

SEPTEMBER 1971

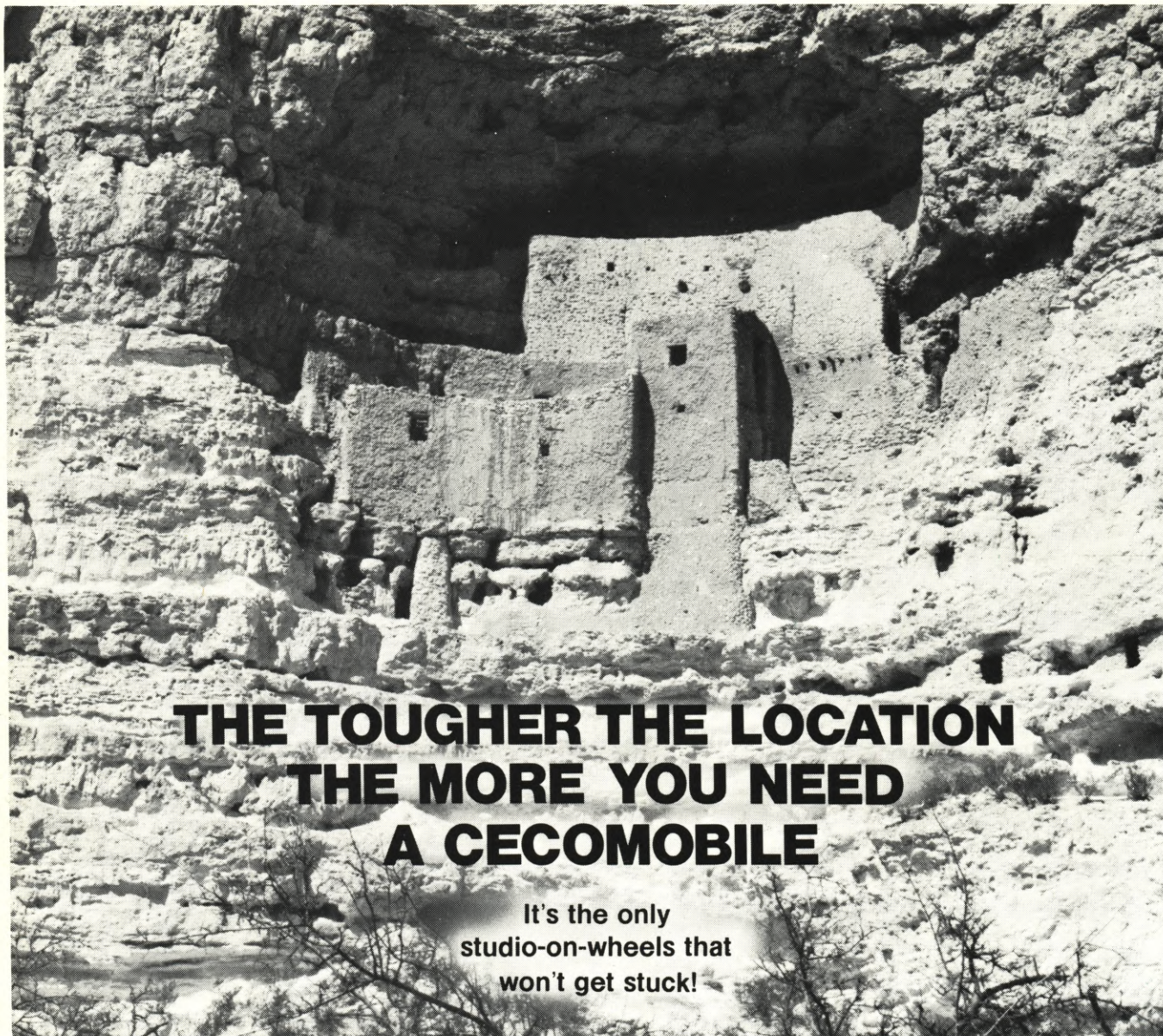
75 CENTS

AMERICAN
Cinematographer

International Journal of Motion Picture Photography and Production Techniques

**DISTORTION TECHNIQUES FOR
"THE BIRTH OF APHRODITE"**

**THE HAZARDOUS FILMING OF
'BLUE WATER, WHITE DEATH'**



THE TOUGHER THE LOCATION THE MORE YOU NEED A CECOMOBILE

It's the only
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won't get stuck!

A stuck truck is a headache you can live without. So we built our Cecomobile with four-wheel drive. It can drive **out** of anything you can drive into: rough terrain, sand, snow, mud or water.

A generator that's stuck inside a mobile studio can be another headache. So ours is separate. Trailer-hitched, with a powered reel holding 800 feet of 4/0 cable. You can set up in one place while generating in another. It saves you time. And noise.

The rest of our Cecomobile is built to take anything you want to give it: BNC's and Arri's with blimps; tripods; accessories; 20 foot Fisher mike booms;



Nagras; fishpoles; Moviola or Fisher crab, Western and Elmack dollies (takes all at once); reflectors; stands; apple boxes; power supplies; cables; lumber; plywood sheets; parallels; etc. It will even take 1000 feet of 4/0 cable on the truck, plus the 800 feet on the generator, all on a power reel

— no hand-carrying or cranking.

One more feature: all equipment in the Cecomobile is supplied by F&B/Ceco. That means it's reliable. And it's another reason we say: The tougher the location, the more you need Cecomobile. It's the way to be **sure** you won't get stuck.

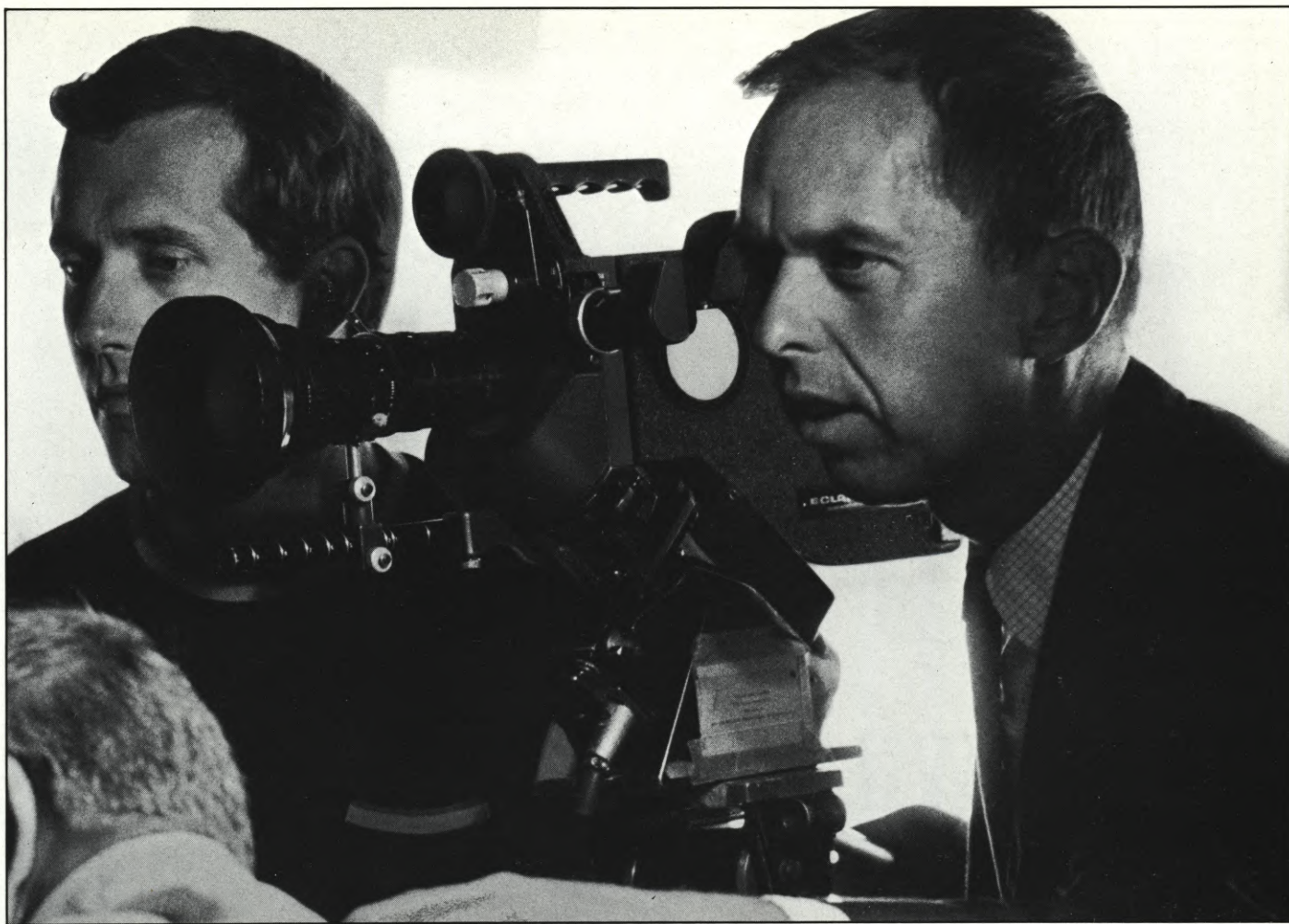
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In 8 months, Baldwin Baker ran 1,250,000 feet through his NPR!

That's 7,000 16mm feet a day, five days a week; so he needed a camera that was fast and reliable.

Mr. Baker writes: "*Everybody's Talking* was an ABC TV show that really ate up film. In the first eight months of shooting, we regularly exposed between fifteen and twenty 400 foot loads a day. In 35mm, that would be over 20,000 feet a day. All lip sync, of course, and all on location — very often three or more separate locations on the same day."

"Short film clips from our footage of people talking about an unidentified subject were screened in the studio for a live panel, who had to guess what the people were talking about. Because we could never tell how long it would take

the panel to guess the subject and because the people doing the talking were mostly non-professionals, we had to shoot literally miles of film to get good, tantalizing quotes and to make sure there would be enough footage to keep running clips until one of the panelists finally guessed right."

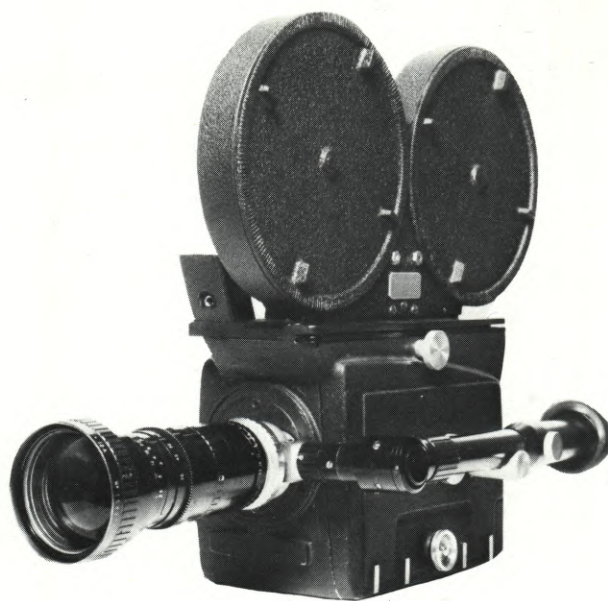
"With travel between locations and a shooting schedule like that, you can imagine how much time there was to spare for setting up or for mechanical problems. Without the NPR's instant magazine change, I don't think we could have gotten that much footage in the can. Overall, it's a fast camera

to work with, of course. But our NPR had to be completely reliable, too; and it certainly was. We got a million and a quarter feet of rock-steady images."

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



One With... One Without

... the new Auricon Crystal Modification

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- **REDUCED WEIGHT OF TOTAL CAMERA PACKAGE** — With the addition of the smaller, lighter crystal motor and the elimination of your current power supply, your crystal-modified Auricon can be reduced in weight as much as 10 lbs. less than your present camera.
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- **ALLOWS FOR DOUBLE SYSTEM FILMING WITHOUT SYNC CABLES** — Crystal modification eliminates the need for interconnecting cables between camera and sound recorder.
- **SIX 400' ROLLS ON ONE BATTERY** — No worries about running out of power. Extra batteries are small enough to fit into shirt pocket.
- **DOES NOT INTERFERE WITH NORMAL AURICON CAMERA CONVERSION OPERATION** — All built-in features of your Auricon are retained.
- **EXTENDS THE USEFUL LIFE OF YOUR CAMERA** — Obsolescence factor is reduced. Less maintenance required.
- **CRYSTAL CONTROLLED MOTOR** — This motor offers the ultimate in quality and reliable operation, incorporating high efficiency, low power consumption, high torque, solid state integrated circuitry and high accuracy, requiring only 9 watts of input power even when pulling a 1200' magazine.

For more information on the new Auricon Crystal Modification contact:

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ON THE COVER: Distortion effect photographed with specially designed mirror by Leland Auslender, as a test for his short subject, "THE BIRTH OF APHRODITE", which won the Silver Phoenix Award for "Best Experimental Film" at the recent Fourth Annual International Atlanta Film Festival.

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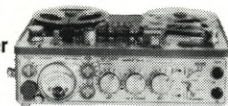


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Interchangeable zoom lenses with servo motor and TTL auto. exp. control, or manual. 100 ft. internal or 200 ft. mag. film loads. 24-64 fps. Synch and wild motor speeds. With 17-68mm lens, \$1469; with 12-120mm lens, \$2067; power pack grip, \$69.95; NiCad battery, \$59.95.

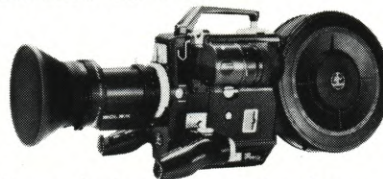
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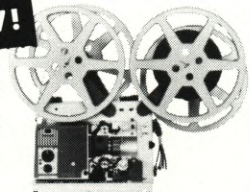
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New professional 16mm motion picture camera by Bolex. Automatic load. Motor driven zoom control. Stabilized 12 to 50 f.p.s. speeds. Forward, reverse and single frames. Auto. exposure control. Bright reflex viewfinder with 20X magnification. Lightweight coaxial 400' magazine. Remote control. Noiseless. Built-in magnetic sound recording unit. Single or double system sound available. Price on request.

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A man, his work, and his camera

Bruce J. Russell—Biologist/Cinematographer
□ Producer of the Thorne Biology Film Loop Library
□ Winner (1969) American Film Festival/Science
Film Loop Division □ President, Educational Films Lab
(Newcastle, California)

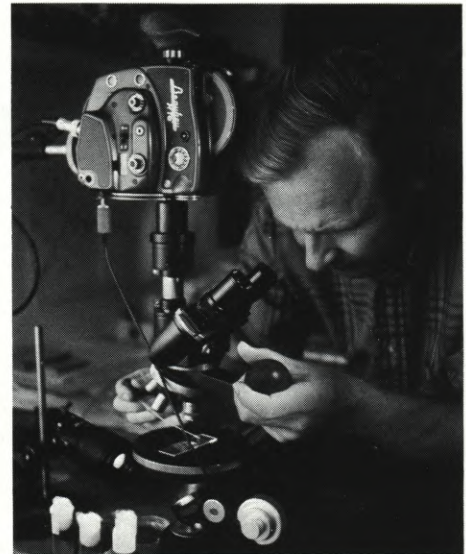
"Film loop production is a demanding form of the motion picture arts. Loops are silent—the story must be carried visually without the help of a sound track. Getting meaningful ecological sequences of organisms in their natural environment requires motion picture camera equipment which is both compact and reliable. The Beaulieu R16B has some unique advantages for this kind of work, and I have exposed some eleven miles of 16mm film through mine during the creation of 150 single topic films.

Capturing the life styles of the little known animals of the tide pools, mudflats, streams and ponds, I have tried to give the student a biologist's eye view. Precision reflex viewing and behind the lens metering are prerequisites for this kind of quick, unobtrusive field work. My camera is frequently attached to the end of some device—a periscope, an underwater viewing

tube, the microscope—often improvised equipment which permits the interesting, visually involving shots which characterize our ecology films.

The Beaulieu's mirrored shutter, which sends full light to the large ground glass viewing screen, provides a bright picture of what is going on before the lens. I am able to focus and set the aperture without removing my eye from the view finder, and this is a terrific advantage when filming living organisms in their natural surroundings.

After three years of this challenging work, the Beaulieu 16mm camera has become an automatic recorder of what my eye sees at the levels of observation common to biologists—normal, macro (as with a stereo microscope) and micro. Its unusual flexibility has allowed me to explore, both scientifically and aesthetically, the fascinating world of living organisms."



Beaulieu.
It lets you be there when
it's happening.

CINEMA  **Beaulieu**
A DIVISION OF HERVIC CORPORATION

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.

Whether you're "new wave" or "old guard," you may not agree that silence is golden — but you'll probably admit it costs. In terms of expensive preparations. Shooting restrictions. Or both.

No more. Not since CINE 60 introduced the battery-powered fiberglass Blimp for Arriflex 35 cameras. Weighing only 19 pounds, the "60" Blimp permits sync sound shooting in even the most restricted spaces. With all standard lenses—even 18mm wide-angle lenses* can be used without vignetting.

But that's just the beginning. The CINE 60 Blimp incorporates a number of exclusive features that make set-up and shooting easier. Starting with improved camera accessibility — the cover detaches completely, putting all camera controls and adjustments instantly within reach. Inside the housing, the camera and its constant-speed motor are mounted on the CINE 60 Offset Motor Base, which reduces camera and motor vibration. The base, in turn, rests on a shockproof rubber platform within the housing, providing further isolation and firm support.

Several layers of different sound absorbing materials line the Blimp to provide utmost sound reduction.

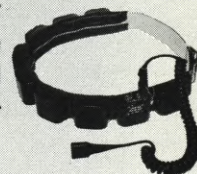
The Blimp is simple to operate. A new, gear-driven mechanism permits smooth, accurate follow-focus from the outside via a large knob. All other controls and connections — power input, sync output, camera on-off switch and control lamp are conveniently placed on a rear control panel.

There are many more reasons why the CINE 60 Blimp has enjoyed instant acceptance and wide popularity among professional filmmakers. Why not send for our brochure?

*the Angenieux 25-250mm Zoom can also be used, with a special adapter.

CINE 60 has a number of other exclusive time- and money-saving products for the professional filmmaker, including:

The Power Belt available in voltages from 6 to 30V, this easy-to-wear belt provides portable, evenly-distributed power to run all professional cameras (and sun guns!). With built-in charger and plug-in coiled power cable, it is one of the most widely-used power sources available today.



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For details on these and any of the other products in our line, please call or write:

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I N C O R P O R A T E D

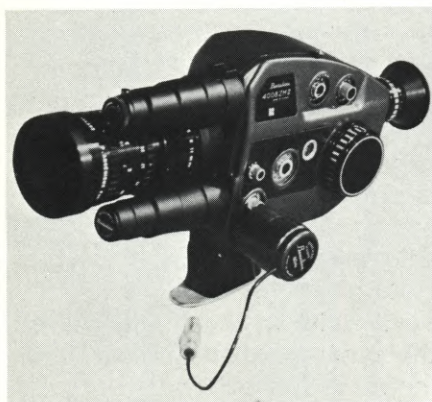
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INSTANT QUIET



WHAT'S NEW

IN PRODUCTS, SERVICES AND LITERATURE



HERVIC CORP INTRODUCES NEW SUPER-8 "SYNC" SOUND CAMERA

Hervic Corporation/Cinema Beaulieu proudly announces the immediate availability of the new Beaulieu 4008ZM2 Super-8 camera with double system sync sound capability.

In addition to its new sync sound capability, the new Beaulieu 4008ZM2 is equipped with an AUTOMATIC tape recorder Start/Stop control. While three separate and distinct double-system sync sound systems can be used with the new Beaulieu 4008ZM2 (Synchro-Pilot; E.T.S.; and Erlson), it is expected that the most popular system which will be accepted by advanced Super-8 cinematographers will be the new Beaulieu 4008ZM2 Super-8 camera in conjunction with the 60-cycle sync pulse sync generator accessory... together with the Uher 1000N Neo-Pilot, Nagra, Stellavox and other similar professional 1/4" sync tape recorders.

Consequently, for the first time a truly professional Super-8 camera system has been designed by the factory to work in perfect conjunction with professional pilotone-type 1/4" tape recorders. Laboratory and editing procedures are similar as when using 16mm professional double-system sound cameras (such as the Beaulieu R16B, Arriflex, Eclair, etc.) together with professional 1/4" sync tape recorders.

In addition to the above new features, the Beaulieu 4008ZM2 also provides the following: Motorized Macro Focusing to 1 millimeter from the Front Element of the Lens (without requiring any accessories), A Variable Motorized Zoom (2 through 12 seconds), A Choice of 2 frames-per-second through 70 frames-per-second Zoom Speeds, A Variable Shutter, The Largest Reflex

Viewing Screen of any Super-8 (27X magnification), Angenieux 8-64mm Zoom Lens, Fully Automatic Exposure Control (with manual override), A Mirrored Shutter (permitting 100% of the available light to reach the film plane and—alternately—100% of the light to pass through the reflex viewfinder, Interchangeability of lenses (C-mount)... and many other unique features.

The new Beaulieu 4008ZM2 Super-8 camera with sync sound capability is priced at \$899.00.

For further information, write Hervic Corp/Cinema Beaulieu, 14225 Ventura Boulevard, Sherman Oaks, California 91403.

SENNHEISER INTRODUCES RADICAL NEW CONDENSER MICROPHONE INCORPORATING VIRTUES OF SHOTGUN AND CARDIOID

At a recent demonstration, Sennheiser Electronic Corporation announced an unusual new addition to its professional condenser microphone line—a unit combining the best features of both cardioid and shotgun microphone designs. Dubbed the Model MKH 415, the unit looks like a miniature version of the company's latest shotgun microphone, the MKH 815—successor to the company's MKH 805—now an industry "standard".

But the MKH 415 is not merely a "sawed-off shotgun" microphone.

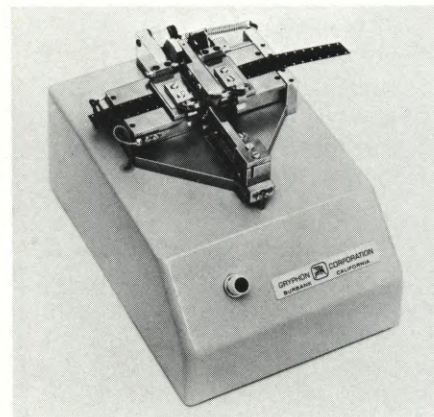
Because of a unique combination of directional characteristics, wind- and pop-suppression, high ruggedness, longer-than-usual length, small diameter and extremely flat response, the MKH 415 fills an unusually broad range of needs. In outdoor work, its extra "reach", and noise-resistance and directionality give the reporter or performer a priceless "edge". Indoors, in critical broadcast or recording applications, the microphone's extended, flat response coupled with its pop resistance mean that performers can be "close-miked" without need of a wind-screen or bass filter to compensate for blast or proximity effect.

These performance advantages are made possible by an unusual, improved combination of the pressure-gradient and interference design principles. Be-

low 2KHz, the MKH 415 has a supercardioid pattern; at higher frequencies, the response pattern is beam-shaped. Besides improved directivity, the resulting higher on-axis conversion efficiency renders the MKH 415 more immune to wind-noise and pops, making it possible to use the microphone without its accessory shockmount and wind-screen in many instances where they would normally be required.

Like other Sennheiser condenser microphones, the MKH 415 features low ambient noise, high output and overload resistance, compatibility with high- and low-impedance inputs and rugged, precision construction. Professional net price of the MKH 415 is \$396.00.

Sennheiser Electronic Corporation (N.Y.) is located at 500 Fifth Avenue, New York, N.Y. 10036. Its manufacturing plant is in Bissendorf, Hannover, West Germany.



THERMAL BUTT-WELD SPLICER FOR POLYESTER BASE FILMS

The new Gryphon thermal butt-weld splicer for polyester base film is announced by Instrumentation Marketing Corporation exclusive distributors, Burbank, California.

Splices may be made on Mylar, Estar and Croner films. It requires less than 15 seconds to make a splice as strong as the film, and is accomplished in four simple steps: 1) position film on pins and clamp in place; 2) trim ends with one stroke of cutting lever; 3) actuate welding cycle; 4) skim off excess bead with one stroke of skiver. No glues, bonding material or other items are required.

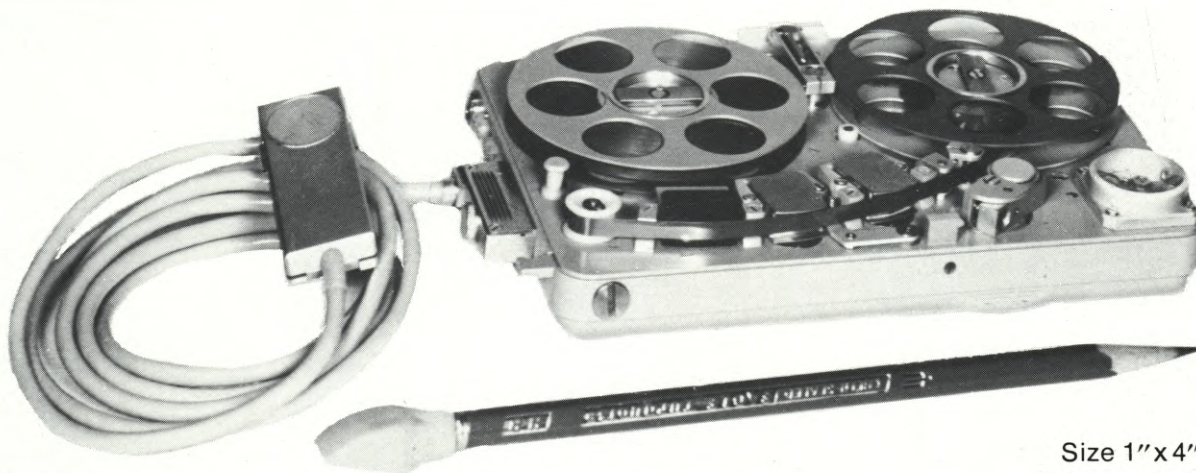
The unit is 7" x 10" x 7" high, weighs 13 pounds, and operates on 115V AC, 60 Hz, 1/2 amp. Three models are available to accept Super 8mm, 35mm, and combination Super 8/16mm. Literature on request.

Price: \$925.00 (16mm and 35mm

Continued on Page 951

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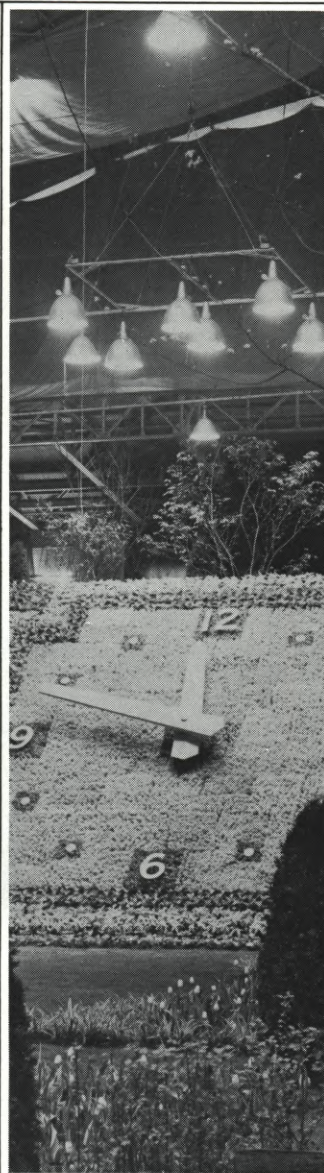
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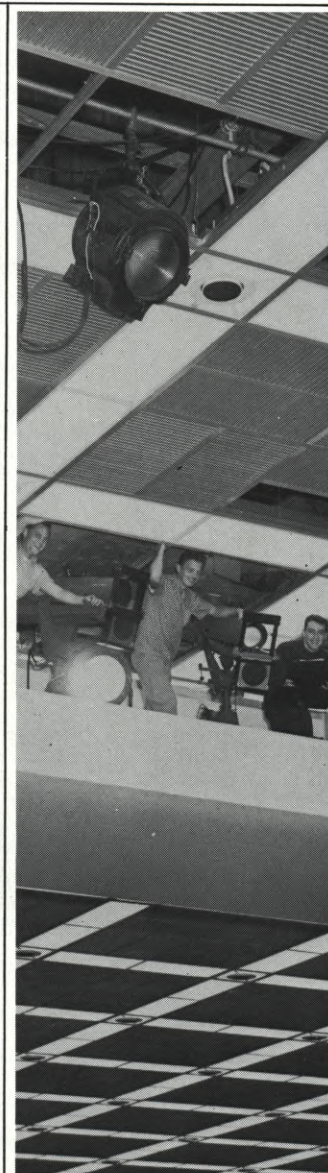
In 1956 thousands witnessed the *This Is Your Life* Network Show honoring Ernest Breech. Lighting was by Jack A. Frost.



Tons of Frost lighting equipment traveled to Havana for this 1958 Steve Allen TV Show. Today Frost experts are still lighting "the show" wherever temporary lighting and power are needed.



Frost has been creating artistic lighting effects for special exhibits, such as this Flower Show, for over a quarter of a century.

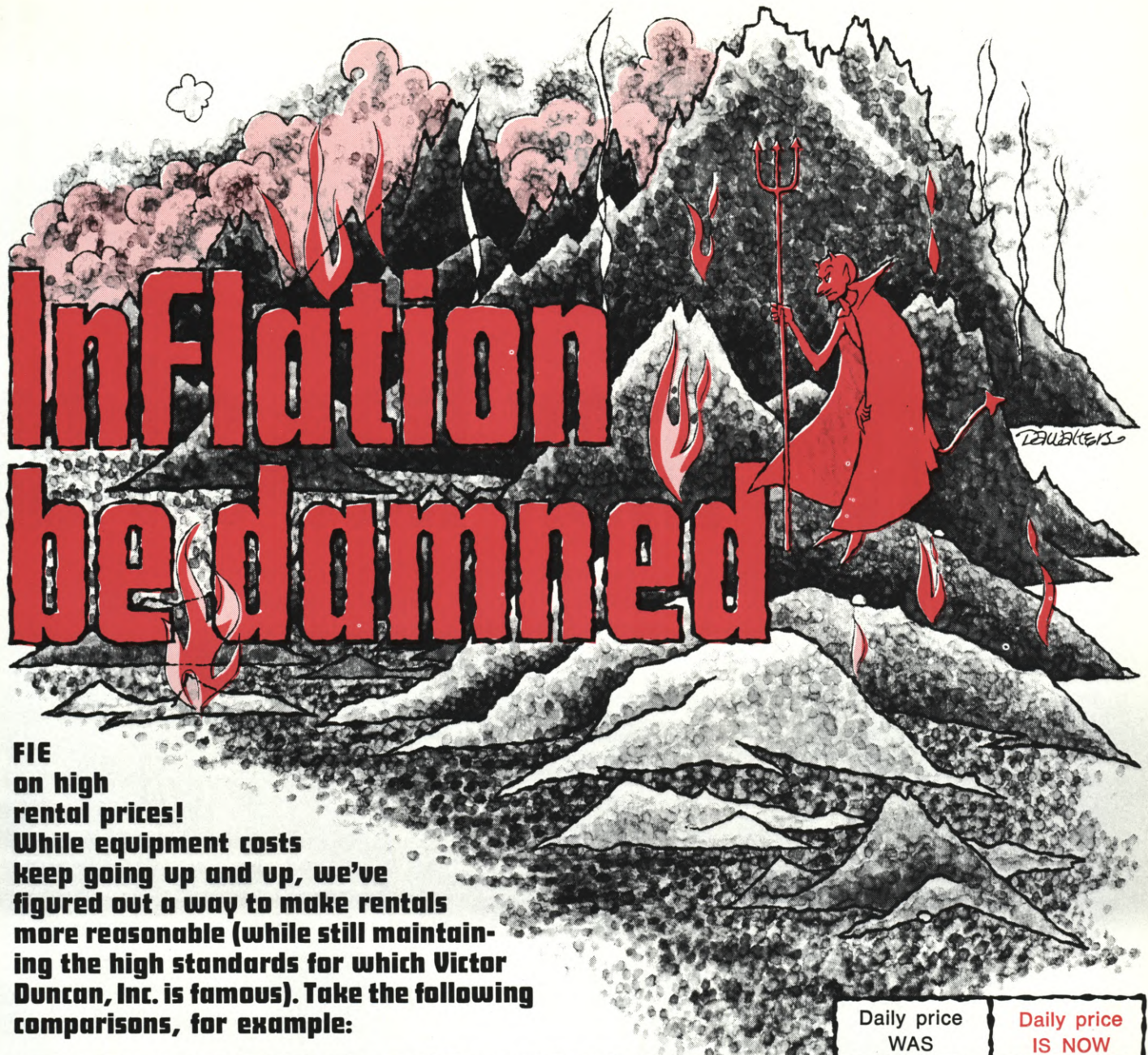


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Eclair NPR, 12-120 zoom, magazine, battery, motor, etc.	60.00	58.00

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ARRIFLEX 16S/B

This ultra-compact/lightweight 16mm camera is unequalled for handling ease and versatility. Ready-to-film, it weighs just over 8 lbs. with 100 ft. daylight spool, 3 lenses, motor and matte box! Famed throughout the world for its professional capabilities—hand-held, on tripod, in the studio and on location.

ARRIFLEX 16M/B

One camera, choice of three Quick-change (200-400-1200 ft.) magazines, makes the 16M/B ideal for the tough, long run jobs, the hand-held grab shots and anything in-between. Standard equipment includes a 60-cycle signal generator and automatic clapstick for location sound filming. Its broad capabilities are practically unlimited.

ARRIFLEX 16BL

A proven location sound camera—quiet, compact and lightweight—supremely capable in every area of professional sound filming. Operates DOUBLE SYSTEM and/or SINGLE SYSTEM—convertible by means of the ARRI Recording Module, without the use of special tools. The 16BL is also available with APEC—the truly professional built-in, thru-the-lens Arri Precision Exposure Control system.

ARRIFLEX 35 2C/B

Filmmakers depend upon the Arriflex 35 2C/B series to deliver theatrical-quality footage reliably and economically—on location or sound stage. Arriflex 35 cameras are first choice of professionals wherever motion pictures are used to teach, document, influence, entertain or sell.

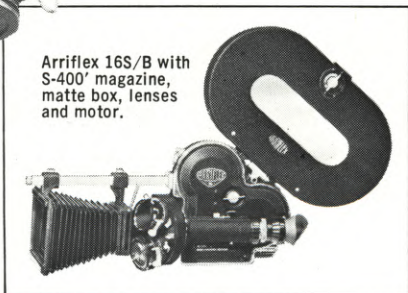
Arriflex has all the

Which camera is best for the assignment? Arriflex's renowned line of 16's and 35's makes the choice easy. Because there's an ideally suited model for every kind of job—to do it better, faster and at less cost.

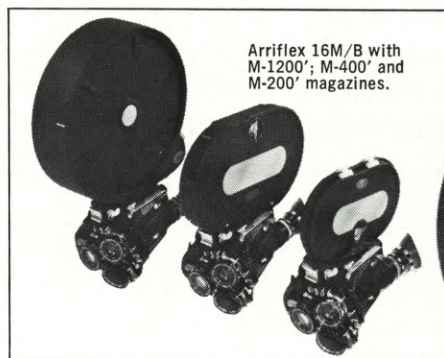
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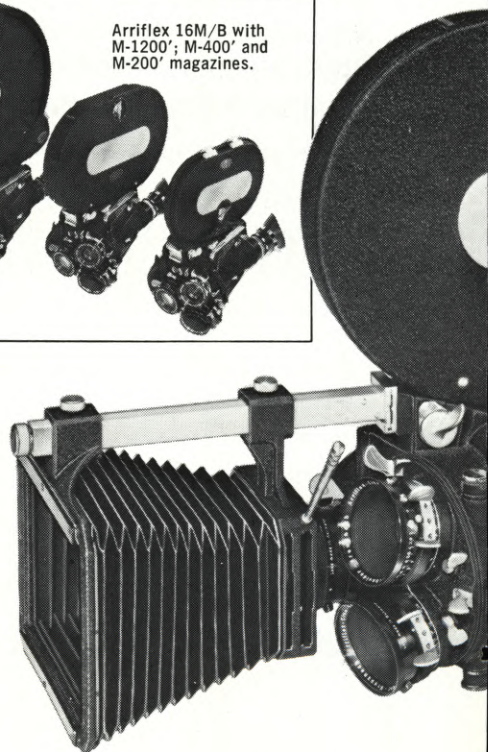
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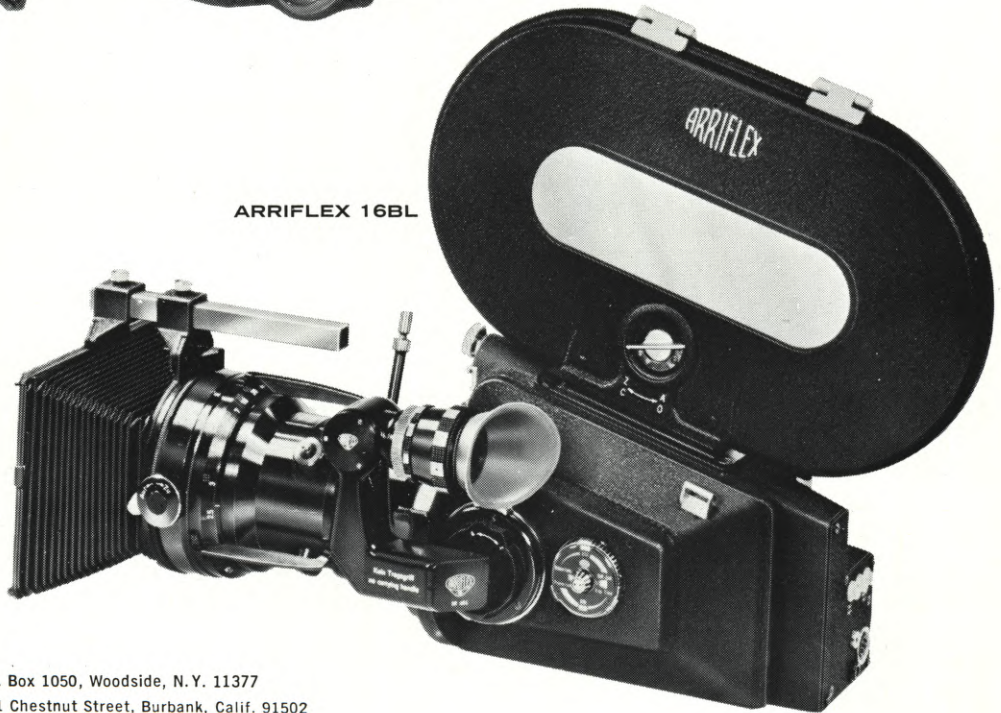


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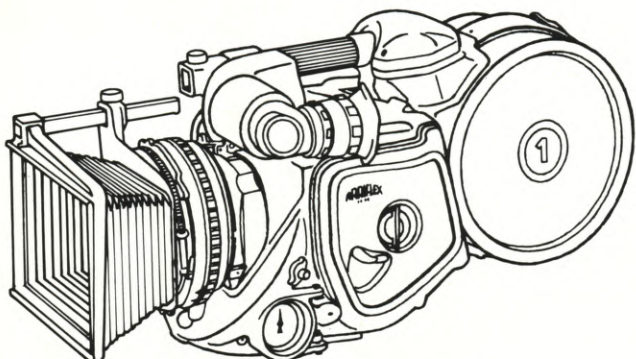
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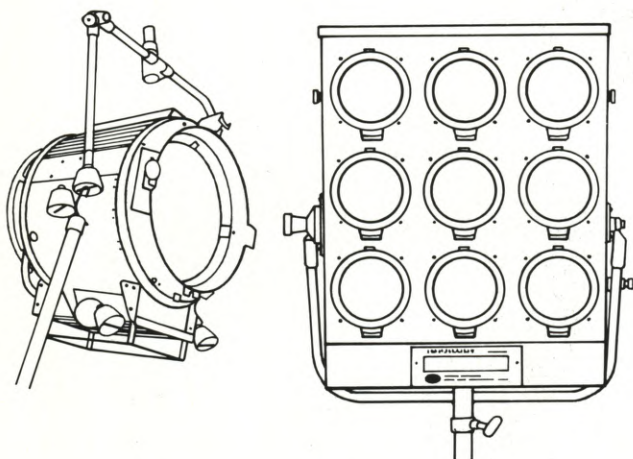
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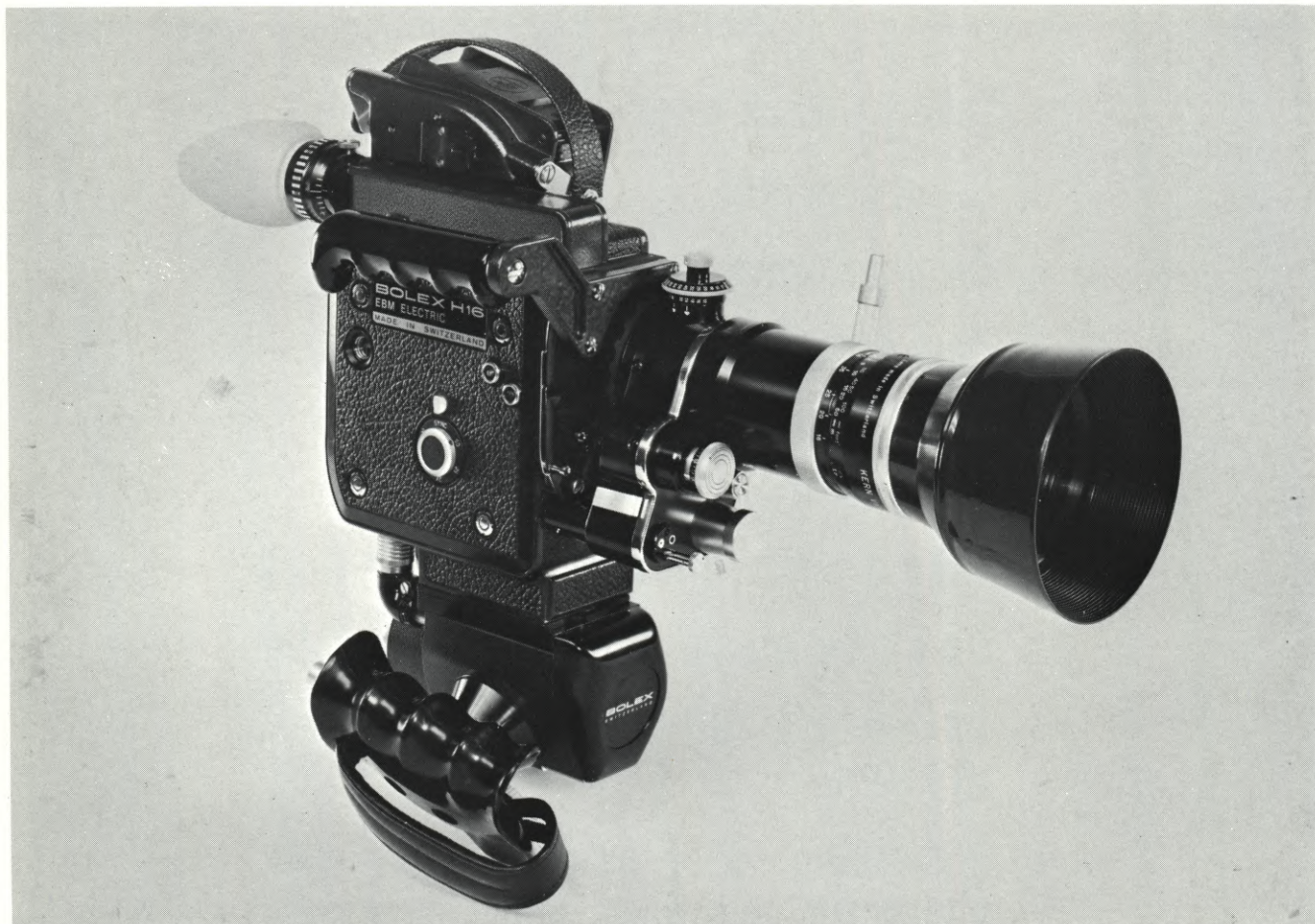


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CINEMA WORKSHOP



By ANTON WILSON

MAGNETIC SOUND RECORDING

Beginning this month, Cinema Workshop will devote several installments to the subject of magnetic sound recording. Topics covered will include tape care and storage, recorder maintenance and alignment, high-frequency bias, microphone selection, etc. As a foundation for these future discussions, a basic review of the principles of magnetic recording should be helpful.

The perception of sound is caused by fluctuations of air pressure near our ears. The magnitude of these fluctuations (amplitude) is perceived as loudness, and the speed of the fluctuations (frequency) is perceived as pitch or tone. There is no way of capturing or recording these fluctuations in their existing state of air pressures. Therefore, they must first be converted into some other form.

The microphone is the converting device, changing fluctuating air pressures into fluctuating electrical voltage. The resulting electrical signal is directly proportional to the original sound; changes in loudness are reflected in the amplitude of the electrical signal, and the frequency of the electric current matches that of the sound. This electrical facsimile of the original sound, however, is still not in a form that can be stored or recorded. Another conversion is necessary. In the case of a phonograph record, the electrical signal is converted once again into a mechanical signal that is ultimately recorded in a soft wax or plastic. The electrical signal is fed to the coil of an electromagnet. As the signal fluctuates, the magnetic field will fluctuate proportionately and a cutting stylus, which is under the influence of this field, will fluctuate likewise. The cutting stylus cuts a path into the soft recording material, and the result is a squiggly-looking groove that is an exact replica of the original air pressure fluctuations or sound.

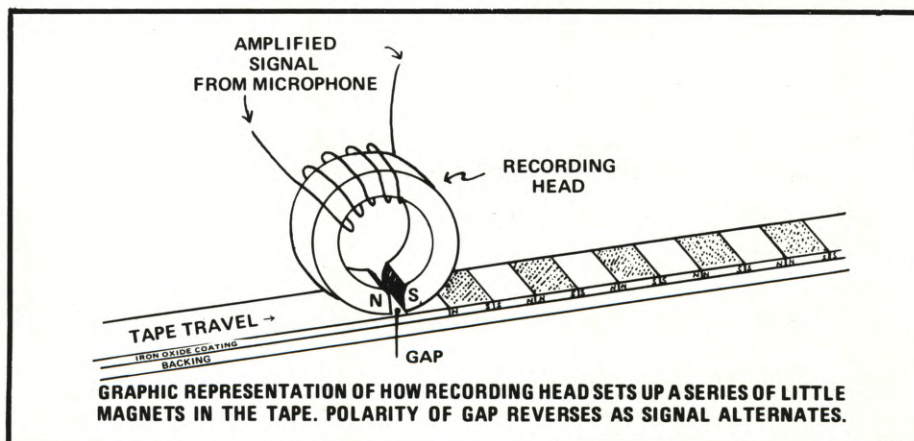
The phonograph disc has its limitations. It is susceptible to dirt and scratches, and it is almost impossible to edit. As early as 1888 scientists were experimenting with a method of storing the signal magnetically as opposed to mechanically in a groove. The basic

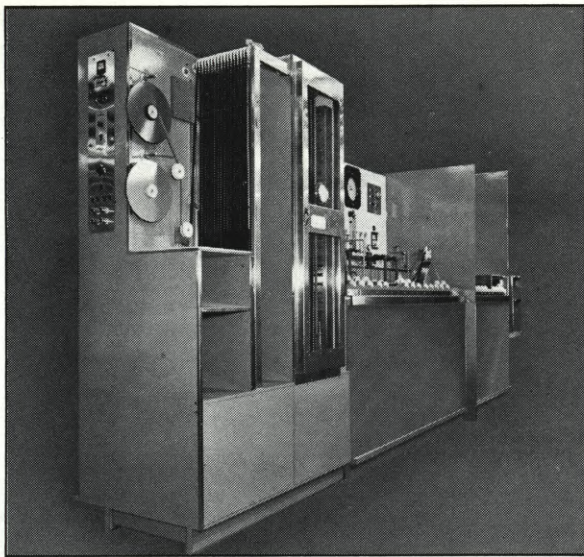
principle is simple. Almost everyone is familiar with the fact that a piece of iron can be permanently magnetized by bringing it in close contact with an existing strong magnet. In magnetic recording, millions of microscopic pieces of iron are employed in the form of an iron oxide coating on an acetate or polyester tape. In the erased condition, those tiny iron particles are in an unmagnetized state. The recording head is merely an electromagnet with an extremely narrow gap, very similar to a horseshoe magnet whose open ends almost, but not quite, touch. Because the gap is so narrow, the magnetic flux density is very strong in this small area.

Meanwhile, back at the microphone, the sound is converted into an electrical signal which is amplified and sent to the recording head. The recording head, as mentioned, is an electromagnet that will convert the electrical impulses into magnetic energy. Thus, the strength and polarity of the magnetic field in the gap of the head is directly proportional to the original signal. While this is happening, the tape, with its emulsion of iron oxide particles, is brought tightly against the gap in the head and moved at a steady rate. At any given instant, the magnetic field in the gap will magnetize the iron oxide particles on the tape that happen to be at the gap at that instant. Furthermore, these particles will be permanently magnetized; that is, they will retain this magnetism even after they pass out of the region of the recording head. Thus, on the tape, is a long series of microscopic permanent

magnets whose polarity and magnitude vary proportionately with the strength of the field in the head gap at the instant they passed. The original sound is now recorded in the form of millions of tiny magnets. If you could "see" the magnetism in the tape, you would see the tiny magnets closely spaced (many to the inch) for high tones, and loosely spaced for low notes. These magnets would be strong for loud passages and weak for quiet ones. For example, when recording at 15 i.p.s., a 60 Hz tone would be recorded as eight magnets per inch (alternating North, South, one cycle is recorded as two magnetic impulses, a North and a South). Likewise a tone of 15 KHz would be recorded as 2000 magnetic impulses per inch. Like film, resolution becomes a problem at higher frequencies. The emulsion must be very fine to record 2000 impulses per inch. The problem is even greater at slower speeds. For example, the 15 KHz signal would be 8000 impulses per inch for a tape speed of 3 1/2 i.p.s.

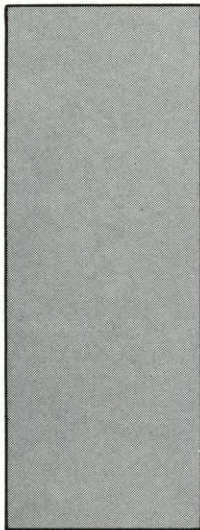
The playback process is merely the direct inverse of the recording procedure. The tape is moved past the playback head, which is constructed almost identically to the recording head. As the tiny magnets in the tape pass by the head gap, they induce an electric current in the head coil. This electric signal is proportionate in both frequency and amplitude to the spacing and strength of the magnetic impulses on the tape. This electrical signal can now be amplified and can drive a speaker or another recorder. ■



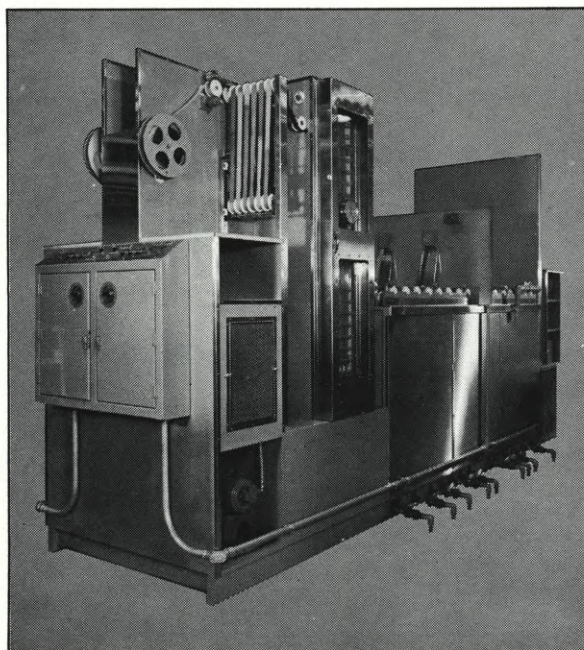
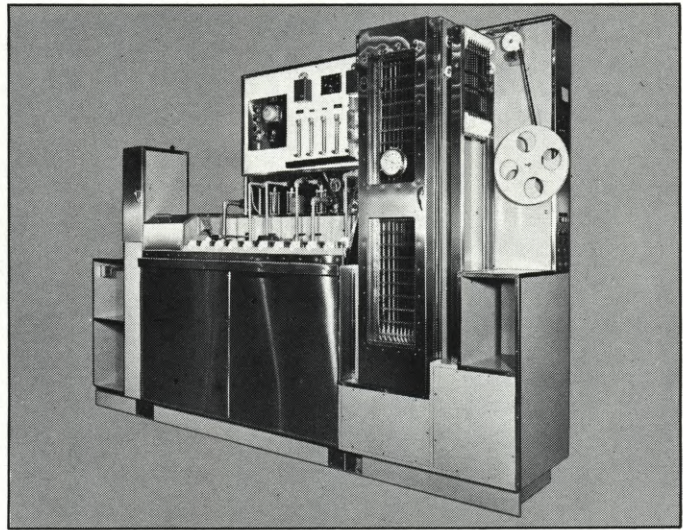


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INDUSTRY ACTIVITIES

U.S. FILMS SWEEP TOP PRIZES IN ITALY FILM FESTIVAL

CINE Golden Eagle selections won top honors at the International Review of Maritime Documentaries at Milan, with four entries receiving half the total prizes awarded to foreign films at this 12th Review.

Major prizes to U.S. productions were:

- 1) The Golden Medal of the President of the Republic of Italy to **THE HUNT** produced by Rob Fowler for RLF Productions, Inc.
- 2) Trophy of the Italian Navy Chief of Staff to **FULL FATHOM FIVE** produced by David Adams for Pyramid Films.
- 3) Trophy of the Italian Federation of Sport Fishing to **FISH: MASTER OF MOVEMENT** produced by executive producer, F.F. (Ted) Sack and producer-director Peter Rabow for Reela Films.
- 4) Trophy of the Italian Naval League to **VENEMOUS ANIMALS OF THE SEA** produced by the U.S. Department of the Navy.

Further details on the Milan Review and other international film and television festivals abroad can be obtained from CINE, 1201 16th Street, N.W., Washington, D.C. 20036, Telephone: Code 202 265-1136.

INTERNATIONAL FILM & TV FESTIVAL DATES ANNOUNCED

October 20-22, 1971, have been an-

nounced as the dates for the 14th annual INTERNATIONAL FILM & TV FESTIVAL OF NEW YORK. In making the announcement, Mr. Herbert Rosen, chairman and Festival Director, advised the setting will once again be the luxurious Americana Hotel in New York City.

Acclaimed as one of the world's leading film festivals, its purpose is two-fold. First, to honor those individuals and companies who contribute to the greatness of the industry with their outstanding creations and, second, to provide a showcase for new developments and a forum for the sharing of new ideas and techniques.

The first and oldest such event in New York, it is the only completely inclusive festival in the world to encompass all phases of film production from Filmstrips, Industrial and Educational Films, Television and Cinema Commercials to Filmed Introductions and Titles, Public Service Television Programs, Newsfilms, Promotional Films, as well as Multi-Media Presentations.

Increasingly popular for showcasing the finest productions for business, education and television, each year leading film producers and representatives of advertising agencies, industrial organizations, television stations and allied fields throughout the world are among those attending the screenings, workshop sessions, seminars and receptions.

Invitations to participate are now going out and full details and application blanks can be obtained from the Film Festival office at 251 West 57th Street, New York, N.Y., 10019.

TWO AMERICAN FILMS HONORED AT VENICE GOLDEN MERCURY FILM PRIZE

Two American films submitted by CINE (Council on International Non-theatrical Events) were honored at the recent Golden Mercury Film Prize in Venice.

The two films, awarded Golden Eagle certificates by CINE, were among 152 film entries which participated in the Venice event.

LIGHT, STRONG AND BEAUTIFUL sponsored by the Kaiser Aluminum & Chemical Corporation and produced by Francis Thompson Inc. under the direction of Neil Tardio took a top ranking Gold Medal. This film is being distributed by Modern Talking Picture Services, Inc. and Pyramid Films Corporation.

FLOWERING OF A DESERT, produced by Jerry Warner & Associates for the U.S. Information Agency, received an honoring certificate.

The awards will be among those presented by a representative of the Italian Embassy at CINE's Annual Awards Presentation Ceremonies and Exhibition of Films of Merit which will be held in mid-November 1971 in Washington, D.C.

Closing date for entry in the next CINE Golden Eagle selection of films will be August 15, 1971. For further information contact: CINE, 1201 Sixteenth Street, N.W., Washington, D.C. 20036 (Tel. AC 202 265-1136).

In the course of its series of monthly dinner meetings last season, the American Society of Cinematographers was privileged to have as its honored guests at the ASC Clubhouse in Hollywood, many prominent personalities of the motion picture industry. These included (left to right) producer-director Robert Wise, John Wayne (shown with ASC President Sol Halprin), and the dean of American film directors, John Ford. Following the summer hiatus, the monthly ASC dinner meetings will resume on October 25.



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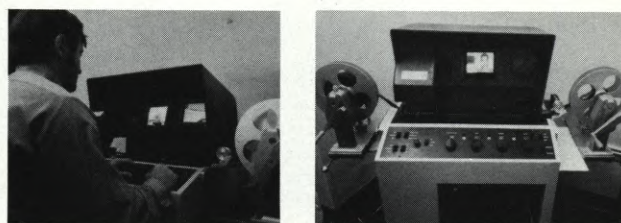
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A REPORT FROM:

The Godfather

IN AMERICAN CINEMATOGRAPHER, JUNE 1971 ISSUE,

CINEMATOGRAPHER GORDON WILLIS SAYS:

QUESTION: I notice that you're using the new Mark VI Cinemobile on this picture, which is the first time it's been used by anyone. How is it working out?

WILLIS: I've never used a Cinemobile before on any movie. I wish I had. When I sat down and thought things out prior to starting this film, I realized that, of all the films I've worked on, if I didn't keep my end of this movie relatively tight and simple, it would look like the Normandy invasion. There would be trucks and bodies strewn all over the place. It's not that I'm using more equipment than I usually use. I'm using the same amount. It's just that there's a tendency for things to grow out of proportion on a "big" movie, or one that's had a lot of publicity. I wanted to keep my part simple.

QUESTION: How did you happen to decide upon using the Cinemobile?

WILLIS: I went out to California to talk to Fouad Said because I thought he might have something to offer that would help me keep things fast and simple. After talking and thinking and working with him for a week I was very impressed and decided that what he had to offer was terrific. We've been using it for some time now and have found it to be excellent. The people he sends along with the truck are excellent, too.

QUESTION: Do you find that you can carry everything you need for a big picture like this?

WILLIS: We've packed more firepower, so to speak, into that Mark VI than most people have got strewn over eight or ten trucks on the average movie. What I'm saying is, of course, based on my philosophy of making a movie. There are a lot of people in this business who still haven't given up using arcs. I gave them up long ago. So, even

though the Cinemobile provides much room for arcs, if you choose to use them, I don't. I use that space for other types of lamps and things which I feel are of more value in shooting a picture. I've found the unit to be excellent. It's contemporary. It's well thought-out. It's a very meaningful piece of equipment for any cameraman, any producer. You can load and unload from both sides of the vehicle. The way it's designed, you can pull things off as you need them, without having to unload the whole truck to get at one thing.

QUESTION: Is there anything it doesn't have that it should have?

WILLIS: Not really, even though there is one thing that we hadn't planned on. I happen to use hundreds of feet of Elemack dolly track, because I believe that if you're going to make dolly shots, you'd better be able to make them fast. Anyway, we hadn't planned on taking along 200 feet of Elemack track. However, we've got it stacked on top of the van and it fits fine, because he provided for that with a railing area. I'm very delighted with the way Said has extended himself. He listens well and he'll incorporate your suggestions into his equipment. He'll keep making design changes, too, which I'm very happy about. I don't presume to speak for other people, but in my department I feel that he's made a major step forward in helping to modernize the business. He's made it easier and less costly for people to shoot, and that's very important. Movies cost enough money. There's no point in spending your entire day working as a parking lot attendant so that you can make a shot. I'm delighted with these trucks and I'll use them whenever I can—forever, if I can get ahold of them.



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DISTORTION TECHNIQUES USED IN FILMING “THE BIRTH OF APHRODITE”

Film-maker refines techniques developed by his wife and wins “Best Experimental Film” award in Atlanta

By LELAND AUSLENDER

Producer/Director/Cameraman



Aphrodite, played by Cheryl Smith, emerges from sea-foam, trailing seaweed. Birth of the goddess from the sea was filmed along California beaches.

The creation of THE BIRTH OF APHRODITE began in 1967, without my being aware of it at the time. My wife, Taki, and I had sat through a showing of experimental films, including some by James and John Whitney, Jud Yalkut and Jordan Belson. When I expressed the wonder and excitement I had felt, Taki casually replied, “Well, I don’t think they were *that* great.”

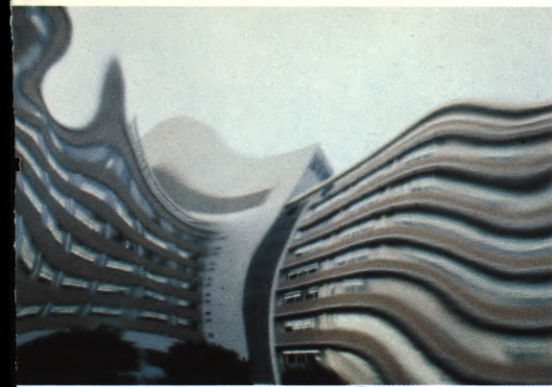
Her reply offended me; yet, I had to find out why she felt that way. For Taki is a sculptor, with works in major collections and museums, and I could not discount this statement from an artist I respect. She explained that the films we had seen deal with non-living, non-organic, non-human images, and it is the human world that is most meaningful to us.

Now I, with my scientific background and feeling of absolute awe at the cosmic mystery, had seen and felt things organic to my nature in these cosmic-oriented films. I told Taki that she just didn’t appreciate the enormity of the film-makers’ accomplishment. I also suggested that she should not be so critical till she had some concrete idea of how to accomplish the imagery she

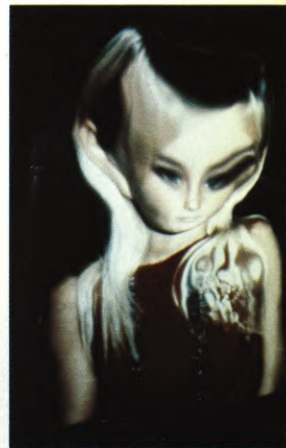
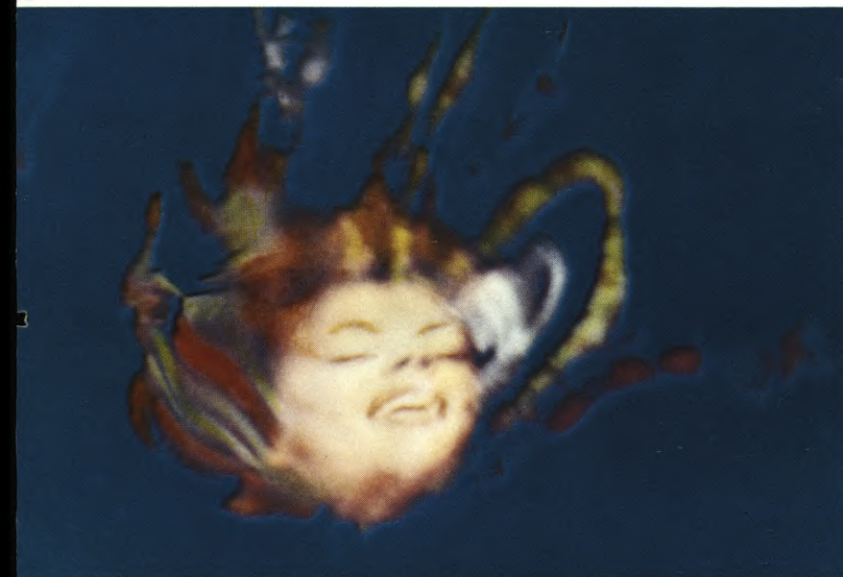
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Aphrodite touches the sand after she is born onto the Earth. Though the story is hers, several girls were used for varying imagery during filming.

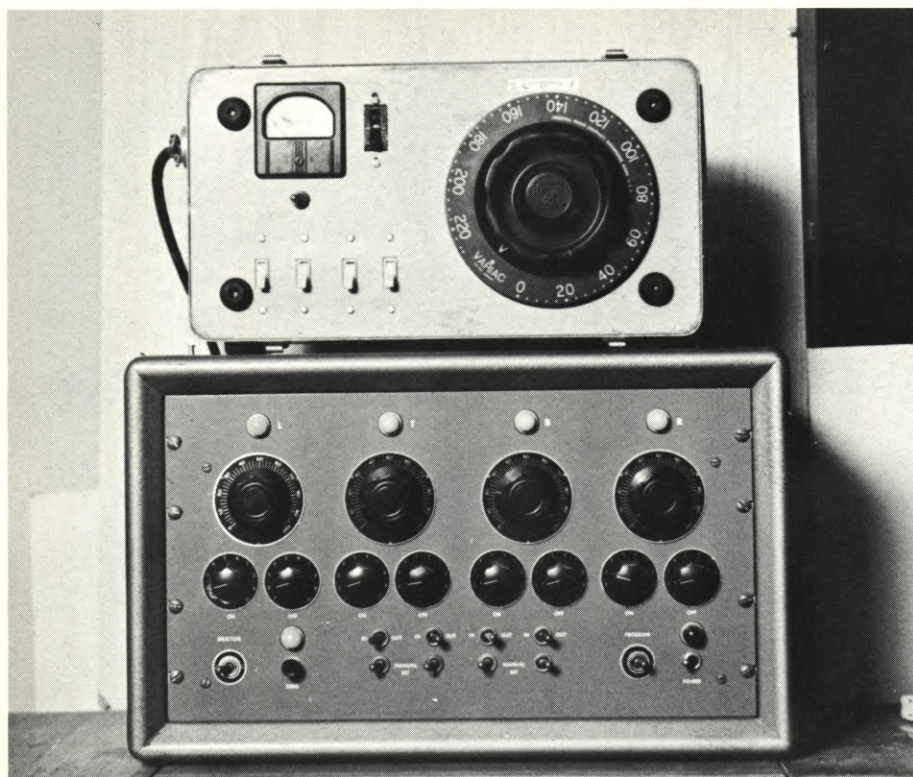


Still photographic tests by the author, using various distortion methods which he perfected, include the box-like Prudential Building in Los Angeles, which is turned into an organic Gaudi-like structure (top left), and a lovely girl compressed into a cyclops banana (bottom left). Methods developed by Auslender and his wife included a large plastic distorting lens and a special distorting reflector that loses hardly any of the exposure value of the original lighting.



(ABOVE LEFT AND BELOW) Frame blow-ups from "THE BIRTH OF APHRODITE" show a few of the many fanciful images created by the author. The wavy results produced by early experiments suggested underwater scenes and prompted him to utilize the techniques in depicting the metamorphosis of Aphrodite who, according to legend, emerged from the sea, dwelt briefly on land, and ended up as the planet Venus.





The author created a series of moving panels which enabled him to impart any desired degree of motion to the distorting mirrors and lenses. Variac (at top) controls light and color intensities. Panel (below) controls speed and direction of motorized distorting reflectors and/or objects to be distorted.

visualized in the cinematic medium.

When, a few days later, she asked me to show her how to run the movie camera, I had forgotten about my challenge. I set the camera on a tripod, framing a square-foot area she had outlined on the floor, and set the exposure for the light coming through the window. I showed her how to focus and to start the machine, and gave her a roll of outdated high-speed color film to play with. Then I went off to work and didn't witness her experiment.

When the film came back from the laboratory, she asked me to project it for us. I didn't know what to expect, and certainly didn't expect what I saw. I gazed with amazement at a kaleidoscope of softly colored living forms, moving in astonishingly complex patterns, organically fusing, curling, evolving and disappearing into nothingness. In their midst appeared a weird, barely discernible, human figure, transmuting itself into dreamlike visions, both lovely and grotesque.

"Well, you did it!" I said, and bowed three times to her, facing East, in salaam-like fashion. Guess as I might, I could not fathom how she had achieved these effects that were as complex as any animated or computer imagery I had seen, yet, as she had indicated, were basically organic and alive. My obeisance was to show her I was vanquished,

in the hope that she would reveal her secret to me. After much pleading, and a promise never to question her seemingly rash statements again, she showed me the following unnervingly simple system.

Two years earlier, when she had expressed an interest in drawing an animated film, I had bought her a package of five-hundred animation cells. To my disappointment, the package lay unopened for two years, as she was giving all her time to making sculpture for various shows. For this experiment, she had opened the package and removed a single cell. This she heated and treated until it retained some natural surface curves. Then she lay it on the floor, over a dark-colored carpet, and pointed the camera toward it. Behind the cell she hung some colored silk scarves and set them gently in motion with a fan. She focused on the image of the scarves, reflected from the surface of the distorting cell, and started the camera. She then walked in front of the scarves, moving and gesturing with appropriate magicianship.

I was unhappy that Taki had never got around to creating an animated film with her exquisite figures on the cells. But now, using just one of those cells, she had made the whole investment worthwhile.

That single day, essentially, was the

beginning and end of her contribution as she returned smiling to her sculpting. But it turned out to be the beginning of a harrowing four-year project for me.

Two years and many thousands of dollars later, I had succeeded in transforming her primitive optical system into a highly reflective, flexible and controllable method for creating continuously changing distorted film imagery.

During the first year, from a clear cell with black backing that reflected only a fraction of the light incident upon it, I evolved a highly reflective surface that lost only a third of a stop in reflecting the image. I developed a means of molding the reflectors into any desired distorting surfaces that rigidly hold their shape regardless of the heat, humidity, handling and mounting stresses. I developed methods for fabricating the reflectors in quantity, and created a variety of distorting surfaces with differing types and degrees of distortion. I even got sidetracked into marketing them as a children's toy on the wave of the psychedelic revolution.

At the time, Taki was working in plastics, and together we designed and created a number of large plastic distorting lenses that could be placed between the camera and subject to provide a

THE BIRTH OF APHRODITE

The sky god mates with the sea goddess and from their union is born Aphrodite, goddess of Love and Beauty. In this version of the ancient Greek legend, the gestation period is realized as the two billion year history of evolution that took place under sea, culminating in Aphrodite's birth from the foam. After her visit to Earth, Aphrodite continues her ascent, becoming the planetary body Venus, thus completing a cycle.

CATEGORY: *Experimental Mixed Media*

PRODUCTION COMPANY: *Leland Auslander Productions*

PRODUCER: *Leland Auslander*

DIRECTOR: *Leland Auslander*

SCRIPT: *Leland Auslander*

CAST: *Cheryl Smith, Gwyneth Cooper, Patricia Hyland*

MUSIC: *Group II with Time Weisberg (Fred Katz, Consultant)*

CAMERAMAN: *Leland Auslander, Rob Lyon*

EDITOR: *Leland Auslander*

RUNNING TIME: *12:00 minutes*

COLOR: *OPTICAL; 16mm*

COLOR SYSTEM: *ECO*

COUNTRY OF ORIGIN: *USA*

LANGUAGE: *English*

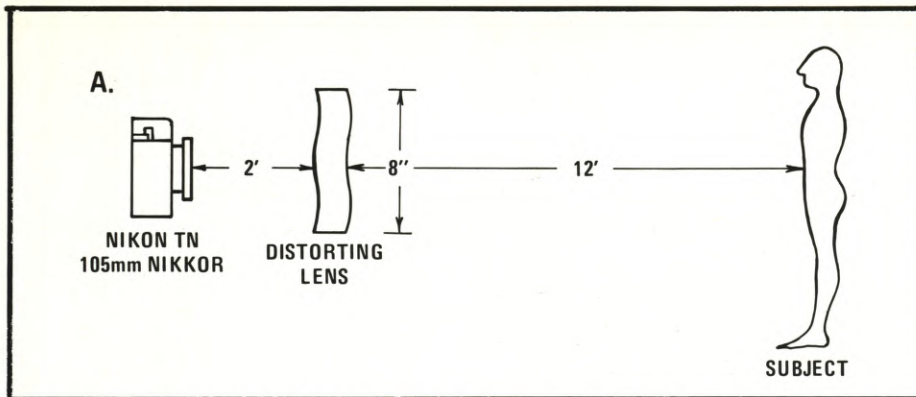


Diagram showing set-up for shooting still photographs through large plastic distorting lens developed by the author and his wife. The identical arrangement can, of course, be used for filming motion picture scenes, as well.

different type of distortion imagery.

Finally, I created a series of moving panels that enabled me to impart any desired motion to the distorting reflectors and lenses.

I spent the next year experimenting with still photographs to perfect the techniques of using these extraordinary optics. The distorting surfaces create an image that is focused on an infinite number of planes, making it extremely difficult to achieve sharpness over the entire image. My experiments resulted in optimizing the optics and techniques for achieving a satisfactory depth of field. Samples from these experiments are shown in the accompanying photographs.

I discovered that, by means of distortions, I could make people not only ugly and grotesque, but could enhance their beauty. A weak chin could be built up, small eyes enlarged, a low forehead heightened, a short body lengthened—I felt like a plastic surgeon of the camera.

The distortions suggested mind-bending images from dreams, nightmares, psychoses, hallucinations and psychedelic experiences,—perfect for portraying deep layers of subjective experiences.

Finally, I was ready to try the new equipment in a film experiment. A friend, Gwyneth Cooper, agreed to recline on the black drapes of my studio while I turned the distorting reflectors and lenses on her unadorned figure to see what effects I could get.

I was immediately struck by the fluidity of the images, as if they were viewed through water with waves rippling gently over its surface. So we filmed some footage of her "swimming" up, down, around, and through—while I made her body ripple, change, and flow by moving the camera and reflectors. It takes a great deal of experience and skill to create meaningful distortion imagery, and the months I spent developing the techniques contributed vitally to achiev-

ing the final polished product.

A little research turned up the fact that distortion effects had been used by an occasional film-maker since the early days of motion pictures. But none of these pioneers had the motorized system nor the flexibility provided me by modern technology and materials. Furthermore, few, if any, used the effects to create beauty, being content to travel the easier route of creating horror and grotesqueries.

I was so excited with the results of the first experiment with Gwyneth that I decided to use the experimental footage—though shot in black-and-white—as

Leland Auslander shoots with still camera directly into one of his multi-distorting reflectors, simultaneously creating a caricature of himself. He developed his own means of molding the reflectors into any desired distorting surfaces that rigidly hold their shapes, regardless of the heat, humidity, handling and mounting stresses.



the basis for a film. As I needed only a small portion of the footage, I decided it would be most economical to add color to those shots I needed by re-shooting them through colored filters on my homemade optical printer.

In this case, the experimental results determined the subject and approach of the film. The fluid imagery suggested placing the action underwater, which led to the idea of portraying Aphrodite, Greek goddess of love and beauty, born

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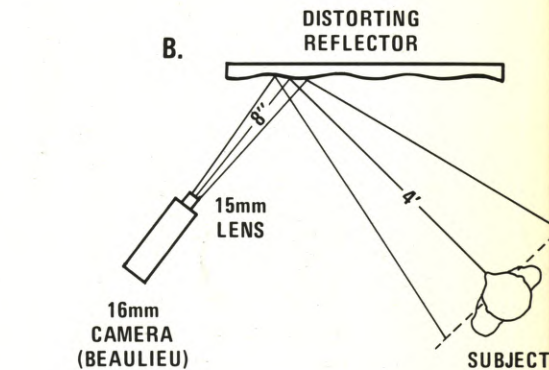


Diagram of the set-up used for filming distortion scenes through the use of special reflector that loses only one third of a stop in reflecting image. Camera is set at an angle to avoid picking up its own reflection.

"BLUE WATER, WHITE DEATH"

THE HUNT FOR THE GREAT WHITE SHARK

By PETER GIMBEL

Director/Underwater Cameraman

On February 24, 1971, I wrote a \$290.00 order for O-rings, chargeable against the budget of "BLUE WATER, WHITE DEATH." O-rings are washer-like devices with a round cross-section made of a variety of flexible materials, often neoprene, and widely used as seals in pneumatic, hydraulic and hydrostatic applications.

So what? Why give us that dull tidbit for starters?—you may legitimately ask.

A six-month, 12,000-mile search for the most lethal cold-blooded predator exposes team of four underwater cameramen to deadly hazards

For one thing, \$290.00 represents a lot of O-rings, about 1,600, in the sizes I ordered. More significantly, although low in unit price (as most of those used for seals in underwater camera and lamp housings are), an O-ring worth 12¢ is one of those special parts that cannot be jury-rigged in the field and the unavailability of a certain size could cripple a geographically isolated filming unit such as ours, days away from our source of

supply. The fixed production cost of our only unit ran to about \$2,000 per day, not an enormous amount by some standards, but quite significant in terms of the budget for "BLUE WATER, WHITE DEATH."

In those pre-production days Phil Clarkson, production manager, confronted me daily with the ever-mounting overage in the hardware and spares

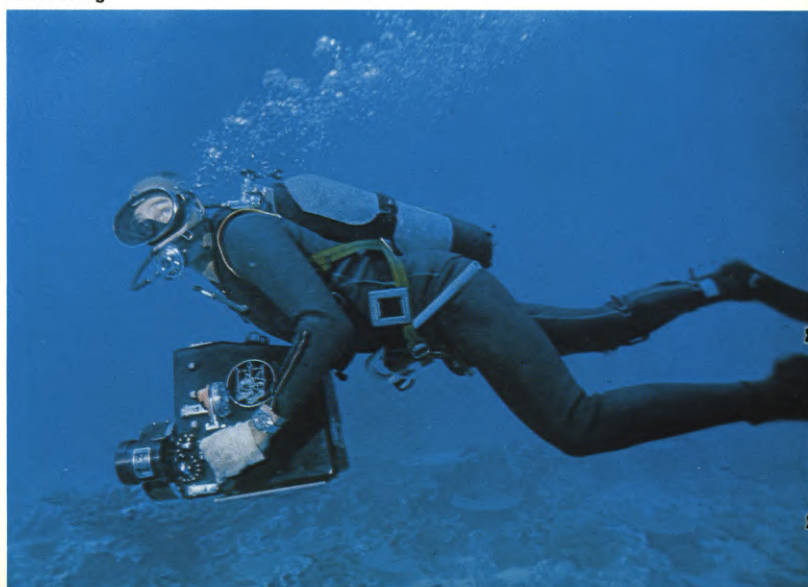
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(LEFT) "Two thousand pounds of streamlined death," is what expedition leader Peter Gimbel calls the Great White Shark. Comparing it to other sharks, he adds, "It's like comparing a Siberian tiger to a pussycat." (RIGHT) The razor-sharp serrated teeth shown here belong to the Great White Shark, the deadliest cold-blooded predator in the world and "star" of Cinema Center Films' "BLUE WATER, WHITE DEATH".

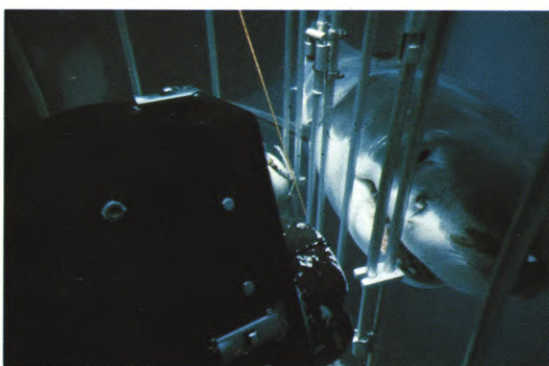


(LEFT) A member of Gimbel's crew uses cow blood as a lure for sharks. The larger-than-life adventure took the expedition to South Africa, Ceylon and Australia's Dangerous Reef, where they finally found the creature they sought. (RIGHT) Cameraman-diver Stan Waterman searches for his subject with Techniscope-adapted 35mm Arriflex camera in MAKO underwater housing.





(LEFT) Co-director/Surface Cinematographer James Lipscomb hand-holds blimped Arriflex mounted on body-brace to film night-for-night sequence on deck of expedition ship. (CENTER) Lipscomb and Australian underwater expert Valerie Taylor film scenes from a rubber boat in the Mozambique Channel. (RIGHT) Gimbel and Lipscomb hold an informal "story conference" on the wharf during one of the ship's rare stops at land areas along the route.

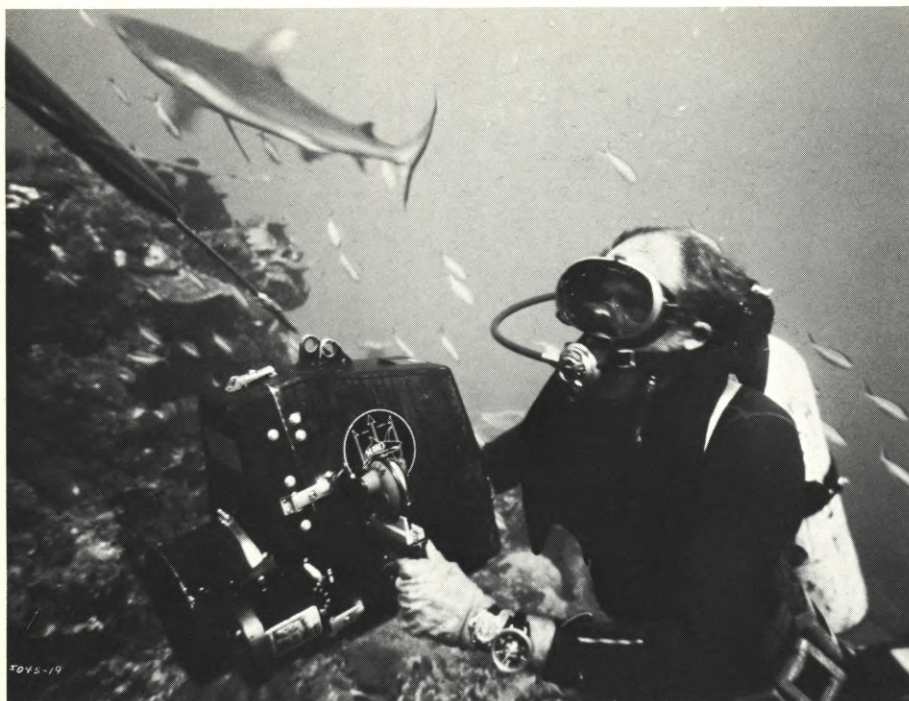


Time after time, the savage shark attacked the elevator cages designed by Peter Gimbel to protect the cameramen-divers. The Great White Shark grows larger than 40 feet in length and, although elusive, is found in all waters of the world. The shark featured in the film was estimated to be about 16 feet long. It has been known to swallow a human being whole. The most recently documented attack of this sort occurred a few years ago, off the coast of La Jolla in Southern California.

Underwater expert Stan Waterman, shown reclining on deck of the Terrier VIII, was one of four highly-skilled cameramen-divers who joined in the search for the Great White Shark and risked his life to capture it on film.

The Terrier VIII was the stout ship used to transport the intrepid crew halfway around the world in their quest for the most dangerous game in the ocean. Before finding him, they filmed many other sharks, giant turtles, barracudas and the wreck of the sunken ship Hermes.





Underwater photography was done with 35mm Arriflex IIC Techniscope-adapted cameras mounted in MAKO housings produced by Jordan Klein of Miami. Most often used were 18mm and 9.8mm wide-angle lenses, which required the use of a corrective port in the housing to avoid underwater distortion.

account. It became a ritual and earned me the sobriquet "Overkill" Gimbel. So be it. But, we lost no production time "for want of a nail"—or an O-ring either.

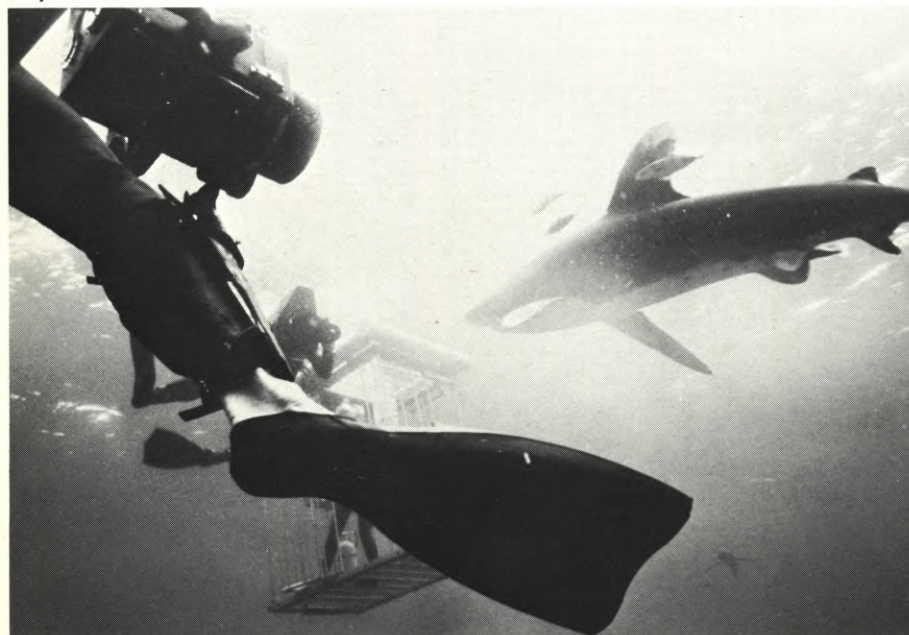
The fact is that in the case of productions like "BLUE WATER", that is, technically off-beat and physically inaccessible, reliable equipment and the capability of field maintenance and repairs are the *sine qua non*. Clearly, I

mean this in the negative sense: it's not what wins the game, but it can easily be responsible for losing it.

Practically the entire film was shot with six 35mm Arriflex IIC Techniscope cameras. Two of these were assigned to James Lipscomb for surface photography, three were assigned to the underwater unit and the last one we fought over.

I selected the Techniscope system for

During their 12,000-mile, six-month sea-hunt safari, the underwater cameramen encountered hundreds of sharks of all varieties, plus moray eels, giant turtles, large groupers, barracudas and an underwater wreck—all of which were recorded faithfully on film and add to the suspense of the picture.



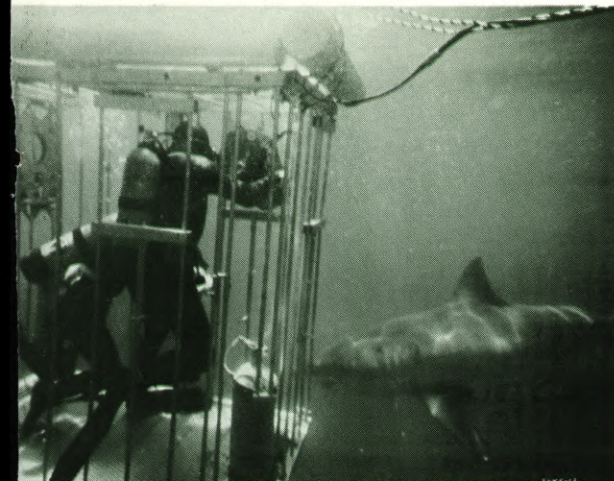
several reasons. A wide aspect ratio seemed clearly indicated because of the normally horizontal orientation of marine creatures—a sixteen-foot shark has an extremely wide aspect ratio—the right look for seascapes and underseascapes and its suitability for shipboard shots, as well. With the two-perforation pulldown of Techniscope (as compared with the normal four-perforation pulldown) a 400-foot load, the largest we could handle, runs 8 minutes and 53 seconds at 24 fps. This is, of course, precisely double the run obtained at four perforations per frame; an enormous advantage in underwater work.

We needed to use the fastest possible extreme wide-angle lenses. A big shark swimming directly across the camera front at close range subtends a very wide angle indeed. When the shark turns and comes straight in toward the camera, certain other problems—which should be immediately apparent to the alert reader—become more pressing than the angle of view of the lens. The fastest and most extreme wide-angle lenses are spherical, not anamorphic, and Techniscope is the only very wide-screen system that can be used with a spherical lens. Wide aspect ratio, maximum running time per load and lens requirements: these were the factors that dictated the use of Techniscope.

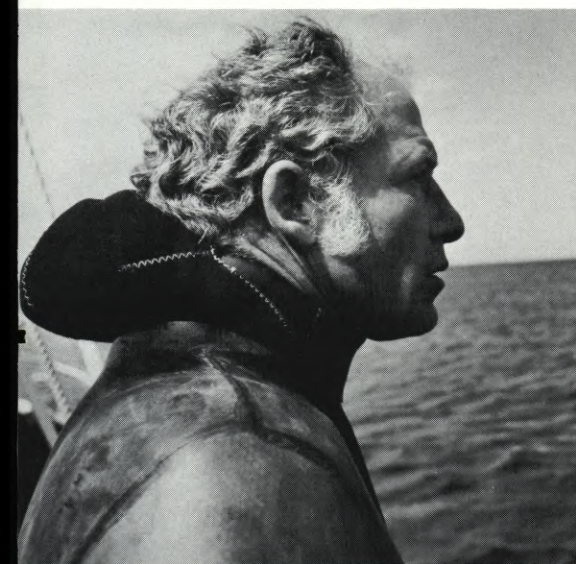
Our primary underwater lenses were 18mm, F/1.8 (T/2.0) Kinoptiks (Apochromat) and 9.8mm, F/1.8 (T/2.3) Kinoptiks (Tegea). In the very clear waters off South Africa and in the Mozambique channel, we tended toward the 18mm's; in the turbid conditions off Ceylon and South Australia, we went more often with the 9.8mm's. The 9.8mm lens is very heavy and, for optimum results, should be fitted with a support.

Lenses as wide as these call for a corrective port, not simply a flat port, due to the refraction of light rays as they pass from the water medium, outboard of the camera housing, through the interface into the air medium inside. This refraction through a *flat* port will cause a narrowing of the field of view and progressive distortion of the image away from the axis of the lens.

I would refer anyone interested in this problem to the published works of Mr. Gomer T. McNeil, president of the Photogrammetry Division of Data Corporation (formerly Photogrammetry, Inc.) to whom I am indebted for generous and invaluable assistance. Although the principles are fixed, the specific solutions vary with respect to the lens used. Mr. McNeil's solutions are proba-



(LEFT) Filming of the more dangerous denizens of the deep was done from special aluminum shark cages designed by the author and on which he holds two patents. (CENTER) The divers, disregarding their own safety, often moved outside the shark cages to get better camera angles—a most hazardous procedure under conditions where sharks are feeding. (RIGHT) Two cameramen swim toward the surface to get shots of a whale, harpooned off the coast of Durban, South Africa. Sharks often tear the wounded whales to shreds before they can be towed ashore.



THE HUNTER: Peter Gimbel, of the department store family that doesn't tell Macy's, deserted the gray flannel world in favor of the adventure of hunting the Great White Shark.

bly as elegant as any at the present time.

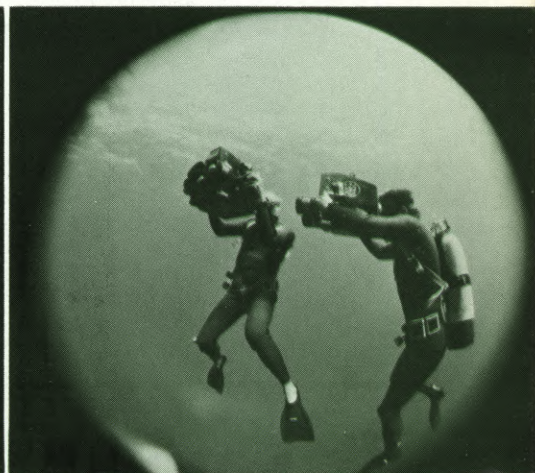
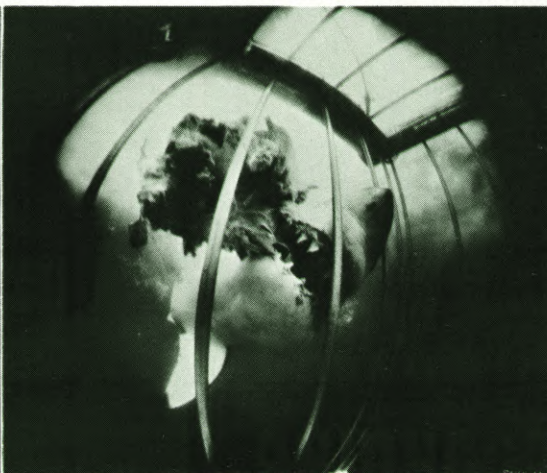
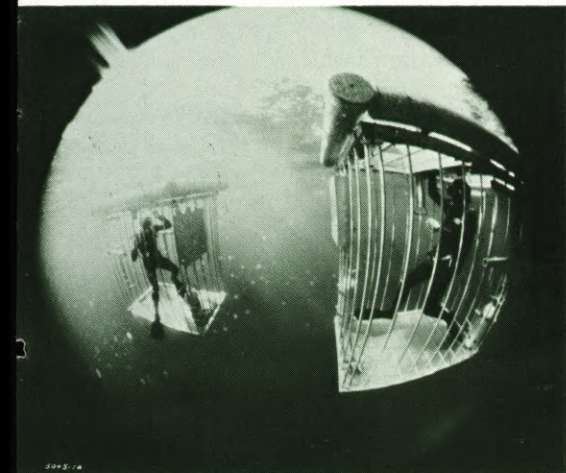
The underwater housings for the Arriflexes were produced by Jordan Klein of Miami under the trade name MAKO. The worst thing I can say about them is that no two were identical. The underwater unit—including myself—had a long-running laugh about that. But none of us laughed when we got down to cases: through months of abusive and constant use, no MAKO housing ever gave us a problem.

Each housing was fitted with a sunshade, mandatory—because without one you will often get a crescent-shaped reflection ring in the lower portion of the frame caused by surface brilliance when the camera tilts at a certain angle. The housings also had an underwater light meter (Sekonic Marine) attached to the top of the left handle and a 180° sport finder with the field for the 18mm and 9.8mm lenses indicated. An optical
Continued on Page 952



THE HUNTED: In a reversal of roles, the deadliest cold-blooded predator in the world became prey for the motion picture cameras that tracked him half way around the globe.

(LEFT) The cameramen often operated from two shark cages in the water at the same time. These special diving "elevators", which operate without any surface connection, are autonomous and can hover stably for underwater filming. (CENTER) At one point, the Great White got hung up when he swallowed a huge hunk of meat roped to one of the cages. His thrashings were so violent that they endangered the diver inside the cage and he had to be cut loose. (RIGHT) Each underwater housing was fitted with a sunshade to avoid reflections from the surface.



THE TOPSIDE PHOTOGRAPHY FOR “BLUE WATER, WHITE DEATH”

Shooting the top-side scenes for a basically underwater documentary, in authentic *cinema verité* style, offered its own special challenges

By JAMES LIPSCOMB

Co-director/Surface Cinematographer

At a round, dark oak table in the Ginger Man restaurant in Manhattan in the Spring of 1968, over raw steak, onions and capers, Peter Gimbel told me the problem.

“A few people have shot fine sync-sound 16mm films and blown them up for theatrical showing—*Dylan, Faces*—and a lot of people have used wild or dubbed hand-held 35mm shots in features. But that’s not good enough. I’m going to lead an expedition to the Indian Ocean in a ship called the Terrier VIII. We’re in search of the most dangerous species of shark in the world—the Great White—and we want to photograph the story of the expedition in *cinema verité* style using 35mm sync-

sound. Arri is producing a light-weight, blimped 35mm camera, but we can’t wait for it. What do we do?”

I had known Peter, mostly by reputation, for a long time. His first pictures of the sunken Andrea Doria were famous. I remembered a marvelous piece he had written on sharks for Sports Illustrated. He had parachuted into an uninhabited region of the Andes and dived with seals under Antarctic ice and with Blue sharks in the Atlantic. He is an adventurer and a fine cameraman. He had the financial backing of Cinema Center Films for his *cinema verité* feature.

Everyone connected with the long, slow development of *cinema verité* in

the United States knows what a breakthrough that represents. Back in 1961 I had been a member of Drew Associates where, with Drew, Leacock, Pennebaker and Shuker, we had been instrumental in introducing the *cinema verité* technique in America through the production of 16mm sync-sound specials for television.

Since those early days I had been involved variously as soundman, editor, cameraman, director and producer of 16mm *cinema verité* films. MOONEY VS. FOWLE (high school football) CRISIS (the confrontation between the Kennedys and Governor Wallace) and STORM SIGNAL (the story of a drug addicted couple) had won us prizes at film festivals and attracted praise from a few critics who, unlike Jack Gould of the New York Times, were able to recognize in those films the excitement of a newly developing form.

We had seen our style develop—at least on television—from a disreputable form which agencies and sponsors resisted, to a cachet where the words “*cinema verité*” were often used as a hot-sell pitch in the presentation of even the most stodgily conventional documentary.

But all of us had known that someday, somehow, someone would get together the money for a true *cinema verité*, theatrical feature. The time was right. Bruce Brown, with his very enjoyable but old-fashioned ENDLESS SUMMER, had proved that a documentary could make money. Pennybaker, shooting in black and white, had made a modest success with his skimpily-budgeted *cinema verité* film about Bob Dylan. MONTERAY POP had been shot on a larger budget, but for television. The Maysles were just finishing SALESMAN, but had been forced to finance it themselves. WOODSTOCK had not yet happened.

All of us in New York, who had been working so long in the reality film tradition, knew that the real breakthrough into successful features had yet to be made, and a number of us had been trying for some time to get the money to make such a film.

The author, Co-director/Surface Cinematographer James Lipscomb, shown with Techniscope-adapted 35mm Arriflex camera in a modified Cine 60 blimp. Addition of an offset viewfinder eyepiece improved the balance of the cumbersome rig and made extensive hand-holding of the camera (mounted on body-brace) possible.



Now, here was Peter Gimbel sitting across from me in the Ginger Man, telling me he had \$750,000 from Cinema Center Films to make the first adequately financed *cinema verité* feature.

A few wary questions and we had both established between ourselves that we were talking about the same kind of film. "*Cinema verité*" means so many different things to different people. The French, for instance, use the term to designate improvised film. In the U.S. one hears films like MEDIUM COOL called *cinema verité*, but marvelous as MEDIUM COOL is, it is, except for a few scenes, a film relying on script, actors and a director, like any other.

Peter and I were talking about a film in which the film-maker photographs a real experience as it happens to people who are not acting fictional roles. We both wanted to tell the real story of the expedition with all the excitement, danger, problems, disappointments and personality conflicts we knew might arise during the course of a six-month expedition.

And Peter wanted to shoot it in 35mm. In order to shoot a reality story a cameraman needs a light-weight camera so that he can move quickly. There are a number of light, quiet 16mm cameras for that kind of shooting, but all the 35mm cameras then available were too noisy for sync shooting and blimps that were big enough to cut the noise were too heavy for anyone to carry. Everything that I knew about 35mm vs. 16mm for *cinema verité* films led me to believe it would be better to shoot in 16 and blow up the release print. Still, I was willing to give it a try.

Peter had already decided that he would like to shoot in Techniscope. The two-sprocket pull-down uses up film just half as fast as the regular four-sprocket, academy aperture format, and that extra long run is important for underwater cameras which are such beasts to reload.

We were both aware of the problems some producers have reported experiencing with Techniscope, but with the first tests, I found an unexpected bonus. An Arriflex 35 camera, pulling down two sprockets per frame is running just half as fast as normal and therefore makes just about half its usual noise. Suddenly the blimping problem dropped from utterly impossible to almost impossible.

The best blimp for our purposes was Cine 60's fiberglass and lead creation, but for hand held shooting it has two serious weaknesses: 1) The viewfinder is

Continued on Page 906



(ABOVE) The reason for it all—The Great White Shark, deadliest cold-blooded predator in the sea. It was in quest of this man-eating monster of the deep that the filming expedition was formed. He was finally discovered off South Australia's Dangerous Reef, after a six-month 12,000-mile sea hunt. (BELOW) Valerie and Ron Taylor, two of Australia's most renowned underwater experts, who joined Peter Gimbel's search for The Great White Shark.



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



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

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

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

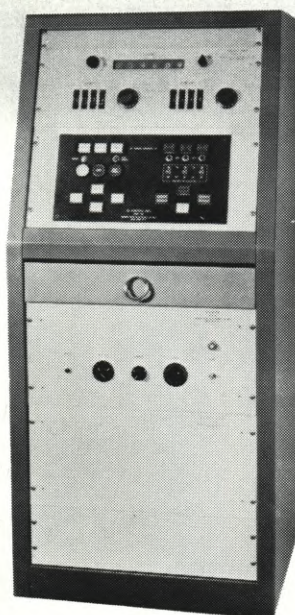
High speed return of the film to "start" saves time and permits new starts without waiting for a "loop" to complete its trip.

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

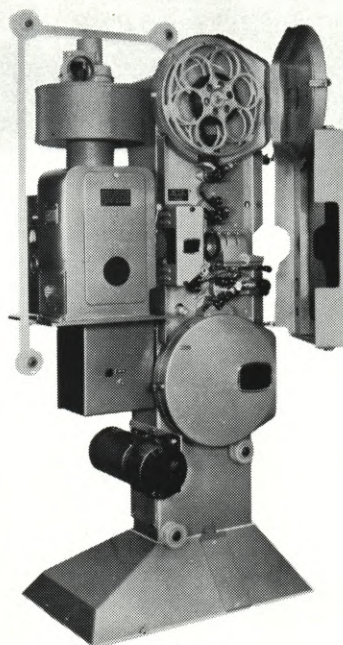
A complete remote control system is provided the director so that, once the recording engineer has preset footages, the director can take over if he wishes and directly control every facet of the recording.

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

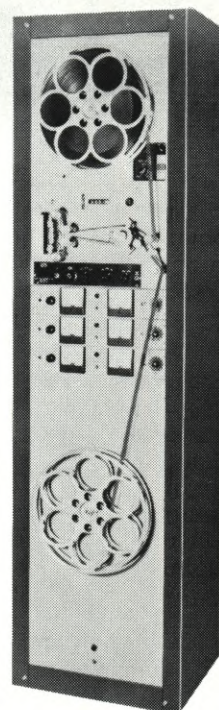
This track now has all of the final takes in sequential position and ultimately permits the screening of the picture and the final edited track in perfect synchronization. From this point the track is ready to go to a mix and no further editing is required.



Electronic Looping Console



35mm Projector



Master Magnetic Pick Up Recorder with Selective Erase



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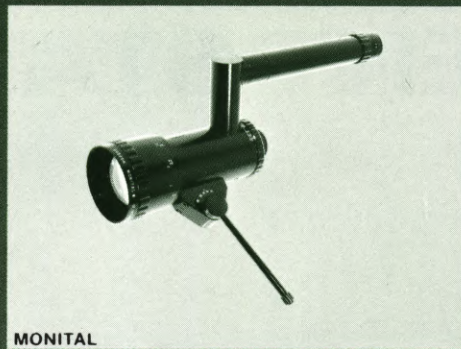
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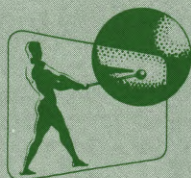
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HAL MOHR, ASC, VISITS KENT STATE UNIVERSITY

Veteran cinematographer bridges the generation gap between the pioneers of the film industry and the "new film-makers"—with everyone enjoying the encounter

By ALEX GILDZEN

It was Hal Mohr Day at Kent State University but Hal Mohr wasn't sure he was going to like it.

The two-time Oscar winner who flew in from an Albuquerque meeting was recovering from a case of ptomaine. Then, upon arriving in Ohio, he was told that his friend Henry King—also being honored with his own day as part of a silent screen seminar at the University—was hospitalized on the west coast and unable to come. Mohr had already planned to stay on campus two extra days to see King.

On top of that, the print of "SPARROWS", which Mohr filmed with Charles Rosher, hadn't arrived from

Hollywood and for the seminar's Thursday evening program at which he was slated to appear a poor reduction print of von Stroheim's "THE WEDDING MARCH" was substituted.

But before the three-day seminar sponsored by the University's Artist-Lecture Series was over, Hal Mohr was having the time of his life.

The hazy print of "THE WEDDING MARCH" didn't deter the students who received Mohr warmly the opening night of the seminar—but for the cinematographer the quality of the print combined with his dislike of the film to produce a sour note.

Mohr, in his Ed Begley voice, de-

scribed von Stroheim as a perfectionist whose sense of detail was exceptional. He recalled that the director charged his script girl with making an exact note of the location of each petal that fell on the performers during the famous love scene.

He became more animated, however, as he discussed the tricks he invented for "A MIDSUMMER NIGHT'S DREAM" and as he staunchly defended the Academy Awards.

Alan Crossland's "GLORIOUS BETSY", which Mohr photographed in 1928 and which was restored especially for the seminar, had opened Hal Mohr Day on campus. It was reshowed the following morning in a cinematography class of Prof. Richard Myers, whose own films include "CORONATION" and "EVERYBODY KNOWS FAY WRAY".

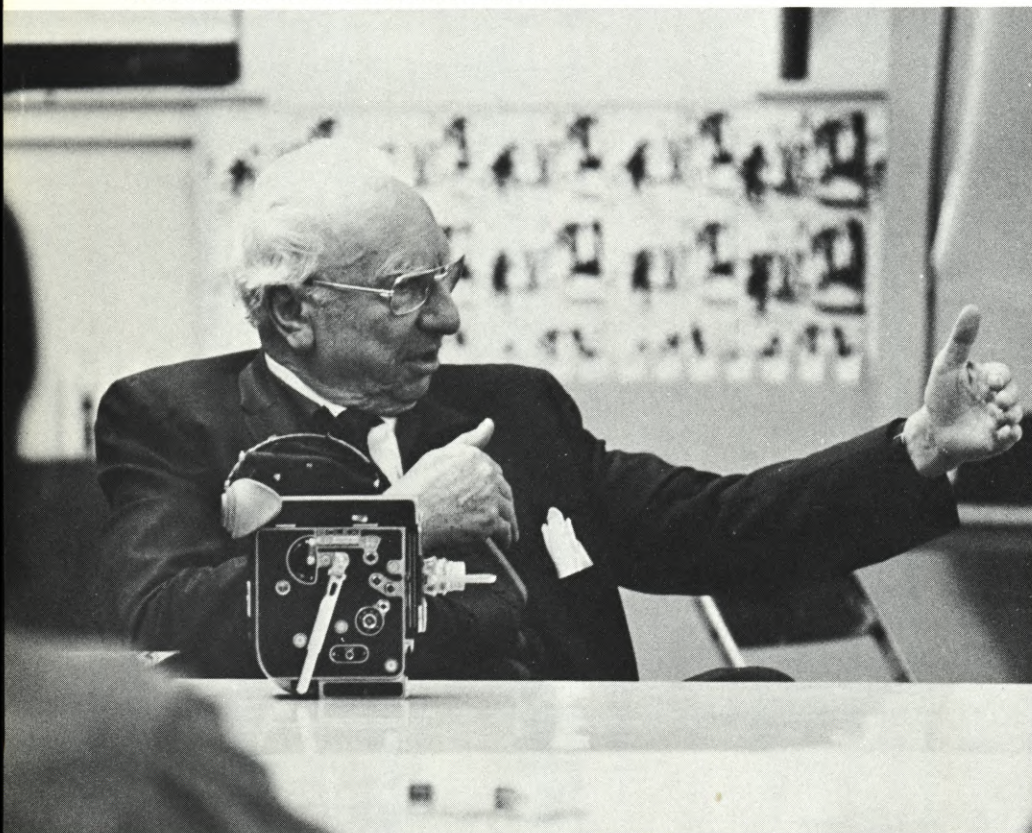
As the Dolores Costello-Conrad Nagel feature was shown, Mohr explained techniques he used in the film. He was especially interested in student reaction to vignetting which he feels deserves a comeback. "Not in all films, of course," he quickly added.

Mohr pointed out that the inserts—such as a hand holding a locket with Miss Costello's picture—were not shot by him and that it was noticeable since they were clear and didn't have the softened edges he developed for all his shots.

The white-haired cinematographer was supposed to talk with the class for a half hour. Three hours later—which took him from the days he directed Harold Lloyd and Bebe Daniels in Rolin Fairfield Studio comedies to his experiences photographing "THE LAST VOYAGE" in 1960—Mohr reluctantly left the classroom so that he could make it to the screening of "THE VANISHING AMERICAN", first of three Lois Wilson films being shown as a tribute to the silent screen leading lady.

Although Mohr had a reputation for photographing Hollywood's most glamorous women, he never worked with

Meeting in an informal seminar with Kent State students interested in cinematography, Mohr discusses such subjects as the depth of field of lenses. He was encouraged by the many intelligent questions asked of him during these discussions.



Miss Wilson. But as soon as she arrived in Kent, the pair responded like lifetime friends.

"Don't worry about the crowd being small, Lois," he warned her before her Friday evening appearance. "They're warm and appreciative and will ask a lot of good questions."

Mohr kidded the actress that they shared "equal billing" along with King on the large poster advertising the seminar.

But the highlight of the three-day program turned out to be the Saturday screening of William Beaudine's "SPARROWS", which finally arrived from the west coast where Mary Pickford had given special permission for it to be reduced for showing at Kent State's tribute to her former cameraman. Mohr hadn't seen the film since its original release in 1926 and it immediately became his favorite film.

"I'm as emotionally upset as I know some of you must be," Mohr said as he made his way from his seat in the auditorium through the applause to the stage.

"I must say I think it's just as fine today as it was then," he said about "SPARROWS". He gave primary credit for the cinematography to Charles Rosher, ASC, "who knew all the little tricks of photographing her (Miss Pickford)."

Mohr said the film was done entirely at the Pickford-Fairbanks studio within the confines of a 5-acre area. The set, including the swamp, was the work of Harry Oliver, now living at the Motion Picture Country Home.

"He was the greatest man that ever lived as far as art direction was concerned," commented Mohr.

Discussing the scene in which Christ appears, Mohr said, "Nature didn't build that set. Harry Oliver did."

One of Oliver's ideas that hasn't been used since, to Mohr's knowledge, was employed in the boat-chasing sequence.

"The long shots of the boats were done in miniature in a way that had never been done before and has never been done since. I've got to brag about this one because this again was Harry Oliver. We worked together on this.

"Harry had a big tray on the stage one day and three or four bags of flaxseed. Flaxseed are about a third the size of a grain of wheat but terribly slippery.

"He dumped the seed in this tray and then a sack of dry aluminum powder and stirred it up till it was luminous." The miniatures were pulled through the flaxseed by cables in a tank three to four feet deep.

"It looked more like water than water itself. I added high lights and crosslights and there were a lot of shadows."

Mohr also explained how the alligator shots were obtained.

"In those days we had no optical printers," he told the students. "Double exposures and other trickery was performed within the camera itself by exposing the film over and over again.

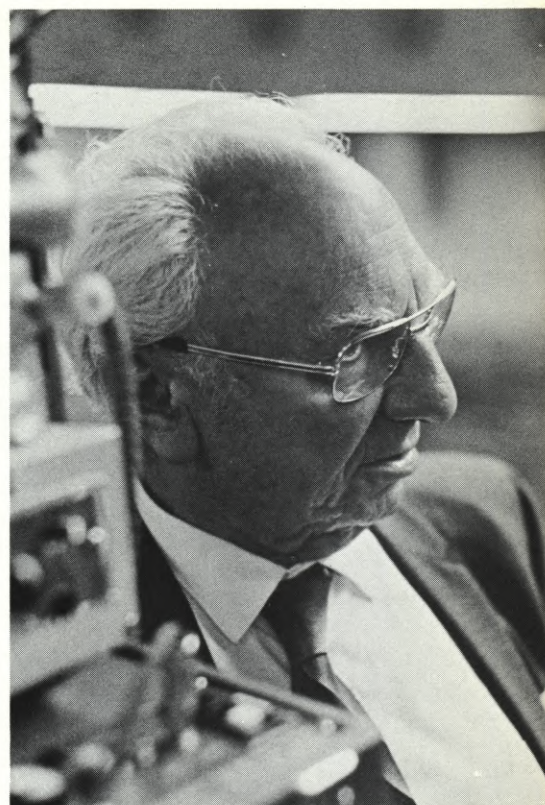
"The alligator part was exposed first so that the script clerk could take account of the moments when the alligators seemed to be leaping for the kids and that portion of the film was covered up and the rest of the aperture was exposed.

"The action of the kids was timed against the action of the alligators," said Mohr, who termed the picture a success because of "the combined efforts of a group of exquisite craftsmen.

"Don't let this die. This is too wonderful. I can't stop talking about this one," Mohr told his youthful interrogators.

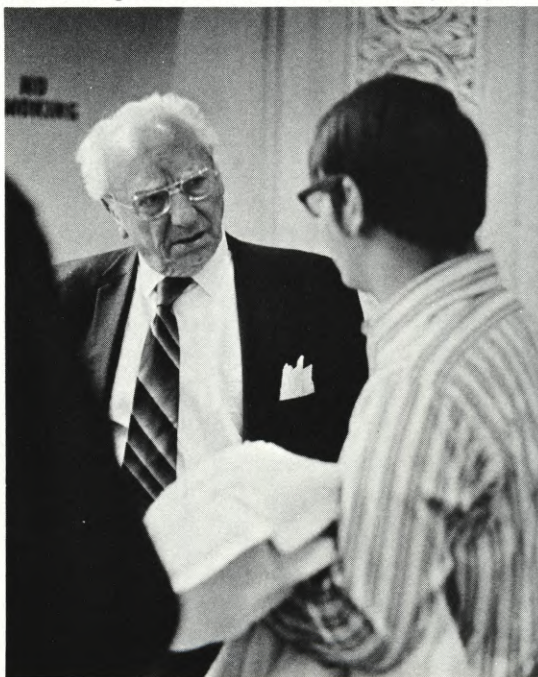
But a plane was waiting to take him back to California and his lovely wife Evelyn Venable—now a college professor.

Hal Mohr left Kent State University vowing he'd come back again and hoping to go to more universities to discuss his role in the early days of Hollywood filmmaking. ■



HAL MOHR, ASC, Past President of the American Society of Cinematographers and two-time winner of the Academy Award for "Best Cinematography", is one of the authentic pioneer cameramen of the industry, having worked continuously in it for more than 60 years. Always an innovator, he was the first to use dolly and boom shots extensively, and was among the first to recognize the value of tungsten-halogen lighting. He also photographed the first actual sound feature, "THE JAZZ SINGER".

(LEFT) When Mohr "raps" with students, the generation gap closes fast, because he has never lost his ability to accept new ideas. (RIGHT) Accompanied by a student guide, Mohr enjoys a brisk walking tour of the Kent State University campus.



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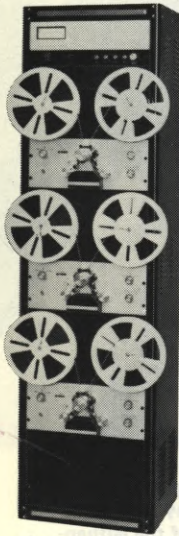
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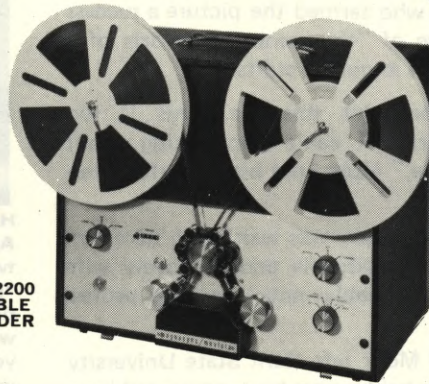
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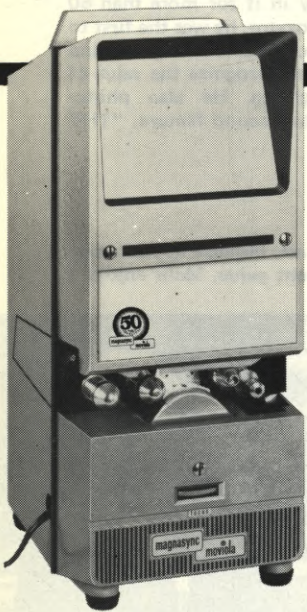
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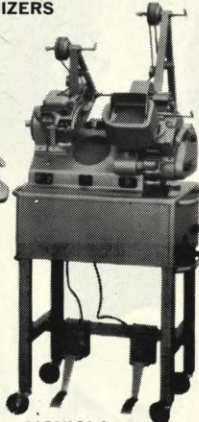
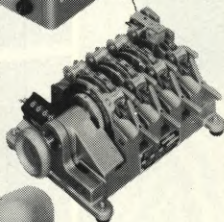
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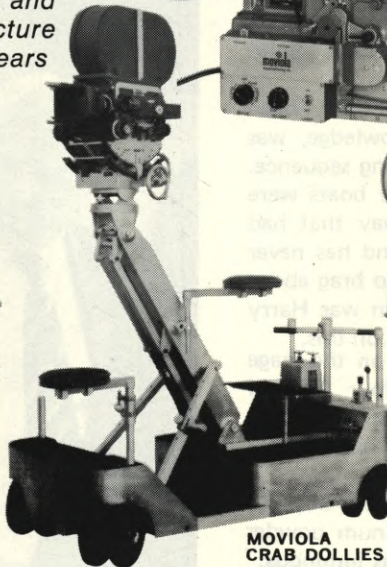
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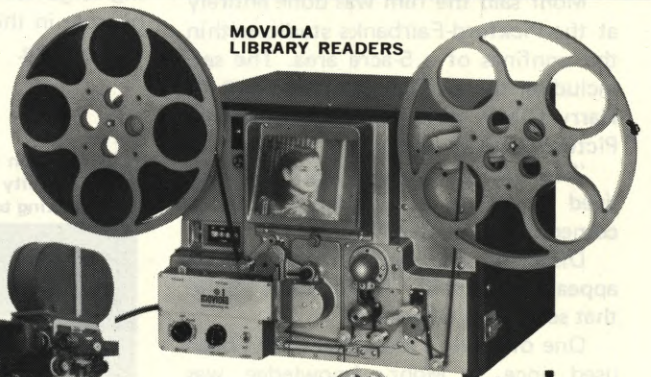
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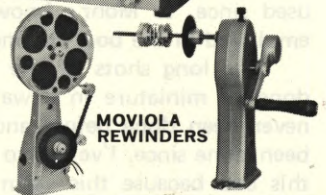
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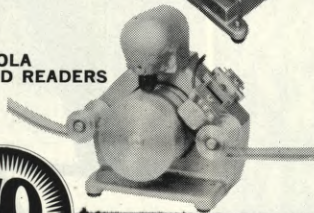


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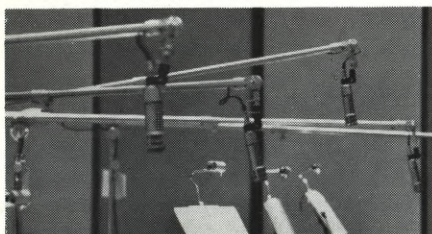


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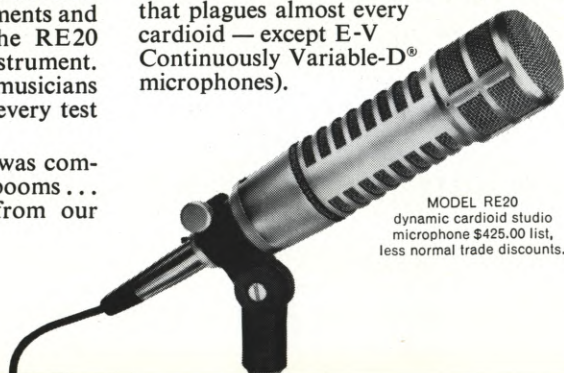
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It was a group therapy setting: ten racially mixed individuals together, in a small room, prepared to undergo some of the most-intense encounters of their lives. Footage of the session could have immense impact and drama — assuming cinematographer Edmund Bert Gerard could get it all on film.

"I had no idea beforehand where any specific individual would be seated," writes Mr. Gerard, "so it was impossible to set my lights to accommodate the tremendous range in skin colors. I purposely kept one side of the room dark because 'nothing-is-supposed-to-happen-on-this-side' and because I wanted some silhouette effects. But suddenly all hell broke loose, and one of the group members on the dark side of the room broke down... two therapists rushed over to comfort him... and I had to pan, changing exposure as I went."

Normally the scene might have come out correctly on film, if Mr. Gerard was able to estimate his foot candles. But guesswork was unnecessary this time; his 16BL was equipped with 'APEC', the Arri Precision Exposure Control, which reads illumination through the camera's lens. "It immediately registered the change and allowed me to instantly compensate for the lower light level. Exposure was on the nose. As it developed, this scene was the most moving of the entire film."

Mr. Gerard has many favorable comments on 'APEC'. "Naturally the system is not automatic. It simply reads the scene and provides the cameraman with the most accurate reflected light measurement possible, continuously visible in the viewfinder scale; now all relevant picture information is always available to the cameraman's eye. Since 'APEC' I've been able to live dangerously with my lighting, yet the exposures are always in the mid-

dle of the printing scale. And I couldn't calculate how much time I've saved by not having to walk into the set with a handheld meter, to measure all the delicate lighting balances."

Events happen suddenly in documentary shooting, and they change without warning; 'APEC's main purpose is to keep the cinematographer on top of all this, working with a greater accuracy than he's ever known. States Mr. Gerard in conclusion, "after working with it for almost a year, I cannot understand how I was ever able to get along without it." The point is, now nobody has to.

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"...and then, where I'd had no idea of what the exposure should be, one of the patients broke down..."

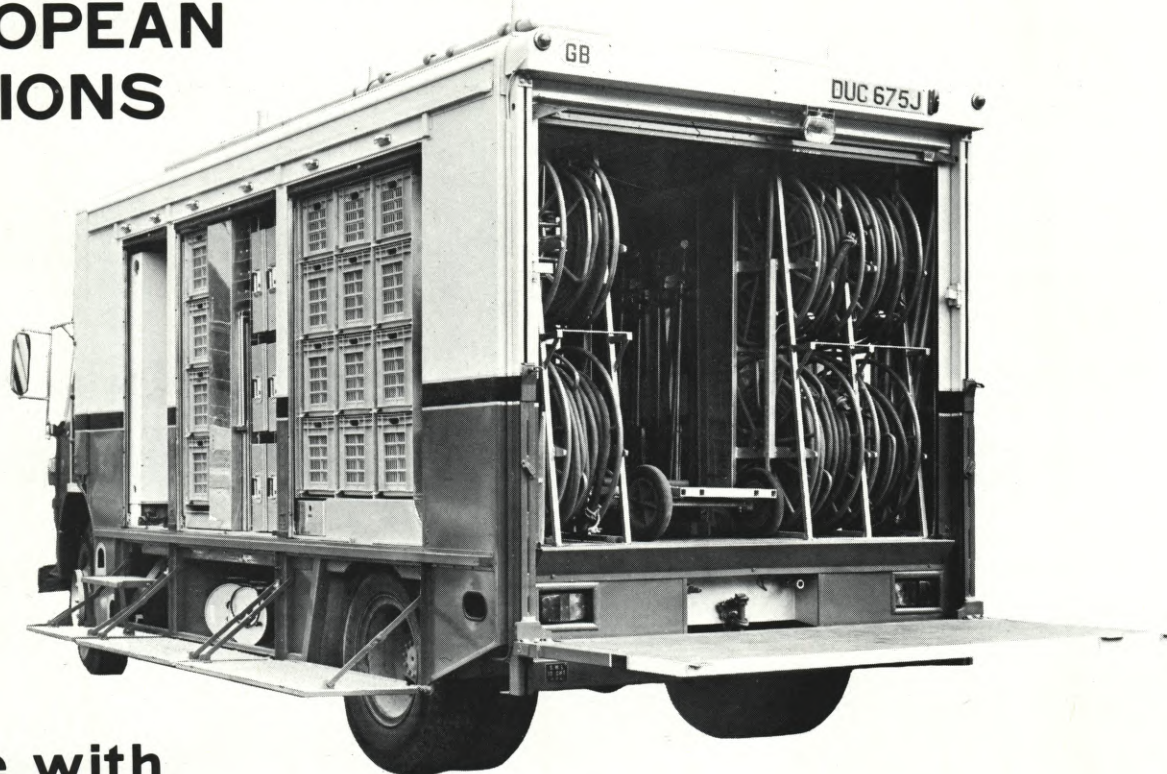
—Edmund Bert Gerard discusses some of his experiences with the ARRI PRECISION EXPOSURE CONTROL



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"SOS—Save Our Sea"

How a group of concerned California high school students, trained and supervised by a professional film producer, served as crew in the making of an ecology documentary film to influence public opinion

By STEVE ROSEN

Producer/Director

"SOS—SAVE OUR SEA" is a twenty-minute color documentary film that was made as the result of a collaborative effort by a professional film-maker and a group of high school students. It has been tremendously successful in the community for which it was intended and was shown nationally on NBC's "First Tuesday" show. The film was originally produced as a protest against the pollution of Monterey Bay by improperly treated sewage.

In September of 1969 over six miles of public beaches on the Monterey Peninsula in California were closed by the health department because the bay's water was contaminated with sewage. The students of the Monterey Peninsula high schools were understandably shocked at the news and wanted to do something that would open people's eyes to the importance of protecting the bay and the ocean as a whole. Wendy Bender, the teacher of a film appreciation class at Pacific Grove High School, and several of her students had just seen "DDT—KNOWING IT SURVIVES US" (an environmental film that I made with Darrell Salk), and approached me with the idea of co-producing a similar film that would educate the people of the area about the need for a system of sewage treatment that would put a stop to dumping any more waste into the bay.

I worked out a complete budget for

them that came to a total of \$6000—not much money to a film-maker, but an astronomical amount to high school students. In order to raise the money they formed the SOS Committee, an organization that united all of the Monterey Peninsula schools. They held rock concerts, auctions and solicited from local business and club groups. One day was designated SOS Day at the high schools and almost \$1000 was raised in donations from the students themselves.

While they were busy raising money, I was training four of the students from Pacific Grove High School to work as the film crew. Randy Tunnell, a senior with a background in still photography, was the cameraman. Linda Olmstead, a junior ham radio operator, worked sound. Maureen Goff and Steve Hughes were the production assistant and grip.

Twice a week they would meet at my house and practice working with the equipment. All of the dialogue in the film would be cut from recorded interviews with local scientists and city government officials (there would be no written narration), so quite a bit of our shooting would be done with double-system sound. Since none of the students had worked with sound or 16mm, let alone sync-sound, I did everything I could think of to keep the equipment simple. We used a 400-foot Bolex camera with an MST motor for all of our shooting. This camera was

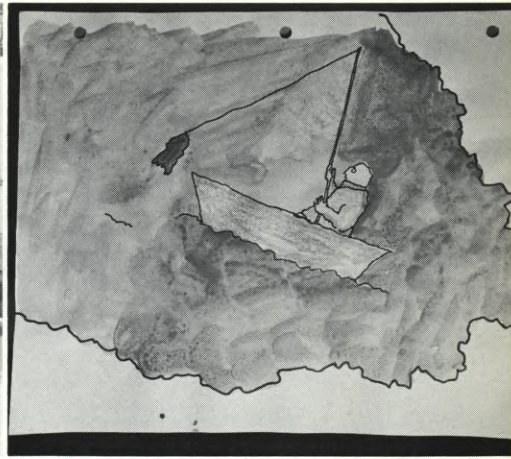
equipped with an Angenieux 12mm-to-120mm zoom lens and coupled to an Uher 1000 Pilotone Recorder with the traditional umbilical cord. Since almost all of our interviews would be shot outdoors, in close proximity to crashing surf, we used an Electro-Voice 649B lavalier microphone to eliminate microphone placement problems. For the "man on the street" material we used a Shure hand mike, held by the interviewer.

The crew would arrive in Randy's panel truck after school, take all of the necessary cases and set up on the beach in front of my house. While Randy mounted the camera on the tripod or body-brace, Linda would put a roll of tape in the recorder and hook up the microphone and headphone cables, and Maureen would hang the lavalier microphone around my neck (I was the practice target). The recorder and camera would roll and Steve would step in and slate the scene. After several setups, the equipment would all go back into the cases and be returned to my house. After four weeks of dry runs, the crew was getting so that they could set up and break down as efficiently as professionals. It only remained to be seen what would happen when film and tape were actually running through the equipment.

Our goal in making "SOS" was to show it to the voters before the upcom-

(LEFT) Steve Rosen and Randy Tunnell photographing the sewage outfall pipe that dumps secondary-treated sewage onto the beach at the U.S. Army installation at Fort Ord, California. (CENTER) Setting up to film an interview with Dr. Welton Lee (back to camera), of Hopkins Marine Station, near the Pacific Grove sewage outfall pipe. (RIGHT) Getting ready to shoot a hand-held sync-sound interview. (Left to right) Steve Hughes, Maureen Goff, Linda Olmstead, Randy Tunnell and Steve Rosen.





(LEFT) The author instructs novice cameraman Randy Tunnell in the use of 400-foot Bolex 16mm camera, mounted on a body-brace. (CENTER) Steve Hughes slating scene for a sync-sound interview with Dr. James Mattison on board his boat at the Monterey Yacht Harbor. (RIGHT) One of the thousands of frames drawn by Michael Roberts for animation sequence. For the student crew from Pacific Grove High School, the filming was an opportunity, not only to perform an important public service, but also to learn the rudiments of professional cinematography.

ing bond elections in November. These bonds were to raise money to improve the sewage plants in Seaside and Pacific Grove to provide secondary treatment. Although this would not solve the whole problem, it was a step in the right direction and we wanted the bonds to pass. We hoped our film would have some effect upon getting them passed. Unfortunately, just as we were about to start shooting, early in March, the bond election was moved up to June, giving us less than three months to shoot and edit the film and get it shown on television.

I compressed our shooting schedule to eleven days. In that time we would interview fourteen scientists and local politicians. The appointments were all made in advance, and the evening before the interview Randy, Linda, Maureen, Steve and I would get together and decide what questions we would ask. The next day we would arrive and be set up in 15 minutes. First we would interview on tape only. Then we would go back over interesting questions on camera. Some pointed questions were reserved for the on-camera interview so that the response would be spontaneous. By reading the past months' papers it was easy to know in advance how each person would react and what they would say. This method of working, although probably not the best, certainly proved to be the most economical. The entire 20-minute production was made on 5000 feet of 7255 raw stock. In addition to interviews, we also photographed scenics above and below the surface of Monterey Bay, two sewage treatment plants, three student demonstrations protesting pollution, surfers, skin-divers, and children playing at the beach. All with a crew that had never used the equipment before.

While we were shooting the live

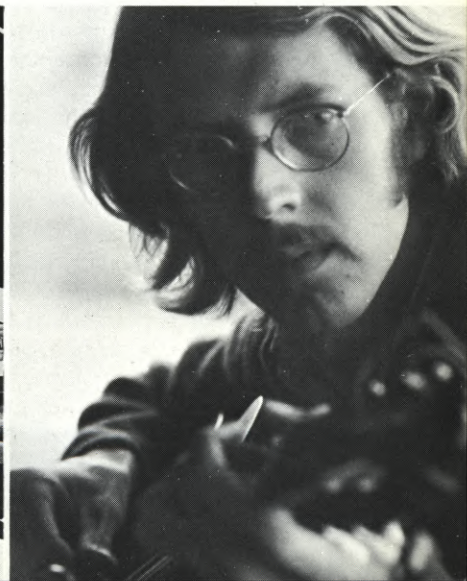
action material, Michael Roberts, a senior at Pacific Grove High School, was drawing thousands of pictures for a three-minute animation sequence. He drew on plain white three-ring binder paper and set up a production line of student painters. While the last cells were madly being painted and laid out around my house to dry, Randy and I started to shoot on our animation stand; a tripod with a spring-wind Bolex pointed at a three-ring frame (for registration?) on the floor.

Original music for the film was provided by three local musicians. Dave Lowe, then a student at Monterey Peninsula College, had written and performed guitar music for several of my other films, including "DDT-KNOWING IT SURVIVES US". He worked up a basic melody and got together with Chris Mathews, a flutist from Monterey Peninsula College, and Craig Callus, a guitarist from Pacific Grove High School. They had never met, but almost without

a word, they played together improvising from the original tune. We recorded the music in my living room with the Uher and one microphone stuck in the neck of a bottle. Their first set together is the music track used in the film.

"SOS-SAVE OUR SEA" was completed just two days before its scheduled airtime on KMST in Monterey, thanks to Quinn Young at Cine-Chrome Laboratories, who timed the good first answer print. The show was aired and, one week later, the bond issues were voted on and passed by overwhelming majorities. Many of the people who were interviewed at the polls by the "First Tuesday" crew had seen the film on television and said they had been influenced by it. The people who had been fighting the pollution problem in Monterey Bay believe that the bonds would not have passed at all if it had not been for the students of the Monterey Peninsula Schools, the SOS Committee, and the film that they produced. ■

(LEFT) Art student Michael Roberts designing the three-minute animation sequence for "SOS-Save Our Sea". (RIGHT) Dave Lowe working on the original guitar score which he composed and recorded for the film, together with flutist Chris Mathews and guitarist Craig Callus.



PRINCE PHILIP'S ADDRESS AT Film '71

A Royal "spectator" of motion pictures weighs technology against the talents of technicians in film production

(EDITOR'S NOTE: During the recent FILM '71 International Film Technology Conference and Exhibition, held in London, the Guest of Honor, H.R.H. Prince Philip, the Duke of Edinburgh, addressed and officially welcomed the assembled delegates from many nations. While the Duke emphasized the fact that he could speak only as a spectator of films, many of the ideas which he expressed are, we feel, directly pertinent to the work of film technicians throughout the industry. For this reason, we are, herewith, publishing his address in its entirety. Prince Philip was introduced to the Conference delegates by David Samuelson, Chairman of the British Kinematograph Sound and Television Society, which sponsored the event.)

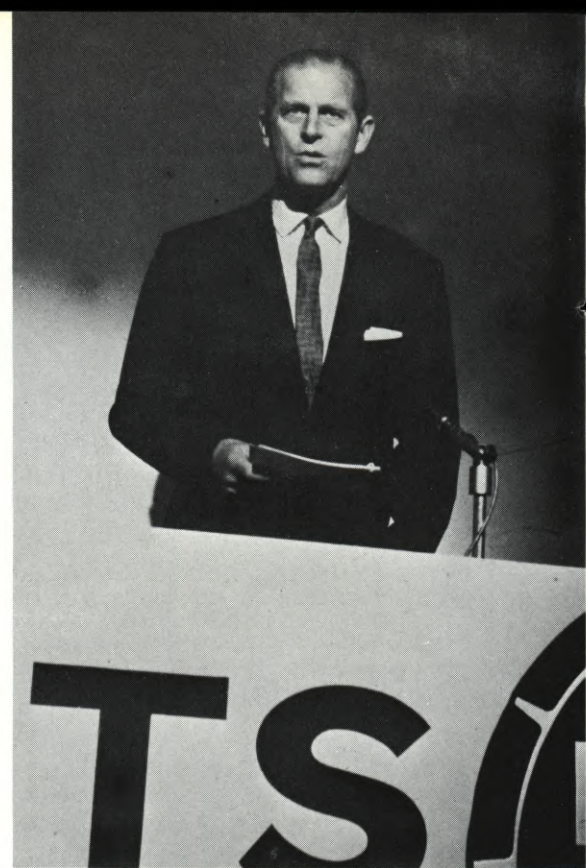
DAVID SAMUELSON: Your Royal Highness, ladies and gentlemen: Forty years ago when this society was founded to serve the British kinematic industries, we already had international connections. The BKSTS was formed after the London branch of our American sister society, the SMPTE. And today we are gratified to find ourselves the focal point of a forum for film, sound and TV technicians from all over the world, and we are particularly gratified to welcome you, sir, the most international of princes.

In honoring our society by visiting us today, you underline the importance of film as the most universal means of communication in the world. We have delegates here from more than 35 different countries, which is indicative of the fact that film is the most internationally standardized form of mass-media communication. Languages differ, forms of writing differ, TV standards differ, people's minds differ—but a reel of 16mm or 35mm film from any one country can be replayed on the equipment of any other country. Because of this, film is the most powerful medium for international understanding, even if the eventual meaning or message is that we all differ. You, sir, if I may say so, must be the most qualified man on earth to speak about the use of film as a

form of communication. I doubt if any other person, anywhere, has been filmed as often or in as many places by as many cameramen, for as many reasons and to such good effect, as yourself. You must, indeed, be a *connoisseur* of the ways of film cameramen.

You and I, sir, have met many times, with little more than a lens, a roll of film and a camera mechanism between us, and such is the power of the medium that you are recognized wherever you go, but the faces behind the camera always remain anonymous. There are, of course, certain notable exceptions. As an old newsreel cameraman, now retired from that particular activity, I owe you a number of apologies, sir. I apologize for the time at the Cowes Regatta when the water from my launch almost cap-sized your sailing yacht, *Bluebottle*. I apologize, too, for the time when I was so disrespectful as to suggest, as you put it, that you did a little play acting when I thought that by standing still you were not projecting your best image. I'm sorry, sir, that I got in the way when you turned the hose on at the Chelsea Flower Show. I'm sorry, sir, that my camera was running at a polo match when your pony was unfaithful to you, but I can only say that my intentions were always good. When you speak here today, sir, only about 400 of us will be privileged to listen, but through the media of film, sound and TV, it is possible that millions upon millions throughout the world will join us. I respectfully submit, sir, that, after yourself, the most important men in this room are those who will transmit your message far and wide. We listen with only one pair of ears; *they* listen with millions. Thank you, sir.

PRINCE PHILIP: Mr. Chairman, ladies and gentlemen: In spite of all the superlatives expressed by the President, I am, in fact, very ignorant about the



H.R.H. Prince Philip, the Duke of Edinburgh, addresses delegates to the FILM '71 Technical Conference, meeting at London's Royal Lancaster Hotel.

technology of the film industry. And neither—and I hate to confess this in this company—do I take any films myself. I haven't really thought of this idea of appearing on so much film. It strikes me that perhaps I ought to stick out for a royalty on the footage.

Well, I'm not here as an expert on films. I'm attending this session merely to offer my very warm and cordial welcome to all of the delegates attending this international conference and I hope you will find both the sessions and the social events and the outside visits interesting and enjoyable. And now, having said that, I feel that it would be far safer if I sat down. However, I think anything quite so abrupt might look a little rude, so you'll have to put up with a few platitudes.

Now, in spite of a lot of incidental appearances on film, the only claim I can make to do with films at all, is that I am a spectator. Indeed, I suppose I've been watching films for so long that I can remember the transition from the silents to sound. In fact, films have been part of my cultural background ever since I started to grow up. I think I can also claim to have grown up with the development of international conferences. The League of Nations' activities in Geneva were amongst my earliest recollections. I can't remember exactly what they talked about, but I do remember that they did talk.

And since those days, international

conferences on every sort of likely and unlikely topic have blossomed out all over the world. Cynics might suggest that most of them are just excuses for a paid holiday and a happy get-together in a nice place and an excursion for the wives. Well, some of them may very well be like that, but most of them, I think, have a serious purpose.

None can deny that talking shop, discussing your business with other people in the same business from other parts of the world, has a certain fascination all of its own. In fact, in my opinion, talking shop is about the best basis for international understanding that you can hope to find anywhere.

And that sort of discussion breaks down all barriers of language, of race, of creed, of nationality, of class and anything else which divides people. And no amount of correspondence or technical articles are quite the same as an hour with a man face-to-face, who knows as much about your business, if not more, than you do yourself.

Even if you can't get to talk directly with the famous figures in your business, you can, at least, hear them talk about it in their lectures. And, in addition, the opportunity to visit and see in operation establishments involved in a familiar business in another country can be extremely valuable. It may not be better, you may not see anything which is better than what you do yourself, but to appreciate a different outlook to common problems can be very revealing.

That's why I am so delighted to be able to welcome so many guests to this conference. I'm sure everyone will find at least some of the papers and some of the personalities in the conference program interesting and instructive and I'm equally sure that many of you will go home having made new and firm friendships, or having had the pleasure of meeting old friends. You may have disagreed with one another, and with many of the views that have been put forward, but you may also have learned something, as well. Out of all of this, the industry in which you work is bound to benefit. And, speaking as a spectator, it is this possibility which interests me most directly.

In the early days, of my own as a spectator as well as the industry's, almost everything was being done for the first time and the very newness of the medium tended to make even the hammiest acting, the thinnest stories, the most inadequate technical standards, fascinating and welcome entertainment. But even so, even with these limited possibilities, they made some splendid

films. And as the technology improved, so the subjects, and the stories and the acting seemed to develop with it. Perhaps it's simply that years of spectating developed a more acute, and a slightly sour, critical faculty. But I must confess that the recent years have left me in a dreadful muddle. There is absolutely no doubt that the technology available to filmmakers has made tremendous strides, but, unfortunately good technology has not guaranteed good films, and this is where the rub comes. Because, while we can all agree about color, about focus and sound and scratches and all the technical qualities of a film, I don't think there could ever be general agreement about the use to which this technology is put.

After all, technology cannot write a story. While it may help an actor, it can't play any part itself. When you come to think of it, splendid dramatic stories were being written and produced and projected long before technology got into the act.

The difficulty with this business is that it requires real talent in all departments—talented writers, talented producers and directors, talented and professional actors, cameramen, lighting and sound engineers and all the others in the backrooms working with the black boxes, and it's only when you've got a team like that together that the technology becomes really important.

The best equipment in the hands of unimaginative and incompetent amateurs is as useless as a piano in the hands

of someone who is tone deaf. Equally, when it comes to making money, there is no substitute for talent and competence.

Talent can only be found and encouraged—but competence can be learned, and if this conference helps to make any of you more competent, more knowledgeable, more familiar with new developments, it will have been worth your while and a direct contribution to the future welfare of this industry, which is playing such a vital part in the entertainment, the education and the information of the peoples of the world. ■

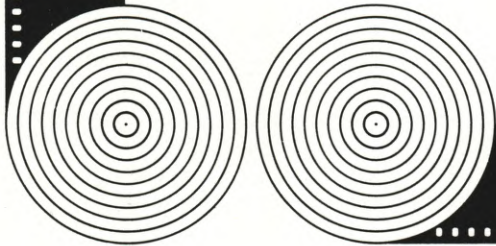
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On June 24, personalities from various parts of the world were presented with Honorary Fellowships in the BKSTS. These included Drs. A. Arnold and R. Richter, joint partners in the Arnold & Richter (Arriflex) company, in recognition of their contributions towards a high standard of cinematography; Pierre Angenieux, for his contribution towards optical design and technology in TV and cinematography; Austin Coma, general manager of the Eclair company, who has been a driving influence in the development of many revolutionary concepts of camera design; Robert Gottschalk of Panavision, whose policy of close collaboration with
Continued on Page 915

George Mitchell, designer of the world-standard Mitchell camera, accepts certificate of Honorary Fellowship in the BKSTS from David Samuelson, Chairman of the Society. Both the senior Mr. Mitchell and his son Tom, who accompanied him to FILM '71, have expressed deepest gratitude for the extraordinary hospitality and many kindnesses extended to them by their British hosts while they were in London.



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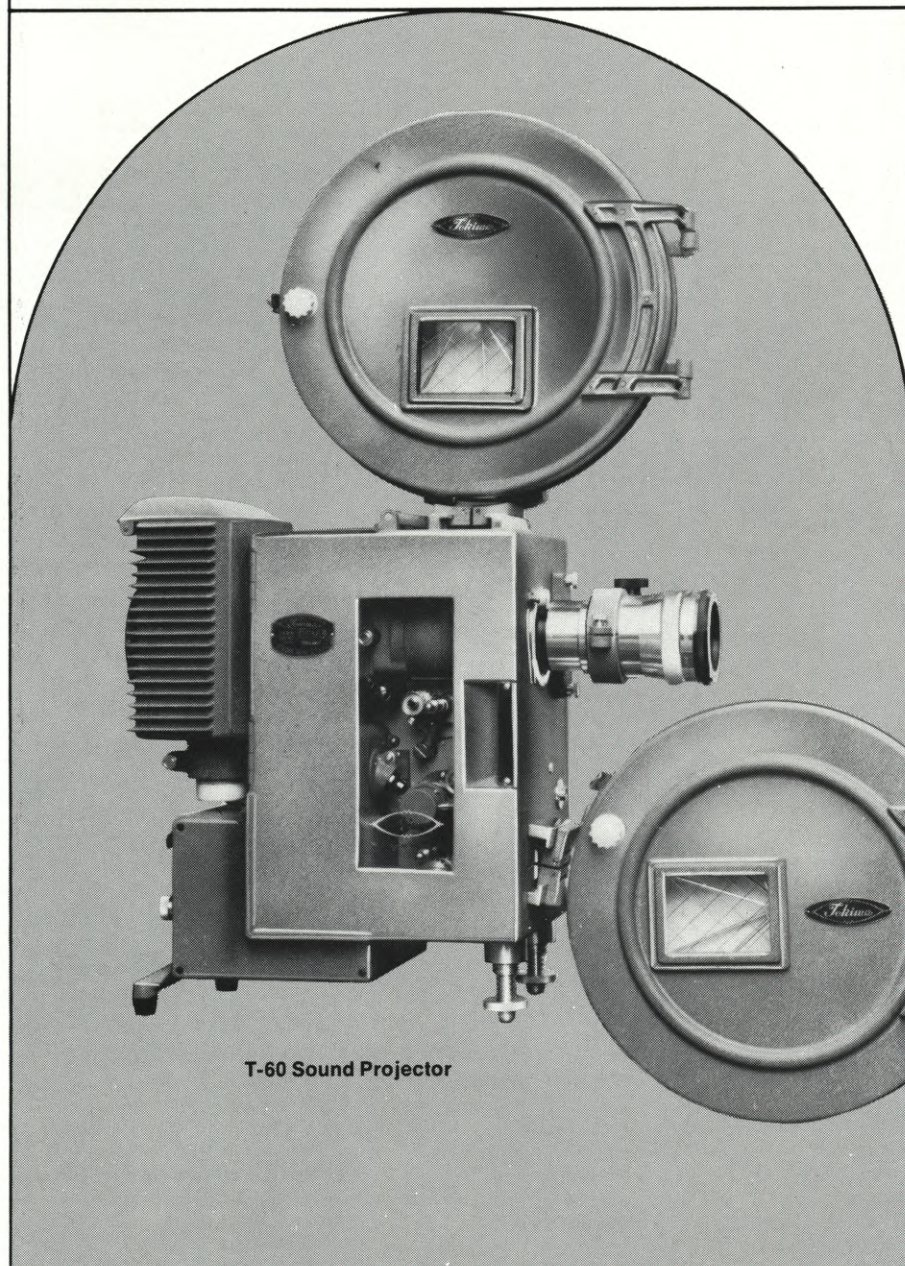
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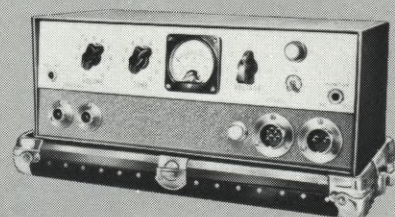
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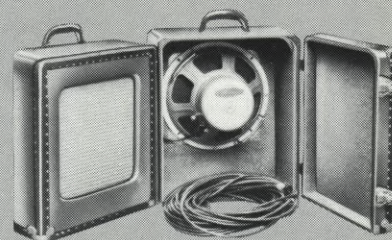
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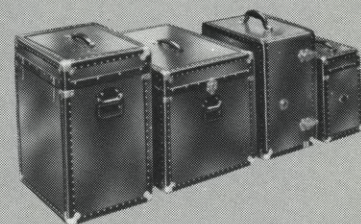
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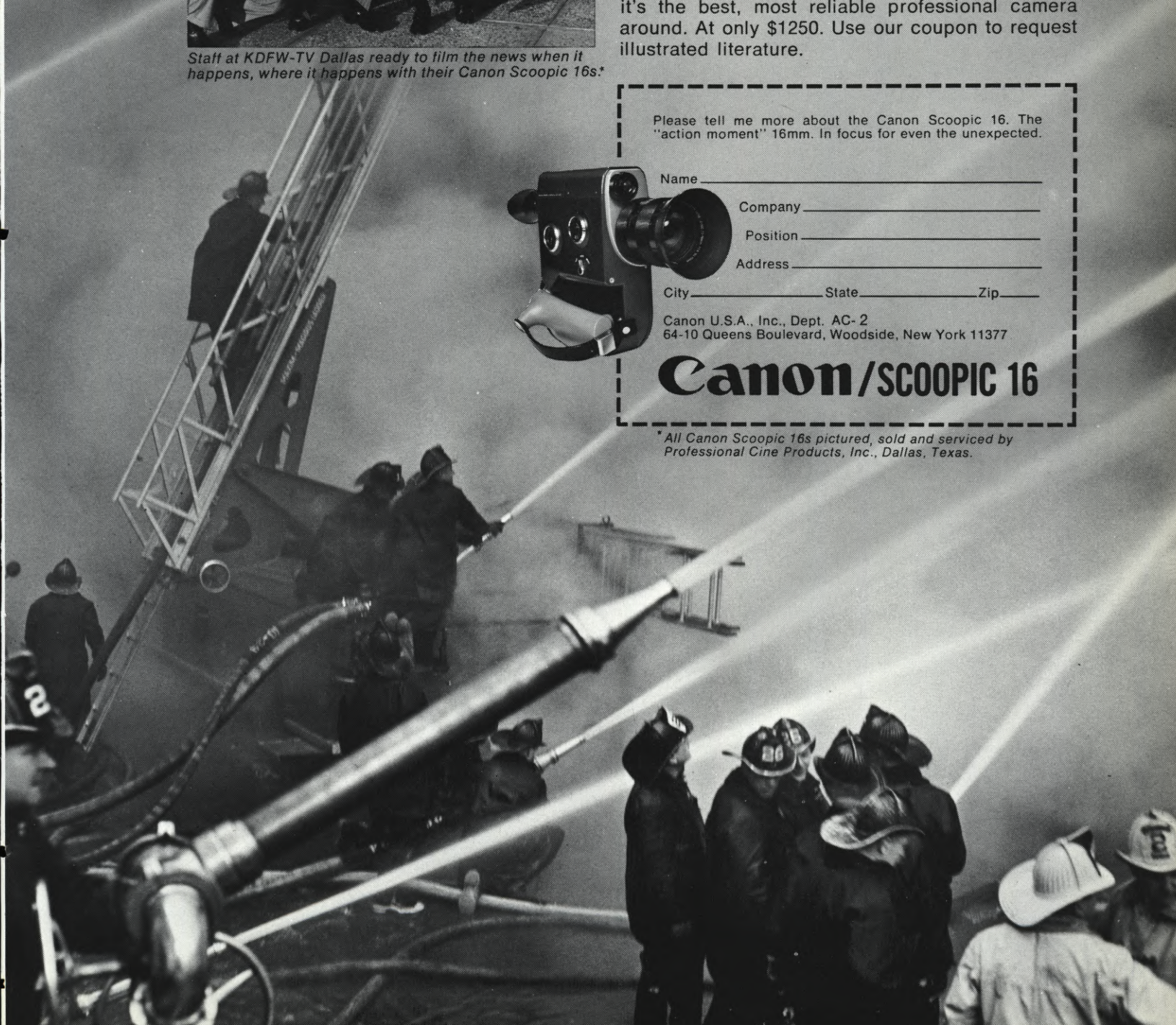
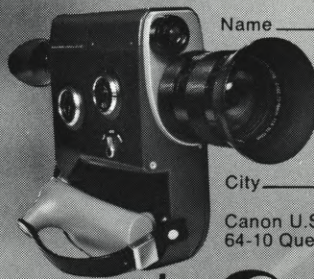
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CINESPHERE AND THE FILM FEAST AT ONTARIO PLACE

Editor journeys to Toronto to see the world's largest movie in the world's most unique theatre and happily ends up in the big middle of the action


By HERB A. LIGHTMAN

Toronto, Ontario, CANADA

Shortly after we published a preliminary report on "Cinesphere at Ontario Place" (See *American Cinematographer*, March/1971), I received a visit in Hollywood from Graeme Ferguson, who is not only one of Canada's foremost film-makers, but President of Multiscreen Corp. Ltd., as well.

Multiscreen is the organization which developed IMAX, the world's largest motion picture format. A horizontal 70mm format with a frame 15 sprockets wide, IMAX was the system used to produce the stunning documentary, "TIGER CHILD", which was shown in the Fuji Group Pavilion at Japan's spectacular EXPO '70 and was considered by many visitors to have been the "hit of the show."

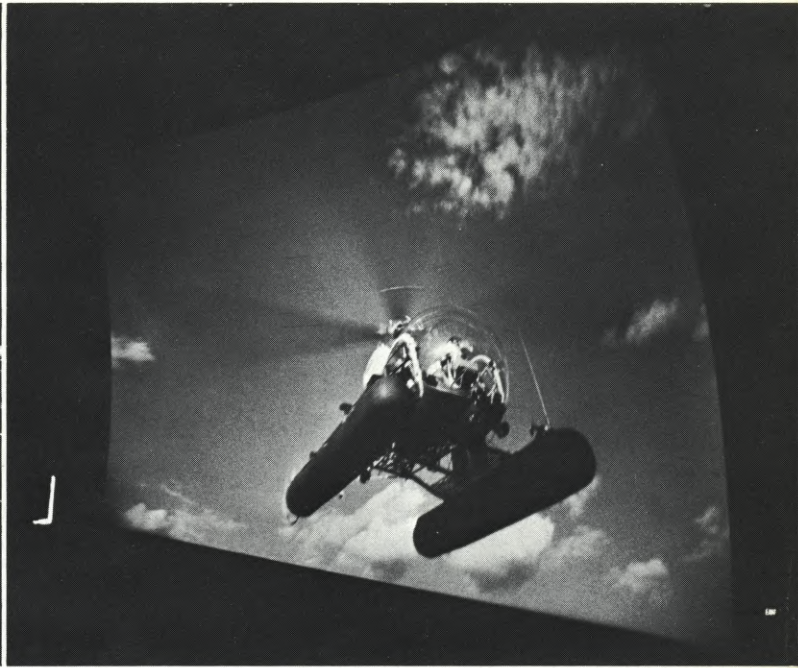
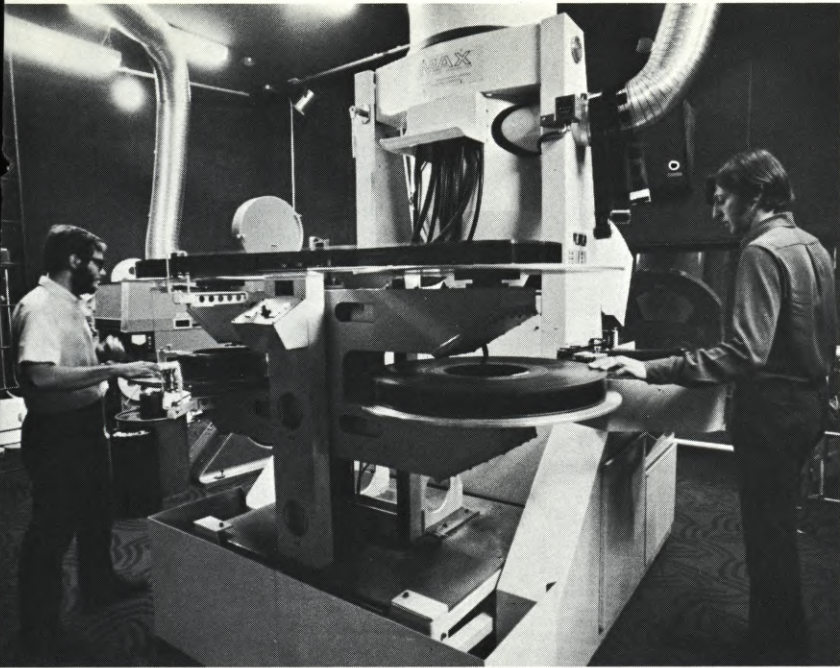
Ferguson, when I saw him in Hollywood, had just finished his multiple chores as writer-producer-director-cinematographer on the new IMAX production, "NORTH OF SUPERIOR", which was to be presented for Ontario Place visitors on Cinesphere's 60 x 80-foot screen, the largest in the world. He invited me to visit Toronto after the "mini-EXPO" had opened to the public, and see for myself what the IMAX format looked like when projected in a theatre ideally designed to do it full justice. I promised him that I would do



Photograph taken while Cinesphere was under construction last year clearly shows steeply-rising circular tier of seats which accommodate 800 people. The most advanced film theatre in the world, Cinesphere can present any known motion picture format, including IMAX. It will be used as a continuing forum for the presentation of films made specifically to take full advantage of its unique projection facilities. It has proved, in its first season, to be the star attraction at Ontario Place.

(LEFT) The Ontario Place Pavilion consists of five steel and glass structures which stand on steel stilts, rising 105 feet above the lagoons which inter-thread the man-made islands. Cinesphere can be seen in the background. (CENTER) Cinesphere is a white triodetic dome that rises 90 feet above the island. It is 110 feet in diameter. (RIGHT) Outside the Cinesphere stand William Shaw, Development Engineer for Multiscreen Corp. Ltd., and Graeme Ferguson, Multiscreen President and writer-producer-director-cinematographer of "NORTH OF SUPERIOR".





(LEFT) Rear view of the giant IMAX projector, shown during reel change in Cinesphere. This is the same projector that was used for presenting the first IMAX production, "TIGER CHILD", in the Fuji Group Pavilion at Osaka's EXPO '70. A new 60mm wide-angle lens had to be designed and built in order to protect the IMAX format at Cinesphere. (RIGHT) In a scene from "NORTH OF SUPERIOR", a helicopter hovers in preparation for landing.

so at the earliest opportunity—and that's how I happen to find myself, on a warm summer's day, in the midst of Ontario Place.

Stretching along Lake Ontario's waterfront and supported on 105-foot-high steel columns rising from a series of man-made islands, is a futuristic complex of five interlinked modules, or "pods", which combine to form the Pavilion. Hard by, on what is more or less *terra firma*, squats the giant triodetic dome that is Cinesphere, the world's most advanced motion picture theatre.

It rises 90 feet above the island, is 110 feet in diameter and seats 800 people. The Pavilion and Cinesphere together comprise the vast permanent provincial showcase known as Ontario Place. Though I'm told its construction was vigorously opposed by certain local political factions which considered it a waste of funds, judging from the enthusiastic crowds that throng the area, I would say that Ontario Place is a smashing success.

It is also very definitely motion picture-oriented, with some of the film

presentations going pretty far out.

Featured in the first "pod" of the Pavilion, for example, is a six-minute cinematic mood piece by Dennis Pike entitled "GENESIS", which, as one might expect, is calculated to show how the Earth was born. Mostly animated, and making use of such props as miniature volcanoes, the format consists of two identical 35mm Panavision prints, one of which has been flopped to make possible a long narrow mirror-image. The prints, butted together side-by-side
Continued on Page 930

(LEFT) Audience in tilted-back seats watches "NORTH OF SUPERIOR" from sharply-rising tier in Cinesphere. The seats farthest back are 75 feet from the cord of the 60 x 80-foot screen, the largest in the world. Sensation for the audience is that of being "in the picture". (RIGHT) Karl Meurin, Director of Technical Services for Ontario Place, operates the large console which controls sound to the 57 speakers located throughout the theatre. Console can handle virtually any mode of sound yet developed for film presentation.



"NORTH OF SUPERIOR"

THE WORLD'S LARGEST MOTION PICTURE

Filming the IMAX production for premiere presentation in the Cinesphere at Ontario Place provided a thrill-a-minute

By GRAEME FERGUSON

Writer/Producer/Director/Cinematographer

The first film produced with the IMAX System, was "TIGER CHILD", featured in the Fuji Group Pavilion at Japan's EXPO '70. I was personally not involved in that production. It was produced by Roman Kroiter and directed by Donald Brittain.

However, on the second IMAX production, "NORTH OF SUPERIOR", now being shown in Toronto's unique Cinesphere, I functioned as Producer, Director and Cinematographer.

The two films are quite different in style, content and technique, but the main difference lies in the two theatres used for their respective presentations. Cinesphere is structurally very dissimilar to the Fuji Group Pavilion, but it is actually the kind of theatre we were thinking of when we invented IMAX. The idea of it, originally, was to have a place in which you could show a motion picture that would fill a very large part of the audience's field of view, and the Cinesphere does that. It has the largest screen in the world, to our knowledge, plus very good audience conditioning, in the sense that everyone in the audience is fairly close to the screen.

The theatre seats about 800 people. The worst seat in the theatre—and in our frame of reference, the "worst" seat is the one farthest from the screen, because it has the narrowest angle of view—has a 60-degree coverage. The

seats in the middle, which are perhaps the best seats, cover an angle of about 90 degrees and the ones down in front provide a viewing angle of almost 170 degrees. All of this goes far beyond the scope of any other existing motion picture theatre, and what we were trying to do as film-makers was, obviously, to create the best film for the given theatre.

In the case of the Fuji Pavilion, it was decided that the best picture would be a multiple-image film. The full IMAX frame was used only about 20% of the time on that picture. In this case, we felt that the audience would be interested to see a very large single image and we were eager to work with such a format because the Ontario government had already produced a number of multiple-image films (including the very successful "A PLACE TO STAND", by Christopher Chapman for EXPO 67, which won an Academy Award) and after that they had made several other multiple-image films. Our feeling was that the time was right to go back to the single-image film.

In terms of designing the shooting, what we thought about continually was how the audience would see it. The person sitting in the middle of the theatre, with this 90-degree angle of view, sees a very wide-angle image and, when you are shooting, you want to

give him a normal set of perspectives within the picture. The proper thing to do is to shoot with a wide-angle lens that will approximately match the perspective as seen from the middle of the theatre. Now, the theatre projection lens used is a 60mm lens. The camera lens that would be most appropriate for viewing from the middle of the theatre turned out to be a 40mm lens and we found that by shooting with a 40mm lens we would get the most successful perspective—so that became the "normal" lens during our shooting. We did a complete set of tests on a wide range of lenses and we selected the 40mm and 50mm Zeiss Distignons which are normally used on the Hasselblad and other 2¼ by 2¼ cameras. Those lenses do not really quite cover our field, but the small amount of cutoff in the corner of the screen is not readily apparent to the audience and we felt it was a satisfactory compromise, particularly as the lenses are extremely sharp and in every other respect very satisfactory. We also used an 80mm Zeiss Planar, plus Nikkor and Schneider lenses of various focal lengths.

Perhaps the most unusual lens of the lot was a 35mm Super-Takumar semi-fisheye lens. Although it does—as all fisheyes do—represent a straight line on the screen as a curved line, in actual fact

Continued overleaf

Favorite sequence in "NORTH OF SUPERIOR" is subjective filming of the sport of "Tubing", a pastime unique to Northwest Ontario. (LEFT) Writer-producer-director-cameraman Graeme Ferguson mounts IMAX camera on semi-circular piece of plywood that is tied to giant innertube used for the sport. (CENTER) With cameraman and soundman wearing football helmets for protection, three tubes tied together are ready for the run down snow-covered slope. (RIGHT) The tubes skid down the hill, eventually flipping over at the bottom and dumping the camera crew on their heads.





(LEFT) Soundman Brian Avery records dialogue of Indian teenagers during shooting of Indian village sequence at Big Trout Lake. (RIGHT) Person-to-person dialogue in the village was often recorded wild.



(LEFT) Multiscreen Development Engineer William Shaw checks out IMAX camera he has reworked with Assistant Cameraman Ronald Lautore. (RIGHT) Lautore positions the camera for Indian village sequence.



(LEFT) Setting up along riverbank for filming of sequence in which canoes shoot the rapids. (RIGHT) Canoes enter rapids. One of them later turned over while camera was in it, but film was salvaged.

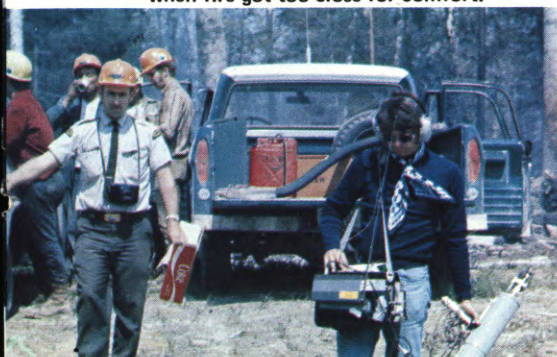


Assistant Cameraman Ronald Lautore holds up a reflective "space blanket" to protect camera from the intense heat, while Director-cameraman Graeme Ferguson shoots sequence in the midst of raging forest fire. This photograph was taken by Chief Forest Ranger, John Cleaveley, of Geraldton, Ontario, using his trusty Kodak Instamatic 124.

(LEFT) Ferguson shoots detail of forest fire, using 600mm lens mounted on IMAX camera. (CENTER) Helicopter is made ready for filming of sequence. (RIGHT) In lakefront sequence, one of the few in which crowds appear, helicopter was used to get full scope of the action. "NORTH OF SUPERIOR" covers some of Ontario's most picturesque natural areas and utilizes subjective filming techniques that put the audience "in the picture".



(LEFT) Soundman Avery walks into forest fire area with his recording equipment, accompanied by fire fighter with still camera at the ready. (CENTER) IMAX camera suspended from camera truck bracket by means of F.E.R.C.O. anti-vibration system, which permitted limited "hand-holding" of heavy camera. Developed for use in small helicopter, mount consists of a delicately balanced arrangement of rubber surgical tubing supports. (RIGHT) Most of the shooting of forest fire was done from the top of the station wagon, so that quick escapes could be effected when fire got too close for comfort.



it's almost impossible for the audience sitting in the Cinesphere theatre to tell a shot taken with the 35mm Super-Takumar from one filmed with the 40mm Distigon. If you could get far enough back, you would perceive it as a fisheye shot, but from the audience's perspective the distortion is not apparent.

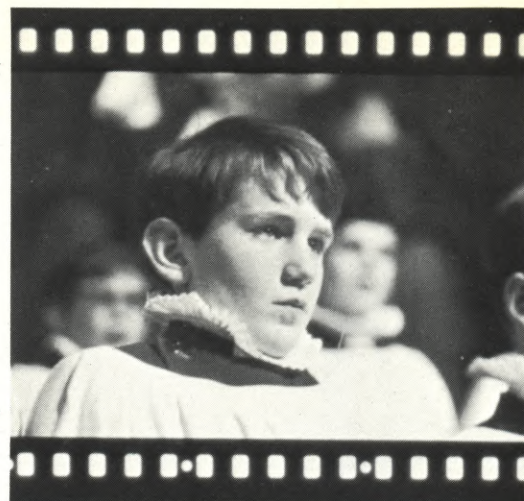
The crew that filmed "NORTH OF SUPERIOR" consisted of myself as Director-Cameraman, Ronald Lautore as Assistant Cameraman, Brian Avery as Soundman and David Hughes as part-time Production Manager. When we were actually shooting, the crew was normally a three-man unit. This was according to my preference, because I wanted to have lots of flexibility and the ability to put the whole crew into a small airplane or small car and move around very easily. Besides, I'm really not happy working with large crews. The arrangement we had proved to be very successful and we were able to get in and out of a lot of places very easily—places such as forest fires, which you simply cannot move large crews into. In a way, you might think that there would be problems in trying to

IMAX camera shown completely covered by neoprene "barney" to protect it from extreme cold. Ferguson adjusts portable heater-blower which pumps warm air into covering.



operate with the world's largest format, but with such a small crew. However, in actual fact, it happens that with the IMAX camera it isn't very difficult. The camera is now actually a little heavier than it was when used in shooting the Fuji Group film for EXPO 70, because Bill Shaw has reworked the movement and put a heavier flywheel into it and generally improved the registration. The camera is now up in the 50-lb. range rather than the 40-lb. range when you are working with it, but it still isn't very difficult to handle. This is about the equivalent of working with a standard unblimped Mitchell or, perhaps, it's a little easier than working with a blimped Arriflex. The camera was used normally on a light-weight O'Connor 100C tripod head and on standard Mitchell legs and the total rig could be picked up and carried by one person. Not with great ease, but certainly not with great difficulty. And we could quite easily move to a new camera set-up in a matter of moments without any problem at all. The operating controls on the IMAX camera are standard ones, such as those that you find on any motion picture camera. It's in no way any more complicated to use than any other camera. It's got a focus control and a diaphragm control and a start-and-stop button and a speed control and a tachometer and a footage-counter, and that's just about all that there is.

The features that were added to the camera for this film included a 1000-foot magazine, which we had not had before, in addition to the 500-foot magazine, which we still considered the normal one for use in the field. It runs about a minute and a half. The 1000-foot magazine runs for three minutes, and with the two we seemed to have all the flexibility we needed in that direction. The other work done on the camera included the addition of a heater. We had considered the possibility of using an electric heater, but when we evaluated the degree of cold that we would have to be working in, it was really beyond the possibility of carrying



IMAX 15-sprocket, 70mm frame, shown actual size. Frame is from sequence of first IMAX production, "TOGER CHILD", presented at EXPO '70.

batteries. So we used a catalytic heater of the type that is normally used by campers to heat tents in cold climates and we put a small fan on that and blew the hot air into what looked like a blimp around the camera. It was actually a rather lightweight neoprene covering and proved to be extremely successful. We were able to work in temperatures down to 48 degrees below zero with no great difficulty at all and hop in and out of our car, and take a picture and get back and move around—not quite as comfortably, but certainly just about as flexibly, in the winter as in the summer. The catalytic heater proved to be slow to start and I think that we might find, in future, an improved heating system, but certainly the idea of blowing hot air around the camera is an excellent one and we were very pleased with the results.

We made a very simple helicopter mount just by using rubber bands, essentially, and it worked fine. These "rubber bands" were actually lengths of 1/2-inch-diameter surgical tubing and there were about six or eight strands. The camera was hung from these strands and that was our total helicopter mount. It func-

FOCAL LENGTH RELATIONSHIPS OF IMAX LENSES TO 35mm CAMERA LENSES

IMAX FORMAT FOCAL LENGTH	35mm EQUIVALENT FOCAL LENGTH	HORIZONTAL VIEW ANGLE
35	11.1	90.0°
40	12.7	82.7°
50	15.9	70.3°
80	25.4	47.5°
105	33.3	37.1°
135	42.8	29.2°

tioned perfectly. I would agree that it isn't as sophisticated as some of the mounts currently on the market, but for normal use it's perfectly satisfactory.

Of course, rigging such a mount correctly requires a bit of engineering. Bill Shaw had to calculate the actual forces that would be involved, the amount of bounce there would be, the weight of the camera and the best type of rubber bands to use. He ran some engineering calculations and came up with the right answers. We did find, however, that at around 30 degrees below zero the rubber bands bounced differently and the mount wasn't quite as successful—but I'm not sure there is any camera mount that works with great ease at 30 below zero, while hanging in a helicopter.

The film opens with a series of aerial shots which were taken from a Piper Aztec aircraft. The camera was set in the front luggage compartment, right behind the nose cone. We simply took off the nose cone and cut a hole in the front bulkhead just the size of the front element of the 40mm Distagon lens and we ran an extension control cable so I could sit in the passenger seat and turn the camera on and off. We didn't even use a viewfinder in that case because, with the 40mm lens, if you look ahead, you see more or less what the camera is going to see. You don't really need to have a viewfinder under such conditions, although it would be nice to have it, but there was no practical way of getting a proper one into the cockpit in the time available.

I should say that the question of viewing is, probably, for the IMAX cameraman the biggest difference from



Graeme Ferguson and Assistant Cameraman Ronald Lautore shooting from fishing boat, with camera covered by neoprene barney and circular glass window revolving at high speed to protect lens from spray. This device, regularly used in the wheelhouses of fishing boats during foul weather, was suggested for use in filming by Robert Gaffney, who first utilized it for this purpose in shooting EXPO '70 featurette, "SKY OVER HOLLAND". Rapidly whirling disc not only spins off water drops instantly, but wet snow, as well. A snowball thrown at the disc will be immediately disposed of.

normal shooting. The camera has a reflex finder (the present version uses a beam-splitter), and when you look through it, it's rather like looking through a normal camera viewfinder. Except for one thing: the optics of that viewfinder produce a picture in front of your eye rather similar in size to the picture in a normal 35mm Arriflex or Eclair viewfinder. However, if you are using a wide-angle lens, or whatever lens, that picture is going to be seen in

this wide-angle theatre by an audience and the picture is going to spread all over their field of vision. The cameraman, in using the present IMAX camera, must continually make an adjustment in his mind between these two fields of vision. He must try to imagine the wider field of vision as he's shooting and this has its main effect in panning, for instance. A cameraman will naturally, during his career, have learned that a pan at a certain speed will be appropriate and I think he will normally relate that to just the way things look. I don't think he works out the mathematics of his panning, but I believe that a cameraman, after a few experiences with chatter showing up on the screen, learns to pan so that a certain rate of panning "feels" right. The pan that feels right with a normal camera will not be right with the IMAX camera. He must pan either more slowly or he must pan sufficiently faster to get something closer to a swish pan. In the forest fire we had a number of quite fast pans, and they are perfectly successful. We also have quite a few pans throughout the rest of the film which are really rather slow. A cameraman, when using the IMAX camera for the first time, will find that what he considers to be a pan of normal speed will probably have chatter in it unless it is slowed down a

Continued on Page 912

NORTH OF SUPERIOR

An IMAX™ Film

PRODUCED, DIRECTED AND PHOTOGRAPHED BY Graeme Ferguson

ASSOCIATE PRODUCERS Robert Kerr, Roman Kroiter, William Shaw

SOUND RECORDING Brian Avery

PRODUCTION MANAGER David Hughes

ASSISTANT CAMERAMAN Ronald Lautore

EDITOR Toni Trow

SOUND EDITOR Tony Lower

ASSISTANT EDITORS Robin Botting and Betty Ferguson

TITLE SONG "Ojibwa Country" composed and sung by Bill Houston

MUSICAL SCORE Zalman Yanovsky

MUSIC RECORDING Eastern Sound Co. Ltd.-Chris Skene

STEREO RERECORDING Film House Toronto-John Aldred

LABORATORY & TITLES MGM Laboratory Inc.

MUSICIANS Maribeth Solomon, Leonard Solomon, Mickey Erbe,

David Brown, Jack Franchman, Brian Leonard

A MULTISCREEN CORPORATION LIMITED PRODUCTION

PRODUCTION DATA ON SOME OF THE OUTSTANDING FILMS PRESENTED AT THE RECENT

ATLANTA INTERNATIONAL FILM FESTIVAL

ALL THE DIFFERENCE

CATEGORY: Ecology & Conservation
PRODUCTION COMPANY: Eastman Kodak Company
DIRECTOR: John Mihal
NARRATOR: Michael Kane, Sam Gray, Phillis Eldridge, Bill Fiore
CLIENT: Kodak
SCRIPT: John Mihal/Lawrence Ravetz
MUSIC: Vardi & Hambro
CAMERAMAN: Robert Weaver/Dick Ham
EDITOR: Carleton Vanderwarker
RUNNING TIME: 23 min
COLOR; OPTICAL; 16mm
COLOR SYSTEM: ECN-CRI-Eastman
COUNTRY OF ORIGIN: USA
LANGUAGE: English

ATLANTA, A NEW KIND OF CITY

(WORLD PREMIERE, SCREENED OUT OF COMPETITION)

This dynamic short film was created for Eastern Air Lines as part of their destination cities "Wings of Man" series.

This special world premiere presentation, is screened out of competition, as

a cordial welcome from the city of Atlanta to those attending the Festival.
PRODUCTION COMPANY: Interfilm
PRODUCER: J. Hunter Todd
DIRECTOR: J. Hunter Todd
CLIENT: Eastern Air Lines
PRODUCT: Atlanta
SCRIPT: J. Hunter Todd/David Moscovitz
CAST: The People of Atlanta
MUSIC: Chico Hamilton
CAMERAMAN: J. Hunter Todd
EDITOR: David Moscovitz
RUNNING TIME: 14 minutes
COLOR; OPTICAL; 35mm
COLOR SYSTEM: Eastman Color
COLOR BY DELUXE
SOUND SYSTEM: RCA Optical
COUNTRY OF ORIGIN: USA

BEFORE THE MOUNTAIN WAS MOVED

Ellis Bailey is a man of the mountains, born and raised in West Virginia as were his parents and their parents before, yet the mountains he loves contain coal, and with the coming of great earth

movers he and his neighbors see the beauty of their mountains torn away by the ravages of strip mining. Even as they watch, their houses and farms are damaged and destroyed and their lives endangered by landslides from the strip mining operations in the mountains above.

The story is recreated as it happened and was filmed using the actual people reliving their roles. All filming was done in West Virginia in the areas where the events occurred.

CATEGORY: Ecology
PRODUCTION COMPANY: Robert K. Sharpe Prods. Inc.
PRODUCER: Robert K. Sharpe
DIRECTOR: Robert K. Sharpe
NARRATOR: Ellis Bailey
CLIENT: O.E.O.
SCRIPT: Robert K. Sharpe
CAST: The People Themselves
MUSIC: Blood, Sweat & Tears
CAMERAMAN: Michael Livesey
EDITOR: Nick Masci
RUNNING TIME: 58:30
COLOR; OPTICAL; 16mm
COLOR SYSTEM: Eastman
COUNTRY OF ORIGIN: USA
LANGUAGE: English

THE ESKIMO: FIGHT FOR LIFE

Shows the Netsilik Eskimos at a seal hunting camp out on the frozen Arctic Sea near Pelly Bay in Northern Canada. Six families are seen trekking across the sea ice and setting up camp near an area which they hope will provide them with good hunting for several weeks. After successful hunting, the families build a large ceremonial igloo joining several of the small one-family igloos under one large roof. Here a seal is divided up among the families, and afterward the people rejoice and play games. There are many scenes of hunting technology as well as of family life in the camp.

CATEGORY: Documentary—Educational
PRODUCTION COMPANY: Education Development Center
PRODUCER: Education Development Center
DIRECTOR: Robert Young
NARRATOR: Asen Balicki
SCRIPT: Asen Balicki
CAMERAMAN: Robert Young
EDITOR: Michael Chalufour
RUNNING TIME: 51 min.
COLOR; OPTICAL; 16mm
COLOR SYSTEM: Eastman
COUNTRY OF ORIGIN: USA
LANGUAGE: English/Netsilik

THE FASHION MAKERS

A pictorial profile of the development of a fashion collection, audience visits French couturiers; watches a fashion photographer at work; and joins the audience at a London fashion show.

CATEGORY: Fashion

PRODUCTION COMPANY: Swanson Productions Inc.

PRODUCER: Robert W. Swanson

DIRECTOR: Robert W. Swanson

CLIENT: Borg Textile Group

PRODUCT: Borg Fabrics

SCRIPT: Robert W. Swanson

MUSIC: Jim Bourgeois

CAMERAMAN: Ron Johnson & R. W. Swanson

RUNNING TIME: 25 min.

COLOR; OPTICAL; 16mm

COLOR SYSTEM: Eastman

COUNTRY OF ORIGIN: USA

LANGUAGE: English

FIRE ON ICE

CATEGORY: Business & Industry

PRODUCTION COMPANY: Peckham Prods. Inc.

PRODUCER: John L. Peckham

DIRECTOR: John L. Peckham

NARRATOR: Donald Hastings

CLIENT: Standard Oil Co.

SCRIPT: William R. Littlefield

CAMERAMAN: John L. Peckham

EDITOR: Hoyt Griffith

RUNNING TIME: 18 minutes

COLOR; 16mm

COLOR SYSTEM: Eastman

COUNTRY OF ORIGIN: USA

LANGUAGE: English

FIRST CLASS

First Class is a surrealistic dream sequence in which a tramp, played by Marcel Marceau, sneaks aboard a luxury liner and falls asleep in a very elegant cabin. During his dream he imagines himself as 16 different characters.

PRODUCER: Chester Fox & Co., Inc. in association with Italian Line

DIRECTOR: Chester Fox

DIRECTOR OF PHOTOGRAPHY:

George Zimmermann

SUPERVISING EDITOR: Fabien Trodjmenn

EDITOR: Deborah Brownstein

ASSISTANT EDITOR: E. Joy Fox

BASED ON AN IDEA BY: John M. McGuire

SCRIPT AND STORY CONSULTATION BY: Marcel Marceau, George

Zimmermann, Deborah Brownstein, Chester Fox

MUSIC ELECTRONICALLY COMPOSED ON THE MOOG SYNTHESIZER BY: Charles Fox

CAMERAMAN: Michael J. Konkus

ASSISTANT: John McMann

2nd ASSISTANT: Toe-Mai-Tai

PRODUCTION: Cine Centrum

PRINTS: Movielab

UNIT PHOTOGRAPHER: Joseph Bilbao

CAST: Marcel Marceau, Terry Goldman

RUNNING TIME: 26 min.

FLASH GORDON

This is the story of a young drag racer who goes his own way and lives only to race. This film concerns the motivations of the driver of a funny car, the environment in which he works, and the pressures under which he operates. The motivations include money, self-satisfaction, and a love of harnessed speed. The environment includes intense noise, spectators, color, ingenious craftsmanship, and competition. The pressures on the driver are considerable, making precision driving and split-second decisions necessary and habitual.

CATEGORY: Experimental

PRODUCTION COMPANY: Student, University of Southern Calif.

PRODUCER: USC

DIRECTOR: Cliff Fenneman & Ron Sponberg

SCRIPT: C. Fenneman & Ron Sponberg

CAMERAMAN: Cliff Fenneman

EDITOR: Paul Komar

RUNNING TIME: 21 minutes

COLOR; OPTICAL; 16mm

COUNTRY OF ORIGIN: USA

LANGUAGE: English

FROM THE FACE OF THE EARTH

The ecology of a possible future: hygienic cubical dwellings for beneath the earth's crust. Adrienne's birthday is a special day: the family dares to burn seconds of precious oxygen for a birthday candle. Grandfather has managed to get two passes to the earth's ruined surface—which Adrienne has never seen. The film deals with Adrienne's gas-masked tour of the remains of an earth life that she will never know: multiroom private housing, automobiles, freeways, the ocean, and animal wildlife (she finds extinct specimens in the museum). Omi-

nous science fiction, this film treats the future by suggestion and the present by implication.

CATEGORY: Ecology & Conservation

PRODUCTION COMPANY: King

Screen Productions

PRODUCER: King Screen Productions

DIRECTOR: Paul Preuss

SCRIPT: Jim Halpin

CAST: Melinda McLean, Ben Golden

CAMERAMAN: Van Ackeren

EDITOR: Joe Valentine

RUNNING TIME: 16:06 minutes

COLOR; OPTICAL; 16mm

COLOR SYSTEM: Eastman

COUNTRY OF ORIGIN: USA

LANGUAGE: English

GERONIMO JONES

Geronimo Jones is a young Indian boy living on a Papago reservation in contemporary Arizona. After an unpleasant experience where Geronimo and his grandfather watch an old Western where the Indians are killed in the name of progress, Geronimo remains eager for life.

CATEGORY: Children's Films (Documentary)

PRODUCTION COMPANY: Bert Salzman Productions

PRODUCER: Bert Salzman

DIRECTOR: Bert Salzman

SCRIPT: Bert Salzman

CAST: Chief Geronimo Kuth-Li grandson of Geronimo

MUSIC: Michael Shapiro

RUNNING TIME: 21 minutes

COLOR; OPTICAL; 16mm

COUNTRY OF ORIGIN: USA

LANGUAGE: English

DISTRIBUTED BY: Learning Corporation of America

THE GREAT SKI CHASE

A ski theft and its resultant payoff leads the thief, his girl and the world's greatest skiers on a worldwide ski pursuit.

CATEGORY: Public Relations
PRODUCTION COMPANY: Summit Films, Inc.

PRODUCER: Roger Brown

DIRECTOR: Roger Brown

CLIENT: Hart Ski, TWA, Skiing & American Express

SCRIPT: R. Brown/Fred Iselin

CAST: Fred Iselin & Hart Demo. Team

MUSIC: Dick Darnell

Continued on Page 922

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.

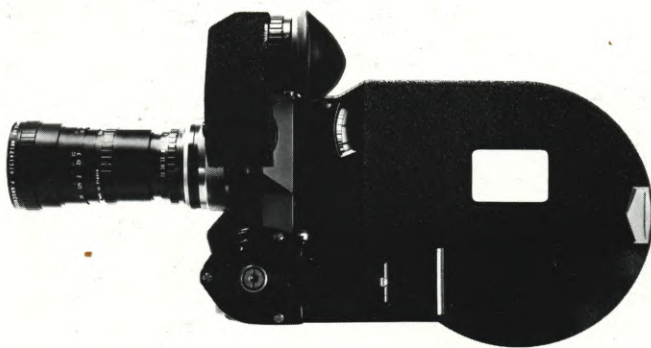
This is the most *inconspicuous* camera on the market. It's completely silent, of course. Hand-held, it's much smaller and lower than your head, as you can see. The battery weighs about a pound and fits into your pocket.

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.

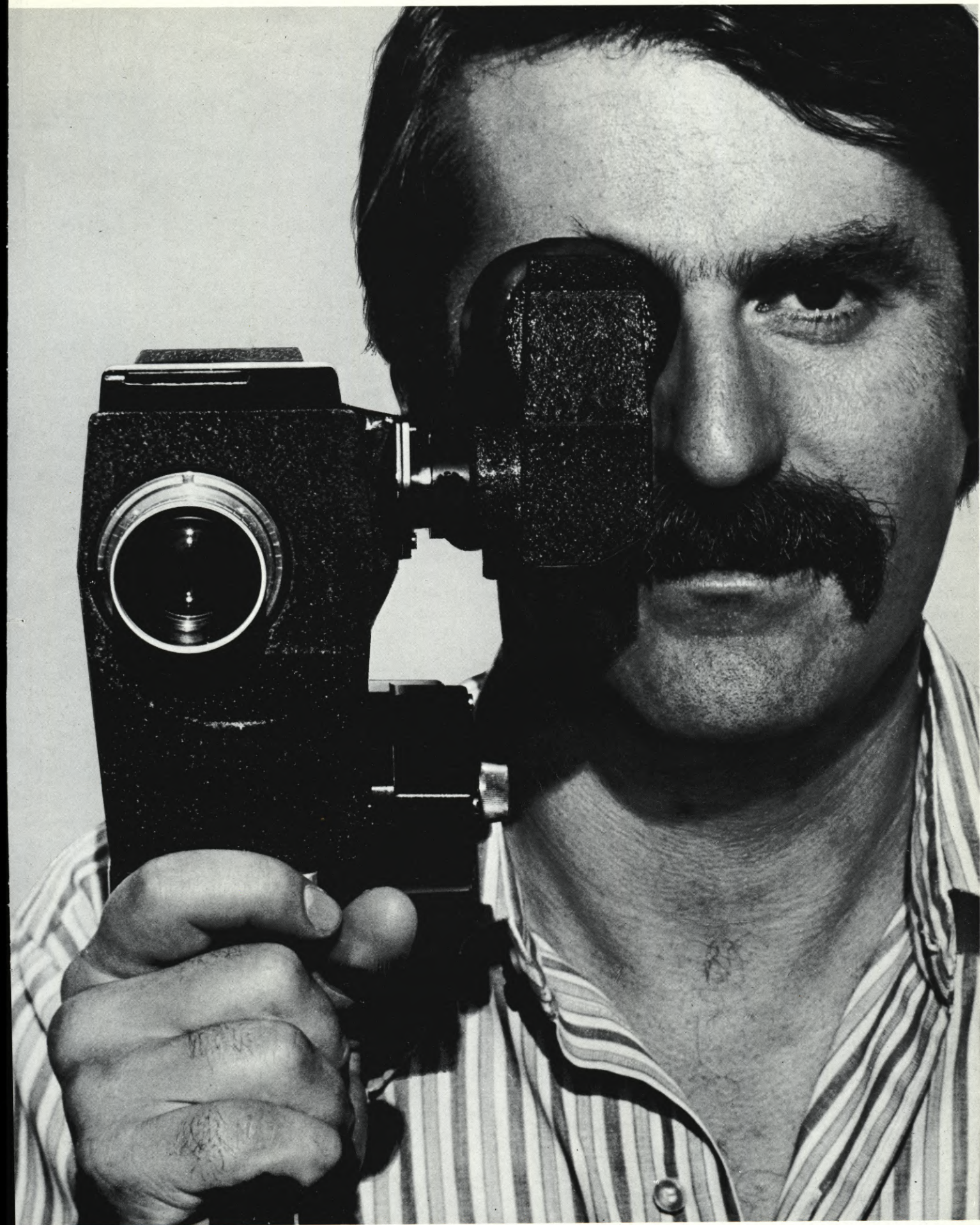
What else? A universal lens mount that lets you use any lens with any mount. Extremely bright and precise reflex viewing, with a viewfinder that rotates 360 degrees. And a price that's considerably lower than the competition.

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



eclair

Eclair Corporation: 7262 Melrose Ave., Los Angeles, Calif. 90046; and 73 S. Central Ave., Valley Stream, N.Y. 11580.



TOP-SIDE PHOTOGRAPHY

Continued from Page 877

designed to come out of the back of the blimp. Camera, blimp and lens project far out in front of the operator. That is fine for tripod shooting, but back-breaking for anyone trying to hand-hold it.

2) Real *cinema verité* shooting of fast-moving action almost requires the use of a zoom lens, but Cine '60's blimp port for the 25-250 zoom lets out too much noise. Besides, the 25-250 zoom is too long and too heavy for hand-held shooting.

For tests we decided to put up with the balance problem while trying to find a solution to the lens problem. Haskell Wexler started us on the solution when he told me about the old, now more or less obsolete, Angenieux 35-140 zoom. It is not, on the average, a very good lens, but is light, and small—about the size of a 16mm 12-to-120—and a few people have screw-on adaptors that convert the lens to a 25-100.

We spent weeks testing every 35-140 zoom we could find. They vary tremendously in quality. Time and again, when I took a lens to Willy Holtz at F & B/Ceco for a test, he would return it to me with the comment, "Das es Coke bottle." It took months, but finally we found what were apparently the best available zooms.

Next we designed and built a special port to fit on the Cine 60 blimp which would maintain the sound integrity of the blimp while permitting me to focus and change stops manually and zoom

The Carcasses of dead whales harpooned by South Africa's whaling fleet were used to lure hundreds of sharks before the underwater cameras for Cinema Center Films' "BLUE WATER, WHITE DEATH". Hordes of sharks tore at the whales before they could be towed to shore for processing.



Hundreds of sharks of different species were discovered by the four divers during their around-the-world search for the Great White Shark. Here diver and cameraman in small boat try to coax one of the sharks to the surface for a closeup.

with a Cine 60 battery-powered motor.

It worked, more or less, so in the summer of 1968 we went to the Bahamas to give our Rube Goldberg a test in the field.

The lens seemed manageable, but having that camera and blimp out in front of me on a brace threw me completely out of balance. Every time I leaned forward I fell over. Worse, the strain on my back was so great I couldn't hold the camera steady.

For anyone used to shooting with a perfectly balanced shoulder-positioned 16mm camera, our contraption was a torture rack. Running through 14 400-foot rolls—I seem to remember every one—proved to me that I didn't want

anything more to do with that camera. Before leaving I told Peter I would be glad to shoot this movie in 16mm, but he'd better find someone else if he wanted to shoot in 35.

To prove to him how good a 16mm blow up could be, I located a print done by the very best Hollywood negative blow-up photographer and as soon as Peter returned to New York scheduled a screening of the 16mm blow up and our 35mm test. Unfortunately, the screening did not prove what I thought it would.

When we looked at the test footage from the Bahamas, problems of 35mm Techniscope shooting were all apparent. The tiny frame line makes every piece of frame dirt part of the picture. Studio photographers can remove the lenses between shots and check the gate. My lens, encased in gears and housings, was impossible to check between shots or even between rolls. Clearly, we were going to have to put up with a certain amount of dirt.

Furthermore, Techniscope's wide screen format—2.35 to 1—makes any vertical movement twice as pronounced as it is in the Academy format and camera movement on a rolling deck would be a real problem. Besides, the clumsiness of the rig and the time required to get ready to take a shot would cause me to miss a lot of action I would not have missed in 16mm.

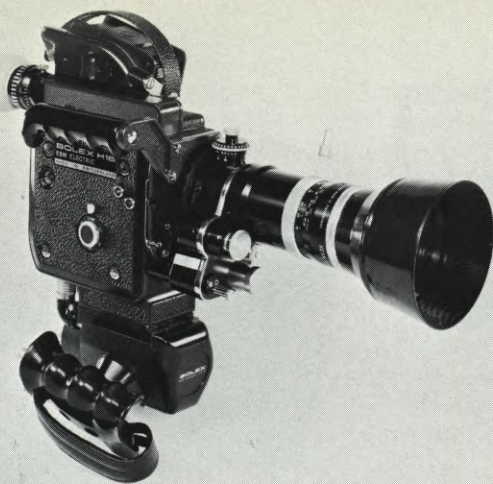
Still, for clarity and beauty, the Techniscope picture was incomparably better than the 16mm blow-up. For weeks I had been conning Peter and myself about the wonders of 16mm blow-ups. But Techniscope put more than double the amount of negative on

Continued on Page 919



THE NEW BOLEX H-16 EBM ELECTRIC CAMERA

This from-the-ground-up new camera combines the familiar silhouette and dependable quality of preceding models, with innovative features for greater versatility in many types of filming



Previewed in prototype form at the latest *Photokina* in Cologne, the new Bolex H-16 EBM Electric Camera has since gone into full production and is now generally available.

Although its configuration is such that the silhouette suggests that of the familiar line of Bolex H-16 cameras which have evolved down through the years, the EBM Electric is not a previous model with a few advanced accessories stuck onto it, but rather a new, from-the-ground-up, lightweight, electrically-driven, 16mm camera built to professional standards with 100-foot or 400-foot capacity for silent or sync-sound filming.

The main features and advantages of the BOLEX H-16 EBM Electric are:

Built-in electric motor with electronically controlled and stabilized speeds.

Same motor used for normal filming, slow motion, accelerated motion and sync sound filming.

Film capacity: 100' with basic compact unit, or up to 400' with magazine accessory.

Lightweight rechargeable battery built into the camera's hand grip for convenient handheld filming or tripod use.

Sync sound filming with crystal or sync pulse generator with automatic slating of film and tape.

Rugged, solid bayonet lens mount with instant changing of lenses.

Flicker-free reflex viewing with 14x magnification.

Rugged, professional camera construction for reliable performance with professional picture quality and registration picture steadiness, with proven registration claw.

FILM CAPACITY AND THREADING

100' reels (single or double perforated film) with basic camera or 200' reels

and 400 films on core with accessory 400' magazine and take-up motor. (Same magazine and take-up motor used on other Bolex models.)

400' magazine equipped with counter showing amount of unexposed film.

Automatic threading with 100' and 200' reels. Automatic threading with 400' film in darkroom, easy manual loading in daylight.

Spool ejector.

Automatic footage counter in camera.

Film rewind in 100' camera for double exposures and other trick effects.

MOTOR DRIVE

Built-in electric motor with electronically stabilized speeds for accurate, constant running at 10, 18, 24, 25 and 50 fps, for silent or sync sound filming.

Same motor used for silent and sound filming, for filming at normal speeds, and for accelerated and slow motion effects.

Smooth camera release in grip.

170° shutter opening.

Camera operation from -4°F to 122°F.

BATTERY

Small rechargeable 12V battery (12V/1 Ah Varta-Deac 10x1000DKZ) in camera grip eliminating long cable connections and the need for carrying separate power pack.

Battery alone weighs only 1 lb. 5 oz. Same battery drives 100' or 400' capacity camera.

400' take-up motor connection on top of camera.

Fully charged battery good for filming approximately 2400 feet at 70°F. (up to 400' at -4°F with battery at 70°F at beginning of filming).

Light at rear of camera shows when battery needs recharging.

SYNC SOUND FILMING

Possible with sync pulse generator or crystal.

Sync pulse generator built into a separate accessory which is small enough (2½"x4½"x1¼") and light enough (6 oz.) to be carried in pocket.

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Each supplied with coiled cable for connection to tape recorder and slating lamp.

Automatic slating of film and DC current supplied to "beep" generator of tape recorder for automatic slating of tape.

Pilot light at rear of camera indicates
Continued on Page 916

The new Bolex H-16 EBM Electric Camera, shown with 400-foot magazine mounted. Hand-grip power supply and crystal-sync option free the camera from cords.



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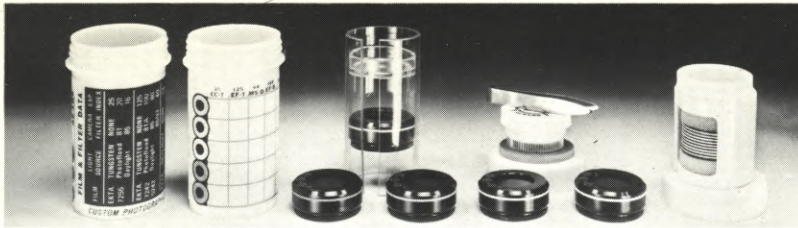
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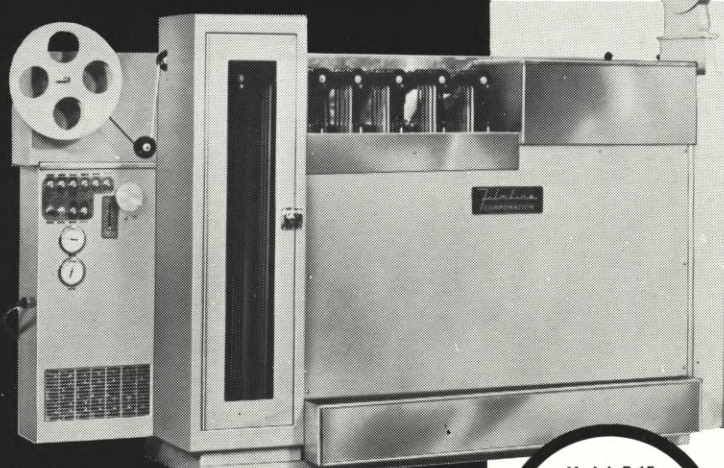
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THE WORLD'S LONGEST AUDIOVISUAL SCREEN FOR KODAK PRESENTATION

A ballroom with an "impossible" long, narrow configuration fails to defeat designers of a unique mixed-media program

What may well be the world's most unusual audiovisual presentation was given recently before the Executives' Club of Chicago in the grand ballroom of the Sherman House. The configuration of the room and the unusually large width of the screen presented problems not often faced by the designer of an AV show.

The delivery was made by Kodak President, Gerald B. Zornow, who spoke on consumerism, the urban crisis, youth activity, pollution, and other national issues confronting business in the seventies.

Seating 800 attendees in a room measuring 190 feet by 50 feet—so that each would have a good view of the speaker and the screen—presented the first unusual problem.

Chandeliers restricted the height of any screen to 11 feet, despite the 30-foot height of the ceiling. A screen mounted at either end wall would necessarily have to measure 11 feet by 33 feet, to accommodate two side-by-side images, due to the height-width ratio presented by the 35mm slide format.

"Were we to mount a screen along one of the end walls," explains the program designer, Dick Reisem, in Kodak's special marketing promotions of-

fice, "the man in the last row of chairs would feel as though he were viewing a ship on the horizon through the wrong end of a telescope.

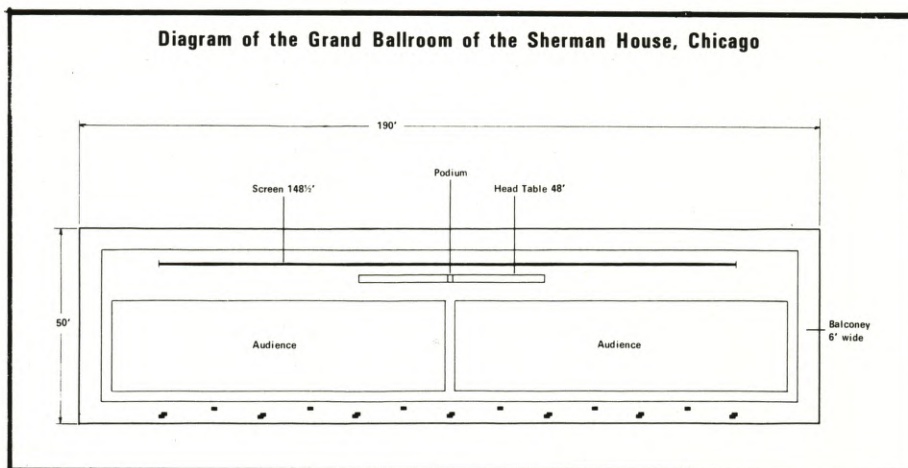
"An additional problem would be the placement of the projection equipment in the center of the audience. If we used several projectors, this would create quite an obstruction in the line of sight of the viewers. Let's face it, when people come to hear the president of Kodak, they aren't going to accept an amateurish show—the equipment must be out of sight and the viewing unrestricted," says Reisem.

The obvious solution to the problem

would be to mount a screen along one of the longer 190-foot walls. Here, too, problems creep in. For example, the man sitting in the front row along an end wall would be viewing the screen at an extremely oblique angle (roughly 20° from the horizontal). At such an angle, he would miss a lot of the show, in addition to developing a severe case of neck strain trying to see what little he could.

The screen would have to run nearly the length of the room so that each person in the audience could view at both a comfortable angle and distance.

"As far as we know, no flat screen



(LEFT) A swirl of psychedelic color enmeshes Kodak President, Gerald B. Zornow, as he speaks on consumerism, the urban crises, youth activity, and other national issues confronting business in the seventies. (RIGHT) The 11' x 148½' screen used in the presentation in the grand ballroom of the Sherman House in Chicago is the widest flat screen known to have been built.





(LEFT) Equipment for the presentation included 27 Ektagraphic slide projectors (Model B), two 16mm Pageant movie projectors (Model AV-126TR), two programmers (each utilizing an 8-channel punched paper tape), and nine Kodak Carousel dissolve controls. (RIGHT) The long narrow dimensions of the grand ballroom of Chicago's Sherman House presented a number of unusual problems in staging the audiovisual presentation. Here the screen is shown under construction.

had even been built quite that long," says Reism. "We figured that it would have to be a minimum of three-quarters of the length of the room, or roughly 145 feet wide."

The end result was a screen measuring 11 feet in height by 148½ feet in length. This allowed nine primary image areas running the length of the screen, each measuring 11 by 16½ feet. Two Kodak Ektagraphic slide projectors, model B, were focused on each primary image area. Eight secondary image areas—each covered by one Ektagraphic slide projector—overlapped the primary image areas, and each was made up of one half of the adjacent primary image areas (see diagram).

Zornow's podium, located at the center of the screen, conveniently divided the screen in half. Although different images were used, essentially the same message was conveyed visually on each

half of the screen, permitting a person situated at either far end of the room to watch the half nearest him. At the same time, full wide-screen effects (utilizing all nine primary image areas, or all eight secondary image areas, or both with overlapping images) could be presented with no visual interruption of the image at the center of the screen.

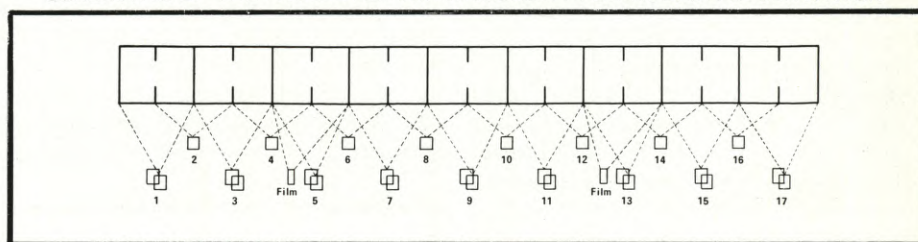
The screen, itself, presented the most problems. Conventional screen materials could not do the job. A light-weight,

but sturdy, frame was needed—aluminum appeared to fill the bill in that respect.

The next problem was finding a material that could be spread out to the dimensions of 11 feet by 148½ feet, mounted on a frame, and remain flat and buckle-free its entire length. Most materials would sag or bulge the entire length of the centerline of the screen.

"A thin, stretchable, white plastic, Continued on Page 942

SCHEMATIC OF THE PROJECTOR ARRANGEMENT FOR KODAK PRESENTATION



(LEFT) The 148½-foot-long screen used in the presentation was constructed of a thin, stretchable, white plastic stretched over a lightweight aluminum frame. The plastic was selected for its ability to remain flat and buckle-free. (RIGHT) Set-up and rehearsals for the 45-minute, 29-projector presentation was completed in a 13-hour period by a crew of 14 workmen.



"NORTH OF SUPERIOR"

Continued from Page 901

bit for this new format.

Another characteristic which is different from what the cameraman expects has to do with depth of field. Normally, when working in a 35mm format with a rather extreme wide-angle lens, the cameraman gets used to the idea that everything from about two feet to infinity is in focus (with the lens stopped down) and he doesn't have to worry much about focusing critically. The shock comes when the cameraman discovers, while using a large format such as IMAX, that while his 40mm lens may cover the same angle as the 11mm lens in a 35mm format, there is a considerable difference in depth of field. A 40mm lens on an IMAX camera has the same depth of field as a 40mm lens on a 35mm camera. There is no difference mathematically whatsoever. If he thinks of his 40mm as a wide-angle lens and expects it to have the same depth of field as the 11mm lens in the 35mm format, he will run into difficulties and he must, therefore, give more care to using follow-focus in situations where he would normally figure on "getting by" with a wide-angle lens in the 35mm format.

The IMAX camera uses standard 65mm Eastman 5254 Color Negative, which is exposed horizontally, and release printing is done on standard 70mm color print stock. Processing and printing is done by the MGM Studios Laboratory in Culver City, California. For cutting purposes, we print down to the standard 35mm vertical format, so that any ordinary editing machine can be used for cutting. In this case we used a KEM Universal editing console because the picture was to have a 6-track sound system and we were interested in the multiple sound track capabilities of the KEM equipment.

The KEM console worked fine, but it was necessary, all the way through the editing, for the editor to hold her head very close to the screen in order to match the field of vision of the Cinesphere audience. In fact, the real editing was done in a regular normal 35mm movie theatre. We would stand on the stage about ten feet from the screen and look at the projected screen image from that distance. The picture would fill our field of vision, just about as the IMAX image does in Cinesphere. It doesn't give you the same degree of sharpness—you get a very soft image and it's hard to make the adjustment in some ways—but it does allow you to get

a feel for the cutting that would be impossible to achieve in any other way.

There is one important principle that governs the editing of an IMAX production, especially when it is projected on a huge screen with the audience sitting as close as it does in Cinesphere—namely: the viewers must have time to look all around the screen. If you cut it the way you would cut a normal film, they wouldn't have time to register what is going on in the individual scenes. The picture would be cut too fast.

IMAX alters the approach to cutting in the sense that you don't need to have an establishing shot and then follow it up with a closeup. This is, obviously, also true of multiple-image pictures, where you can cut several scenes "in parallel", so that the audience can see simultaneously what it would normally only see sequentially. The same concept applies—though in a somewhat different way—when the full IMAX frame is used. The director-cameraman can actually combine, frequently in one shot, what the editor might otherwise take two or three shots to show. For example, in "NORTH OF SUPERIOR" we have a sequence that was filmed in an Indian village. You see the Indian children closely enough so that you can get a sense of who they are and what they look like, and yet you see the whole of their village and their houses and the other people watching them and many other details—all in the same shot.

This is one of the ways in which IMAX functions as a new medium and it requires a special editing technique.

Although, on the other hand, the forest fire shown in our film is cut in a traditional manner. It's edited as an action sequence with fast cutting and, if you view it in a normal 35mm theatre, it looks quite a bit as it appears in Cinesphere. In this particular instance, the cutting pace doesn't make all that much difference. But the main characteristic of the IMAX format as presented in Cinesphere is certainly—and everybody in the audience tells us this—that you feel that you're "in the picture" in a way that nobody really has been before, unless they've been sitting in the first few rows at Cinerama. This whole audience, or a very large part of it, feels themselves to be in the picture, and that's what we were thinking of all the time when we were making the film. We tried to design our sequences to maximize that value, so that the audience would *enjoy* the feeling of being in it. If it's an aerial sequence, you want them to be in it from the point of view of, let's say, the pilot of a plane that is flying low. If someone is in a canoe, *they* are in a canoe. If the canoe turns over, as it did in this film, *they* turn over. They are *in the picture*.

The turning over of the canoe, incidentally, was a complete accident. We had risked taking the camera into the canoe only because the canoeist had assured us that there was less than a 1% chance of anything going wrong. So we put the camera in the canoe and we didn't waterproof it and the canoe *did* turn over. To our great astonishment,

Continued on Page 943

BETTER LATE THAN . . .

One of our (fortunately) rare typographical errors in the August/1971 issue of *AMERICAN CINEMATOGRAPHER* resulted in a miscredit for the still photographs illustrating the story on Dalton Trumbo's Atlanta Film Festival top award-winning feature, "JOHNNY GOT HIS GUN". The photo credit should have read: "PHOTOGRAPHS BY MELISSA CAMPBELL", which is the name of the petite lady in the accompanying photograph. The gentleman she is hugging so warmly is her husband, Bruce Campbell, the Producer of the film.

Mrs. Campbell, who also happens to be the daughter of writer-director Trumbo, is a professional photographer, but "JOHNNY" was her first feature film assignment as still photographer. She learned her craft from her mother, who is also a highly-skilled professional photographer.

It's all in the family!



BIRTH OF APHRODITE

Continued from Page 871

from the sea-foam. The ever-changing imagery also suggested the idea of evolution and led to having the goddess's gestation period take place in the womb of the sea, represented as our two-billion-year history of evolution, since each of us relives this history to a large extent in the womb.

From this central core, the rest of the film evolved, and I found additional ways to use the distortion techniques throughout, adding a visual unity to the film. For example, I created the lightning effects by bending and shaking a reflector before a spotlight and filming the resulting thin-line reflections. The water superimposures were created by filming a large piece of aquarium plastic designed to look like water; for these effects, I took advantage of the reflector's natural blurring proclivity to make the "water" soft and liquid-looking. Underwater shots, filmed without distortion equipment under the sea, were later distorted by refilming them on my optical printer, which was designed to accept a distorting lens in the optical path. This method enabled me to try many different distortion effects by viewing them on the printer before committing them to film. The color auras that radiate from Aphrodite as she emerges onto land were created by filming, through moving distorting reflectors, colorful slides projected on a homemade rear-projection system. Finally, the swirling star fields and galaxies through which Aphrodite flies on her way to becoming the planetary body Venus, were created by shooting simulated stars of shiny beaded material, with the material made to pass on large revolving wheels in front of the distorting lenses.

Leland Auslander, shown with Silver Phoenix trophy awarded him when "APHRODITE" was voted "Best Experimental Film" in recent Atlanta Film Festival.



The author holds his Beaulieu 16mm camera upside down to film a slow-motion scene of Aphrodite walking backwards into the sea. When the scene is spliced in right-side-up, the action will be reversed to create weird effect of the girl being cast up onto the shore by a ponderously moving wave.

Even with my advanced equipment, I found it very difficult to achieve meaningful distortions. It took great skill and perseverance to film the subject in the right area at the right distance from the right distorting reflector moving precisely along the right distorting path. I often had to shoot in a ratio of 10-to-1 or more. At one point, I became so discouraged about the time and money I was spending that I set the film aside to work on a screenplay.

The unfinished film sat for a year, when I met a distant cousin, whom I

(ABOUT THE AUTHOR: With a background that includes graduate studies and degrees in engineering, business administration and theatre arts, Leland Auslander's film career combines his twin interests in science and art. He has worked in television as a cameraman-writer-producer-director, film director, and program manager. In 1961 he designed, built and patented the optics and hardware used to create Dynamic Frame effects for motion pictures and, more recently, the distortion effects described in this article. Dynamic Frame is a method for changing, slowly or rapidly, the size and shape of the motion picture format—with the changing frame incorporated on the film. He is a technical writer—filmmaker and has written and created many scientific films for aerospace and electronic firms. His short films, DEAR LITTLE LIGHTBIRD and THE SCULPTURE OF RON BOISE have been honored at international film festivals, and THE BIRTH OF APHRODITE won the Silver Phoenix for Best Experimental Film at the 1971 Atlanta International Film Festival. In this article, he describes the methods used to create his highly original imagery.)

rarely saw, at a funeral. Jay Lovins told me he was looking for a film short to round out a 105-minute film program he was releasing through his company, Hollywood Film Associates. After viewing my partially completed film, he was highly enthusiastic and said that he would like to use it in his program.

With this incentive, I finished the film. To meet a forthcoming film festival deadline, I rushed a print, made off the workprint, to the Atlanta International Film Festival, and was overjoyed to learn, a few weeks later, that it had won the Silver Phoenix award as Best Experimental Film.

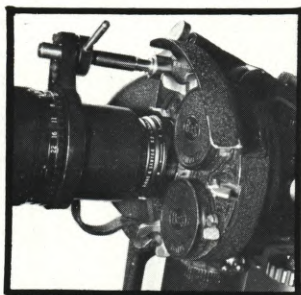
At Jay's request, I also filmed the main titles for his film, ILLUSIONS, using my distorting system. The resulting titles are visually arresting—even hypnotic. The word "Illusions" seems to grow, change, break apart, and reform, behaving as if it had an organic life of its own.

The final shot of Aphrodite flying from camera closeup to an image supposedly millions of miles away, as her tiny figure shoots toward outer space, was created in my 12 by 18-foot living room-turned-studio. I have found that working within such severe limitations often results in the forced creation of radical new effects. Had I had a large studio to shoot in, I never would have thought of using the method I finally dreamed up. How did I do it in such a confined space? Well, you don't expect me to give away *all* my secrets, do you?■



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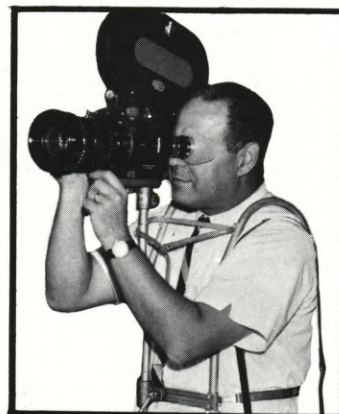
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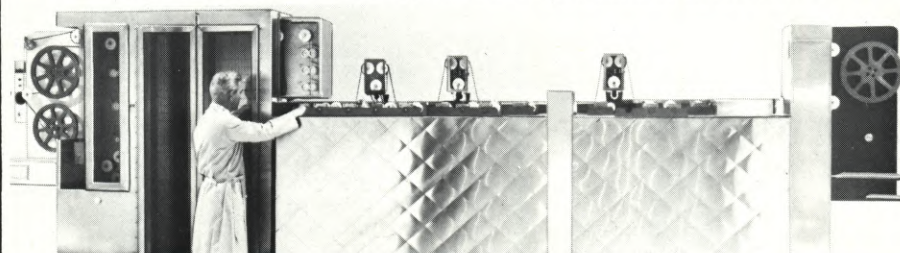


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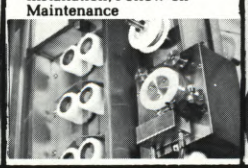

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PRINCE PHILIP'S ADDRESS

Continued from Page 891

leading producers, directors, and Directors of Photography has helped to create a high standard of optical and mechanical design in motion-picture lenses; Prof. Boris Konoplev, technical director of Mosfilm Studios, Moscow, whose maintenance of high technical standards in the Soviet film industry has given him international status; Thomas Earle-Knight, chief Engineer at Pinewood Studios for 37 years, in recognition of his outstanding career and for his contributions as an innovator in solving production problems by designing many new devices which have been applied to television as well as to other film studios; Stefan Kudelski, creator of the Nagra sound recorder, which has systematically reduced the proportions of location recorders to pocket size without losing quality; David Lean, director of such films as "BRIDGE ON THE RIVER KWAI" and "RYAN'S DAUGHTER", in recognition of his technical skill and the "lustre" he has added to the British film industry; Dr. Paul Luyten, head of color film research at Agfa Gevaert, Antwerp, responsible for developing the Gevachrome range of reversible color films, for his work on new technology in photographic color emulsions; George Mitchell, designer of the motion-picture camera which bears his name, in recognition of his remarkable achievement in maintaining it as the basis of present-day equipment; and Fred Orain, president of the Union International des Associations Techniques Cinematographiques since 1957, a producer of feature and documentary films, for his eminence in the French cinema and his contributions to international cooperation; James Redmond, Director of Engineering, BBC, in recognition of his substantial contribution to the advancement of knowledge in the field of technical problems of using motion-picture film in television, from the earliest experiments in telerecording (kinescoping) to the massive engineering effort involved in the present-day use of color film in color TV; Dennis Robertson, Bell & Howell Professional Division, in recognition of both his technical contributions and his overseas liaison activities for the BKSTS; and Dr. Norwood Simmons, general manager of the Rochester motion-picture and education marketing division of Eastman Kodak, in recognition of his world-wide repute as a scientist and his outstanding service to the motion-picture industry as a whole, particularly in the rational application of technological trends. ■

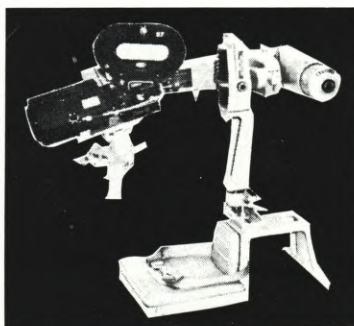
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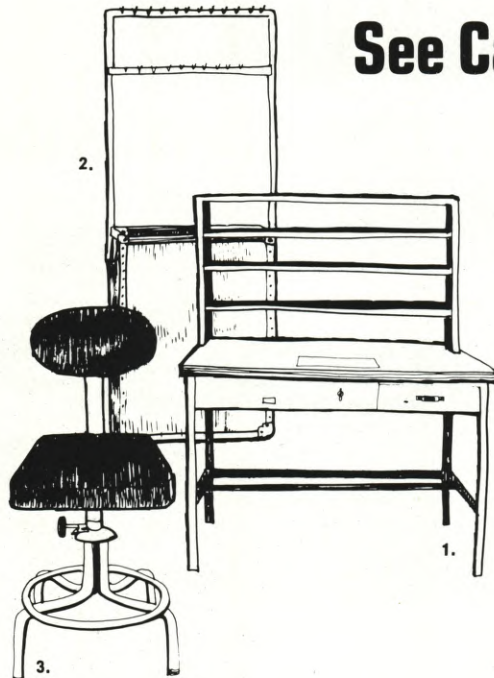
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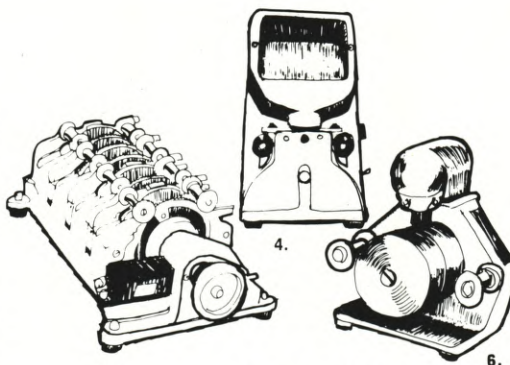
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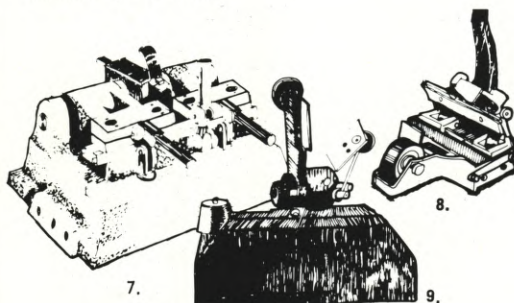
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BOLEX H-16 EBM CAMERA

Continued from Page 907

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Shows field of view for 10, 16, 25, 35, 50, 63, 75, 100 and 150mm focal length lenses. Extremely useful for previewing a scene.

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QUESTIONS & ANSWERS

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and WALTER STRENGE, ASC.



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

Q I have used "Kodak 7302 D.P." film in various makeshift devices. Of course, this film is quite slow and results in a negative image of the art work. I suppose the normal idea is to use a reversal film.

- a. Do you have any suggestions for a developer for the above film?
- b. Could you suggest a more appropriate film together with a suitable developer?

A a. The developer recommended for Eastman Fine Grain Release Positive film 5302 (35mm) and 7302 (16mm) is D-97 at 70°F. The film is not designed for reversal use, so is not tested for reversal development. It can be reversed but your results could vary from emulsion to emulsion. Why don't you try reversing the black-and-white on your art work and just develop it as a positive? Your blacks would then come out white and your whites would come out black. If you would like a higher contrast film with greater maximum density—one designed for making positive titles, use Eastman High Contrast Positive Film 5362 (35mm) and 7362 (16mm). It is also designed for the D-97 developer.

b. Black-and-white reversal camera films have a maximum density of approximately 2.20 to 2.40. If you are making burn-out titles to be used in printing, it is possible that light would be passed through the black areas and degrade the background of the title.

Q What is the best position for a microphone when shooting sync-sound motion pictures?

A The microphone should be about one or two feet in front of and two feet above the head of the person speaking for the best sound pick-up. It should not be pointed down, since this results in boominess and a jumble of low frequencies. It should be pointed at the speaker's mouth, or, if this position is too bright or sibilant, it should be pointed at the speaker's chest or to one side of his head. If two or three people are speaking, it is best to compromise with a small movement of the micro-

phone. Do not overdo microphone movement. A boom man or a man handling a "fishpole" (a long rod with a microphone hanging from the end) should learn the scene so that he can anticipate moves and thus avoid placing the microphone in boomy or harsh positions such as equal distance from two walls and the ceiling when working in a corner or in the focal point of a dome or curved wall. Do not place the microphone too far from the speaker. Ambient noise on exterior shooting such as that from autos, airplanes, ocean, wind, and off-scene people, can be minimized by operating with the microphone closer than normal. Directional microphones are also an aid but not as much as close operation. Increased bass suppression also helps to eliminate rumble noises. Lapel or chest-type microphones are recommended for noisy locations.

Q I recently shot 16mm color film in below-freezing temperatures. Most of the footage was underexposed. Is this due to the low temperature or a wrong exposure meter reading? If temperature affects film sensitivity, is there a formula that can be applied in computing exposure under such conditions?

A Test data, that should be used as a guide only, show an emulsion speed loss of about 1/3 lens stop at 0°F, and about 1/2 lens stop at -30°F. Since this loss is less than the exposure latitude safety margin for this film, it would not seem that the low temperature caused the underexposure. Have your meter checked and be certain to read the scene properly to avoid a misleading high reading which would result in underexposure.

Q I wish to produce the effect on the screen of a scene as viewed through binoculars.

A If you are shooting with one of the professional cameras, purchase a binocular matte and place it in the camera when photographing the scene. The effect of the binocular masking can also be produced when the film is printed.

TOP-SIDE PHOTOGRAPHY

Continued from Page 906

the screen. One hour of projection room viewing with the prints side by side convinced Peter and me that I had to give that awful, back-breaking camera another try.

Okay! The lens, the zoom motor, the blimping worked as well as they were going to work. Everyone suggested that we wait for the blimped 35 Arri. But we knew we had to work in 1969 with the best compromise we could engineer.

The worst feature of our contraption was the viewing system. The eyepiece projected almost a foot behind the camera. We knew that the only way I could possibly "wear" that camera for months on an expedition was to get the eye piece beside the camera and the camera in a straight line over my back-bone.

It ought to be possible, we reasoned, to build a viewer for the Arri that would come out the side of the camera rather than the rear. Then we could try to make the eyepiece take a jog forward, then a jog out before turning back, positioning the eyepiece beside the blimp rather than behind it.

Accomplishing this little business called for twisting the image 90 degrees in six different turns. How much light would we lose? No one knew, but we had to try.

Getting someone to build the viewer proved very difficult. We must have talked to half the optical engineers on the East Coast and found few who were hopeful about doing the work in the time required or for less than a percentage of the Company.

Finally, Ray Emeritz, now of General Camera, took on the job. For weeks the thing grew twisted and changed in his shop. I dropped in from time to time, as to a tailor for fittings.

Finally we had a finished eyepiece and it worked! Light loss was negligible and definition remained good enough for me to focus the zoom through the viewer. Now the camera rested solidly on my shoulder beside my head.

We had great doubts about how long such a twisted optical tube would hold up in the field so Ray built us an extra viewer as a back up. We never used it. For six months, in dugout canoes in Ceylon, on pitching decks in Indian Ocean storms, on rigid-sprunged jeeps bouncing on pot-holed roads, it never failed. Lens elements dropped out, cameras choked and magazines jammed, but Ray's viewer worked.

While he was making the viewer, Ray helped re-engineer our custom door

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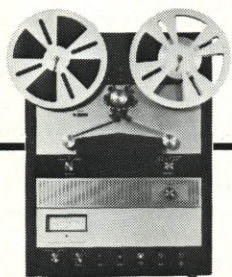
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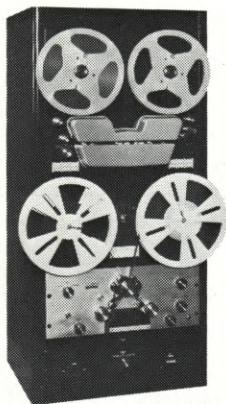
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blimp for the 35-140 zoom and move the start-stop switch, the inertial button and the sync slate button to convenient locations on the side of the blimp.

Six months of fiddling and fooling gave us a practical, well-balanced, 35mm blimped camera, quiet enough to use in a small room. We all knew that with more time and money we could do better, but at least we had something usable.

Weight remained the big problem. Camera, lens, blimp and belt-battery weigh an enormous amount of pounds. When I first balanced it on my shoulder, I was outraged. How could anyone be expected to make a movie like that!

But part of the problem, I convinced myself, is psychological. I wasn't used to such a heavy camera so I resented it like a newlywed who discovers, belatedly, that changing diapers is the price of loving.

Many times in my life I've climbed a mountain for the fun of it, and I've carried back-packs which weigh more than that camera—and that was supposed to be fun. So tell yourself, I told myself, that making this movie is just a long hike.

As the time before departure shortened I began to wonder whether the weight of such a camera wasn't a threat to my health. The family doctor obligingly checked my ticker, blood pressure and cholesterol count, then smilingly said, "If you want an excuse not to go, try a head doctor."

So we set out. Peter and I knew that our method of filming and our camera were compromises. You pay a price in control and quality when you determine to shoot a true *cinema verité* film, and we paid another price by shooting in 35mm and in Techniscope. You pay that price because you believe there are other values to be gained. You want to catch a no-fooling, nose-picking reality, a sense of "being-there" that will compensate an audience for the technical limitations of the method.

Film societies and TV give us a chance to look at the popular Hollywood triumphs of a decade or so ago, and seeing them, we realize how quickly most films become dated. The fantasies, like the Chaplin films, maintain their effect best because they never pretended to be "real". But it seems incredible now that viewers could have accepted the "realistic" films of the 30's and 40's as having anything to do with reality. *AFRICAN QUEEN*, which won such praise in 1952 for its location shooting and realism, looks soap operish now. The reason is, I suspect, that we viewers are often unaware of the contemporary

cinematic conventions of fictional films. We are so close to them that we accept stagey direction and improbable plot uncritically. Time and distance bring those make-believe fictions to the surface of our awareness where they spread across the landscape like noxious weeds.

I don't think the sense of reality in *cinema verité* films will date so quickly. We hope that 1971 audiences will like our film, but whatever the popular verdict now, it pleases us to believe that in the future—ten years or maybe even fifty years from now—a viewer will be able to look at the film and know what it was really like chasing the Great White Shark on the Terrier VIII in the Indian Ocean during the summer of 1969. ■

4 U.S. FILMS WIN HONORS AT CANNES, ANTWERP, BERLIN

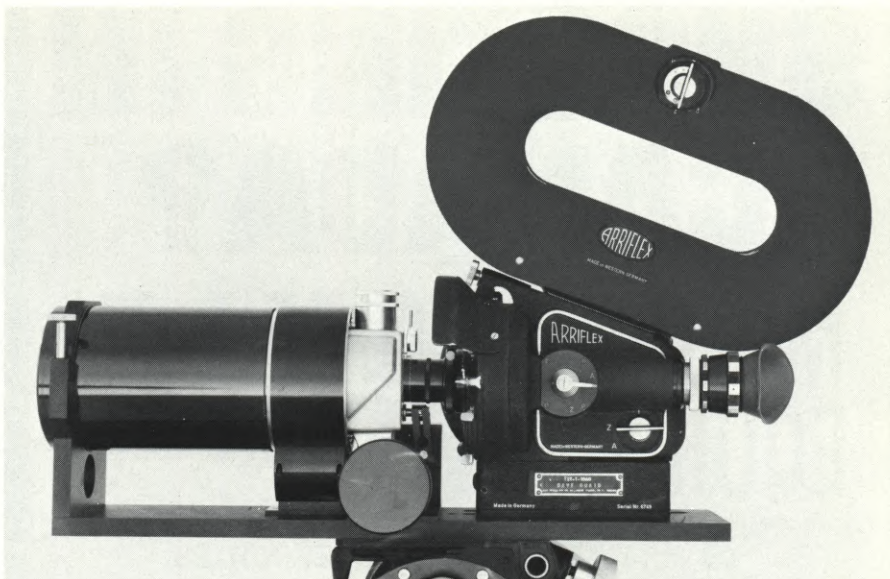
"1501½", a producer's first short film effort, captures top prize at the Berlin Film Festival. Paul B. Price, a New York TV commercial producer who has tried his hand at a different medium, has won the Berlin Golden Bear award for the film "1501½".

At another European film festival, the Antwerp International Labour and Industrial Film Triennial, CINE (Council on International Nontheatrical Events) has received word that two American films were cited for honors. John and Faith Hubley received an award "Engraving" for the best artistic film in the information category offered by the Hoger Institute Voor Schone Kunsten of Antwerp. Their film, "OF MEN AND DEMONS", was sponsored by IBM World Trade Corporation. The film "THE BILL OF RIGHTS IN ACTION: EQUAL OPPORTUNITY" produced by Bernard Wilets and sponsored by Bailey-Film Associates was awarded the prize "Sculpture" for the best film concerning socio-cultural labour aspects, offered by the Minister of Culture.

A five minute film "STAR SPANGLED BANNER", produced by Roger Flint, was awarded the Special Prize of the Jury "for the cinematographic script and the concise way in which a serious and real subject was exposed" at the Cannes Film Festival.

"1501½" is a delightful 10 minute comedy concerning the housing shortage and a man who converts a small bathroom into an apartment. The film was written and financed by Paul Price.

The winning producers and sponsors will receive the trophies and diplomas at the 14th Annual CINE Awards Program during the week of November 8 in Washington, D.C.



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Questar, with the assistance of famed cinema photographer David Quaid, has redesigned the focusing mechanism of its world-reknown telescope especially for the professional cameraman. Now this lens system, the only one in the world of 1400 mm. focal length that can focus from 8 feet to infinity, permits the cinematographer to adjust his focus from an extreme telephoto situation to a macro-closeup within the same film take. And all of this, the barrel containing the optical system, the control box, and the beautifully engineered system of controls, all mounted on a supporting platform, is light in weight. Moreover, it is possible to mount the Questar system on the Arriflex 35 mm. camera in approximately the same time required to mount a conventional lens.

The great thing about this system, David Quaid says, is that it will permit the cinematographer to do something that nothing else in the world will let him do. For example, from a distance of 8 or 10 feet, he can pick up an ant full screen, balanced on the tip of a blade of grass, and as the ant begins to move he pans, keeping it in exact focus as it crosses over to a tall tree and then climbs to its very topmost branch, the whole trip in perfect focus. He may then, if he wishes, switch to a woodland a mile away and focus sharply and instantly on leaves swaying in the breeze.

The precise engineering that has gone into this equipment makes it virtually vibration-free. It can be used not only with the Arri 35, but with 16 mm. reflex cameras. Special accessories are available, such as the Questar Calibrated Follow-Focus Gauge, a Barlow lens to increase the size of a distant object on the film, a positive lens which will diminish the size while increasing the light on a nearby object, and an aerial-image groundglass.

David Quaid says that the prototype of the Questar Cinema Model was used in producing several of the award-winning films made by David Quaid Productions.

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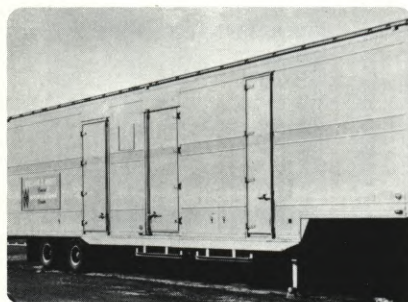
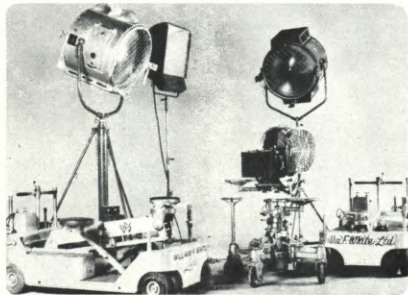
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ATLANTA AWARDS

Continued from Page 903

CAMERAMAN: Roger Brown/Robert Fulton

EDITOR: Robert Fulton

RUNNING TIME: 28 minutes

COLOR; 16mm

COLOR SYSTEM: Ektachrome

COUNTRY OF ORIGIN: USA

LANGUAGE: English

D. W. GRIFFITH: AN AMERICAN GENIUS

A 60 minute program about the life of D. W. Griffith, a Louisville-area native, often referred to as "the father of American film."

CATEGORY: History

PRODUCTION COMPANY: WAVE-TV

PRODUCER: Art Metzler

DIRECTOR: Walt Lowe

NARRATOR: Richard Schickel

SCRIPT: Schickel & Lowe

MUSIC: Don Murray and Cliff Shaw

CAMERAMAN: Walt Lowe

EDITOR: Walt Lowe

RUNNING TIME: 60 min.

COLOR; OPTICAL; 16mm

COUNTRY OF ORIGIN: USA

LANGUAGE: English

HEARTBEAT OF A VOLCANO

Dramatic film of one of the earth's most powerful land building processes—a volcano eruption. Viewers watch volcanologists quietly making their precise measurements as the volcano expands and erupts.

CATEGORY: Earth Science

PRODUCTION COMPANY: Encyclopedia Britannica Education Corp.

PRODUCER: Bert Van Bork

DIRECTOR: Bert Van Bork

NARRATOR: Lee Ranger

CAMERAMAN: Bert Van Bork

EDITOR: Ulf Baeckstroem

RUNNING TIME: 20 min.

COLOR; OPTICAL; 16mm

COLOR SYSTEM: Eastman

COUNTRY OF ORIGIN: USA

LANGUAGE: English

HIS LAND

HIS LAND is the thrilling story of Israel from ancient to modern times. HIS LAND, a one-hour color motion picture, takes you on a journey through

space, time and current events. You see graphically the fact that Israel today is a living testimony to the words of the prophets when they proclaimed that Israel would take her place among the nations of the world.

CATEGORY: History

PRODUCTION COMPANY: World Wide Pictures

PRODUCER: Frank R. Jacobson

DIRECTOR: James Collier

NARRATOR: Cliff Barrows/C. Richards

SCRIPT: James Collier

MUSIC: Ralph Carmichael

CAMERAMAN: Paul Lohmann

EDITOR: Gene Pendelton

RUNNING TIME: 54 minutes

COLOR; OPTICAL: 16mm

COUNTRY OF ORIGIN: USA

LANGUAGE: English

IMOGEN CUNNINGHAM, PHOTOGRAPHER

The film combines interview and candid footage of Imogen Cunningham with a full selection of her work. Through the course of this film, we come to feel both a sense of her achievement as a photographer and a feeling for her radiance as a still vital human being.

CATEGORY: Documentary Films, Graphic & Cultural

PRODUCTION COMPANY: Korty Films

SPONSOR: American Film Institute

DIRECTOR: John Korty

NARRATOR: Roger Bowen

CAST: Imogen Cunningham

MUSIC: L. Alexander; B. Haynes

CAMERAMAN: John Korty

EDITOR: Richard Chew

RUNNING TIME: 20 minutes

COLOR; 35mm

COUNTRY OF ORIGIN: USA

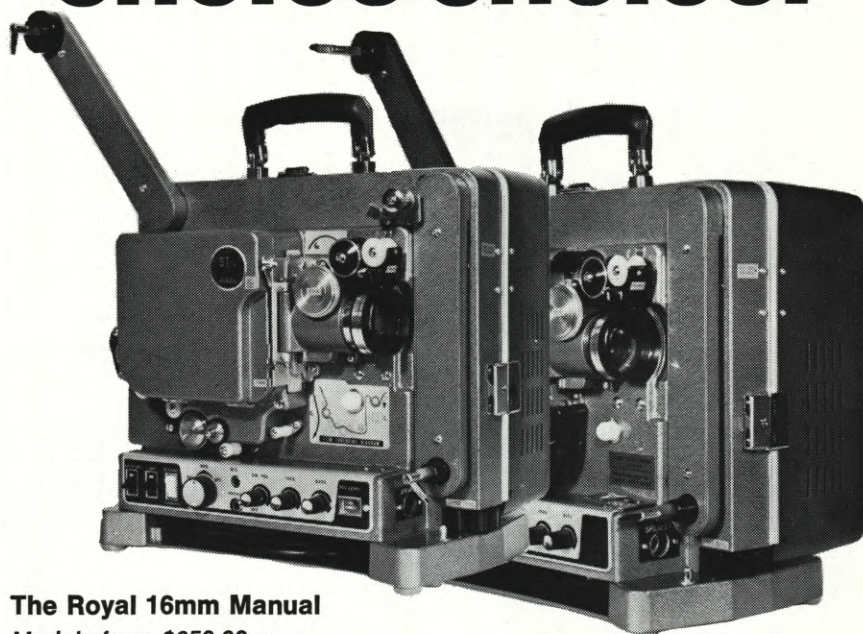
LANGUAGE: English

THE INSOMNIAC

A group of children see their world as a peaceful country garden at the beginning of a summer day. Suddenly they are called in to bed. For the adults see their world only as an ugly city at the end of a grey, tiring day.

The children's father reads them a bedtime story which hints at the ambiguity of these two worlds. Later at midnight, unable to sleep, the father looks out of his apartment window. But

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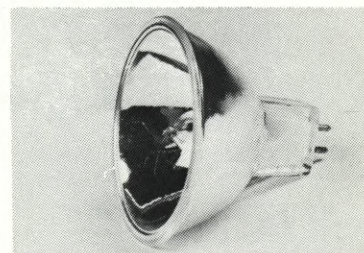
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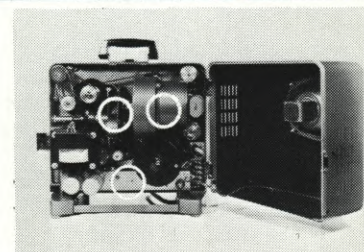
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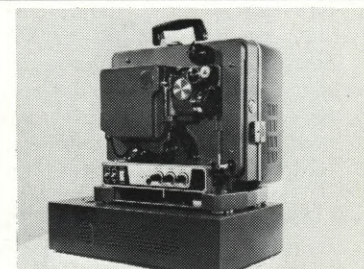
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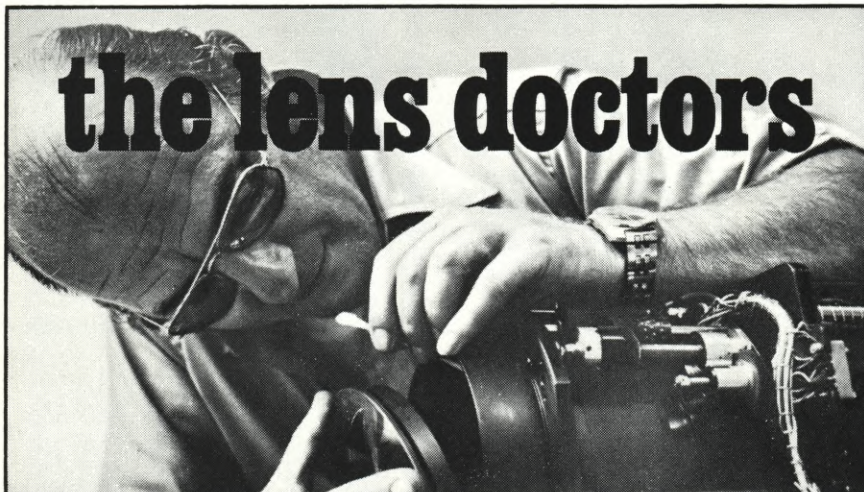
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instead of the usual city skyline, he now sees the children's country garden, brightly lit by the midday sun.

Projected into the children's world, he decides to explore it. He finds himself invited to a party where all the guests still believe it is the middle of the night. He persuades a girl at the party to see things as he does, and escapes with her into the deserted, sun-drenched countryside.

CATEGORY: Short Subject—Live Action

PRODUCTION COMPANY: Auriga Films, Ltd.

PRODUCER: Rodney Giesler

DIRECTOR: Rodney Giesler

SCRIPT: Rodney Giesler

CAST: Morris Perry; Valerie Ost; Patricia Leventon; Neville Marten

MUSIC: James Stevens

CAMERAMAN: Tony Richmond

EDITOR: Mike Pavett

RUNNING TIME: 44 minutes

COLOR; OPTICAL; 35mm

COLOR SYSTEM: Eastmancolor

COUNTRY OF ORIGIN: United Kingdom

LANGUAGE: English

THE KEYMAKER

"The Key Maker" deals with an elderly retired locksmith—who is not willing to give up the vitality of living as his neighboring contemporaries have.

Mr. Tod's somewhat secluded life enabled him to develop private amusements through the years. His beloved wife, Helen, was the greatest single spark to his life. But now, living alone, Mr. Tod cheerfully carries on, dwelling in a room filled with a wealth of enchanting, imaginative things and taking his daily walk to the park and back again.

In the park the old men sit about in a self-pity, loneliness—caught up in lifeless thoughts.

Beneath the old, weatherbeaten surface of a certain alley wall vibrates another world—a colorful, beautiful dimension. Every day during his walk, Mr. Tod enjoys looking into it, and then remembering these sights (that no one else has seen) as he falls asleep at night.

CATEGORY: Experimental Live action
PRODUCTION COMPANY: University of Southern California Division of Cinema

PRODUCER: U.S.C.

DIRECTOR: Trace Johnston

SCRIPT: Trace Johnston

CAST: George Prud'homme, Walter

Overman, Paul Davis
 CAMERAMAN: Doug Knapp
 EDITOR: Andy London
 RUNNING TIME: 20 minutes
 COLOR SYSTEM: ECO
 COUNTRY OF ORIGIN: USA
 LANGUAGE: English

DAVID LEAN: A SELF PORTRAIT

David Lean rose to fame in a British cinema dominated by the literary adaptation executed with taste, intelligence and expert craftsmanship. Though it is a long way from "In Which We Serve", his first directorial assignment, to "Ryan's Daughter" these qualities have become characteristics of his style. The attempt to create an epic portrait of an era through the intimate story of a family or closely-knit group of people is a basic element of his works. "A Self Portrait" explores film as a director's medium, using interviews with Lean and his associates and scenes from his films.

CATEGORY: Documentary—Television

PRODUCER: Thomas Craven

DIRECTOR: Thomas Craven

CLIENT: N.E.T.

CAST: David Lean

RUNNING TIME: 55 minutes

COLOR; OPTICAL; 16mm

COUNTRY OF ORIGIN: USA

LANGUAGE: English

DISTRIBUTOR: Pyramid Films

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CATEGORY: Industry and Business

PRODUCTION COMPANY: Francis

Thompson, Inc.

PRODUCER: Neil Tardio

DIRECTOR: Neil Tardio

NARRATOR: Charles Kimbrough

CLIENT: Kaiser Alum. and Chem. Corp

SCRIPT: Richard Olmstead

MUSIC: Elmer Bernstein

CAMERAMAN: Alan Green, Neil

Tardio

EDITOR: William Bruder



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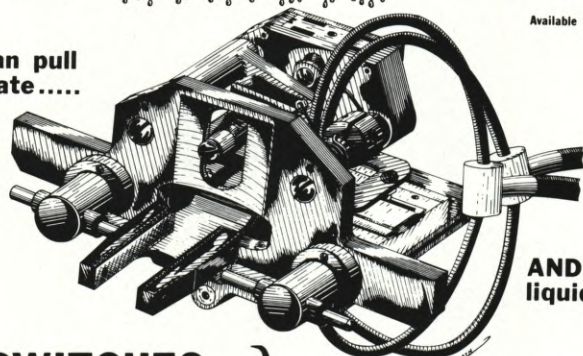
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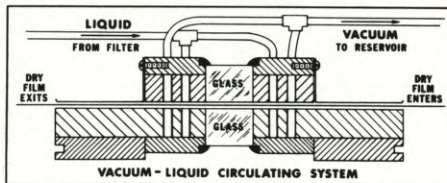


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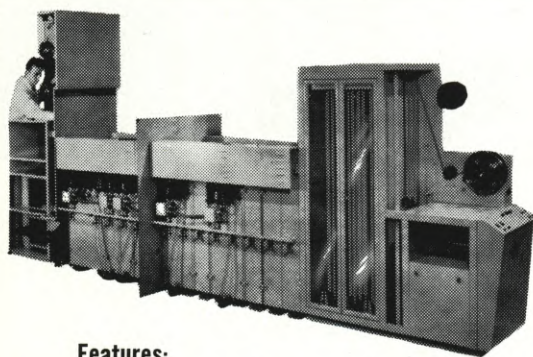
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COLOR; OPTICAL; 16mm
COLOR SYSTEM: 3200 Kelvin
COUNTRY OF ORIGIN: USA
LANGUAGE: English

MASTERS OF THE SKY

"Masters of the Sky" is a film capturing man's highest sense of joy and accomplishment in skydiving today—"relative work." Swarms of jumpers exit en masse from their lofty birds miles above the earth, enjoying minutes upon minutes of free-fall, maneuvering freely in 3-dimensions, building world-record stars and formations. Witness for yourself man expanding his universe, forming the world's first 12-man "snowflake" and the world's first 16 and 18-man "stars." Watch him being towed on a rope behind an airplane like a glider; watch him jump in snow, over water, and land in trees. "Masters of the Sky" is poetry and grandeur; it is the most comprehensive and contemporary film on jumping today.

CATEGORY: Short Subject—Live Action

PRODUCTION COMPANY: Photo-Chuting Enterprises

PRODUCER: Carl Boenish

DIRECTOR: Carl Boenish

MUSIC: Michale Lloyd

CAMERAMAN: Carl Boenish

EDITOR: Carl Boenish

RUNNING TIME: 14 min.

COLOR; OPTICAL; 16mm

COUNTRY OF ORIGIN: USA

OUT OF SIGHT

A boy wanders thru a day seeing things in an ordinary way until they transform into new dimensions which can only be realized thru the power of the camera—making what is usually out of sight—and out of mind—a present reality and new awareness.

CATEGORY: Education

PRODUCTION COMPANY: Morton

Goldsholl Design Associates

PRODUCER: Goldsholl Associates

DIRECTOR: Millie & Morton Goldsholl

CLIENT: Eastman Kodak Company

SCRIPT: Millie Goldsholl

CAST: Bradley Elias

MUSIC: Dick Boyell

CAMERAMAN: Tom Freese, Mert

Knapp, Millie Goldsholl

EDITOR: Millie Goldsholl

RUNNING TIME: 18 minutes

COLOR; OPTICAL; 16mm

COUNTRY OF ORIGIN: USA

LANGUAGE: English (title only)

THE QUARRY

The film, contracted for by a large chemical company, was produced to inform young people of the potentially fatal dangers of inhaling concentrated vapors from aerosol products to achieve a "high". So far more than 100 youngsters have died, and the numbers are rapidly rising, as a result of abusing various aerosol products. The film was based on a composite of details taken from actual case histories of young people who have been victims of aerosol inhalation in order to create a believable and medically authentic picture. It is hoped that the film will have some influence in discouraging youngsters from abusing these otherwise safe and useful consumer products.

CATEGORY: Medical & Health

PRODUCTION COMPANY: Artz Productions

PRODUCER: Tony Artz

DIRECTOR: Tony Artz

PRODUCT: Aerosols (Safety)

SCRIPT: T. Artz, Kay Hines

CAST: Tony Bruno, Diane Spiro, Val Kirschoffer, Rick Losey

MUSIC: Bill Smith

EDITOR: Tony Artz

RUNNING TIME: 30 min.

COLOR; OPTICAL; 16mm

REPLAY

This is a film that gives the lie to the generation gap by humorously documenting the existence of the generation link.

CATEGORY: Short Subject—Live Action

PRODUCTION COMPANY: Concepts Unlimited

PRODUCER: Richard Barclay

DIRECTOR: Robert Deubel

MUSIC: Charles Strouse

CAMERAMAN: Robert Bailin

EDITOR: Gary Youngman

RUNNING TIME: 8 minutes

COLOR; OPTICAL; 16mm

COLOR SYSTEM: DeLuxe

COUNTRY OF ORIGIN: USA

LANGUAGE: English

SAD SONG OF YELLOW SKIN

A film of the other Saigon, where bombs seldom fall and blood seldom flows, where the wounds of war are of a different sort, and the people suffer a different kind of dying.

If you wonder what ordinary people
Continued on Page 933



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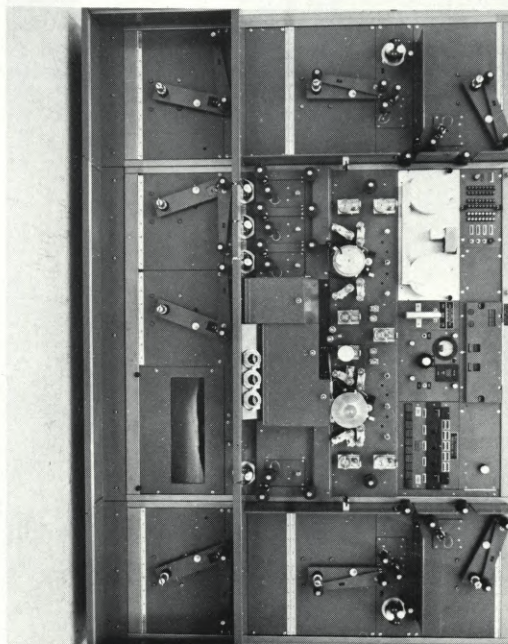
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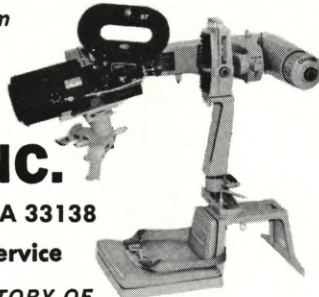
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BOOK REVIEW

BIOGRAPH BULLETINS, 1896-1908.
Compiled with an introduction by
Kemp R. Niver, edited by Bebe Berg-
sten. Los Angeles: Locare Research
Group, Publishers, 1971; 464 pages,
Profusely illustrated. \$20.00.

Of all the early motion picture stud-
ios, the American Mutoscope and Bio-
graph Company was, perhaps, the most
important. The company developed the
Biograph camera and projector, as well
as the card-flipping Mutoscope. These
were inventions that did much to sup-
port the first faltering steps of the
moving picture. Somewhat later, Bio-
graph, as the company was popularly
called, furnished the setting and where-
withal for D.W. Griffith and his cadre of
players, cameramen and technicians
which gave such impetus and direction
to the art and craft of the American
motion picture.

Biograph advertised their product by
issuing a series of handbills giving a brief
synopsis of each picture together with
length, release date and, quite often, an
illustration from the film. Although no
cast list or credits were given, much to
the dismay of present-day film histori-
ans, these handbills have provided inval-
uable information in studying the devel-
opment of the American motion picture
industry. Unfortunately, it has been
very difficult for historians and students
to obtain these bulletins, since the rare
existing copies can only be seen in a few
libraries or in the hands of private
collectors. *Biograph Bulletins* compiled
by A.S.C. Associate member Kemp R.
Niver, makes this invaluable reference
material easily available for the first
time. It will be a welcome volume for
anyone with a serious interest in motion
pictures.

In the introduction to this book, Mr.
Niver explains how the company invent-
ed the Mutoscope, a flip-card wheel
fitted into a viewing device so one could
view moving pictures. Subsequently,
Biograph built a projector. Moving pic-
tures could now be shown in theaters,
thus enabling the company to reach
more customers. The projector eventual-
ly replaced the flip-card viewing ma-
chines. Biograph was now launched as a
full scale producer of theatrical films.
Some of these early movies were mem-
orable and are of historical importance.
For example, films were made of Major
William McKinley at Canton, Ohio in

1896 when he was a presidential candidate.

Beginning with "My Rag Time Gal", a Mutoscope release of April 1896, most of the handbills Biograph issued for all of its product, until December 1908 with "The Helping Hand", are reproduced in this book. The most important thing that happened during that period was Biograph's signing of D.W. Griffith as a director. Bulletins of most of the pictures Griffith directed in 1908 are included.

Cinematographers will be particularly interested in the index of titles listing the name of the cameraman responsible for the photography of each Biograph picture between 1896 and 1908. G.W. ("Billy") Bitzer is usually mentioned by film historians as the one responsible for most of the Biograph product. Bitzer was the cameraman in quite a few Biograph releases, but there were also a number of other men responsible for photographing Biograph pictures. Arthur Marvin, for one, photographed D.W. Griffith's first picture, "The Adventures of Dollie". Other Biograph cameramen were: F.S. Armitage, a Mr. Ackerman, a Mr. Bonine, a Mr. Congdon, F.A. Dobson, O.M. Cove, a Mr. Louisti, Wallace McCutcheon, H.J. Miles, F. Ormiston-Smith, A.E. Weed and William K.L. Dickson. This same Dickson was Thomas Edison's chief assistant when Edison invented the moving picture camera. Dickson photographed the first moving picture and thus became the first Director of Photography. He was one of the early founders of Biograph and probably trained Billy Bitzer, Arthur Marvin and the other early Biograph cameramen. Mr. Niver has listed all of Dickson's Biograph pictures in this index.

In addition to the bulletins, reproductions have also been made of Biograph press clippings, as well as many letters written by Biograph executives to early motion picture exhibitors and other people in the film trade.

Biograph Bulletins is a large, handsome book. All of the illustrations, letters and bulletins are well reproduced. Throughout the book, Mr. Niver has included many explanatory notations. In the forepiece and backpiece, photographs of many early Biograph players have been included: Lillian Gish, Lionel Barrymore, Mary Pickford, Blanche Sweet, Harry Carey, Robert Harron, Alfred Paget and others.

This book will add to Mr. Niver's reputation as an authority on the early American motion picture industry. ■

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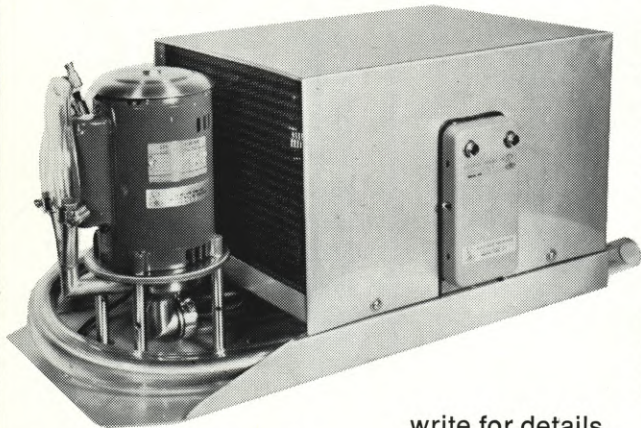
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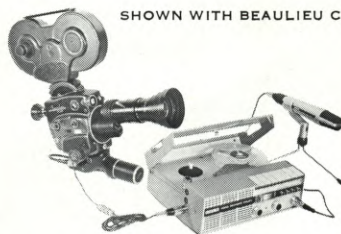
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FILMS AT ONTARIO PLACE

Continued from Page 897

through the use of twin projectors, are projected onto clusters of large plastic balloons speckled with matte white paint to make them partially reflective, but not so opaque as to prevent some of the light from passing through to a second layer of balloons in back of the first one.

If one regards this presentation as simply a montage of fluid light and color, the effect is quite beautiful, but the huge balloons (which appear to be at least five feet in diameter) form such a lumpy "screen" that it is impossible to get any of the images sufficiently into focus to be able to tell what they are supposed to be. It's a case of the means having defeated the end result.

The second pod features a presentation called "EXPLOSIONS", which is a mixed-media show involving both slides and film. Each of the four walls of the darkened room has the identical screen configuration, so that spectators, standing or seated on the floor, can see the same presentation, no matter in which direction they are pointed. The center of each screen is a 32 x 16-foot panel for the projection of a motion picture segment in the anamorphic format. Framing this panel on both sides and the bottom are 10 rear-projection screens. Each is mounted on the front of an eight-foot cube with two Carousel slide projectors inside.

The central motion picture screen panels include sliding doors which open on computerized command to reveal various three-dimensional artifacts, such as the circular blade from a saw mill. The doors are, of course, covered with the same reflective material as the remainder of the screen, so that when they are closed they simply become part of the screen. The film segments are projected from a central booth which houses four Ernemann IX 35mm interlocked projectors with 2500-watt xenon lamps—one projector for each of the four screens.

Fully computerized, the 12-minute show is cued by an 82-channel programmer which operates the 35mm film projectors, the 80 slide projectors (for the four screen areas), opens and closes the doors of the artifact capsules, keeps the 12 channels of stereo sound in sync and cuts the light off the screens at the conclusion of each showing.

As for the content of the show, it is an imaginatively visualized panorama of the progress of civilization in Ontario from the earliest pioneer days up to the

present. The 6,480 super slides involved in the production were shot by various still cameramen under the direction of chief photographer Leonidas Zourdoumis. Veteran Canadian film-maker Pat Crawley produced and photographed the 35mm Panavision film segments for "EXPLOSIONS" and cut them expertly to key in with the surrounding slide images.

The third pod features a film presentation known as "ONTARIO STYLES" (a title more appropriate to a fashion show), that is projected in accordance with a far-out mechanical concept which, however novel, doesn't quite work. The subject content spans an era in the development of Ontario from the Indian times through the War of 1812, the two World Wars, and the arrival of the post-war immigrants.

The scenes which compose this panoply are arranged in groupings and thrown, by means of 28 RCA 1600 16mm projectors onto clusters of tall, cylindrical white bags which are suspended from the ceiling and left to dangle freely about two feet off the floor. The bags are similar in shape to those which boxers pummel while training in the gym, but are much larger and lighter in weight. In order to make his way across the pod to the next presentation, the spectator is required to push himself through tiers of these swinging bags. The idea is that, in so doing, he will feel that he is right in the midst of the battle action. Perhaps, if a single person were to run this gauntlet, the effect would be as visualized by its creator. But with hundreds of people simultaneously pushing and shoving their way through this obstacle course of dangling bags (with movies projected all over them), the result is a kind of colorful chaos.

It's one of those ideas that must have sounded great on paper, but ran afoul of the realities of the situation. Which is a pity, because obviously a great deal of thought and effort went into the planning and shooting of the films produced by Pat Crawley. He even went so far as to compose his battle action shots so that each soldier would fit neatly onto his own bag when the scene was projected. Similarly, great care was taken to film the advances of troops head on, since horizontal action would have "rippled" across the bags in an unseemly fashion.

Some ingenious effects were also planned in terms of the cutting and sound perspectives. For example, a cannon is fired by a group of British

Continued on Page 935

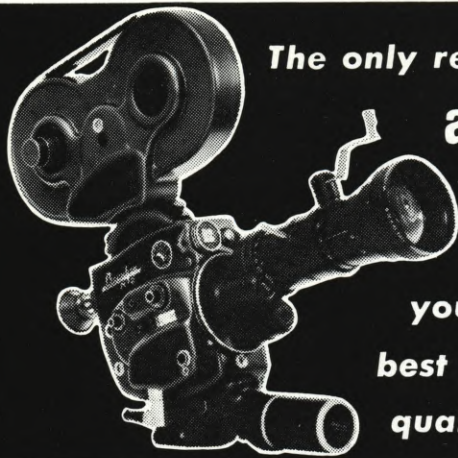
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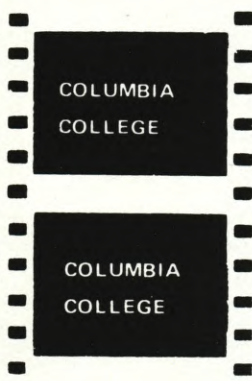
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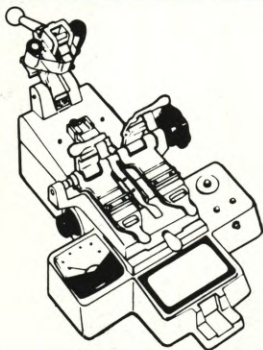
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"The filmmaker has learned that his art depends on the way his camera shapes the scene he is recording" is Gerald Mast's approach to screen art in *A SHORT HISTORY OF THE MOVIES* (Bobbs-Merrill.) Mast considers film as a basically visual medium, integrated with sound, and creative despite awesome financial pressures and mechanical burdens.

Significant trends in film history are aptly outlined, concentrating on American feature production and noting Europe's part in its early years. While the directors' contribution is stressed, many cameramen are mentioned—Karl Freund, "Billy" Bitzer, Joseph August, Lee Garmes, Gregg Toland, Raoul Coutard (*Breathless*) and Edouard Tisse (*Potemkin*) among others.

* * *

Richard L. Bare's *THE FILM DIRECTOR* (Macmillan) is a practical and thorough-going manual on film and television directing techniques, written by a successful, full-time practitioner of the craft.

Reflecting its author's extensive experience (the long-running *Green Acres* and many other film/tv productions) the book stresses, on the one hand, the director's "absolute control" function and, on the other, the essential cooperation he expects from his associates. The cameraman's work is discussed at length in the "Telling a Story with the Camera" section. This is an eminently useful and authoritative manual for all filmmakers.

* * *

The increased realism of television fare is made technically possible by the imaginative proficiency of cameramen, optical experts and propmen. The wide diversity of the illusions they create is discussed in *THE TECHNIQUE OF SPECIAL EFFECTS IN TELEVISION* by Bernard Wilkie (Hastings House.)

This indispensable guide to practical tv production surveys in specific terms and with detailed illustrations the working principles and procedures involved in each effect, and the equipment required.

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The first reference work of its kind, *FILM & TV FESTIVAL DIRECTORY* (Back Stage) has been ably researched and edited by Shirley Zwerling.

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* * *

The contribution of underground filmmakers to other forms of art, particularly because of its revolutionary camera techniques, is stressed in *EXPERIMENTAL CINEMA* (Universe) by David Curtis.

Boldly innovative movies appeared after World War I, when almost simultaneously in France, Germany and Soviet Russia, artists from various fields turned to camera work and began exploring the then infant medium. The book discusses film's fifty year evolution and finds that today, experimenters like Jonas Mekas, George and Mike Kuchar, Ron Rice and Stan Brakhage depend on their cameras in the search for new creative effects.

* * *

"Location" shooting of a very special type is considered in Denis Gifford's *SCIENCE FICTION FILM* (Dutton.) It is a lively and extensive survey from Georges Méliès' 1902 *Trip to the Moon* to current space epics like John Sturges' *Marooned*, which was so exceptionally well photographed by Daniel Fapp, ASC. The fascinating s-f field is faithfully reflected in this well illustrated book. ■

ATLANTA AWARDS

Continued from Page 927

do and feel who have grown up on the fringe of perpetual war, then this film will let you draw your own conclusions. It is a view of a different kind of war, as seen by three young Americans conscripted by their own personal ideal of winning peace for themselves and the Vietnamese by cracking the wall of distrust into a genuine human acceptance.

CATEGORY: Social Welfare

PRODUCTION COMPANY: Nat. Film Board of Canada

PRODUCER: N.F.B. of Canada

DIRECTOR: Michael Rubbo

NARRATOR: Michael Rubbo

SCRIPT: Michael Rubbo

MUSIC: Vietnamese folksong

CAMERAMAN: Martin Duckworth, Pierre Letarte

EDITOR: Torben Schioler, M. Rubbo

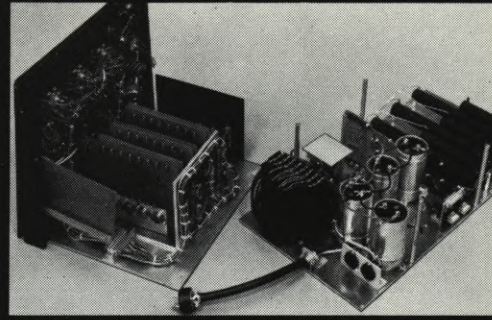
RUNNING TIME: 58 min. 5 secs.

COLOR; OPTICAL: 35mm

COLOR SYSTEM: Eastman

COUNTRY OF ORIGIN: Canada

LANGUAGE: English



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CATEGORY: Music and Dance
PRODUCTION COMPANY: Flower Films

PRODUCER: Les Blank
DIRECTOR: Les Blank
MUSIC: Dewey Balfa; Nathan Abshire
CAMERAMAN: Les Blank
EDITOR: Les Blank
RUNNING TIME: 41 minutes
COLOR; OPTICAL; 16mm
COUNTRY OF ORIGIN: USA
LANGUAGE: English
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PRODUCTION COMPANY: Wolper Productions, Inc.

PRODUCER: Robert Guenette
DIRECTOR: Robert Guenette
NARRATOR: Richard Basehart
CLIENT: The Quaker Oats Company
SCRIPT: R. Guenette & Theo. Strauss
MUSIC: Director—Jack Tillar
CAMERAMAN: Adam Giffard
EDITOR: John Link II
RUNNING TIME: 51:38 minutes
COLOR; and BLACK AND WHITE; OPTICAL; 16mm
COUNTRY OF ORIGIN: USA
LANGUAGE: English

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FILMS AT ONTARIO PLACE

Continued from Page 931

soldiers shown on one cluster of bags, and it supposedly travels across considerable space to explode on an opposite set of bags where American soldiers are seen falling as a result. The idea was good enough, but the reasons why it doesn't quite come off are best explained in the words of Ontario Place Audio-visual Post-production Supervisor Ken Heeley-Ray: "When you get the British redcoats coming toward you and you hear the 'bang' off their sound track, you see the Americans fall over. We had to dub those things as if we had stereo track running. In other words, we had the two pictures running on the screen. In the recording studio we played both films on either side of the screen.

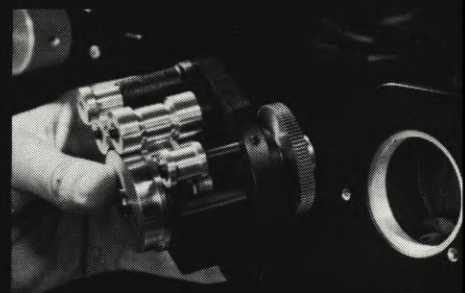
"When we dubbed it, we opened up all the pots to get the sound of the rifles and cannon firing. Then we sort of panned the thing—but the panning doesn't work because we only have two tracks to pan on—so we more or less faded it out on the one track and faded it in on the other. The effect is that of an actual stereo track."

In practical terms, what with the throngs of people shoving their way through the bags, it's hard to tell who is shooting whom—let alone from what direction. Nevertheless, the people who dreamed up "ONTARIO STYLES" deserve an "E" for Effort.

In the final pod is a more conventional (and more effective) film presentation called "ONTARIO CHALLENGES", which deals with the quality of life, present and future, in the province. The audience sits on carpeted steps to watch a pair of 35mm anamorphic films which are projected off of two large mylar mirrors mounted directly above and behind the audience. Two interlocked Ernemann IX projectors are mounted overhead and aimed at the mirrors. Sound is on four channels, with two speakers for each screen mounted over the screens and beamed directly down at the audience. The films themselves are sprightly and "mod" in style, clipping along at a brisk pace.

Throughout the various pods of the Pavilion there are several other film presentations on a less ambitious scale, ranging from 16mm rear-projected endless loops to Super-8 films made by Ontario school children, the latter being made viewable simply by dialing any one of 12 Super-8 "tracks" on Zeiss Panacolor machines.

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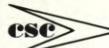


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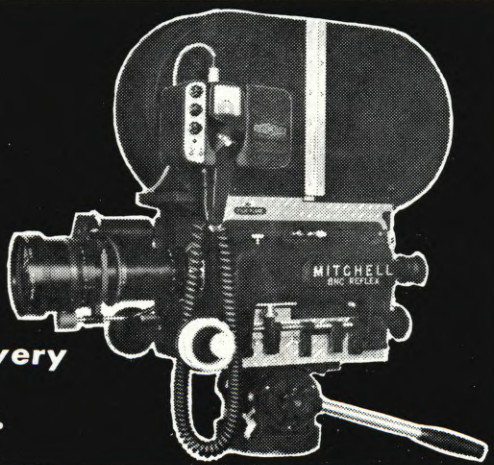
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sphere that film at Ontario Place really comes into its own—a fact attested by the long lines of visitors patiently waiting to get inside. Just now, Graeme Ferguson's IMAX production of "NORTH OF SUPERIOR" is being shown alternately with a well-made 35mm Panavision featurette, "SEASONS IN THE MIND". Predictably, it is the IMAX film that is the real mind-blower, judging from the comments of the viewers emerging from Cinesphere.

As for the IMAX format itself, there has been extensive editorial coverage of the system in previous issues of this journal (See *American Cinematographer*, July/1970 and August/1970), so I shall not repeat that data here. An in-depth technical description by Multi-screen Development Engineer William Shaw, which follows, aptly describes the modifications to the IMAX projection equipment which were necessary in order to tailor the presentation to the huge Cinesphere screen.

And huge it is. A screen that is 60 x 80 feet in area may not sound so large in terms of cold figures, but when one realizes that the height of the screen is equal to that of a *six-story* building—and that the width is even greater—the figures begin to mean something.

The giant screen is not rectangular but, rather, somewhat oval-shaped. It is also concave, dipping in 10 feet, 4 inches from the perpendicular at its deepest point. The 57 speakers that project sound from the basic six-channel track of "NORTH OF SUPERIOR" are located in many different areas of the dome, so that the viewer is surrounded by sound.

Before the screening begins, I seat myself in the center of a middle row of the sharply rising circular tier of seats. This is an unaccustomed vantage point for me. It is one of my eccentricities that, when viewing a film, I try to sit as far forward in the theatre as possible—even in the front row, if there is any set-back at all to the screen. When my somewhat horrified, more "normal" friends have asked my why I do this, I've always replied, quite truthfully: "I like to feel that I'm *in* the picture."

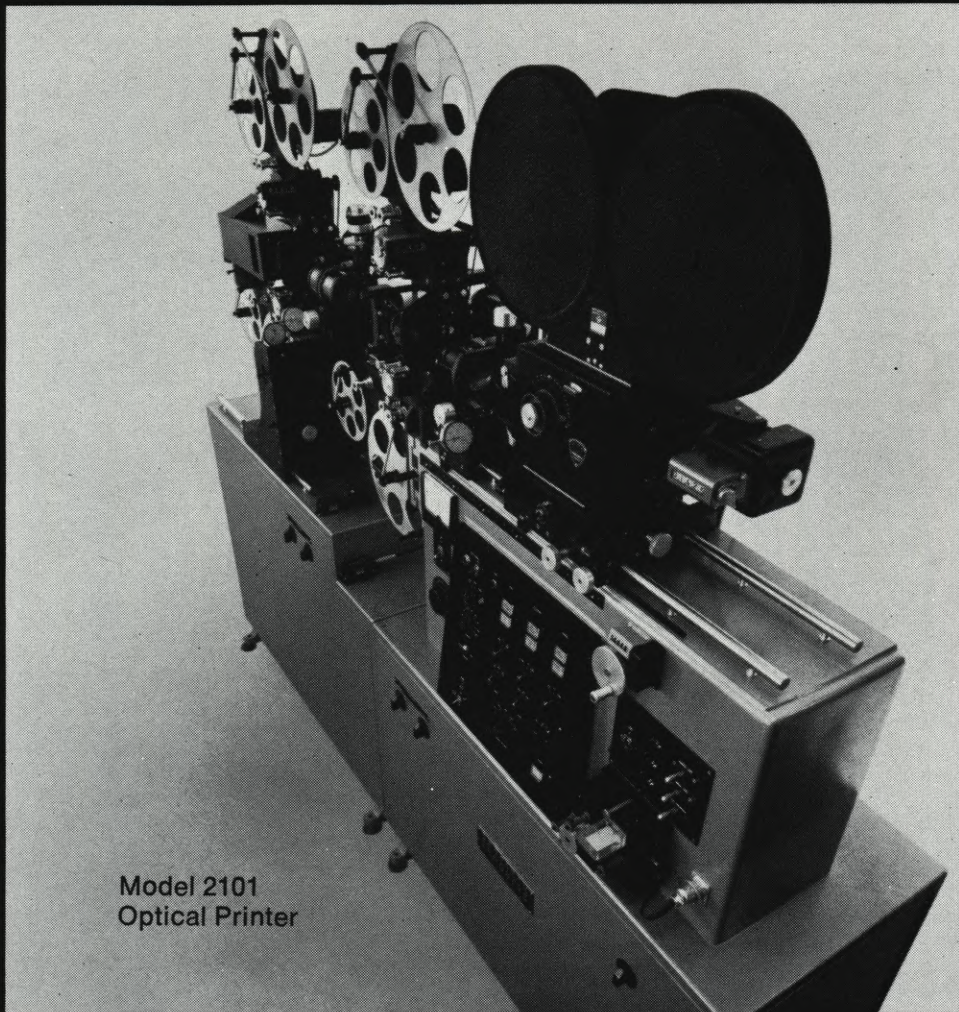
Invariably they have gone away shaking their heads—as one does when trying to get a straight answer out of an amiable idiot.

But now, on Graeme Ferguson's advice, I settle for a seat in the middle of the theatre. It turns out to be very good counsel, for the Cinesphere is unlike any theatre ever built and, even though the seats tilt backward, if one were to sit in the very front row, it would be almost

Continued on Page 938

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FILMS AT ONTARIO PLACE

Continued from Page 936

like looking straight up at the facade of a six-story building.

"NORTH OF SUPERIOR" begins conventionally enough, with relatively small white titles on a black background. Then a frame no larger than that projected in a conventional 35mm theatre reveals that the camera is flying low and swiftly over water. Suddenly, the frame opens out to full IMAX proportions and fills the giant screen completely. The audience gasps. It is no longer the camera that is flying—it is all of us, the entire audience, as if soaring on a magic carpet. In every direction, as far as the eye can see, there is a magnificent lake surrounded by vividly-colored autumn foliage. Then the plane suddenly zooms up and over the face of a cliff. The audience shrieks. The sense of involvement is absolutely total and real.

I've finally got my wish. *I'm in the picture!*

And so is everybody else who is watching "NORTH OF SUPERIOR". During the course of the film's running time, we find ourselves shooting the rapids in a canoe (which turns over unexpectedly and dunks us in the drink), plunging down a snow-covered slope in a giant innertube, and seemingly trapped in the inferno of a raging forest fire. It is impossible to simply sit there and watch objectively, so compelling is the sense of participation engendered by both the IMAX format itself, and the subjective camera techniques employed in the filming of "NORTH OF SUPERIOR".

When it's over, the viewers leave the Cinesphere in a kind of post-orgasmic daze, but still atingle with the stimulus of having shared in some pretty wild experiences.

So this is IMAX in the Cinesphere. I like it! ■

IMAX IN THE CINESPHERE
By WILLIAM SHAW

Development Engineer, Multiscreen Corp. Ltd.

The lens which we are using to project "NORTH OF SUPERIOR" in the Cinesphere dome is quite a wide-angle lens compared to the one used on the IMAX projector at EXPO '70. It was designed and built by Ernst Leitz Canada Ltd. in Midland, Ontario and is a 60mm, F/2.4 retro-focus lens, covering a 70-degree diagonal angle. It has ten

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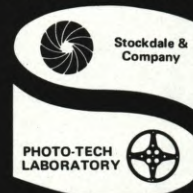
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elements in the focusing barrel, plus the two quartz elements that make up the field-flattener. These are adjacent to the film and are fixed in position (as to focus) within the projector. They are actually interchangeable for cleaning purposes, since the film is laid against the face of the rear element.

We were originally concerned as to whether we could have a lens built that would be of sufficient quality for our purpose, so we had micro-densitometer studies done on a length of 70mm film that we judged to be of excellent quality and the lens was matched to the available information that would appear on the film in terms of the MTF curve. To get that MTF value, Leitz said that the maximum speed that they could design to was probably F/2.4. But this slightly slower than normal lens speed for big projectors meant that the lens and the optical system in the illumination side of the projector had to be well-matched and, with that in mind, we did some studies in Japan at the end of EXPO '70, using pinhole patterns to find out the light angles from the film to the back of the lens. As a consequence, the field-flattening elements were modified and redesigned accordingly, and the result has been very good.

We are getting on this screen which is approximately 64 by 82 feet, a screen brightness at the center of approximately 10 foot-lamberts. The screen gain is probably only about .75, so we are getting pretty good illumination. Also, we are getting brighter corners than we expected to get. In Japan we accepted corner brightness that was about 50% of the center brightness and we were expecting that we might get down to a third or even less here but, in fact, the corner brightness is more like 60% of the center brightness and, with so wide an angle lens and that screen, that is very acceptable.

We had really designed toward the SMPTE screen brightness range, which, if I recall correctly, is 10 to 16 foot-lamberts at center. While we are right at the bottom of that range, we don't seem to be in trouble because I think the eye accepts the very large scale of view and it gets a lot of light and so it really perceives the picture as being somewhat brighter than it is. This is because it's so big and covers such a large angle of your view.

By comparison, the regular 70mm projectors in here which are running at 5000 watts with xenon lamps versus our 25,000 watts, are getting just about 1/5th of the light to the screen, so our optical efficiency is equal. Because they are blowing the 70mm pictures up to

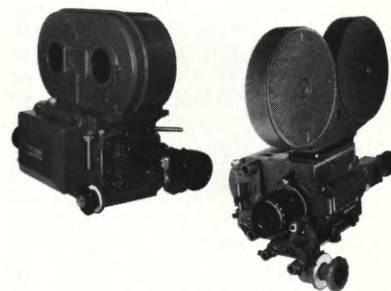
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something around 75 feet wide, they are, in fact, running rather low on brightness at screen center but I assume that, in this theatre, they probably feel that the bigger picture, though not at full brightness, is better than the smaller, slightly brighter one. There could be some discussion about that I think, but they do really need more illuminating power to stretch a picture to 75 feet than they have.

The Leitz lens, as I said, is a retro-focus lens and it is made as if it were going to be a lens with cemented elements in it, but there has been no cementing done on it because of projection heat. We and Leitz were rather concerned about that but, in fact, the lens just gets kind of comfortably warm all over while running at full power with film in the projector and we limit the operation without film to perhaps 5 or 10 seconds at a time to avoid damage to the elements from cracking. And, of course, the projector has pretty good heat separation in it. It has a big quartz cold mirror in it which was made by OCLI in Santa Rosa, California. It's a multi-layer coated quartz slot that works at about 90% efficiency in terms of separating the visible from the infrared and ultra-violet, so we dump approximately half the heat output from the lamp at that point into a water-cooled heat sink. The end result is that the lens is not force-cooled in any way. The film gate is not force-cooled either, except by the movement of the film. The rolling loop passing the gate creates an air disturbance, windage action, which helps, and the gate runs quite cool without any supplementary cooling at all.

The film, of course, with its large format area, runs only nice and warm. Our tests have indicated that it would probably stand four times the heat load, at least, before we would get into trouble with film embossing or anything like that. So, it's been quite good and the lens quality has turned out to be up to the design specifications fully. We think that's pretty remarkable. It certainly produces a picture quality that you can't get by pushing 70mm projectors. That's due to a combination of things, of course; it's the large format, first of all; it's the camera lenses, on which extensive testing was done for selection purposes; and the field-flattener in the projector, which stops all the breathing that occurs in normal projectors. And, finally, it's the good registration.

We took a check on registration just the other day because we got a first test from a full-frame IMAX-size printer

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head that Film Effects of Hollywood has built. We ran it with the frame lines in the middle of the picture and found that the combination steadiness errors in the printer and the projector amount to approximately a ¼-inch unsteadiness in an 82-foot-wide picture, which is less than .03%. I think the motion picture standard is .5%, so we are running much better than the standard.

Of course, when we set the projector up here we ran tests on it to make sure that the projector itself did not touch the emulsion in any way. The emulsion is not touched at any point through the projector and, in a test run after a thousand passes, we expect to make a microscopic examination and find nothing in the way of marking on the emulsion.

The usual print life on big format prints at EXPO seemed to be 120 to 250 passes and then they would throw them out. We expect reasonably to run prints from 1500 to 2000 passes here before we throw them out. And even then I think the picture quality will still be considered to be excellent.

The Cinesphere theatre is not the usual EXPO sort of theatre where the screen is often placed high up and the audience is standing below it, which is pretty common practice in order to get good traffic and high-volume flow. This is a theatre in which people sit down. Once that was decided, the seating and the screen and the projector could be put into a better relationship. The better relationship here consists of, first of all, having a large enough screen so that a reasonable-sized audience can all have a view which uses a large portion of their vision. The rear-most seat in the theatre provides a person with more than a 60-degree field of view. The seats number about 800 in the theatre and, of course, as I mentioned before, the screen is about 82 feet wide and 64 feet high.

Actually, that's the image size. The screen itself is a big dish about 90 feet in diameter and it has a dish radius, of 80 feet, so that it's a spherical-shaped screen rather than a cylindrical or a flat surface. This combination of a good-sized audience with a large screen and large field of view, even for the back seats, means that the projector has to have that wide-angle lens in order to be in the same building. Another important factor is how the audience should be placed in relation to the screen, particularly for the vertical angle of view.

The IMAX picture is more like the Academy format—3 x 4—so we have

Continued on Page 956

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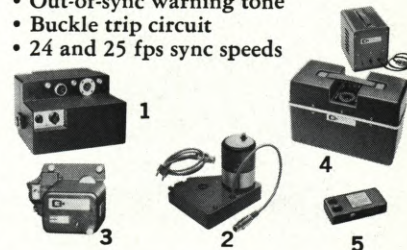
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Continued from Page 911

available in long rolls, was decided upon. It was lightweight and strong enough to be stretched over a frame of those dimensions, securely fastened to the frame, but it wouldn't sag—or worse yet, tear," says Reisem.

The screen was designed and constructed by Warnecke Studios in Chicago. Once set up, it could not be taken down and used again, due to the puckering effect of the stretched plastic when removed from the frame.

The room configurations and the screen dimensions were not the only problems faced by the program designers. Time was an important element. The workers, 14 in all, had exactly 13 hours in which to completely set up the presentation, synchronize the equipment, rehearse the show, and get all of the bugs worked out.

A list of the equipment used in the show reads like an Egyptian scroll: 27 Ektagraphic slide projectors, model B, two 16mm Pageant sound projectors, model AV-126-TR, two programmers each utilizing an 8-channel punched paper tape, nine Kodak Carousel dissolve controls, 18-20 amp circuits, 900 feet of remote control cords, and roughly 1000 slides.

The presentation ran 45 minutes. Equipment was placed along a balcony opposite the screen; and a man, seated in the center, ran the show from one console, following word cues from Zornow's speech.

Setup for the show began at 11:00 the night before the speech, when the room became available. The screen, equipment, motion pictures, and slide trays were in place and ready to go by 5:30 a.m., leaving about six hours for rehearsal, and the usual last-minute checks required in any large AV presentation.

"This is an incredibly short period of time," explains Reisem. "Two to three days is normally required for any audiovisual presentation this size.

"The show went without a hitch. We had four standby slide projectors on the line and four standby dissolve controls, just in case a lamp blew or something did malfunction, but we never needed them," says Reisem.

"Nevertheless," he concludes, "I wouldn't mind having a little more time and slightly less unusual circumstances next time around. Our next AV presentation in a standard auditorium ought to be a breeze!"

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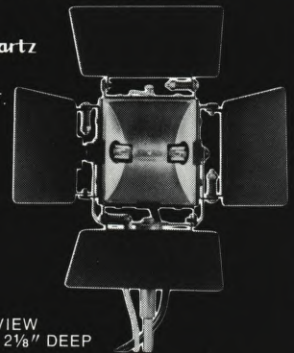
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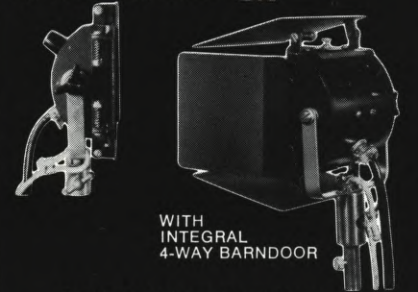
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"NORTH OF SUPERIOR"

Continued from Page 912

when the canoe was righted, the camera was still going and the film was still running happily through it.

We had tried to waterproof the camera by putting gaffer tape over the cracks and openings, but when we were halfway through with it we could see that we were not going to be successful in the waterproofing operation, so we didn't complete gaffer taping it. At any rate, everything got wet. We called MGM and said: "We've got a wet film. What do we do now?"

They said, very simply: "We had that happen on one of our stages two days ago and they just put the film into a bucket of water and brought it over to the lab and we developed it and there was no trouble. You've got to do the same thing."

The only difficulty was that we were 3,000 miles away from their lab, in the middle of a forest. We did what they advised, however. In the darkroom, we took the film out of the camera and put it into a film can which we filled with water. Then we taped the can shut with the water inside it and our Production Manager took the film can and held it in his lap on the plane and hand-carried it to Los Angeles. He took it straight to the MGM Lab and they developed it. The results were perfect.

Our efforts to put the audience into the picture seem to have been especially successful in the sequence devoted to the sport of "tubing"—if one can judge by audience reaction. Tubing is, as far as we know, a pastime that is unique to Northwest Ontario. It uses huge inner-tubes from the tires of earth-moving machinery and giant tractors. People get into these tubes and slide down a snow-covered run—rather like a toboggan run—and it's a very exciting sport to engage in, I assure you.

We wanted the audience to enjoy the sensation of tubing, so it became necessary for the camera to go tubing. We tied three of these huge tubes together so that a group of kids could ride down in two of them, with the camera crew in the other. Our big problem was that we wanted the tube to behave in exactly the same way with the camera on it as it would with people on it, and that really wasn't very easy to achieve.

Providing some sort of mount for the camera was a sticky one, also. What we actually used was a semicircular piece of plywood which sat on half of a tube. It was tied onto the tube with rope and then the camera was bolted onto the

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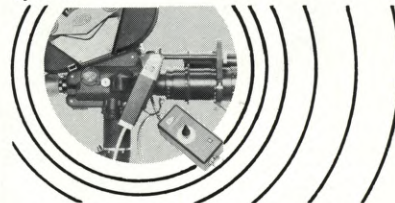
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board through its tripod screw. The IMAX camera, as I've said, weighs 50 pounds and it has pointed corners. We were afraid that, if we flipped over, the camera might fall on us and hurt somebody. So we all wore football helmets as a partial protection. Even so, it's not the type of thing I would like to repeat very many times, because eventually you'd get hit by the camera and get rather badly wounded.

I rode on the tube with the camera and another chap rode as additional ballast, so that the tube would balance out. He was replaced by the Soundman, Nagra and all, in those scenes where we wanted to shoot sync sound.

As some sort of safeguard for the camera, we fastened on top of it a little thing known as a "satellite", I believe. It's a child's toy—a circular plastic dish which children sit in to ride down snowbanks. We put one of those on top of the camera, so that if the camera flipped over, it would then ride on its top in the snow a little more satisfactorily, and that is precisely what *did* happen. On the first run we flipped over beautifully and we all went flying through the air. It was fortunate that we were wearing the football helmets, because we landed on our heads. But we weren't hurt and the camera wasn't hurt.

Every cameraman, at one time or another, has encountered situations that call for him to continue shooting while it is raining or snowing. The main problem is not only to keep the rain or sleet off the lens, which can usually be done by means of a protective glass slide, but also to keep the raindrops or snow particles from showing up in the picture.

We had that problem with the IMAX camera while shooting several sequences for "NORTH OF SUPERIOR" and we solved it by using a device that was designed for the wheelhouses of ships, in order to provide clear vision during inclement weather.

It is basically a whirling glass disc which revolves at a very high speed and whisks water or sleet away the instant it touches the glass. It works equally well with wet snow. In fact, it would immediately get rid of a snowball thrown at the glass.

The device is available at ship supply companies and it operates off the camera battery without any difficulty. We take no credit for adapting it to motion picture use, however, because it was suggested to us by producer-cinematographer Robert Gaffney, who first used it during the filming of "SKY OVER

HOLLAND", which he made for EXPO 67.

More recently, this device, or one very similar to it, was used by Freddie Young, BSC, while shooting the storm sequences for David Lean's production of "RYAN'S DAUGHTER".

We never tried to hand-hold the IMAX camera, in the true sense of the term, but we did hang it from stationary bars occasionally, using our rubber band helicopter mount. For example, we had a sort of hook that projected out from the camera car and it could pivot around. We were able to hang the camera from that hook and walk around for a short distance, hand-holding the camera, so to speak.

When we filmed our Indian village sequence at Big Trout Lake, it took a bit of doing to pack the equipment around. This is a village where there are no cars, no roads, no vehicles of any sort. When we went in we were dumped off by a bush plane at the dock and we had to do all of the filming then. Everywhere we went we walked, so this was a real test of the portability of the equipment. Ronald Lautore organized a way of carrying the camera on his back, using the kind of pack arrangement that campers use and we just piled everything onto our shoulders and took off. In spite of all that, I don't think any of us have ever been on a location where we have had so much fun as during those three or four days in that village. We were treated beautifully by the people. They loved us and they loved the filming. It didn't matter that we had to carry everything everywhere. It was really a very pleasant way of working.

As might be expected, the most spectacular sequence in "NORTH OF SUPERIOR" is the forest fire, and there have been many comments about how lucky we were to be in the right place at just the right time to capture the fury of the fire on film. In actual fact, we waited all summer, the whole summer of 1970, trying to find a fire that we could get close to. The main problem was that the service that fights these forest fires is so efficient that during that summer they put out every fire before they told us about it. We were getting pretty discouraged, until, at the end of August, we learned that the Department of Lands and Forests of the Imperial Government had a program of setting forest fires on their own. They burn about three of these a year as experimental forest fires in certain areas where the timber is worthless. For several years now, they have been burning in small selected areas, pruning off the timber and replanting, and in a few

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years they hope to be able to determine whether or not this is a practical way of improving the forest yield. It's quite dangerous, because a forest fire that they set on purpose might get out of control and burn more valuable timber, and that has happened a few times. One of the fires last summer did get away from them and burned a few hundred extra acres. However, the one that we eventually decided to film did not get away and there was no great problem about it at all. It was an area which had been logged off in part and, therefore, had some logging roads through it, so we were able to drive into it.

We had a Chevrolet station wagon on a truck chassis which we used as a camera car. It was a four-wheel-drive vehicle with a heavy winch and heavy-duty springs and tires. With this vehicle we were able to get right into the heart of the forest fire, really drive right up to the point where the fire was going to break through. Since the program of setting experimental forest fires allows for three days of burning, we were able, on a number of occasions, to get up to a station where the fire was about to burn. We would just go there and the fire boss would tell us where he was going to burn next. This made it possible for us to set up the camera and photograph the fire "on cue", so to speak.

It wasn't, however, quite as easy as I make it sound, because some very tricky problems can develop when the fire gets close. Most of the time we set the camera on top of the station wagon and we had the production manager sitting at the wheel waiting nervously for the signal. The signal was usually a scream when the fire got so hot that we couldn't stand it anymore and he would take off and get out as fast as he could. What allowed us to get even as close as we did was our use of what is called a "space blanket." It's made of a plastic developed by NASA for the astronauts' clothing. It's a very thin, very flexible plastic that reflects heat. It is also sold in blanket form to help keep audiences warm at football games. We discovered that if the assistant held one of these blankets between the camera and the two of us on one side, and the fire on the other, we could work until the fire got very close. The problem is, of course, that a tremendous wind arises with the fire, and so the blanket tends to blow away at the crucial moment. That's what causes the screaming. We tried once to shoot the fire from the ground, actually, without the car being close and that was a mistake. We nearly lost the camera on that occasion, just

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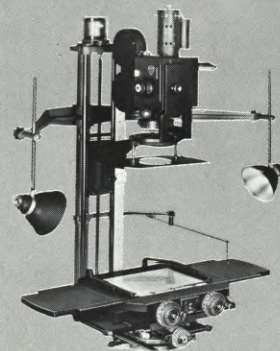
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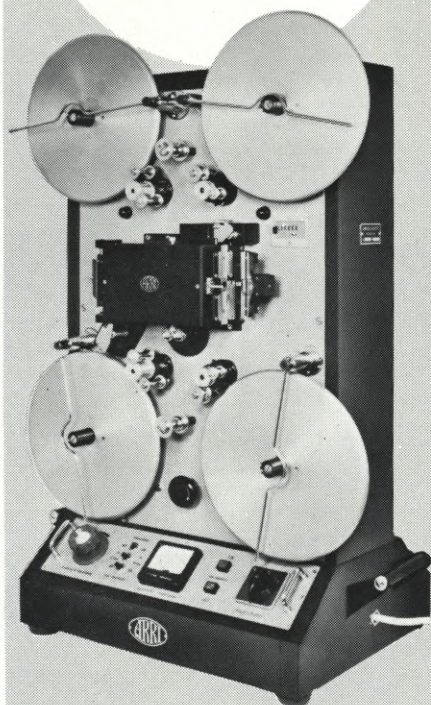
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because it got so hot that it was difficult for us to get it out in time. And so my recommendation is that if you are going to let the fire burn right up to you, it's better not to be on the ground.

Our shooting ratio for "NORTH OF SUPERIOR" was 10-to-1, and the budget totalled \$270,000, which according to the standards of the films made for EXPO '70, is a very low budget.

Audience reaction to "NORTH OF SUPERIOR" has been most enthusiastic at Ontario Place, but for the future, it is our hope that the IMAX system will be used in many more locations than just the Cinesphere. We hope that eventually it will become a "new generation" motion picture medium and that other theatres will be built according to the prototype of Cinesphere. We hope, too, that audiences everywhere will see movies much like "NORTH OF SUPERIOR" (in terms of the unique viewing experience which it affords), except that these pictures will be full-length feature films.

RECORDING THE SOUND FOR "NORTH OF SUPERIOR"

By BRIAN AVERY

The challenges of recording sound for this particular IMAX production were quite considerable, but I suppose one might say that the main problem was the fact that we were shooting with an unblimped camera—which got a bit rough at times. Generally, the sort of stuff we were shooting was of such a nature that, most of the time, Graeme could run up and do his pictures and I could run up and do my sound. Though we worked more or less independently at times like that, we always kept an eye on each other. We were pretty well coordinated.

We tried to get as many wild sound effects as possible, because we knew we were going to have to build a multi-channel sound track for screenings of the film in the Cinesphere. It becomes a challenge to try to record enough of the right kinds of sounds for six channels when you're running around with just one single-channel tape recorder. You have to be especially careful to record every little sound component of everything that happens.

For example, when you're doing a forest fire sequence you have to get in there and record individual crackles, almost. Then there's the roar of the huge flames and the fire-fighters yelling at each other. You try to get different qualities of the sound—a variation of distances and perspectives. You have to

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go in and isolate each sound and identify it, so that when the editors ultimately get all of those wild sounds, they will have a very large variety of "closeup" effects that they can assign to the various channels for the building of the overall sound mosaic. I would say that this was the most important difference between shooting our kind of film and most others that one would work on in this business.

Where not having a blimped camera became a special problem was in those sequences where we showed people talking. We tried to record as much of their actual dialogue as possible in order to capture the flavor of the people in a particular area and the kinds of lives they lead. We managed to get a great deal of that—and relatively free of camera noise, too.

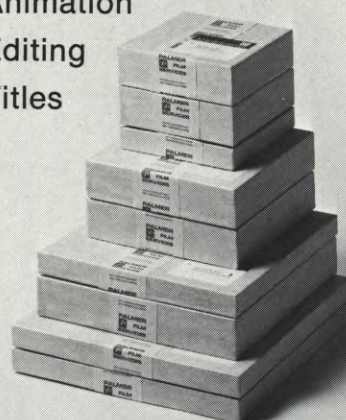
The sound recording equipment had to be very reliable and as portable as possible, because it had to be carried most of the time and we needed the kind of gear that could take the rugged conditions and not break down in the field. I used a Nagra IV recorder and took along an extra Nagra III as a back-up machine but, as it turned out, I never had to use it. The Sennheiser 805 was the microphone used to record most of the sound, but I also had a couple of Sennheiser radio mikes which I used in recording things like the canoeing sequence. We simply hung them on the lads who were paddling the canoes and they worked out quite well. The main drawback of using radio mikes in areas like that had to do with the range and reach of the equipment. I couldn't get the very best results out of the mikes because they were, in some way, influenced by the rocks, by the terrain itself. I tried to keep the mikes on the people as long as I could and covered as many passes as possible, so that the editors would have a large choice of tracks to cut from when the picture was finally edited.


There were times when I used more than one microphone, simply because it wasn't possible to be everywhere at the same time. For example, I was often running around with the 805 to catch sound effects in my area. But at the same time I would have a radio mike wired onto one of the other people, with the receiver strapped on the side. I played a lot of games like that and the system worked particularly well in the forest fire sequence. I wanted to cover as much of the sound as possible, but I couldn't be in two places at once. So I just wired up the leader of the fire-fighting group with a mike so that I could

Continued on Page 950

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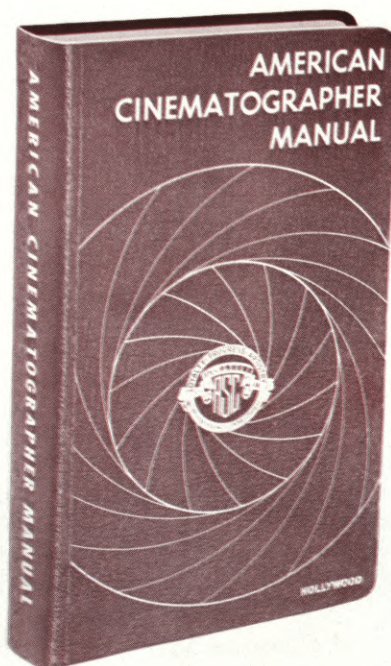
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"NORTH OF SUPERIOR"

Continued from Page 948

get the sounds of his crew working. Then I used the 805 to cover the other fire-fighting group that was working in my vicinity.

Somehow I managed not to get burned up or have any of my equipment suffer damage from the fire. Actually, I think Graeme was the one who came the closest to being incinerated.

One of the most frantic things in the whole picture to try to record was the tubing sequence. The first time I slid down on the tube we were attempting to film a sort of semi-sync scene, with the camera and recorder rolling together. I was hanging on the tube with my Nagra, while trying to hold onto Graeme and other people. What happened was that my 805 microphone fell out and hit the ground on the way down. So that first take, which looked like a very good one, unfortunately got ruined, as far as the sound was concerned. I had to make that trip many, many times more afterward with the Nagra in order to get good sound tracks of the activity.

I came back with about 120 wild-track tapes and Tony Lower did a fantastic job of sorting through all of that stuff and cataloguing it, then going through it again with Graeme to decide what was going to be used. I admire most of all his incredible patience in cutting those hundreds of effects—which were all recorded wild—and getting them properly synced onto six channels to go with action that is quite big. It was a tremendous lot of work on his part, and he's really very, very good at it. The sound gives the picture a very "live" feel, although it was all recorded wild.

In the Cinesphere theatre, there are speakers for three channels located at the front, behind the screen—at center left and right. Then there are two surrounding ones at the rear, and a center one at the top. That one is used mainly for effects to go with scenes of helicopters and airplanes and one scene in the forest fire sequence where the flames go roaring up to the ceiling. That effect is really quite powerful; it brings the audience's attention right up.

I feel that the sound in the Cinesphere theatre is really very good now. When we first went there for preliminary screenings there were pneumatic drills going off and all sorts of other things happening, and I was a bit nervous. But it's all turned out very well and we're happy with the way the tracks sound in the theatre. ■

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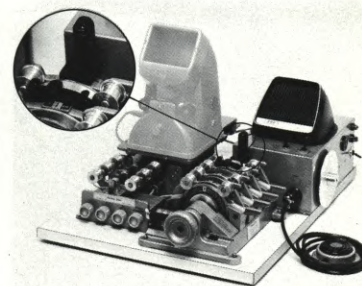


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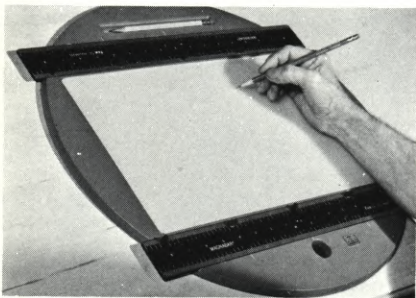
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THE SEARCH FOR THE GREAT WHITE SHARK

Continued from Page 875

finder with a fisheye view, such as this, enjoys a great advantage over a reflex finder when the action is really heavy and movements are not predictable since you can pick up a target before it enters the field of the taking lens. Normally, the housing itself obstructs your view to the right, but with this fisheye finder located at the front of the housing, on the left side, the cameraman can pick up every target forward of the camera. I would often pick up a subject through the sport finder, then quickly shift my eye to the reflex finder port.

One problem plagued the underwater unit: jams. The jams were rarely, if ever, in the camera. They originated in the magazine. It has been months since I made my last underwater shot, but, oddly enough, only quite recently have I been convinced of the cause of our problem: backlash, caused by momentary hesitation followed by sudden release of either the feed or the take-up roll. The roll hesitation being caused by lateral impact against the underwater camera housing. Lateral impact against what? Either of two objects: a shark or a diver's elevator (anti-shark cage). Our maximum incidence of jams occurred during the shooting on the whaling grounds off Durban, South Africa, when we were either inside the elevators with the housings taking frequent blows against the inside of the cages or out in the open, with the sharks making frequent impact—lateral and frontal—with us and our cameras.

Visualize what happens. A heavy blow against the side of the housing suddenly forces, or slaps, either the feed roll or the takeup roll against the inner surface of the magazine causing an instantaneous surge in drag tension. Clearly the roll that is most vulnerable to this condition is the larger of the two since it has the greater side area. Thus, if the magazine is a fresh load, the feed roll is vulnerable; if more than half the film has been transferred to the takeup roll, this is the one that is likely to start the trouble. It is a fact that we rarely, if ever, had jams near the middle of a roll. They occurred near the start or near the end, more frequently—unfortunately—the former. We would find film tightly accordionized inside one side of the magazine and wadded between the film roller and either the feed or takeup sprocket. At locations in the Mozambique Channel and at the wreck of the Hermes off Ceylon we experienced few

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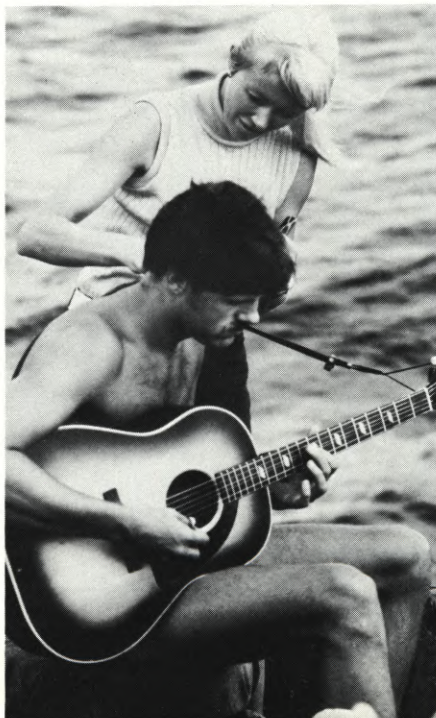
jams. At these locations we were working without the cages as sharks were scarce and those we saw, mostly blacktip and whitetip reef sharks, did not bump the cameras.

The magazines and cameras were kept immaculately clean and blown out with dry compressed air before each load. The changing bags were shaken out often, too, as a precaution against general shipboard dirt and what our engineer, Stuart Cody, referred to with disapproval as the "pervasive dog-hair environment" caused by the presence aboard ship of my Norwich terrier, Billie. Virtually no rolls were ruined due to dirt or hair along the edge of a camera aperture plate. I mention this because it is a common problem connected with the use of Techniscope as there is no gap whatever between frames, and any dirt, hair or emulsion on an edge is going to end up in the image.

For recording underwater sound Stuart Cody used Clevite hydrophones which he would either suspend in the vicinity of the action or in a corner of a cage. The hydrophone cable led back aboard ship to a Nagra recorder. The sounds of the divers breathing, the noises caused by the cages' buoyancy systems, the cameras, sharks bumping cages were thus recorded on location.

We attempted whenever possible to shoot underwater using ambient rather than artificial light. But obviously, we were compelled to light for night shooting and, because of depth, for much of the work around the Hermes. We used lamps of two sizes, 5,000 watts and 750

Valerie Taylor, doubling as a kind of den mother to the men aboard the "Terrier VIII", gives a home-made haircut to Assistant Cameraman Tom Chapin.



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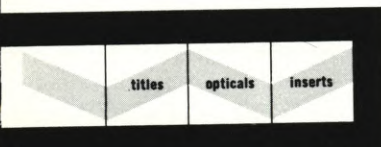
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watts. The smaller ones were over-voltaged to yield an actual output of about 1200 watts at the cost of shorter lamp-life. I would not use the larger size again. They are too difficult to handle underwater due, not only to their size, but also to the enormous power cables they require (number 8, 2-conductor) and to the terrible problem of devising a reliable method of switching them on and off underwater. The smaller Geodyne lamp housings with their 750-watt tungsten-halogen lamps are a more practical tool for underwater use. Whatever lamps are used, they should, for safety reasons, be isolated from the power source by means of an isolation transformer.

The responsibility for maintaining most of our equipment and contending with most of the technical problems that arose fell upon Cody. In addition, the six or eight air conditioners on board, the ship's radar and the two generators (one 30-kilowatt, one 50-kilowatt) provided their fair share of

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Rodney Jonklaas	Peter A. Lake

John Moen, The Officers and Crew of the "Terrier VIII"
Songs Sung by Tom Chapin

TECHNICAL CREDITS

Producer	Peter Gimbel
Directed by	Peter Gimbel and James Lipscomb
Written by	Peter Gimbel
Associate Producer	Stanton Waterman
Underwater Photography	Peter Gimbel, Stanton Waterman, Ron Taylor
Surface Photography	James Lipscomb
Assistant Cameraman	Tom Chapin
Assistant Cameraman, Australia	Ian McKechnie
Production Manager	Phil Clarkson
Sound and Engineering	Stuart R. Cody
Sound Mixer	Sol Tabachnick
Sound Editor	Mark Rappaport
Film Editor	John Maddox
Production Coordinator	Roland Condon
Production Assistant	Arthur O'Connor
Production Manager, Australia	John M. Carey
Production Coordinator, Ceylon	Rodney Jonklaas
Production Assistant, South Africa	Barry Cullen
Diving Coordinator, Australia	Rodney Fox
Narrator	Wally King
Assistant Film Editor	Lucille R. Rhodes
Location Coordinator	Elyn Clarkson
Expedition Historian	Peter Matthiessen
Still Photography	Peter A. Lake
Film Editing Assistants	Michael McManus, Randy Roseman
Maps	Priscilla Bowden
Location Auditor	Dennis L. Judd, II
Production Secretary	Valerie G. Bowyer

MUSIC

"Come Along"	by K. Michael Burke
"Chilly Winds"	Folksong
The Music for Durban Night Drive	by Walter E. Sear
"Songs of the Humpback Whale"	Recording by Roger Payne and Frank Watlington; Arrangement by John Maddox
"Someone Keeps Calling My Name"	Tom Chapin
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problems and, since he was the only person on board who could deal with them, Cody inherited these woes, too. By the end of the trip he had acquired an almost transparent pallor in contrast with the tanned look of the rest of the crew. He would sometimes emerge on deck from his cluttered electronics shop blinking like a sun-blinded mole in the bright austral light.

The main title sequence was shot off Bimini well after completion of principal photography. It presented certain peculiar problems of its own. I wanted to achieve, through the use of strong, saturated colors and black shark silhouettes, a stylized and mysterious effect. Specifically, the black forms were to be shown swimming through concentrated clouds of red (blood) suspended in the sun-drenched deep blue of the open sea.

We experimented with various dyes and paints, but when thrown into the water they appeared insipid compared with real blood. So we brought to Bimini, to the utter astonishment of the local customs officials, 30 gallons of canned, defibrinated animal blood. While an outboard towed me at dead slow speed at the end of a rope, Cody heaved pitchersful of blood a few feet in front of my camera. Peter Lake, still photographer, swam near me in mid-Gulf Stream, shooting stills of this odd performance.

The silhouettes were more difficult. Obviously we wanted to get a negative of high contrast which, in turn, when high-contrast printed, would yield a black silhouette on a clear background. A bag was fabricated from white ballistic nylon. It was 20 feet in diameter and 8 feet deep and was supplied with a top cover. The bag was stretched between the points of a hexagonal steel frame made of Unistruct and the whole contraption was floated by means of one-gallon paint cans taped to the frame. We launched this free-floating "swimming pool" in the Gulf Stream 25 miles off Bimini and placed inside it a shark. I filmed this shark for most of a day using a closed-circuit oxygen rebreather, rather than normal open-circuit SCUBA gear, to avoid disturbing the shark and to insure that no shots would be spoiled by bubbles appearing in them.

After many generations of high-contrast printing, the Westheimer Company came up with the desired shark silhouette footage and superimposed this and the graphics on the background shots of blood and sea. The effect was achieved, but not, I'm afraid, until the technical difficulties he had to overcome had almost driven my friend Joe Westheimer out of his mind.

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FILMS AT ONTARIO PLACE

Continued from Page 941

significant height in the picture, like the panoramic-type of wide screen formats. I think Graeme Ferguson would agree that this is important, especially if you can carry the picture below the horizon line significantly, as well as above. To carry it below means that the audience must not be looking at the backs of heads in front of them. So, this means a seating area with a very steep break and this theatre has it. We think, perhaps, that it should be even a little steeper, but it's pretty good and each member of the audience doesn't look at a head in front of him; he looks at the picture and he can see below his horizon as well as above whether he's in the back row or the front row. That, also, means quite a bit in terms of being involved in the picture. You see the same things that you ordinarily see in actual life. You see things down below your chin as well as up in the air. Also, that extra height suits a lot of scenes that a wide panoramic picture wouldn't suit, like the forest fire, the helicopter flying overhead and many other things that turn up in a film.

The screen itself, being a spherical dish, was, and still is, a bit of a problem. It's tough to make a screen in that shape. In this case it was done by building a triodetic structure and then covering it with an expanded steel mesh skin, and then covering that with an adhesive-backed vinyl screen. The difficulties are that nobody really understood well enough the accuracy requirements in terms of uniformity of that curve and it really isn't quite good enough. Also, there is a problem of joining pieces of vinyl so that they are adhered but don't overlap too much and show seam lines. There are some other minor technical problems, but it's a pretty good start I think, although we would hope that the job can be improved and perhaps that the screen can be redone in the near future.

The curve in both directions, I think, is quite useful in terms of satisfying the audience no matter where they are seated. It wraps the picture around so that you are not looking at a very flat angle across to the far side if you are seated toward one side of the theatre. It also brings the picture back actually over the heads of the front four or five rows, so that panoramic views with sky really have sky over your head, and that seems to work quite well. The spherical, almost a fisheye, type of distortion I don't think bothers very many people at

all. In fact, I don't think they are conscious of it. The thing they are more conscious of is an odd camera angle with a wide-angle lens, like the church scene where there is quite a bit of camera tilt with an inward-pointing perspective to the top. People notice that sometimes, but overall the big curve and the number of curved shapes that it produces don't seem to disturb people and it gives them much better sight lines than they would otherwise get.

The main changes that we made in the projector besides the lens, which is quite significant, were those concerned with durability—things that we learned in the 2000-plus hours of operation that it ran in Japan. There we had some electrical problems and some tempera-ture problems and some mirror degradation problems, a lot of which we think had to do with excessive local temperatures inside the projector. And, of course, that's part of the problem of trying to handle 25,000 watts of input power. That is approximately 85 to 95 BTU an hour, which is like an average home furnace in that part of the world.

We were getting overheating of some components because we had some electrical starter problems in Japan. The projector was run without housings on it a lot of the time and we didn't get good air-flow through it. So we put some improved heat sinks into it, plus a couple of improved cooling collars up around the lamp house, which are water-cooled copper rings. We have improved the air-flow through the whole projector and it is running significantly cooler. We changed the lamp last night after we had run 150 hours, and we have detected no degradation of mirrors at all so far—and we certainly had found problems at this point at EXPO. So we think, perhaps, that we are in much better shape.

The electrical system in the projector has been simplified here, but that's only because it's run as a projector and is not controlled by a central control room on a remote basis. As a result, we were able to chuck out a lot of interlock and program type relay equipment. Other than that it's much as it was. The film transport is unchanged. In fact, the only thing we did with it was to re-hard-chrome the rotor shoes in the projector. The register pins and everything are practically in mint condition, and this after the projector has run more than 35,000,000 feet of film. We didn't have to adjust them or take them out or do anything but inspect them under a microscope and determine that they were in essentially perfect shape and set them up to run again.

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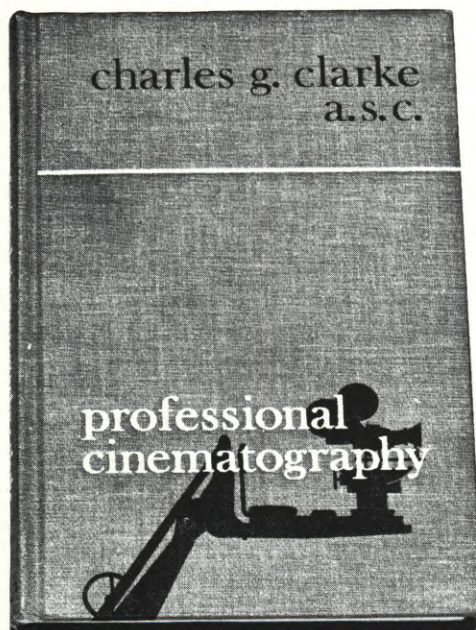
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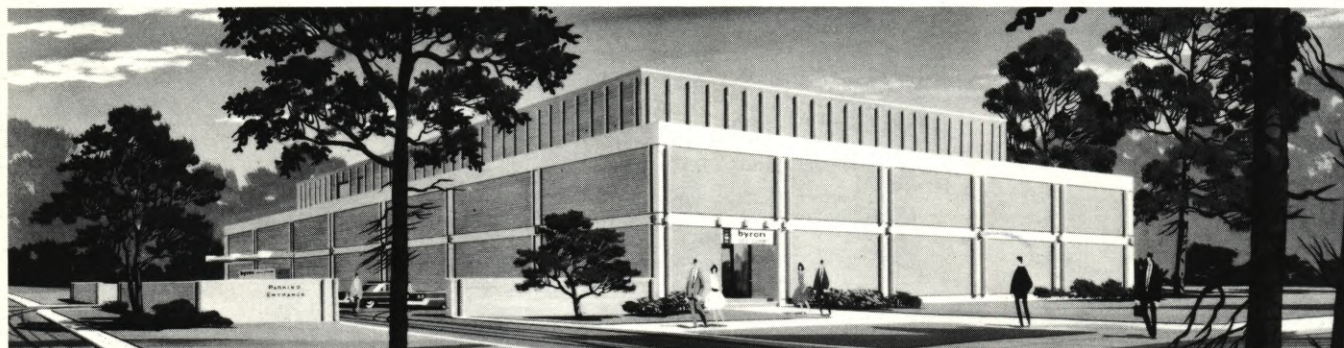
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
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