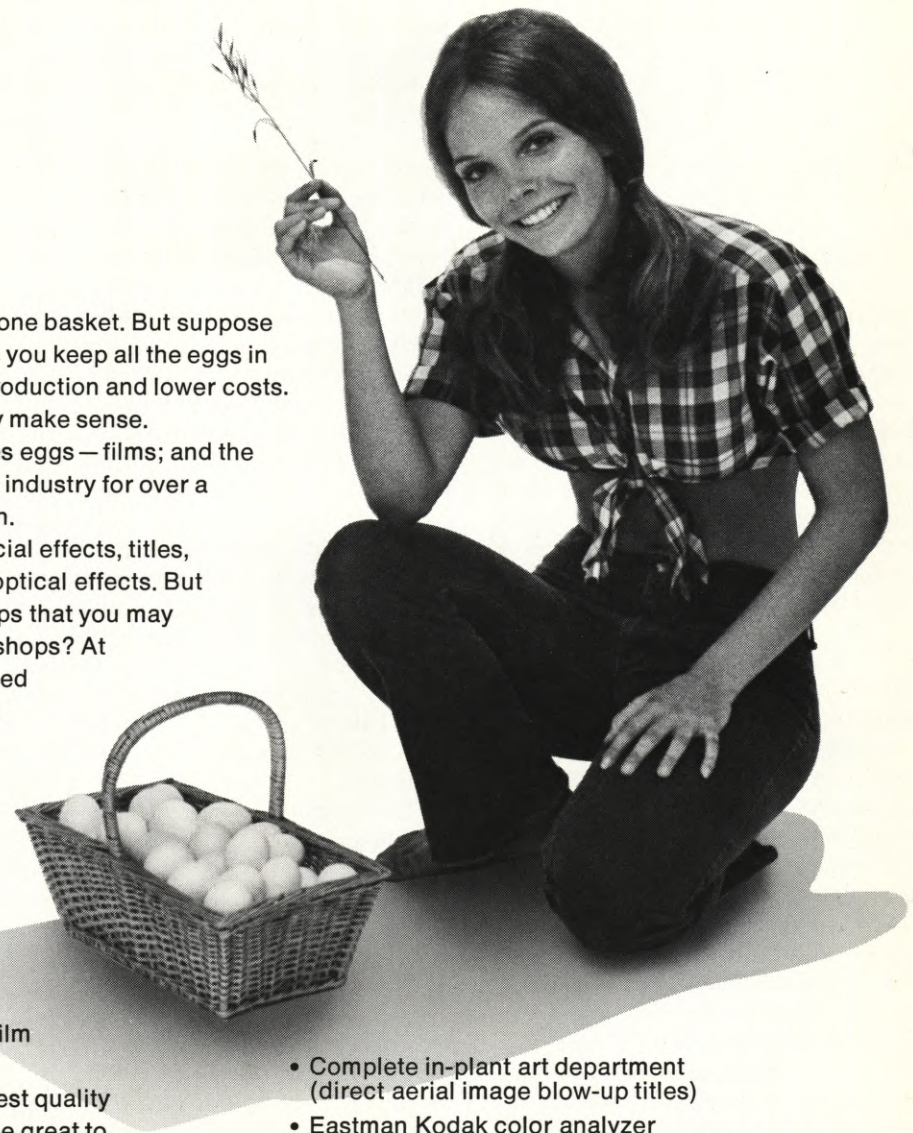


Why not?



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"LE MANS"—SPEED WAS OF THE ESSENCE

Continued from Page 991

to carefully inspect it while the car is going around the track with its replacement. You have, through a lot of effort, come up with two cameras shooting straight back and one shooting forward —each with a complete electrical backup system with extra batteries. The battery storage proved to be an extremely critical problem (as was everything else), due to the fact that race cars have very little space unaccounted for wherein one can place an item as bulky as a battery, let alone *SIX* of them! Two for each camera.

Since these are race drivers, not cameramen, activating these cameras, footage counters and warning light systems had to be designed so that the driver would have at least a vague idea of what he was doing. All three Panavision cameras would have to be changed in less than three minutes, total time, during a pit stop which was called specifically for the purpose of replacing the cameras. The ease and speed with which these cameras were changed was so incredible, that at one point in the race a showdown occurred between the Hollywood mount technician, Gaylin Schultz, and the race drivers, because they were so close to winning that their enthusiasm was hard to contain; and the director had to remind the team manager that this car had been entered in the race with the specific purpose of obtaining footage, not winning!

The race day was over and the rushes revealed that valuable footage had been achieved and though the problems of the real 24-hour race had come and gone, the staged version of the race was hot on its heels with even greater obstacles, uppermost of which was always Steve McQueen's fervent desire that everything be totally true to his principle of never undercranking to achieve his strict commitment to actual speed. He put his life on the line for his principles and, along with the other 25 drivers hired for the movie, drove his car at blinding speeds. When queried by the harried Mr. Schultz as to whether the effect wouldn't be really quite as good at, say, 150 MPH rather than 180 MPH (and the resultant aerodynamic problems more than compounding themselves for these 30 miles), the answer came back unequivocally that if he was dedicated enough to his ideal to risk his life for it, then the least the technician could do would be to solve the few problems inherent in the sport.

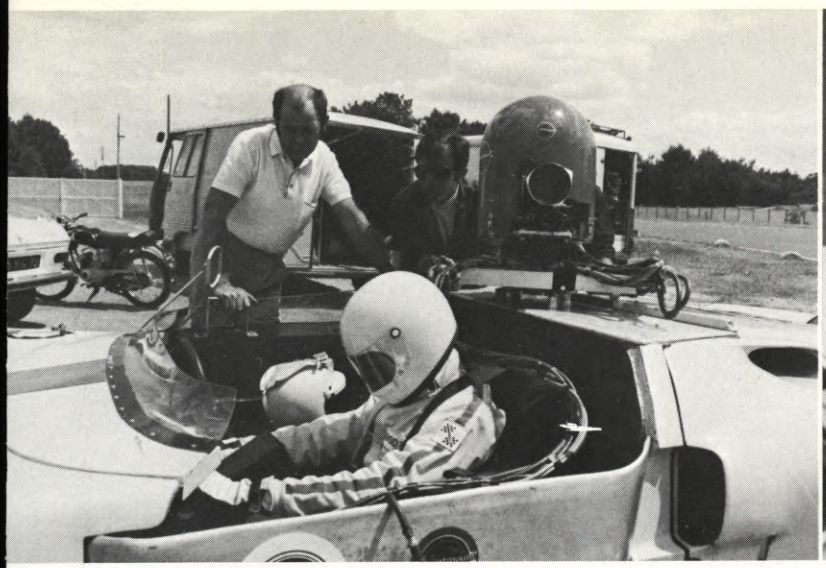
So now, in addition to anything heretofore mentioned, comes the dawn of the GT 40, whose birth was a direct result of the company's need for an insert type camera car that would be capable of keeping up with the pack. The car was purchased in London and immediately Schultz set about to totally revise its configuration, starting with cutting off the top! The door was removed from the passenger side and a built-in padded seat was created alongside the driver to enable a cameraman to sit in safety as he was propelled at speeds of 170 miles and better. To increase the safety and to also create a basis for attaching mounts to the car, a ½" duraluminum plate was inserted to beef up the chassis and to add more protection.

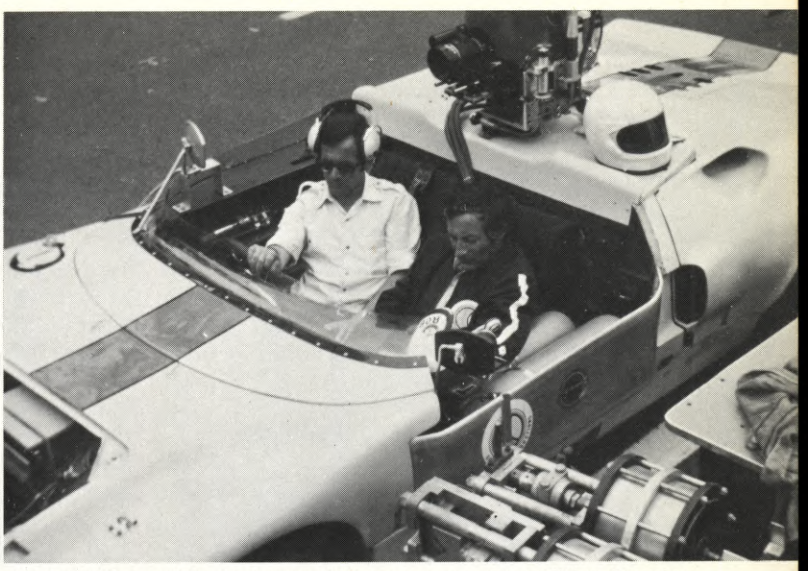
The basic requirement demanded by the director was that he have a unit capable of panning 360 degrees, as well as tilting, focusing and zooming. Various systems were tried, such as a Pelco head, but this proved to have far too slow a reaction. Then a crankhead, with cables extending from the camera to pan and tilt wheels for the camera operator, proved equally unusable, due to too much play in the movements. The final and successful solution was an air-valve unit controlling two air motors. This idea had come about as a result of noticing how the same aerodynamic pressures that were causing problems, could also be harnessed to work for the camera's benefit. The operator was able to achieve very fine points of maneuverability and since he was simultaneously equipped with a TV monitor, he could focus and zoom at will.

The camera was placed in the center of the car and, in order to reduce friction caused by the flatness of the magazine, a dome was built around it, thereby once again "using" the aerodynamic flow by directing it to one's advantage. Due to the unusual flexibility of the air-hose guidance system, it was possible to place this same camera at any position on the car, thereby not having to be confined to its one central position. The only limiting factor incumbent on the operator was the length of the hose, thus it was possible to give his creative urge free rein.

Since one of the basic aims of this film was to achieve footage literally involving the audience, cameras were mounted on 917 Porsches and 512 Ferraris in almost every conceivable vantage point, resulting in shots like giant-sized closeups of flattening tires, and kaleidoscopic views framing drivers' helmets, rear view mirrors and countryside views as seen from the inside out. Mounts were created with such exotically controlled devices as to have, by now thoroughly inured drivers, running into cameras extending 6 to 8 feet out from another car; thereby on impact causing the camera to swing and photograph the passing car at 180 MPH without cutting. This was a type of mount which was installed both at the front and the rear of the autos, reversing the situation between who was passing whom. The camera thusly mounted in the rear of the car was relatively easy, but the similarly-mounted front camera had tremendous air friction to overcome and a system of dash pots and weather vanes

(LEFT) Control unit for remote-controlled electrical panning mount was installed in well under seat of racing car. (CENTER) Side view, showing seat replaced over control unit and camera on electric panning mount ready to film driver point-of-view shot from inside the car. (RIGHT) Camera, with remote-controlled electrical panning mount, shown installed on a special bracket outside the car, to film a low-level shot in which the camera pans from race course to show tire going flat.





(LEFT) GT-40 racer, equipped with highly sophisticated air-controlled head. The unit, capable of panning 360 degrees, as well as tilting, focusing and zooming (all by remote control) was designed and built on the spot by camera equipment expert Gaylin Schultz, who had noted the effects of aerodynamic pressures and deducted that the basic principle could be put to constructive use. (RIGHT) Car prepares for a run with air-controlled camera mount. Operator, next to driver, manipulates mount through a wide range of maneuvers, while monitoring image on small television monitor.

had to be instituted to achieve the proper swing rate; otherwise, the camera would dash itself to pieces when it came to the end of its run.

By now the drivers had become totally convinced of the safety of all the mounts, as day after day of running at flat-out speeds had not broken the remarkable record of not having suffered a single malfunction or traffic accident in any way related to the cameras. No stone was left unturned in the quest for original ideas and always they were accompanied by the ever-present shadows of aerodynamic problems and constantly subject to the threatening specter of ever-present super-speeds. Mounts were placed in front, in the rear, on the side, below, above, literally everywhere, and as the 24-hour race became a 24-day and then a 24-week race, the tensions and the problems mounted.

Since the race uses an everyday highway as part of its course, permits had to be obtained for closing this part of the highway for filming usage exclusively, and, as permits became more and more difficult to obtain, and race cars were running hotter and hotter as they were pushed beyond the normal toil that 24 hours of continual running extracts from them, it became imperative to try to accomplish as much as was humanly possible with each run. By the end of the production, cars were running with as many as five cameras at once, covering a multiple of angles with each try.

All mounts were built, created and installed right on site and, except for the continual job of thinking out the problems, were installed within 15 or 20 minutes, with the help of a rather well-equipped van consisting of all the components Gaylin Schultz had designed to facilitate ease of assembling and to conserve valuable production time. The result was an almost totally self-sufficient operation for "on the spot" mounting.

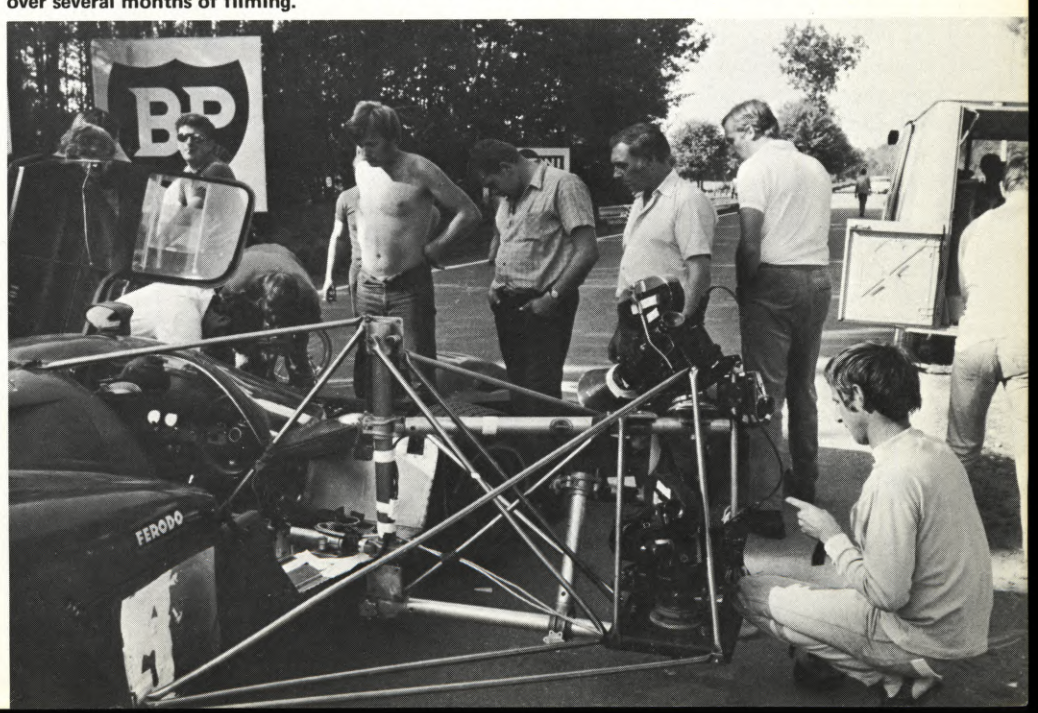
Through the entire eight months of filming, there was not one single malfunction of the mounts, nor was a single camera damaged or lost. Inasmuch as there was a heavy concentration of vehicles, with as many as five cameras mounted on them at once, this should speak for itself in regards to the safety and engineering accomplished.

Total dedication and absorption were given to the safety of anything and everything that was used on these cars, down to securing special M.S. certified bolts and keeping, not only the success of the production in mind, but the safety of all concerned.

Acknowledgement and sincere gratitude is also extended by Schultz to the producer, Jack Reddish, for his total approval of all mounts, for without his complete backing and faith continually extended in regard to any and all mounts attempted, there would have been no achievement.

One tries only what one is inspired and encouraged to attempt, and success follows commensurate with the support extended. ■

External mount which provided positions for two cameras lined up to get close shots of tire going flat. Dozens of special purpose mounts were designed and built on location as needed. Safety and performance records of mount were perfect, with not a single mishap or malfunction occurring over several months of filming.



FILMING OF "LE MANS"

Continued from Page 989

photographed more than 70,000 feet of the most thrilling film footage ever recorded of racing cars being driven in actual competition.

THE RACING DEPARTMENT

Noting the furious activity in Solar Village after the real race was over, an imaginative French newspaperman headlined a story about the film with: McQUEEN EXTENDING "24 HOURS" FOR FIVE MONTHS.

His observation was accurate. In order to do so, it was necessary to set up a $250,000 racing department duplicating one which would be used in actual competition. The job fell to British racing team manager Andrew Ferguson, who had handled the Solar Porsche 908 at Sebring (Fla.) when McQueen startled both the film and racing worlds by winning first in 3-litre class and finishing second overall in the 12-Hour race, just 26 seconds behind Mario Andretti in a 5-litre Ferrari 512.

Ferguson recruited 56 professional racing drivers from all over the world. In alternation, they worked an average of two to three days weekly with the film company, driving the swift racing cars from which the actors emerge in the movie. They often went away on weekends to race in actual competition. Many were involved with the filmmaking for more than 12 weeks.

Ferguson also assembled 25 of the world's fastest racing cars, including four each of the ultra-swift Porsche 917s and Ferrari 512s, two Lolas, two Porsche 908s, an Alfa-Romeo, a Matra, two Chevrons, a Porsche 914, four Porsche 911s, a Ferrari 312, a Ford GT-40, and the long-tail Porsche 917 in which Vic Elford set a new lap record at Le Mans in 1970.

He also assembled a full corps of mechanics and tire technicians, for the problems of the racing department were monumental due to the extraordinary demands put upon man and machine by the filmmaking.

"These cars were built to run *at speed* for 24 hours, but not for 98 days," it was observed—the expert pointing out that the 25 vehicles often raced at top speeds daily with many stops and starts for retakes which put inordinate stress on component parts.

Some auto parts failed to endure the strain.

A $45,000, Solar-owned Ferrari 512 driven by British professional racer Derek Bell suddenly caught fire one day in August. Bell escaped with minor burns but the car was completely consumed in flames, abandoned in the middle of the roadway.

On another luckless day, a Porsche 917 went out of control for inexplicable reasons and demolished itself against a guard rail causing serious injury to its driver, David Piper.

Many maintenance problems plagued the racing department, but alternating teams of factory mechanics on loan from makers of the cars overcame most difficulties in record time with flying colors.

THE PROPERTY DEPARTMENT

To reconstruct the actual ambiance of the Le Mans circuit and the many swift vehicles which comprise its great show, California property master Don Nunley found himself faced with the assembly of more than 20,000 separate items, ranging from the high-priced wristwatches worn by the drivers to the small promotional decals decorating the cars.

Nunley's accumulations included countless colorful umbrellas, varicolored warning lights and flags, walkie-talkies, TV and still cameras, 5,000 balloons, fire extinguishers, tables, tents, tote bags, transistor radios and racing magazines. Even the crash dummy (whose face was cast from an old George Raft mask) was Nunley's responsibility.

PRODUCTION DESIGN

Another challenging area for the staff of "LE MANS" was dressing the people seen in close-ups in the pits and pavilions and at the tony parties held by jet setters during the race.

Production designer Phil Abramson relied on race day photographs and research as much as possible, but had to call upon his own creative judgment and that of several top French fashion designers to resolve the problem.

The problem? Changing fashions!

What was de rigueur in June 1970 simply may not be "in" when the film is released. In consultation with representatives from designers from Dior and St. Laurent (and sometimes the Salvation Army on cast-off clothing), Abramson had to anticipate what the fickle fashion scene will be.

FILM EDITING AND SOUND DEPARTMENTS

The film editor's operational headquarters during the making of "Le Mans" was located in what was once an antiseptic college infirmary.

There were 30,000 feet of film from the 1969 race, 70,000 feet from the race day camera car, another 50,000 feet from the 19 stationary race day cameras, still another 25,000 feet of hand-held footage of race day activity, and the day-to-day footage with which to function.

On that slick infimary floor, virtually up to their elbow in 35mm film, the editing crew, which included French editor Ghislaine Desjonqueres and two competent young French women, Catherine and Pauline, seemed always to be trying to keep their balance or disentangle themselves. They didn't talk much.

John Mitchell, a Britisher who headed the Sound Department, talked to himself quite a bit after recording what is assuredly "the fastest sound track in the world."

This was accomplished while sitting beside professional racing driver Rob Slotemaker, an expert at controlled skids, who rocketed Mitchell over Mulsanne Straight at 200 miles-per-hour so that the authentic sounds of acceleration, down shifting, or a chilling spin on a wet track would be recorded.

SPECIAL EFFECTS DEPARTMENT

Headed by rotund expert Sass Bedig, who accomplished the auto chase sequence in "BULLITT" which made that Steve McQueen film a worldwide hit, the special effects department pioneered new ground during the making of "LE MANS".

Cameras placed at ground level, in helicopters, inside and outside speeding cars, fore and aft of speeding cars and even in radio-controlled cars which go up in flames captured some of the most thrilling footage ever filmed.

Toughest job of all, however, was maintaining control of an unmanned racing car roaring over the highway with nothing more than bleeps from a radio panel. When steering varied a fraction of a second with the car going 100 miles per hour, the vehicle could thrash itself to death against the guard rails before a correcting bleep reached it—and did!

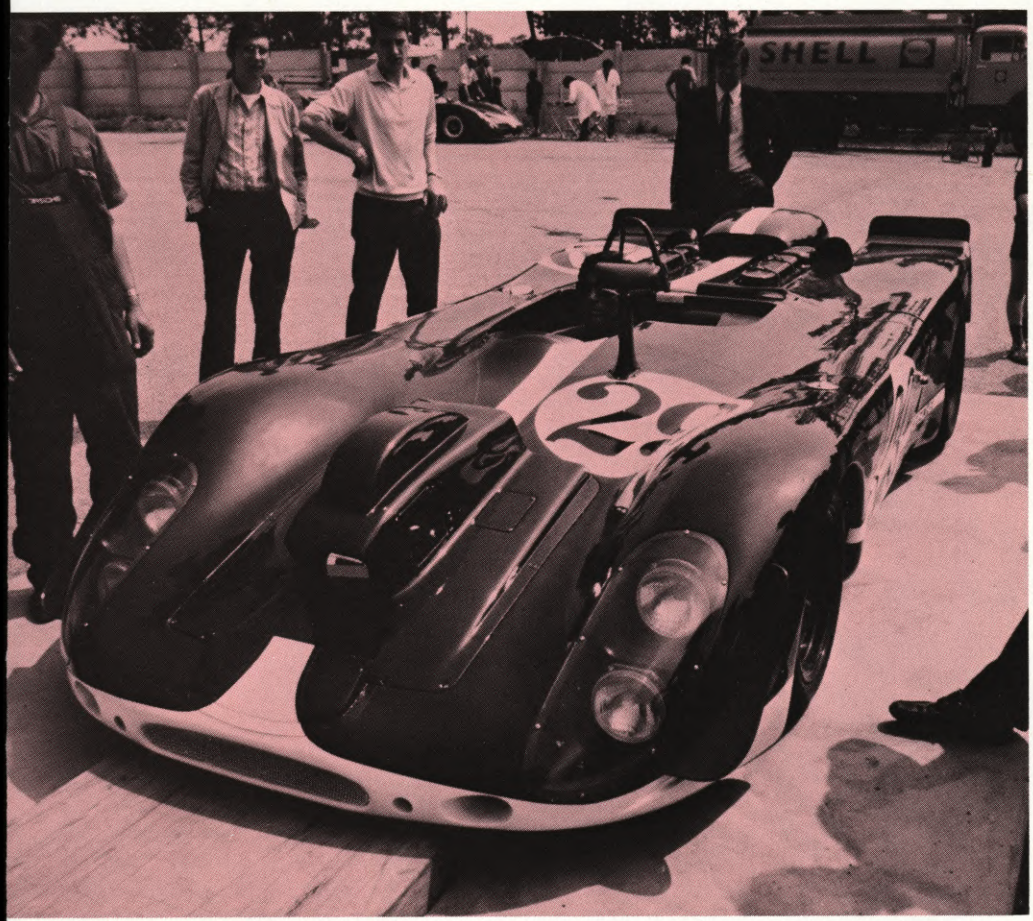
Bedig determinedly armed himself with a $25,000 replacement, made the necessary corrections in radio-controlled cars, and promises movie fans speed and excitement superior even to the historic "BULLITT" scenes.

PRODUCTION CINEMATOGRAPHY

While Gaylin Schultz was busily mounting as many cameras as possible onto racing cars for the Second Unit photography of the racing sequences for "LE MANS", Robert B. Hauser, ASC,

was called to France rather suddenly to assume the function of Director of Photography on the First Unit—which involved filming of the dramatic or "story" sequences of the picture.

"I went out to the location the day after I arrived and everything was completely unfamiliar to me," he relates. "I didn't know what lenses I had to work with. The lighting equipment was all of French design and quite different from ours. I had a totally French crew, whose language I didn't speak and, on top of that, I discovered that the function of 'Lighting Cameraman' when you don't even know what type of lighting equipment you have to work with or what it will do. For example, we had only 600 amps of current available—total—and two arcs. With this, I was asked to light a shot showing the pits with all the racers in the foreground, and a grandstand full of people in the background. The only thing to be done was to throw one arc across the pits, the other across the grandstand, push the film two stops—and pray. Strangely enough, it came out looking fine. Even the closeup



GT-40 racer, purchased by the film production company for conversion as a camera car to actually participate in the race. Equipment specialist Gaylin Schultz drastically altered its configuration by cutting off top, removing passenger-side door and building in padded seat for camera operator alongside driver. Extra cowling on front was used to conceal camera equipped with air-controlled panning head, so that it would not be picked up by other cameras filming race.

what we call a 'Director of Photography' in Hollywood is quite different from his function in a European crew. There I was considered a 'Lighting Cameraman', a technician who doesn't even look through the camera viewfinder. Over there, the Operator places the camera and then argues it out with the Director. Frankly, I anticipated problems, but none developed. Everyone on the French crew was very nice to me and extremely cooperative."

What problems Hauser did encounter had to do with equipment, rather than personnel. "It's pretty hard to be a of Steve McQueen, shot with the second camera and no fill light, turned out great. There was detail in his eyes like I couldn't believe. It looked just the way it should have. Incredible!"

Hauser was in for a few other surprises, and no small degree of puzzlement, in relation to the lighting equipment. "One day they gave me a light with nine quartz lamps in it that looked like a French version of a FAY light," he recalls. "It looked like it was going to be a great light to use, but perhaps a bit bright, so I put silks over it. I heated up the light and, one by one, turned on all the lamps, but I couldn't get enough light for an exposure. I took the silks off and found that I was then getting just barely enough light to get it onto the film. This I couldn't understand. I thought that I must be going out of my mind. I went back the next day and asked my interpreter, 'Jacques, will you please tell me why I can't get any light out of these lamps?' He explained that, because bulbs were so expensive, they had rewired the lights so that they would draw only half of the rated current and, thus, last twice as long. I told him that the company was paying for the bulbs and to please wire the lamps back the way they were. After that, there was no problem."

Even so, there simply wasn't enough light to expose the night-for-night long shots called for in the script. "All I could do was illuminate the subject as far as the lights would stretch, quit right there and frame accordingly," he says.

One of the really stimulating challenges was having to light inside close quarters where there was hardly room enough to hide even small quartz units—actual location interiors, like a trailer and an American field hospital that travels the circuit with the racers and is, in reality, also a trailer. "It was a flat interior and there was no way to light it except to bounce light off the walls, hoping you could frame the hot wall areas out of the picture. To make things more difficult, we were shooting from the inside toward an open doorway, with daylight showing in the background. I had the inside lighted for F/4, with an exposure of about F/6.3 outside—a passable balance. Right about then, the director and Steve McQueen got into a long discussion about something and, by the time they were ready to shoot, the outside light had fallen to F/2, which would have made it look like a night shot and would not have matched the scenes previously photographed. There was nothing to do but wrap it up for the day."

The moment of truth came when Hauser, as Lighting Cameraman, was called upon to rig all the lights for a sequence to be shot inside a large rotary club.

"It was the first time I'd ever rigged such a set in my life," he observes. "It was a hell of a challenge, but when I got all through, it looked good. I liked it."

This sort of thing went on for eight weeks, during which challenge was heaped upon challenge.

"It was a great experience, though," says Robert Hauser, ASC, the eternal optimist, "and everyone was very nice to me." ■

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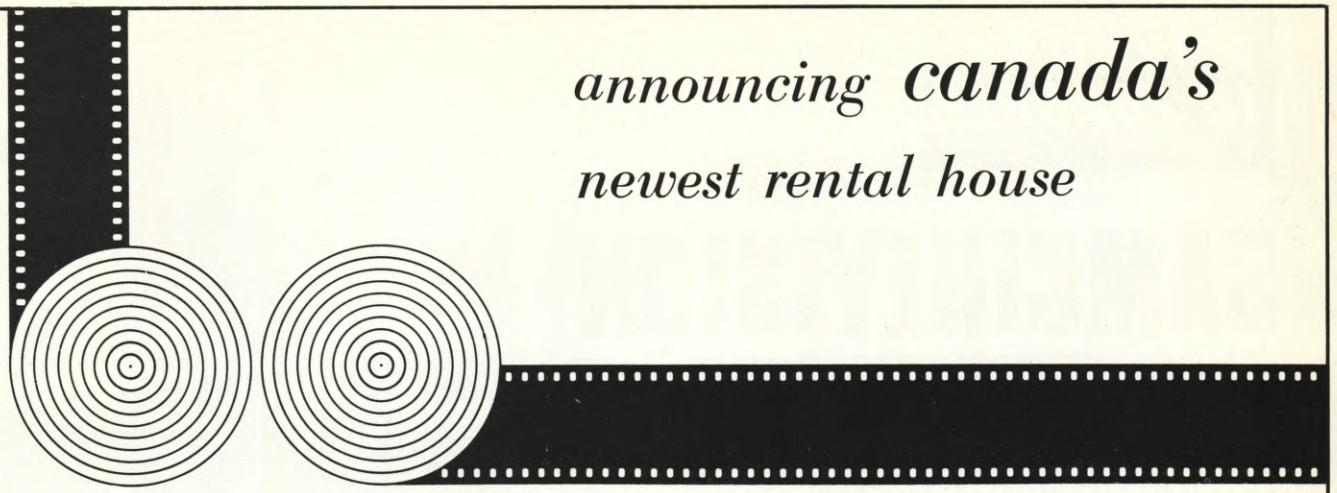

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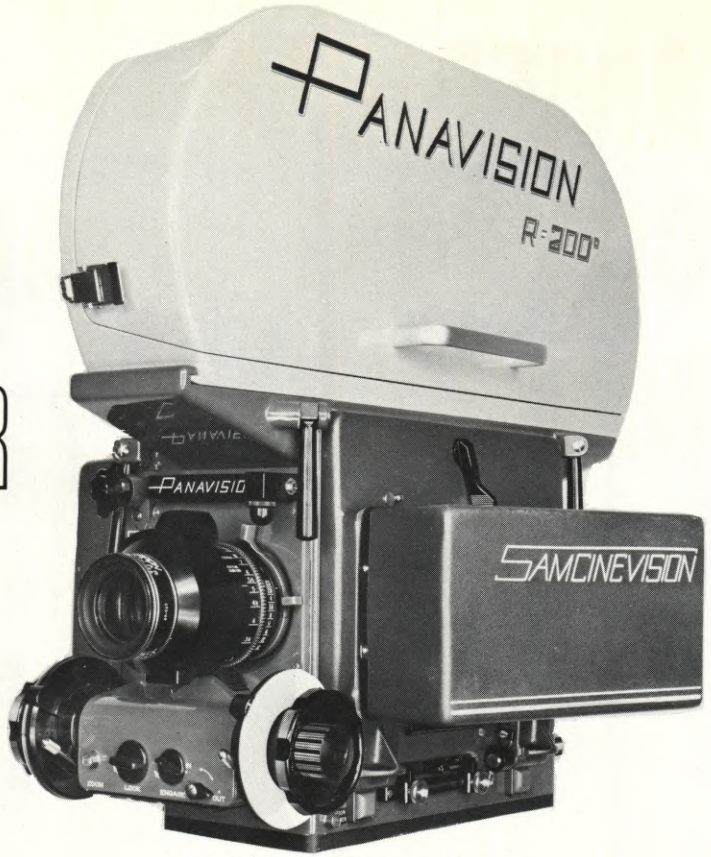

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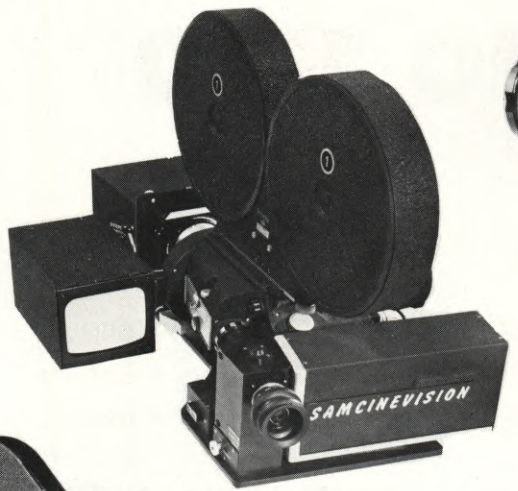

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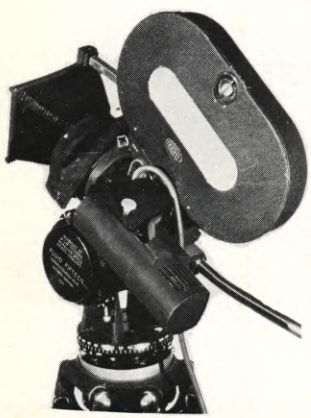

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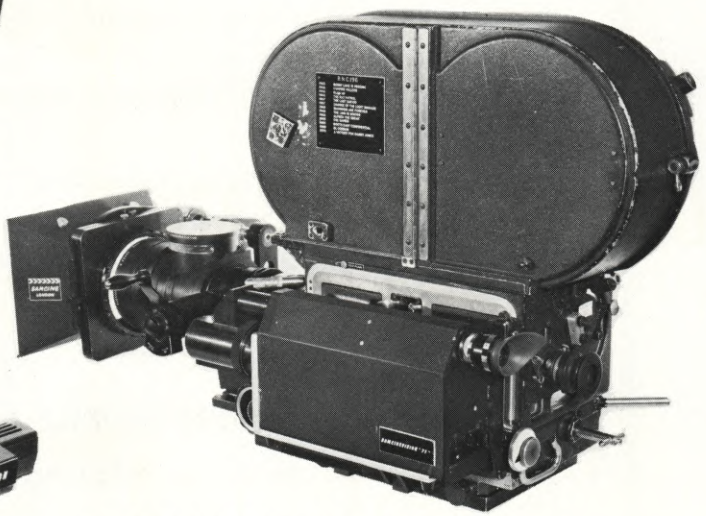

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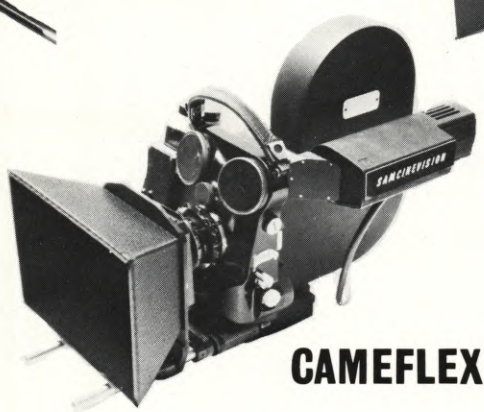

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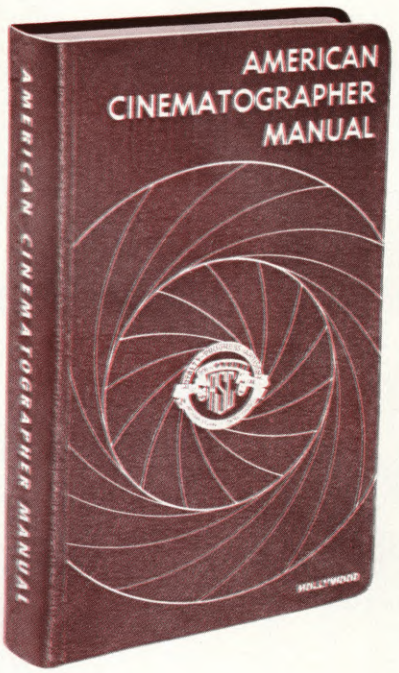

COMPILED AND
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Two Veteran Cinematographers
ARTHUR C. MILLER, A.S.C.
AND
WALTER STRENGE, A.S.C.

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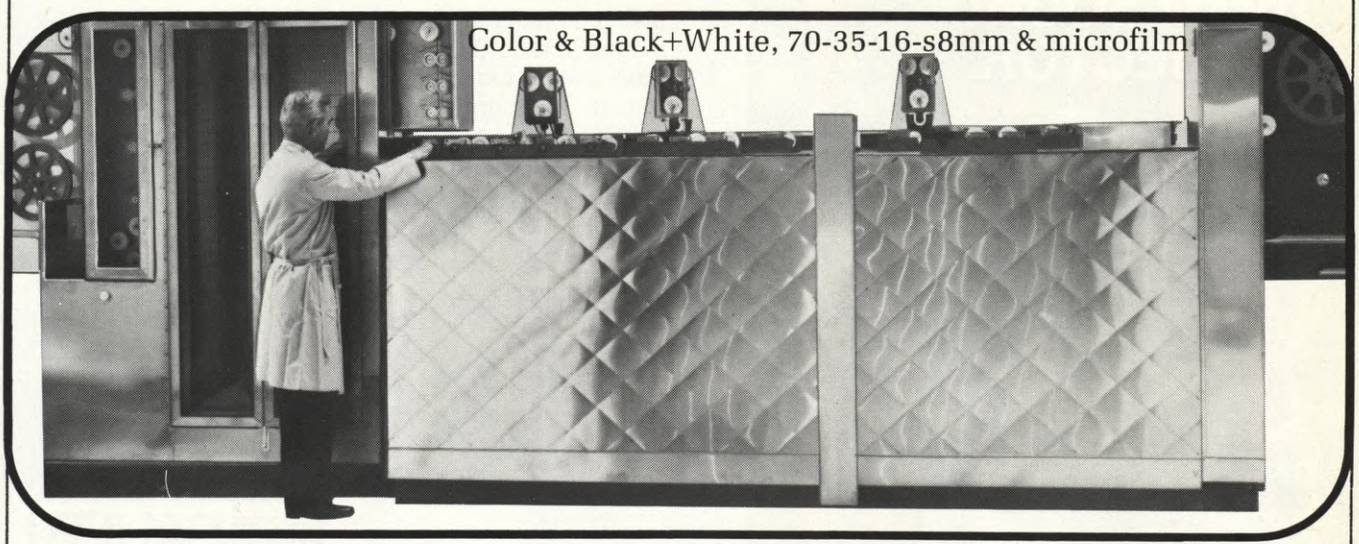

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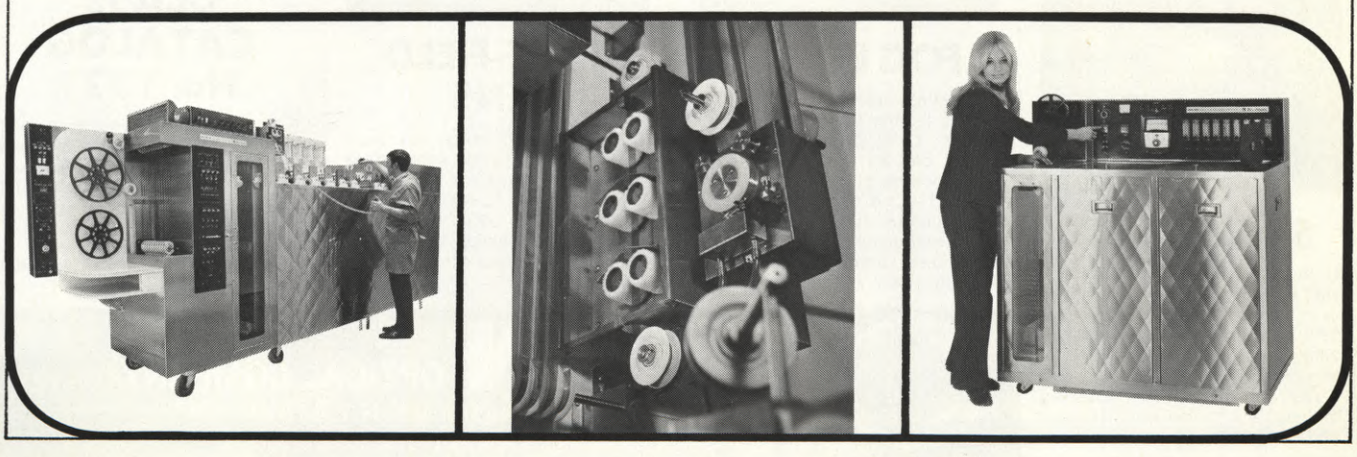

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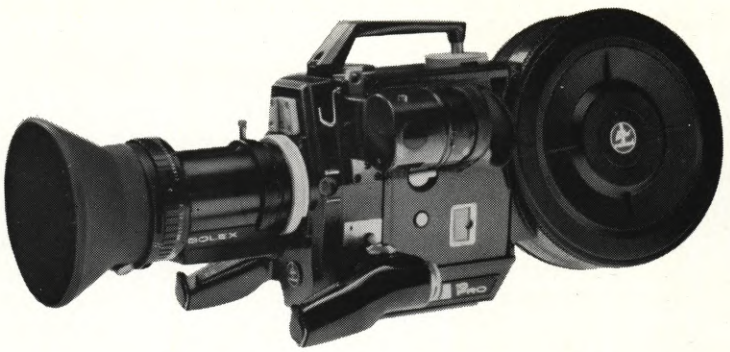

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QUESTIONS & ANSWERS

Conducted by CHARLES G. CLARKE, ASC.
and WALTER STRENGE, ASC.

(Inquiries are invited relating to cinematographic problems. Address: Q. & A., AMERICAN CINEMATOGRAPHER, P.O. Box 2230, Hollywood, Calif. 90028.)

Q Can I make a 16mm film in Cinemascope? Also explain what macro lenses are.

A The larger photo supply houses sell an anamorphic lens attachment, which placed before your regular lens, produces the squeezed, wide-angle effect such as in Cinemascope and Panavision.

Macro lenses are those special lenses which can be focused at extreme close distances, yet retain the normal f-stop. Regular lenses when focused extremely close, alter the distance between nodal point of the lens and the plane of focus, thus reducing the effective lens aperture.

Q I wish to hand-paint designs on clear 35mm films. How do I obtain clear film with only the black frame lines showing?

A Use positive film, of the type used for making black and white prints, as your "negative" and photograph a clear white card or sky. Have a B&W print made from this high-contrast negative on a *continuous* printer. The result will be clear film with black frame lines.

Q To complete a film on a major construction project, I plan to utilize some color slides for scenes where no motion picture footage is available. I plan to photograph the slides by means of back-projection, using a fine-grain translucent screen about two feet by three feet in size. (1) Is this size screen large enough? And may I pan or Zoom? (2) The slides are Kodachrome. I will rephotograph them with Ektachrome Commercial. How do I figure exposure? (3) What about color temperature?

A (1) Any size screen may be photographed, depending on the amount of light put out by your background projector. It is best not to pan on this screen, but you may zoom in directly on your center line. (2) Again, the exposure will depend on the amount of light put out by your projector. A yellow-flame carbon is recommended. Your exposure will also be governed by the screen size. The larger the screen the greater amount of light will be required by the background projector to balance with the amount of light on the foreground object. (3) The color temperature of your projector lamp should be 3200K.

Q I shoot single-system optical sound newsreels for television. The original negative, both picture and sound track, is reversed in transmission so that it is changed to a positive on the television receiver. Shooting under available light requires the use of fast emulsions. What effect does the grain pattern of these fast films have on sound reproduction? And what would happen to the sound track if it became necessary to overdevelop the negative to get a suitably dense picture negative?

A Since the sound track must be considered a "direct positive" under the transmitting conditions you describe, it should be exposed very low with a resulting unbiased density of approximately 0.4, to avoid serious sound distortion. The noise reduction operation must be reversed, that is, greatest exposure while there is low sound level. The grain pattern from negative-type stock is very detrimental to sound, resulting in a pronounced hiss during low-level sound passages. Overdeveloping the single-system negative raises the gamma (contrast) on both picture and sound track. However, in the case of direct-positive recording, the higher gamma is beneficial rather than detrimental. This is true for both variable-area and variable-density types of recordings.

Q I have a Bolex H-16 cine camera. What is the angle of the shutter opening and what exposure does it give?

A This information is probably available in your camera instruction manual. The Bolex camera shutter opening is 190 degrees. The exposure rate, of course, depends upon the camera speed at which you shoot. At 16 frames per second the exposure per frame is 1/30 second; at 24 fps it is 1/46 second. ■

Continued from Page 980

almost 20 seconds (at 3¾ ips). This reaction to humidity has other adverse effects. At high relative humidity the moisture absorbed by the acetate backing will tend to curl or cup the tape. In this condition the tape will not rest flat upon the head and, thus, the important tape-to-head contact is impaired. This stretching and shrinking with humidity changes will also cause an overly loose or too tightly wound condition on the spool. The polyester base, on the other hand, is relatively insensitive to moisture and exhibits the aforementioned problems to only a minimal degree.

Differences also exist in strength. FIGURE i gives a lucid picture of the relative strengths of the two materials. Both materials show a yield point of approximately 5% elongation. This means that both materials can be stretched to 5% without permanent deformation. (This is the so-called elastic region—once the stress is removed, the tape will return to its normal dimension.) If either tape is stretched beyond 5%, it will be permanently deformed. Note, though, that the polyester is 15% to 20% stronger; it will withstand a greater stress before permanently deforming. Also, the polyester can deform to twice its length before breaking, whereas the acetate will break at 25% elongation.

The ability of the acetate to absorb shock is greatly affected by humidity. At high humidity its impact strength is much greater than under dry conditions when it becomes brittle. The polyester, however, maintains a higher impact strength regardless of relative humidity. In addition acetate is greatly weakened by slight nicks or notches in the edge of the tape. The polyester tape, in contrast, can maintain its full yield strength inspite of minor nicks or edge imperfections. Lastly, acetate has a tendency to "age" or become brittle with time due to loss of moisture content, while polyester exhibits no such phenomena.

It should be clear that the polyester backing exhibits superior performance in almost all respects. Some recordists still prefer acetate for editing reasons. However, where ultimate strength, stability and quality are vital, especially under rough or adverse conditions, the polyester backing will provide the greatest reliability and consistency. (It is interesting to note that polyester backings are used almost exclusively in video, instrumentation and computer applications.) ■

SAN FRANCISCO'S OWN AMERICAN ZOETROPE

Continued from Page 1005

taken *Zoetrope* into the production of TV commercials, as well. I feel that if you have all that equipment, it's essential that you use it. Right now *Zoetrope* is doing a great deal of TV commercial work. We seem to be shooting some project of that sort every day.

Such activity has helped us to keep things going during the lean times that have plagued the film industry of late. Francis moved north just as things began to go bad in Hollywood, but the resultant slump has been much worse in San Francisco. We've had to struggle with the general downturn (in addition to the growing pains that any new business encounters) and it has been a rough fight to keep the place alive. However, things are going much better now—as I believe they are for the film industry in general—and we have quite a few films coming up in the future.

The main premise of *American Zoetrope* is based upon the principle of the *personal* film-maker, working with a small crew and very mobile equipment. On that basis, and with the very complete facilities we have available, we could, theoretically, make features for $60,000 or $70,000. We haven't actually made any yet with that kind of budget, but I'm sure we will. So far we have used our 16mm equipment only for filming documentaries and certain types of television material. However, we have been looking into the possibilities of shooting features in 16mm—especially in the Super-16 format. I've seen a lot of footage shot in Super-16 and I'm very impressed with it. I'd really like to see us do a feature in that format.

We have 8mm cameras and 8mm interlock equipment which we use for screen tests, location hunting and things like that. We also have two ½-inch videotape units which we are using more and more in our TV commercial department.

When *Zoetrope* first started, there were a lot of people who thought of it as a kind of Ivory Tower, and perhaps it was at that time—but its scope has now broadened out considerably.

For example, we have recently formed another company called Tri-Media Educational Systems, which is basically a think-tank functioning in the field of educational films. Its main purpose is the researching and putting together of proposals for such films. But it extends, also, into other areas of communication. In fact, we have an

exhibit that recently opened at the San Francisco Exploratorium devoted exclusively to touch media. We had a large dome built on the interior of which are thousands of different "touch-feels"—materials like rocks and stones with varying textures. People enter this dome in total darkness and find their way through the building strictly by touch. What is really fascinating is the fact that you can go through it 30 times and never know you are in the same place, because everything is different, depending upon the textures you touch each time.

The educational branch of *Zoetrope* is into some other interesting things. For example, we have put together a kind of comic book called the *Zoetrope Film Book,* which will be a monthly paperback on film-making for high school students. It is a very innovative type of project and was initiated by Francis' brother, Dr. August Coppola, who is a professor at Long Beach State University.

There will be some unique features in this book—such as, "CROSS-FLICKS", which aims to teach school children the language of film. Not how to use the camera as you would use a pen, but how to use the language of putting ideas across on film. You start with something like a crossword puzzle, but instead of blank spots, you use pictures. The child fills in the other pictures. There are editing tests, with pieces of film that the child can cut together in various ways. There will be interviews with cinematographers and little tricks of the trade—how to make an inexpensive animation stand, for example. The Film Book project is also part of *Zoetrope.*

We're trying to incorporate projects which are worthy in their own right, but which also have commercial viability. Art for Art's sake is a beautiful ideal, but it's not realistic. You have to get down to some solid methods of bringing in money so that you will have the means and freedom to create. It's sad, but true, that the film industry is based on the dollar, just like any other industry.

From that standpoint, I hope we can do more work for TV. We certainly don't look down on the medium. Francis is very much interested in it, though perhaps not in terms of "everyday TV" as it now exists. In fact, we're even looking into the possibility of buying a UHF television station in order to do experimental programs and things of that sort. In November we will start production on a picture for Metro-

Continued on Page 1063

FILMING IN SAN FRANCISCO

Continued from Page 999

for an artificial set on a studio stage when we could locate almost any background imaginable right here. There is one 17-mile stretch near Carmel where you can find almost any kind of period background that you want. And it is green virtually the year-around," he notes.

In 1968, Snazelle made important breakthroughs with East Coast ad agencies and began to put the stress on 35mm color negative film production. He earned a reputation for producing clean, fresh-looking color commercials that doubled his business in 1969, winning Gold and Bronze Lions at the Venice Film Festival, Gold and Silver awards at The New York Film Festival and 1st place at the IBA Festival, Hollywood.

Then, in the 1970 recession that closed many other film houses, Snazelle tripled his business, greatly expanded his pre- and post-production facilities, added two full-time film editors to his staff, and opened an excellent 35mm preview room that is now rented to many film-makers working in San Francisco.

Snazelle, who started out as a fashion photographer before turning to film-making, is now setting his sights on theatrical productions. Like Claude Jarman and some of the other producers who have made it as commercial film-makers in the area, he is currently looking for "the right" theatrical feature property.

One local producer who has already crossed the line from non-theatrical to entertainment films is Lee Mendelson. His Burlingame-headquartered firm is probably the best known of all local film houses. Included in the Lee Mendelson Film Productions repertoire is "A BOY NAMED CHARLIE BROWN", made in association with animator Bill Melendez for theatrical release, and a series of TV specials featuring the kids from Charles Schulz's popular comic strip, including the now almost classic "CHARLIE BROWN'S CHRISTMAS".

This producer has already received two Peabody and two Emmy awards for his creative efforts. However, it is indicative that the recognition that Mendelson values most is the Silver Reel Award he received at the San Francisco International Film Festival last October.

Mendelson's winning entry was for a television commentary film entitled, "I'M 17, I'M PREGNANT AND I DON'T KNOW WHAT TO DO".

It was the 14th international film

festival sponsored by the city—and one of the oldest such competitions in the world. Mayor Alioto is particularly proud of the fact that the festival, held at the Palace of Fine Arts, is self-sustaining, and that some 70 to 75 percent of the people who pay to attend its sessions are of college age.

No review of film-making and films in San Francisco would be complete without commenting upon the city's unique theater, "The San Francisco Experience." This multimedia showplace in tourist-saturated Ghirardelli Square might well be the advance guard for the movie of tomorrow.

Inside this 236-seat theater, 30 computerized Kodak Ektagraphic slide and 16mm Pageant movie projectors throw thousands of images onto a 70-foot screen that curves to nearly 180 degrees. The 35-minute program surrounds the audience in a whirlwind of sights and sounds that encompasses some 200 years of San Francisco history.

The visuals, which are changed as quickly as every two-tenths of a second, are complemented by flashing lights, four-track stereo, foghorns, bells and other sounds.

This unique theater, where the viewers sit on specially contoured, swivel chairs that allow them to turn toward the action that catches their fancy, operates seven days a week. Each new show is advertised on an electronic count-down clock outside the box office.

The audiovisual presentation technique is dubbed *Electrovision* after the parent company, whose management includes Bing Crosby and former NBC-TV executive David Sacks. The first Electrovision theater opened in June, 1970. It will play to some 100,000 persons during the first year, according to Sacks. The San Francisco-based company has opened a second Electrovision theater at the Waikiki Beachcomber Hotel. The newer theater is called "The Hawaiian Experience." Others are on the drawing board.

Sacks says that the idea for the mod-theater was based on a popular multimedia show that he saw at the World Exposition in Montreal in 1967.

"I saw in a flash what Marshall McLuhan has been writing and talking about," he says. "People are simply turned on to visuals as a means of absorbing information. The more visual, the better. There is little doubt in my mind that we are at the crossroads of introducing a new kind of theater.

"And when it reaches your community," concludes Sacks, "remember that it all started in San Francisco." ■

"THE S.F. EXPERIENCE"

Continued from Page 1013

monitoring carefully the reactions and opinions of audiences in San Francisco, and incorporating the small modifications that make the system most feasible.

THE SAN FRANCISCO EXPERIENCE

...AND HOW IT GREW

BY RUSTY RUSSELL
Writer/Designer/Director

I would imagine that everyone engaged in what is now known as the "multi-media" industry got into it by the back door. Certainly, six or seven years ago, you couldn't go to the New York School of Visual Arts and register in a course called "Multi-media 104". There were no such courses—and it may be that there still aren't any.

I got into mixed-media because I was a commercial photographer in New York—primarily a specialist in food photography—and I kept getting clients who wanted words to go with pictures. We turned such projects over to film writers who could create beautiful continuity, beautiful vignettes or beautiful documentaries, but who always came up with something terribly dull when they were called upon to combine words with a slide presentation.

The people I knew in New York who were vitally interested in mixed-media were all thinking in terms of a one-shot deal. You presented your budget—anywhere from nothing to several hundred thousand dollars—threw a lot of visuals and sounds together in a flashy presentation, and went on to more serious things.

When my former partner and I were contacted by David Sacks, who is President of Electrovision and whom we had done work for at ABC-TV, we had a hard time visualizing what he had in mind. He approached us about creating an in-depth sight and sound commentary on a particular area, to be installed for public showing in that area. Quite frankly, we couldn't imagine people of a certain locality flocking to see a glorified travelogue (which was what we envisioned it as being at that point)

about the place where they lived.

In any event, it seemed like an interesting challenge—especially since it would not be a one-shot deal. On the contrary, the presentation had to be designed for showing 12 to 17 times a day—day in and day out. There were no precedents or standards to follow. It was just like the early days of the movies. You developed your bag of tricks and hoped that the audience would like it.

In the technical sense, there were basically only two ways in which to approach such a project: You could go off into the garage with your best buddy, who's been reading *Popular Electronics,* and devise your own way-out system (which sometimes works and sometimes doesn't)—or you could opt for a modular approach, where you use off-the-shelf items and try to avoid modifications, if you can. My preference is to let the big companies spend the R & D dollars for creating instruments, instead of going off in the basement and building them myself.

Unfortunately, if you're going to remain in the *avant garde* of whatever you're doing, you *have* to do a certain amount of design work yourself. You *have* to make certain modifications and, above all, you have to develop an in-depth relationship with your suppliers. If you can't rely on your suppliers, in terms of both hardware and software, you're done for.

At the inception of our work on "The San Francisco Experience", I had arrived at the conclusion that the major failing of most multi-media presentations is that they use visuals, sound and words redundantly. They put a red schoolhouse on the screen and someone says: "This is a red schoolhouse." Then you hear a school bell ding-donging in the distance. It all seems sort of superfluous.

To me the thing that is most intriguing about mixed-media is that you can present an audience with a number of different stimuli which are sort of tangential—or at least in interlocking spheres—and, hopefully, they will draw a conclusion from the combination of elements, although it may not necessarily be the unified message the writer-designer had in mind when he put it together.

One of the nice things about multi-media is that there aren't any rules; there is no standard studio procedure. You don't have the incredible subdivision of labor that you have in the motion picture industry. For example, my own area of participation in the creation of "The San Francisco Experience" was very broad. I wrote it, designed it and directed it—which is very gratifying but, obviously, can't always be done.

One of my biggest kicks now is trying constantly to find people who are better than I am in each of these areas. When you are writing, designing and directing such a presentation, you are too close to it. You lose your critical faculty. You let this big area develop, when what you really need is for someone to come in with a machete and just chop, chop, chop.

One of the problems of multi-media lies in the editing, because you are dealing in environmental theatre and unless you are terribly well financed, there is no way that you can see the show until you view it in the theatre for which it was designed. You see the slides up on the light box and, if you are really flush, you see the programing stage. You see your multitude of film work-prints, but you rarely see them all interlocked and projected together. You certainly don't hear what the sound is going to be like in four-track or eight-track. So, at every stage it's an approximation until you install the completed show in its designated theatre. It requires a lot of guesswork and a lot of gambling to get everything right—which is exciting, but this renders it an inexact science when you are trying to decide what will play and what won't.

Our technical complement for the Hawaii show includes 28 slide projectors, three 16mm film projectors and about 56 special effects, and they're all separately programed. Our programing is done by the Arion Corporation of Minneapolis, which I consider to be years ahead of anybody else.

There are two basic approaches to programing which are commercially viable right now. One involves punch-tape and the other, magnetic tape. You get more flexibility with the magnetic tape, in terms of transporting the tape. If I recall correctly, the Czechs, in their pavilion at EXPO 67, used a filmstrip projector to project the automated code for one of their presentations onto a battery of photoelectric cells, and they needed 26 technicians—or some incredible number like that—to over-ride it. We use one union projectionist in the booth, whose job it is to replace bulbs and monitor the show.

If you have an electrical disturbance generated somewhere in your system, you may get a slide out of sync, but that has become increasingly rare for us and I think we owe most of the credit to our programing people. Our relation-

ship with Arion during the past few years has been such that whenever a certain concept of mine required a special piece of equipment, they have created it. Also, they will often come to me with an idea which I never thought was possible, but which adds greatly to the effectiveness of the show. It's a nice relationship.

I'm often asked how I write one of these multi-media presentations and I can only say that the scripting is not done in any conventional way. Theoretically an outline comes first, then words, then visuals—but in actual practice, it never quite works out that way. I usually go through a period of research and gestation which involves a certain amount of random shooting, a certain amount of looking at what everybody else has done. I don't believe the old adage that there's nothing new under the sun—because there's always a new way of reassembling familiar elements in order to get a different point of view.

In the early stages of conception, literary ideas become little vignettes which I jot down on 3 x 5 index cards, but getting these into an actual script format is something else again. What I'm after, generally, is a series of visual and audio playoffs which serve as segues, and you can't use the same language that you would use in a film script. You are actually working with a totally different vocabulary. You don't have the cut, the fade, the dissolve. You don't have the montage in the same sense that you do in movies.

Creating a new visual language is a lot of the fun. It's also where you make your most drastic mistakes. On "Hawaii", I guess it took about six weeks to create the script. Prior to that I had spent two weeks in Hawaii with camera and recorder doing research, and prior to that I spent about four weeks in really intensive homework, reading and studying.

The distillation of all this data serves as the basis for the script and the next thing that is developed is a detailed storyboard, which is kind of like cost accounting. What you are actually doing is accounting for every 2/10ths of a second interval in a show which will run about 45 minutes. Our current "Hawaii" storyboard is, I guess, 1300 pages long and it has something like 8000 cues and weighs 25 lbs. It's in four volumes. This becomes the bible for the art director, for the sound engineer, for the programing people. It literally creates a new technical jargon which everybody can relate to, because there aren't any words established. You can't look up these terms in the dictionary and it sort

of creates a reference book that everybody can use as a guide.

After you have your storyboard, the ideal procedure is to assign an art director, your still photographer, your cinematographer, your illustrators and your sound director—all starting work simultaneously under the supervision of the director. As we progress in Electrovision, we will probably work more and more in this formalized way.

Currently, I enjoy very much having a strong hand in the creation of the sound track, which, I feel, accounts for easily half of the ultimate effectiveness of the show. We are presently working with 4-track sound, although we lay everything out originally on 16-track—all of the voices and the music and the effects. Once again, the building of the tracks is not like anything you'd do in a movie. You don't go to a composer and say, "Hey, I want a sound track."

That would be the worst thing in the world—a conventional motion picture sound track. What you really want is a sound *collage*—with an overlapping blend of music and many voices. A single voice droning on and on would make it just another documentary. In creating the sound track, I rely very heavily upon first-person quotations out of history. Many times you can then use a visual playoff against them which is contemporary. You can do this with multi-media without having it seem awkward. You can inter-relate present tense with past tense very, very easily.

In "Hawaii" we used lots and lots of original chants. We got the preeminent chanter in Hawaii to do our chants and they are electrifying. They just make chills run up and down your spine. I've been trying a new approach in recording quadriphonic sound on location. For instance, in our drum music we use a different instrument on each channel and then we chase the instruments around in a rotational dimension, so that the bass drum appears to be in a different position on each beat, which has a fascinating effect. And we do a thunderclap that originates in front of the theatre and then rolls back across the audience.

We believe that the sound equipment has to really be sensational. We use huge Altec-type *Voice-of-the-Theatre* speakers with JBL Super-Tweeters, and I guess we ended up by using 300-watt Crown amplifiers—all of this in an intimate theatre where you don't really need all that power. But it's the same old hi-fi buff's thing; you need it for the peaks.

In "Hawaii" we have a number of

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"THX 1138"

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was feasible in order to get the required effect. Often we'd go to a location and George would show us the action and the shot he wanted. I'd say to myself, "We're going to have to light this one." But then we'd get to figuring around and wind up using nothing but an edge light from behind a door or a small quartz light to pick up faces as the actors came through.

We did have the advantage of scouting most of the locations beforehand and making some tests. We knew we were going to be working on the ragged edge of the available light and it was mainly just a matter of getting *used* to working on the ragged edge. Like the sequences shot in the BART tunnels, for example—you'd swear you couldn't get an exposure, shooting it the way it was lighted, but by the time we got around to filming it we knew we could. They use something like mercury arc lights spaced about 50 yards apart along the sides of the tunnel, and we were able to set up a couple of 2000-watt quartz lamps to get a rim light and a bit of definition where it went completely black—but we shot sequences under conditions where you couldn't have gotten an exposure with a Leica at 1/10th of a second, using ASA 500 film. It was unbelievable.

That we were able to get it at all was mainly due to the fact that the effects George wanted, graphically, were the effects you normally get when shooting at an extremely low light level, with very little modification. In other words, he wasn't asking the impossible; he was simply exploiting aesthetically the low light level that existed. The same conditions could be exploited by other people, too—except that they don't have the aesthetic sensibility to visualize the effect—or they don't believe it can be done, especially if they come from a studio background. I do documentary filming most of the time and I'm used to shooting in places like the subway, so I knew what we could do. Plus the fact that we had 5254 negative to work with and the Technicolor lab processing it.

I don't think you can beat the Technicolor lab when it comes to consistent quality. I don't remember any dailies that were off. There was always that consistency of quality in the dailies.

In the prison sequence, George wanted to have the faces, and practically nothing else, show up against a stark white void—an extreme limbo effect. We

shot this in the studio against a huge white cyclorama, with every sky-pan we could get mounted overhead. Even though the corners of the cyc were rounded, there was still slight definition in the background, so we poured more light into the corners.

It was my educated guess that, in order to get the flat white void George wanted, we would have to overexpose the sequence by about two and a half stops. We made some tests, bracketing with various exposures, and it turned out just that way. In the actual filming, the set was lighted for F/11, and we shot it just cracked open from F/5.6. The natural reflective quality of the white cyc added amost ½-stop more of exposure. I believe we pushed it a bit, too, in the processing, just to add to the unreal effect.

Shooting that sequence was a real challenge—trying to follow-focus with a 200mm lens on actors coming from deep background up into closeup, with nothing but the face floating against that limbo white. It's a sort of freak-out. You feel as though you're going blind. A couple of times I stopped shooting because I thought I'd lost the focus completely, even though I still had it—everything had simply turned into a blur.

We shot a sequence in the BART headquarters control room, before it went into operation. We hit them just at the right time, because we could never get in there again. It had this fantastic control panel and looked like a million-dollar set. There was fluorescent overhead lighting. We made some pretty careful tests in there—lighting it completely, augmenting it with both tungsten and daylight-compensated light, then shooting it with the existing light plus some gel corrections. The absolute optimum combination for the effect we wanted would have been—as it turned out—the existing light plus something like an 85A filter, but it was so slight a correction that it wasn't worth the trouble, and we just shot it straight.

We had some interesting experiences shooting the sequences where the robot police, on motorcycles, chase Duvall's car through the tunnels at high speed. I guess some people might think this was done by means of trick photography or special effects, but the car chase was actually very straightforward. The only gimmick was that we did some of the closeups with both the camera and the car mounted on a trailer.

However, the rest of it was for real—as I found out when photographing it. I started out by shooting from

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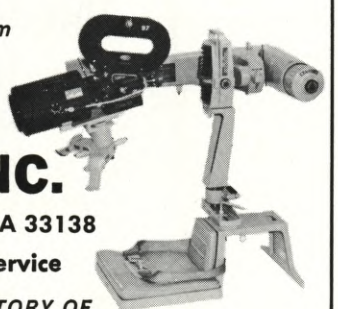

THE BOOKSHELF

By GEORGE L. GEORGE

Comedian Jerry Lewis, who is also a seasoned producer, writer and director, has condensed in THE TOTAL FILM-MAKER (Random House) his lectures to USC graduate film students. His advice is always practical, based on personal experience or close observation. Mixing expertly psychology and technical know-how in his handling of cast and crew, he covers all aspects of film-making with disarming candor and an abundance of professionalism.

As far as the cinematographer is concerned, Jerry Lewis states that next to the screenwriter and the lead actors, "the most important assignment is the choice of the cameraman." However, he adds, "in pictures I direct, I do not allow any cinematographer to get behind the camera until after I position it, select the lens, set it for marks; frame high, low, left or right, and then lock it." Verbatim.

* * *

The first casebook to deal with non-fiction film production, Alan Rosenthal's THE NEW DOCUMENTARY IN ACTION (U. of California Press), is a probing series of interviews with some 20 directors, writers, editors and producers in the various areas of that *genre*. Their extended and detailed comments on styles, approaches and techniques constitute a valuable compendium of source material encompassing every aspect of their work.

Several "hyphenated" cameramen (directors Albert Maysles and Don Alan Pennebaker, associate producer Richard Leiterman) contribute original and insightful reports. In connection with his film *Salesman,* Maysles discusses the problems of shooting in *cinema verité* style, where, as a two-man crew, he handled the camera and his brother David the tape recorder. On the other hand, Pennebaker's *Monterey Pop* used six cameras, each with a recorder for cue tracks, plus a big 8-track Ampex recorder hooked to stage mikes.

* * *

Volume One of a projected 19-tome series covering all U.S. film production from 1893 to 1970 has been published. THE AMERICAN FILM INSTITUTE CATALOG—FEATURE FILMS 1921-1930 (Bowker), in its 1st section, lists and describes all features released during that decade by title, cast-&-credits, literary source and plot summary. The 2nd section lists all individuals and firms mentioned in the 1st part with specific

cross-references, plus a remarkably detailed and cross-indexed list of subjects.

The first to offer a full listing of cinematographers along with other craftsmen, this monumental reference work, expertly brought off by executive editor Kenneth W. Munden, is a unique achievement and will be a boon to general researchers and those seeking specific information alike.

* * *

Ivan Butler's succinct, yet detailed, guide to current film production practices, THE MAKING OF FEATURE FILMS (Penguin), is based on extensive interviews with leading craftsmen in each area. Its main value is in the up-to-date assessments and expertise of the respondents. Four cinematographers discuss aspect ratios, location shooting, special effects, psychological approach and film speeds: Jack Cardiff (GIRL ON A MOTORCYCLE,) Oswald Morris (OLIVER!), Walter Lassally (THE ADDING MACHINE) and Douglas Slocombe (THE LION IN WINTER.) Among 16 directors interviewed are John Huston, Fred Zinnemann, John Schlesinger and Roman Polanski. Other crafts are represented by equally qualified spokesmen.

* * *

The first book on the subject, M. Ali Issari's CINEMA VERITÉ (Michigan State U. Press) tackles the historic, theoretical, stylistic and technological aspects of that much-misunderstood term. Questioning Charles Groesbeek's view *(American Cinematographer* Oct. 1970) that "the validity of *cinema verité* is in its being a statement about reality," Issari holds that reality is too elusive an element, and settles for CV as just another "method of expression . . . presenting the conflict of man in his society."

Issari is knowledgeable when discussing such past and current CV practitioners as Dziga Vertov, Robert Flaherty, Jean Rouch and Richard Leacock. The technology section is particularly interesting, since he sees the camera as the main CV tool and describes with competence the various types of equipment available.

* * *

Gregg Toland contributes to FOCUS ON CITIZEN KANE (Prentice-Hall) an enlightening article first published 30 years ago and well worth re-reading. In addition, the book includes many press reviews, essays and commentaries (one by Welles himself), a significant excerpt from the screenplay and other valuable data that make for a stimulating and informative volume, ably edited by Ronald Gottesman. ■

"THX 1138"

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the camera car. Then I made it into the racing car and got some shots while roaring through the tunnel at 140 miles per hour. Feeling kind of brave by then, I said to myself: "I'm really getting in there now—so I'll just try that motorcycle."

They had a low-bed racing side-car on one of the motorcyles—which was the loudest, meanest-sounding machine I'd ever heard. They sat me on the side-car with the camera tied down on a high-hat about two-inches off the ground. That tunnel was two or three miles long, and the guy driving the motorcycle took off down it, accelerating all the way up the range. Every time he shifted gears, I thought he couldn't possibly accelerate any more or go any faster, but he kept going right on up from gear to gear, faster and faster. When he reached top speed (130 miles an hour, he told me later), the damned high-hat came loose and I started to slide off the back end. The noise was so deafening that I was actually in pain from it.

I was shooting sort of through the front wheel and for me it was like being projected into orbit. I just barely managed to hang on until we made it out the other end of the tunnel. Later, when I saw the scene on the screen, it all went by so fast and the walls were so uniform that it looked like some kind of process shot made in the studio. It didn't look like anything—but, man, what a trip! ■

PHOTOGRAPHING A FIRST FEATURE: "THX 1138"

By Albert Kihn

Co-Director of Photography

"THX 1138" was not only the first feature I'd ever photographed (as it was, also, for Dave Meyers), but I'd only been free-lancing for less than two years. Before that, I'd been doing news and documentary work exclusively, at a TV station in San Francisco—and their requirements were not awfully sophisticated, to say the least. I had also made some documentary and industrial films but they weren't too demanding either.

The major difficulty in switching from documentary to feature filming was getting used to the new experience of working with a sizable crew. It's a totally different world that you find yourself in. When you're doing a documentary, you work with a four-man crew—which is still rather large for that kind of operation. On "THX" we had fifteen people, more or less, around all the time—a very small crew by Hollywood standards, but a lot more people than work on a documentary.

The size of the crew very definitely affects your working style. When you have a lot of technicians who have to be geared and synchronized to work together smoothly and comfortably on a project, it becomes a huge machine. So, to me, the crew size was the biggest change and, in a way, it was the biggest problem, too—trying to fit myself into it and see where it was going. Also, your human relationships are totally different from those of a documentary situation where you talk every day with a small group of people. George Lucas is, himself, a very talented photographer. This tended to take away some of my initiative, because George knew exactly what he wanted as a cameraman, as well as a director, and he was fully responsible for the photographic style of the film.

Before we started shooting, George had a wall full of stills, some of which he had taken, some of which Walter Murch had taken, and others simply clipped out of magazines, that represented pretty much the style of the film. For instance, George decided that, whenever possible, we would shoot the film with available light, capitalizing on the ugliness of blue and white and green fluorescence that just destroys the features of people and their humanity. This was exactly what George wanted and he let us know that was what he wanted.

Many people consider "THX" to be a work of graphic art. I'd say that a good part of that was George's doing. He felt that Dave's eye and mine saw somewhat like his, or as close as he would find in San Francisco. He was very specific in what he wanted in the way of framing.

One thing that applies to the whole film is that what gives it a lot of its quality are the rules that were broken. It was not the things that were taken advantage of, but the things that were not done that made the film. The people at Technicolor must have been tearing their hair out because this film with this strange light quality would be coming in to them. Whenever you read photographic magazines or Eastman's pamphlets on how to get good color, they tell you how to get this precise control of color quality. We did everything that would "uglify" the color. Instead of just putting on filters and searching desperately to find some way to counteract the available fluorescent lighting, we'd shoot it. If there were some sunlight spilling into it, we wouldn't correct it. We'd let it go blue.

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SAN FRANCISCO'S OWN AMERICAN ZOETROPE

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media—a Movie of the Week, which may spin off into a TV series.

The initial reason for setting up *Zoetrope* in San Francisco had nothing to do with the motion picture industry *per se.* It was mainly that it's such a beautiful city in which to live. However, I feel that it's also a beautiful place in which to shoot film. Within 50 miles of *Zoetrope* you can find any kind of scenery you want—from absolute desert to beautiful mountains. There are also many different types of ethnic communities, ranging from Chinatown to Spanish settlements. It's all there.

Of course, *Zoetrope* didn't discover San Francisco. People have been shooting films there for quite a few years. There are some excellent film crews available locally. Not as many as in Hollywood, of course, but I would say that you could get together enough excellent local technicians to shoot two large features simultaneously.

I should like to say that *American Zoetrope* is set up to attract and use new talent. Francis was one of the first to take the risk of using new talent on a major project. George Lucas, for example, is now regarded as being unquestionably a very fine director, but there was a certain risk involved in having him direct "THX 1138" as his first feature film for major studio release. I'd like to feel that the fact *Zoetrope* was behind him helped influence certain people to allow him to make the picture.

I hope that in the future, *Zoetrope* will be able to do more of that to help the young film-maker, to be on his side in terms of influencing people and getting financing for production. We like the idea of using *Zoetrope* as a way and means of giving the young film-maker that extra push that may help him break into the film industry. ■

■

3 DAYS TO 3 MINUTES

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require endless hours, but it could only be applied to color reversal film, which shows an image comparable to a print. There was no way a color negative could be corrected visually.

To color balance a 35mm color negative, an interpositive first had to be made from the negative, and then put onto an optical printer for a "wedge test." The printer operator took a clip from a scene, and by varying exposures and trying combinations of cyan, yellow, and magenta filters, he would arrive at an acceptable color balance—he hoped. He wouldn't actually know until the second day, when the color print was returned from the lab. From the wedge test, the color-timer would select the proper balance and exposure to add to the time sheet.

On occasion, wedge tests had to be repeated several times before the color-timer, or his customer, was satisfied. On the average, because the film had to be on the optical printer the first day, delivered to the laboratory and processed the second day, and then returned and inspected, it took up to three days to complete each wedge test. It was hardly economical, either. An optical printer was tied up full time in making the tests, and the wages of the printer operator and the color timer had to be added to the cost of raw stock, plus developing and printing charges.

Another problem with wedge tests stemmed from the fact that they were subject to laboratory variations. The daily control on wedge tests is not very tight because the test is usually just a short length of film spliced onto a large roll in the lab. Suppose the timer, in inspecting a wedge test, decided it was too red. He would adjust the timing to a minus-red, and the dupe negative would be shot minus-red on the optical printer. The print from the negative would also be minus-red, but then it might be discovered that the original plus-red of the wedge test was just a vagary of that particular day's lab work. The result: start over, with more precious time and money down the drain.

Then, too, there is a variation in labs to complicate the timer's work. Differences in the contact printers used from lab to lab make it necessary for our timer to adjust his color corrections specifically for the lab where the release printing is to be done. This lack of tight control added both to the confusion and the expense.

However, with the Eastman video

color analyzer, these adjustments for the particular lab can be made instantly with the analyzer's trim tabs. When the timer's work is complete, the film can be cleaned and ready for the optical printer the same day.

Instead of wedge tests that took up to *three days,* we can time color scenes in as little as *three minutes* with the analyzer. This advance is a great boon to the producer whose panic button is almost in the "on" position . . . or to the employee who wants to take his wife out to celebrate their wedding anniversary . . . or to the lab that doesn't have to "cover" our mistakes with its own adjustments, but can be reasonably certain we have furnished a dupe negative that can be printed on a one-light basis.

Considering the wide variety of assignments we receive, there is hardly a "typical" one we could describe. However, we've had numerous cases where the Eastman video color analyzer has helped us solve major problems.

For example, we received a contract from the Marine Corps to duplicate and restore 300,000 feet of historic World War II film. Naturally, this old footage had been ravaged by time, and was badly shrunken and faded. With the old slow method, we would have hesitated to accept this job, but with the analyzer, we can estimate a six-months timesaving.

In addition, the video color analyzer presents no threat to our very careful handling of this material; there are no sprocket drives on the machine. This means that the shrunken footage can be run through the analyzer almost as rapidly as new film. Although we must use special movements on the optical printer to accommodate shrunken film, the volume of a job like this makes it a "natural" for the additive head's high-speed operation.

With the additive head, a white light beam is split into red, green, and blue components by dichroic mirrors. Each color beam passes through a light valve, or "gate," before it is recombined to form the light that strikes and exposes the interpositive film. The punched tape dictates exactly how much each color gate is open during the exposure of every frame of interpositive film. This, of course, determines the amount of color that is added to each frame.

Another major job in our shop is the blowup of Bruce Brown's new motorcycle-racing film, "ON ANY SUNDAY". There are many variables to contend with here. The footage was shot over 2½ years, in differing climate conditions, at different times of day, with different

film emulsions, in different cameras. Sometimes the same action was photographed by three or four cameras, with the film's editors selecting the best scenes for the final version. Yet, our job is to balance the color so successfully that the viewer will be unaware of the existence of all these variations that can affect color.

With the Eastman video color analyzer, our timer can tell instantly what needs to be done. Another advantage is that the producer, if he desires, can also view his film before it goes to the optical printer, and can select the color that best fits the mood he wishes to convey. In subjective areas such as color and mood, what words does a producer use to describe the effect he wants? With the analyzer, there is no need to put feelings into words.

As more film is used for creative expression, our job becomes more challenging, as evidenced by the multiple-panel work we did on such blowups as "WOODSTOCK" and Joe Cocker's "MAD DOGS AND ENGLISHMEN". On both pictures, shooting conditions provided many exposure variations that alter color. For example, a scene filmed at night or in the rain might be orange-red, while one done at noon would be on the bluish side. Still, when they are combined on one frame in a multiple panel, the colors must be blended in such a way that the variations are not offensive. Again, the video color analyzer to the rescue.

Many of the color films we blow up from 16mm to 35mm are wildlife or hunting and fishing subjects that cannot be programmed into studio photography conditions. With the video color analyzer, however, we can correct color or density deficiencies to provide good quality for theatrical release.

In contrast, even some studio-shot productions give us other kinds of problems. On a show such as TV's "MANNIX", long-running success can actually be a source of trouble for us, and we can spend a full day on 100 feet of film.

We have been doing the multiple-panel main titles for "MANNIX" for years, yet these must be constantly updated for current shows. That means that we must match the color of recent film with title scenes shot years ago, probably on different emulsions. Also, a show like "MANNIX" might require blue-backing shots, where the color of the foreground live action must be painstakingly matched to that of the matte shot in the background.

And though we focus so much on color, the Eastman video color analyzer is also helpful on black-and-white film.

Suppose the characters in "MANNIX" are sitting in a room, all in color, watching a TV set with a black-and-white picture. Of course, the supposed TV action must be carefully matted in, but the producer may also have some thoughts on its brightness. With the color analyzer, we can even give this black-and-white image a bluish cast if the producer feels it would be more effective than a complete neutral.

With TV commercials, the color problem is much less subjective than with features. Here, the No. one color requirement centers on product identification. A John Deere tractor *must* be a John Deere green, not just a pleasing green; or the Shell Oil scallop must be the Shell yellow, not just an attractive shade. These colors must be maintained even if the product is zooming in or out, or combined in a super-imposure with other action.

A popular technique these days for commercials, features, and titles is solarization, in which the color is deliberately "way out." The color-timer can manipulate the analyzer's dials to provide whatever distortion is desired, and again, the producer can stand beside him until the scene is as psychedelic as he envisions it.

These are just a few of the ways in which our use of the Eastman video color analyzer has enabled us to give our customers better quality in far less time. We selected the 1635 because of its reliability and ease of operation. We have been able to train even our least experienced color-timers to use it very quickly. While we have not had any maintenance problems, we know that effective technical service is no more than a telephone call away.

But what about costs? Neither the Eastman video color analyzer nor the Bell & Howell additive head is an inexpensive tool, and constantly updating all of our equipment means a considerable capital outlay.

However, since the old adage that "Time is money" is truer today than ever, we find that equipment costs have largely been offset by the savings in decreased labor time. As a result, we can offer our clients the advantages of better control and vastly improved quality without increasing our charges. Even if this were not so, we would probably still go the better-equipment route. Unless we in the film industry strive constantly to keep up with ever-changing needs, we will fall far behind, to the detriment of us all.

Progress is essential. And when we can go from three days to three minutes, we *know* that's progress. ■

"THE S.F. EXPERIENCE"

Continued from Page 1057

special bass effects: a volcano, a minor earthquake and some other rather loud things that happen. We have a special bass-boost device through which we can increase the bass below 100 cycles by about 18 db on cue from the computer. This is something like the effect of eight 15-inch thunder-bass speakers, with a special baffle. You can blow out candles with this combination. The whole place shakes. We had to have a special sound wall built between the theatre and the hotel lobby where we are in Hawaii, the New Waikiki Beachcomber, a specially insulated wall to keep the sound from feeding back into the lobby.

We try to keep one or two artists who think alike involved in the artwork to develop a visual continuity in our original art. We rely very heavily upon historical sources, and upon taking a given place and trying to find the definitive photograph of the contemporary look. We take it back 15 years, 50 years, 100 years—so that you get a relationship of what is going on in the place. I think we hope to motivate people to get out and *see* where they are and *experience* where they are. We feel that it's a great boon to the travel industry in the community where we are located. We are certain that in Hawaii more people are going to go to the outer islands than ever went before, after they see our presentation. We are also certain that they will know more about Hawaii than they will ever discover by going to the conventional Polynesian shows at night and seeing Tahitian dancers and hula girls.

When it comes to equipment for creating the shows, we don't use anything very special or exotic—just the very best standard cameras and recorders available. Beyond that, we feel it is the people using the equipment that made the results really outstanding. After all, the paper and pencil used by Jacqueline Susann is about the same as that used by William Faulkner. It's what they do with it, respectively, that makes the difference.

We employ very accomplished cinematographers—usually those with a documentary rather than a feature background, for shooting our film. It's hard to teach them that you don't have to overshoot, because they come from a documentary background.

We rely, here in San Francisco, very heavily upon Palmer Labs, which does a beautiful job of 16mm opticals.

Editing for three screens is obviously much more difficult than editing for

one screen. We find the Kem horizontal machine much more useful than the Moviola vertical arrangement. It's expensive to work on that sort of equipment, but it pays off in the long run. The big problem technically, is that of taking three strands of 16mm film and stacking them up against 28 super-slide formats. Then you've suddenly got this 500-watt lightbulb and about five times the available film area on the super-slide, while you're trying to get the same amount of light and brilliance and contrast and color saturation out of 16mm. It's not going to happen, but we are constantly trying. We are learning how to balance out our copy photography, with super-slides in relation to our 16mm work. We are, of course, keeping our 16mm film in sync by means of a number of methods. Synchronous motors are probably the best solution, from our point-of-view.

I'm intrigued with the idea of Super-16, but the obvious problem is that you get locked in to the guy who's got the equipment to shoot the stuff and then you've got one more piece of special equipment in your theatre and you don't know quite where the percentages are.

If you use a Xenon or a Mark 300 projector, you've this wild discrepancy of color temperature between your slide projectors (with their tungsten lamps) and your movie projector. You filter down your Xenon and then you've lost your light output. We don't yet have all the answers as to how to get things up on the screen. We rely on Kodak Carousels because you can run them for the Kodak-recommended seven months and then you either dump them or get them refurbished.

We have our own specially designed and manufactured slide mounts which hold the registration within 2/10,000ths of an inch, because we do a number of optical builds. Because we sometimes use as many as four projectors in a screen area to create an in-depth look, registration is obviously very, very important to the way we do things.

Ultimately, you get all your slides together, all your movies together and all your special effects notations, and then it's Mohammed going to the mountain. We go out to Minneapolis to our programing people and spend two or three weeks sitting there and working out the program and laying it in against the music. This is a time-consuming, tedious proposition, but it's infinitely more flexible in its end product than anything like punch-tape or punch cards or a photoelectric system. We can move within 2/10ths of a second or even

1/10th of a second.

I suppose if there is anything related to a philosophy of equipment, our conception is that each single instrument must get something up on the screen. Whether it's a motion picture projector or a lamp, it is its own system. That is, there is no such thing for us as a dissolve, you are either increasing the potential of the lamp or you are decreasing it. Either you're telling it to go forward or you are telling it to go in reverse. You are either telling the machine to drop a filter in front of it or pull a filter away from in front of it, so that each instrument is its own system. There are none of those interlocking types of ideas that you get involved with in most hardware—which makes it very convenient, because each slide has a life of its own, like a note on a piano.

There are special moments in our presentations when we fill all seven screen areas with a single panoramic scene. We have several techniques for accomplishing this, depending upon just what kind of an effect is desired. We have one specially built camera that has very fine optics and shoots a picture with an aspect ratio of 2-to-7, which we then reduce to 1-to-7 in our copying operation.

For a true panoramic effect, we use one of those old circuit cameras, the kind where the guy used to run from one end of the bleachers to the other, as the camera traversed across, in order to get into the picture twice. The one we are currently using is Russian, although we've also used a Japanese model. We're trying to get a new one specially built to our specifications, but no one seems to know how to build them anymore.

We've also used a Hasselblad—taking separate shots at incremental steps across the screen, with our technicians hand-matching the panorama. However, this is a tedious process and not always successful. Once again, we're fighting that image-size-to-film-size problem. The object is to get a single image that's 70 feet across by 10 feet high, and we're stuck with a piece of film that may be only 1 inch by 7 inches. This, then, has to be blown up into super-slides to fit into the Carousels—and it's a real problem. But we're probably doing a better job of it than anyone else right now.

The nylon-antron stretch screens we use in the theatres are not unique with us, although I hope we're using them more effectively than most people. We're interested in this type of screen because it allows us the facility for incorporating rear-screen effects. You can also do a certain amount of scrim work with it, which makes for exciting

theatre when you wash it with light. Its major defect, in my opinion, is that it's not a very good reflective surface. In the best of all possible worlds, I would probably be much more satisfied with a lenticular white screen. Once you have those delineated screen areas, you've given the whole thing away. The sharp people in the audience realize that there are seven areas and begin to watch for what is going to happen where. Then you've lost a bit of that element of mystery. I hope that someday we can arrive at a screen configuration that is just as exciting as the stretch screen, but without the reflective problems.

What we use behind the screen are primarily lighted effects. For example, in "Hawaii" we use flash pots that go off during the Pearl Harbor sequence. Then we have a huge lighted star that animates to the Star-Spangled Banner during the statehood sequence. I think the boys told me it has something like 5000 2.3-volt lamps in it, and it's fairly sensational. I'm a sucker for sentimental things like blue wash and little twinkling stars behind the screen.

During the volcano sequence, we are using infra-red lamps in the ceiling, which are on a unit that bombards the spectators with heat rays, to get that sort of hot feeling into the audience. We are using a number of specially constructed kaleidoscopes, to create the effect of all of the flowers of Hawaii suddenly appearing at the same time.

We're using a lightning device in "Hawaii" which involves a number of multiple strobes and they chase across the ceiling in sync with the visuals. We're also using our old Chinese Lantern trick again in "Hawaii". It's fun to have Chinese lanterns, because they look so great—except that, this time, they are suspended on pulleys from the ceiling and they wheel down in front of the screen. I wanted to get more involved in flying effects, but in an intimate theatre without fly space, it's a problem. You haven't got anywhere to put them.

The audiences at both of our "Experiences", in San Francisco and Hawaii, have been very responsive to the presentations and the word-of-mouth has been very good. They all seem to feel that the effects are very spectacular.

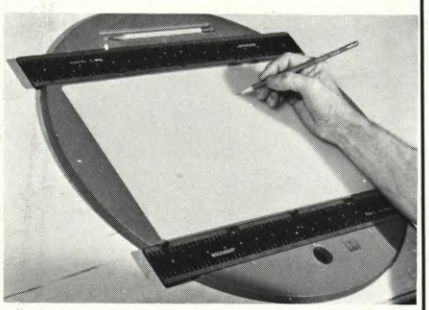
However, as we put together new shows for various other locations, we will develop even more advanced techniques and more unusual effects. We've come a long way with multi-media, but we've still only scratched the surface. In my opinion, there's a lot farther to go and a lot more fun to be had in working with this exciting medium. ■

"THX 1138" had very little hand-held photography. We wanted the sense of the camera being anchored and having to struggle to get your shots with a heavy, automated machine. The cameras we used were the Eclair CM3's. They are terribly noisy and, unfortunately, they had to go into blimps, which just "grounds" them. That was one thing I found most difficult about doing a feature, having to work with the camera in a blimp. I disliked it intensely because it insulates you from your camera and, if you're used to news and documentary work, your camera becomes part of you because you can hand-hold it. To then adapt to something that weighs as much as a blimped 35mm camera takes some time, and I'm still not comfortable with the blimp.

In the photography of the chase there were two spectacular car crashes. The photography of these scenes was always covered by two, and sometimes three, cameras. There were many occasions of all-night shooting in cold, damp places—exhausting, bleak places that affected the crew and put everybody down. It got really tiring. We'd go and spend the whole night, say, at the Caldecot tunnel, in order to get what would be just a few seconds or minutes of film for the chase. It had to be a combination of many tunnels to get the final effect, to capitalize on all of that available scenery.

In lighting all those tunnels—the Caldecot tunnel, the tunnel going out to the Golden Gate Bridge, the tunnel going out to Fort Kronkite, and the Broadway Tunnel—we used only natural light. The only extra thing added was a little light Bill Maily put inside Bob Duvall's racing car. The racing car was on the truck bed and then the cameras, two cameras always, would be on the truck bed alongside the car. Sometimes we'd clamp onto the car with one of the really fine devices that Kenny Phelps had built.

The scene of the car and the motorcycle flying up was both planned and unplanned. The shot itself, as far as the accident was concerned, had been planned. The policeman was supposed to come zooming up and then be destroyed and the stunt man was going to take a fall there. However, he had not figured on taking the kind of fall that you see in the film. We had no idea he would fly so far. A little ramp was made in the dirt there, after the car had spun out, and when the stunt man came up, he was supposed to go into the dirt. Instead he flew that incredible distance into the car and the instant he hit the



"THX 1138"

Continued from Page 1062

That was all part of the format, which made it easier for us in the sense that we could use anything that was available and, therefore, take advantage of the fact that people walk around in a lot of ugly light. If you go and sit down in any restaurant you're in "THX" as you eat your donut and coffee.

Working with Dave Meyers was both easier for me and not easier. It was complex. For one thing, this type of film was a new project for me and I was glad there was another man like Dave there. That was a help to me, and yet it was complicated, too, because with two men you weren't quite sure who was doing what and it could get complicated. And then with two cameras you have the problem of having to make a sacrifice in the quality of your shot. Quite often I felt that there would be only one prime shot. We would be running two cameras and you would get one shot that wasn't what a cameraman would want. And yet, for George's purposes, it was right because he wasn't always after the prime shot or the fancy shot. He wanted a very restrained kind of thing where the camera would sacrifice polish to get, not only a documentary quality, but a quality of something almost automated.

As he told us before we started, he wanted it to look as though everything were being observed by hidden television cameras, such as those which would have been used in that underground society. And he did as much as he could to see that Dave and I didn't do the little fancy things that cameramen will do to polish things or to protect themselves with a little gimmickry. He wanted to take away those opportunities and that drive, and the two-camera thing helped him do that.

Like myself, most of the people on the picture actually had never worked on a feature before. Kenny Phelps, the gaffer, had, and a few of the others. Although I hadn't worked on a Hollywood feature before, I didn't feel that this constituted a problem. In fact, I had the feeling that this, being a new experience, by and large, for the crew was a good thing. It fit in with the fact that it was George's first feature directing experience, that it was all part of the Zoetrope scene of doing something new, and using new people. I never felt any strain in the crew due to their not having had a lot of experience in features, because they all functioned smoothly. Technically things got done and moved along quite well.

car we all stopped shooting. I remember one of the assistants leaping out of the car, because we had a third camera there, and he made a shot of the fellow flying through the air as seen from Bob Duvall's point of view. We were calling an ambulance, while that stunt man just lay on the ground on his back. Most of the fender of the car and the headlight were knocked off where he'd bashed into it. And then, a minute later, he opened his eyes and said, "How was that?" We all got at him when he said, "Well, you wanted me to play dead, didn't you?" He got up and walked away. So that part was definitely not planned. It was incredible.

A lot of the film was pre-recorded. In other words, you see a lot of it on television screens in the next dimension back. Most of that was done with the 16mm Eclair and it was done more quickly. We knew it was to be the television monitor footage and so we didn't put quite as much effort into it, hoping we could save a little time. Often one of us would be shooting a 35mm scene while the other would be shooting with the 16mm Eclair. Sometimes we would both be working with the Eclair. There was quite a bit of footage that was to be seen on monitors and so the Eclair was there for that purpose.

The photographic procedure for shooting the television screens was very basic, almost exactly as you would do it in a documentary. There was no effort to counter any shutter bar effect and, as you know, cameramen will go to great lengths to get rid of those, as in "THE ANDROMEDA STRAIN". They went to incredible lengths to eliminate them, because the monitored images were to play such a large part in that film. But we didn't; we let it go and found that we could get by quite acceptably for our purposes because it was to look almost like an amateurish kind of television monitoring system. In the whole film, instead of a polished future of total technical control, it was a sloppy future of technical know-how in the hands of people who weren't quite complete. Things were sloppy, and so it fit in. It was to be part of their human environment; they have technology, but they're not so polished. Crude things happen in that technological environment, so all we did was take readings on the TV monitors and it called for our shooting pretty wide open. We'd shoot at F/2.8 roughly, or F/2, and with our film speed, we could handle that comfortably. So the lighting was very, very minimal in the control rooms. We filmed those sequences at KGO-TV and at KTLA in Los Angeles. ■

THE SPECIAL SOUND OF "THX 1138"

By WALTER MURCH
Co-writer/Sound Editor

There were certain very specific objectives we had in mind when building the sound track for "THX 1138". These goals to be achieved included the following:

1. We wanted the whole picture to have an alien quality, so that, not only the subject matter of the film, but the film itself, would seem to be from the future. A "foreign film", not from some other country, but from some future point in time. In this way, we could have the story and ideas reveal themselves indirectly, rather than describing them directly, and supposedly "objectively", from the present.

2. Because of this, we wanted much of the "sound" of the film to have an ambiguous, mysterious quality, yet not without its own inner logic.

3. We wanted the sound to have a direct emotional impact on the audience, with very muted distinctions between dialogue, music, and sound effects.

How We Achieved These Goals

1. The film was designed—even before the script was written—to establish an organic relationship between sound and picture. We decided to have the soundtrack carry as much of the film as the story, or the visuals. This would increase the "alien" quality.

   a. The work on the sound effects and music was begun during shooting and carried out during the editing, so that the sound and the picture grew together and influenced each other. By the time there was a rough cut, we also had a mixed "rough cut" sound track to go with it.

   b. Each subsequent cut of the film—there were three—was accomplished by another mix, with each more refined and perfected than the last. The final mix was simply the last of these many mixes. This method afforded us much more control, a much tighter "organic" relationship with the picture, and no last minute disastrous surprises at the final mix.

2. We stayed away from conventional electronic sound effects and music because that is what was expected: Weird bleeps and bloops. Much of the film's strangeness comes from seeing and hearing familiar things in strange settings.

   a. The Moog synthesizer was only used to generate electronic tones

when they were called for by the visuals. It was also used as a processor—to filter and distort previously recorded sounds.

b. Much of the offscreen dialogue was futzed by sending it through a side-band transceiver.

c. A great deal of the sound was simply altered by slowing it down, occasionally speeding it up, making compound loops, notch filtering, etc.

d. Almost all of the sound was recorded specifically for the film . . . only two library sound effects were used.

3. The equipment we used:
   Nagra-Stellavox recorders
   Sennheiser 404-804 microphones
   Amega transfer system
   Steenbeck editing table
   Keller mixing system

All of this equipment was designed and used to reduce the amount of time between getting an idea and putting it on the track, mainly by having all the equipment in the same area and immediately available, and by reducing the number of people involved in the work. This also helped create the unity of expression in the sound and the blurred distinction between dialogue, music, and effects.

a. Cutting sound effects on the Steenbeck tends to force you to think in terms of whole sequences at a time, rather than in separate, discrete particular sound effects. You also tend to build whole rolls of one kind of effect while you are synching them up, so that one roll will be, say, distant footsteps, one will be rustling, etc. This also makes for more reels of sound effects per reel of picture—50% more than on a Moviola—you use a lot more fill.

b. Mixing on the Keller—There are only six playback dummies, so you must subdue a lot, which I prefer anyway. Otherwise, there is a great deal of flexibility and freedom. Essentially, there are only two people involved—the mixer and the director. Once the film is threaded up, you don't take it off until the reel is finished, because of punch-in record, plus hi-speed forward and reverse. No projectionist is required if you use the TV monitor hookup for picture. Fewer people means that you can work odd hours and late at night with no labor problem. The whole process is much more similar to editing than it is to conventional mixing. ■

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F.O.B. Mich. JOSEPH'S CAMERA SALES, 20700 Mack Ave., Grosse Pte. Wds., Mich. 48236 (313) 765-4582

BOLEX REX 5 w/86 OE zoom lens, new in box w/guarantee card. Cost $1,445 first $895/ R. BARTLETT, 623 Northlawn, Marine City, Mich. 48039 (313) 765-4582

ANIMATION STAND, custom built. Includes Oxberry Master Series table and compound. OMEGA PRODUCTIONS, 711 W. Capitol, Milwaukee, Wisc. 53206

FOR SALE: BLIMP for R-35 Mitchell camera accommodating 1.10 zoom lens. Also 220V 60 cycle 3-phase sync-motor. Best offer. TDF FILM PRODUCTIONS, LTD., 980 Yonge St., Toronto, Canada

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SERVICES AVAILABLE

PRODUCTION AIDS. Write for literature. CINEPHONICS, Box 534, Del Mar, Calif. 92014

PRODUCER: Your program distributed through Europe, Africa, 16 or 35mm at no cost to you. Contact A.S.P. DISTRIBUTION, 5716 Vecino Dr., Glendora, Calif. 91740 (213) 963-6761

SUPER 8mm B&W processing $1.50 per cartridge. 16mm B&W processing 2½¢ per ft. One day service. SOUTHWESTERN CINE SERVICE, 2406 Classen, Oklahoma City, Okla. 73106

THE CAMERA DOCTOR repairs Arris, Eclairs, Mitchells. Call ALAN GORDON ENTERPRISES, 1430 No. Cahuenga Blvd., Hollywood, Calif. 90028 (213) 466-3561

BELGIUM: Cameraman available. Travel anywhere. Contact P. ANGER, 69 rue de l'association. 1000 Brussels. Phone (02) 19 09 78-(02) 47 40 95

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CINEMATOGRAPHER—2 Reflex cameras, sound—telephotos—Parabola—tripods—car pods—4 wheel drive—etc. Will travel. L. L. RAIL, 649-1801—2934 Las Vegas Blvd., No. Las Vegas, Nevada SP. 19 89030

FILMING IN JAPAN. International motion picture company. Telex J2-6219. Cable IANMUTSU Tokyo. Air Mail IAN MUTSU, CPO Box 710, Tokyo.

SITUATIONS WANTED

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315 W. 43rd St., N.Y.C. 10036
CALIF.—Phil Dewald—(213) 466-9361
7051 Santa Monica Blvd., Hollywood 90038
N.J.—Wally Robbins—(201) 939-5250
40 Kero Rd., Carlstadt 07072

WANTED: inexpensive Auricon, good condition. LOZOWSKI, 12 Drazen, North Haven, Conn. 06473

PRODUCTION HOUSE REQUIRES late model 16/35 Steinbeck and sound equip. Write THE GROUP, 2001 Northcliffe, Montreal 487-5616

900A ALTEC REPRODUCER 35mm magnetic for interlock 35mm & 16mm optical recorders. *16mm & 35mm reduction printer any condition (will trade equipment). ROBERT M. DOMINIC, 1219 Scenic Way, Hayward, Calif. 94541

WANTED: Mauer 16mm camera, B&H 400 ft. camera, Cine Special 200 ft. film chamber, JAY H. SCHIFF, 500 Cornelia Ave., Chicago, Ill. 60657

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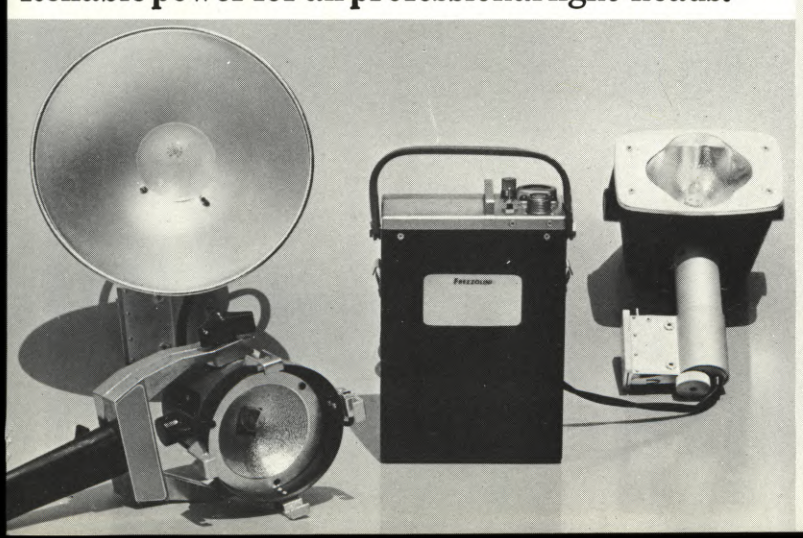

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. . . with the acquisition of additional adjoining property, we are designing one of the most unusual production studios in the world. A small studio 60 x 80 and later a large studio 150 x 200. Two new model PC-100 Norelco color cameras will be available temporarily in a small studio in our present building. THESE STUDIOS ARE DESIGNED EXCLUSIVELY FOR RENTAL TO PRODUCERS.

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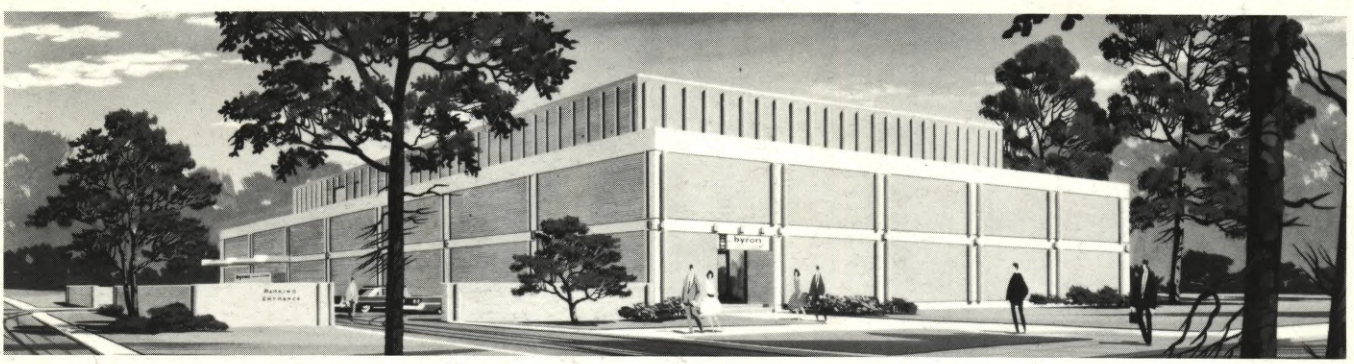

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