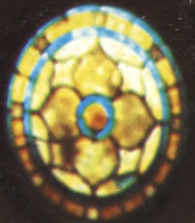




American Cinematographer

International Journal of Motion Picture Photography and Production Techniques

JULY, 1979/\$1.50



FILMING "THE MUPPET MOVIE"

"Cinema Products has it all... The ideal equipment mix for film and electronic field production: CP-16R, MNC-71CP and Steadicam!"

Dennis Burns
PACIFIC FOCUS
Honolulu, Hawaii

Today, video and film is the way to go. With the Oscar-winning Steadicam, of course.

For the small-to-medium sized production company shooting industrials, documentaries, TV commercials, as well as docu-dramas and specials for television, Cinema Products offers the ideal film and EFP equipment mix. Lightweight, rugged and reliable production equipment, recording broadcast-quality film and tape. All covered by the standard Cinema Products full one-year warranty and around-the-clock* service backup.

To meet their extremely varied and demanding production requirements, forward-looking and dynamic production companies — like Honolulu-based Pacific Focus — make use of Cinema Products' easy-term lease/purchase



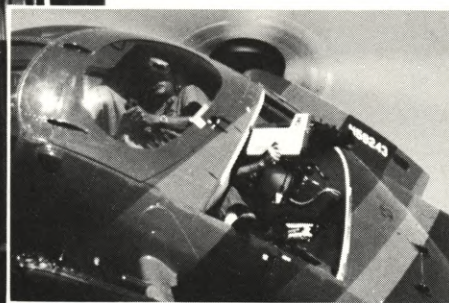
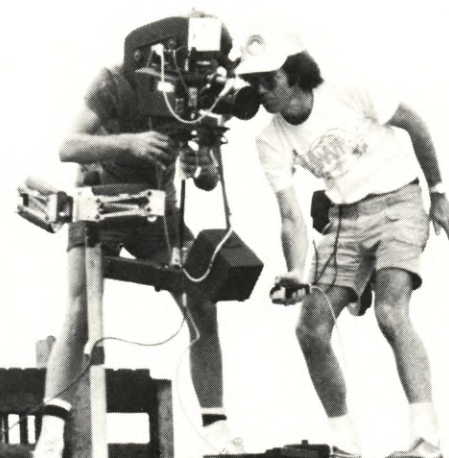
program to maintain a versatile mix of the highest quality 16mm film and electronic field production equipment available today.

In addition to its existing CP-16R camera equipment, Pacific Focus has

recently acquired two MNC-71CP video cameras with all the ancillary equipment needed to convert them to MNC-710CP studio/field production configuration.

"We shoot video or film, depending on what would best serve the needs of each particular project," says Dennis Burns, award-winning producer/cameraman and president of Pacific Focus. "In Hawaii, though, we produce on location almost entirely. So it's important that our broadcast-quality MNC-71CP cameras are rugged enough to take the kind of abuse that the CP-16R can take.

"Combined with the versatility and cost savings provided by Steadicam, which can be used interchangeably between our CP-16R and MNC-71CP cameras, there's no assignment we cannot handle!"



"The Steadicam camera stabilizing system lends itself to many innovative uses," says Dennis Burns. "For instance, by placing Steadicam on a special mount (built by Bud Weisbrod of Pacific Instrumentation — the CP dealer in Hawaii) and rigging it to a forklift, we were able to simulate boom/crane capabilities.

"And for shooting aerials, the same mount can be easily rigged to a helicopter or a fixed-wing aircraft."

For further information, please write to:

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Starting with the new ultra-versatile, self blimped Panaflex®A camera so advanced, it's a generation ahead of its time. A camera so light and natural to use, you'll have trouble remembering it's a "35," and it's studio silent!

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Let us show you more about Panavision. As the exclusive East Coast Panavision distributor, we invite you to visit our camera department and see why so many motion picture credits say: "filmed in Panavision."



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Supremely refined, yet unbelievably rugged.

When it comes to creating delicate instrumentation, Swiss perfection is legend. No less so with the impeccably engineered BOLEX H-16 EBM. The product of 50 years of Bolex experience, it achieves a new standard of accuracy for 16mm cameras with a realistic price.

To fully appreciate this accomplishment, consider

the imperatives of professional filmmaking. And how superbly the EBM serves them.

The First Imperative: Effortless Handling. The photo shows a fully equipped yet perfectly handheld camera—from its one-amp battery in the pistol grip to its unbelievable 16-100mm f/1.9 Vario Switar automatic power zoom lens with built-in light meter. Total weight of this rugged, ready-to-roam package? An incredible 12½ lbs.

The Second Imperative: Uncompromising Performance. All the essentials for professional results are gathered here: chronometer accurate electric film drive, suitable for synchronized sound with your choice of

variable speeds from 10 to 50 fps, built-in filter slot, automatic threading and full rewind.

The Third Imperative: Adaptability With its positive-locking large bayonet mount and optional C-mount adapter, you can attach virtually any lens to your Bolex EBM. And for stability under all shooting conditions, choose among our versatile tripod, precision-machined monopod, or shoulder brace.

There are two power supplies available for the Bolex EBM—as much power as you'll ever need for continuous studio or on-location shooting. And with the easy clip-on 400 ft. magazine, your film capacity is sure to measure up to all your shooting requirements.

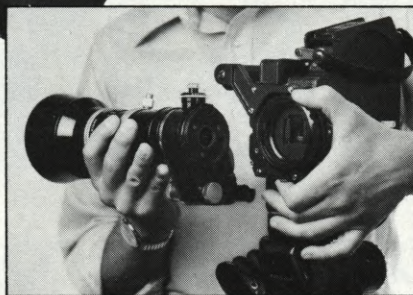
The Final Imperative: Affordability When we say that you can rig up a quite complete system for less than half the price of other high quality 16mm cameras,



crystal or sync pulse generator. A diaphragm pre-setting device that lets you focus and frame with full light coming into the flickerless reflex viewfinder. And all the other niceties that help you refine your technique and your results, including:

you may be astonished. So initially were the many pros who have since discovered that they needn't spend a fortune to own a system which can help them build one.

We urge you to inspect the Bolex EBM carefully before you purchase any other camera. And set the perfection of Swiss movement into motion for you. **Bolex...First in sixteen.**



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Clip-on 400 ft. magazine.

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American Cinematographer

International Journal of Motion Picture Photography and Production Techniques

The American Society of Cinematographers is not a labor union or a guild, but is an educational, cultural and professional organization. Membership is by invitation to those who are actively engaged as Directors of Photography and have demonstrated outstanding ability. Not all cinematographers can place the initials A.S.C. after their names. A.S.C. membership has become one of the highest honors that can be bestowed upon a professional cinematographer, a mark of prestige and distinction.

JULY 1979

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ON THE COVER: Kermit the Frog and Fozzie Bear frolic with members of the Electric Mayhem band inside an abandoned church that shakes to the music in a scene from "THE MUPPET MOVIE", a Jim Henson Production, presented by Sir Lew Grade and Martin Starger, distributed by Associated Film Distributors.

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Francis Reusser with the 35 mm camera Aäton is making for J.L. Godard.

Jean-Luc Godard
is one of the very rare
directors
who has had
his instruments
made to measure.

First with his own video laboratory for feature production : - 3/4 Sony to 35 mm : «Numéro Deux» 1976,
- 1" Bosch Fernseh : «France, Tour, Détour, Deux Enfants» 1978.

Now he has had Aäton design a **35 mm camera** specially to meet his requirements. 35 mm because he wants the enormous information reserve of this format so that he can rework the original. And J.L. Godard wants a 35 mm camera that is as unobtrusive, and ideally as light, as a Super 8 camera.

To design this compact instant-magazine 35 mm camera,

F. Reusser & J.L. Godard getting a feel of the 8-35 in prototype form.



he has called
on Aäton — well
known for
its achievements
and innovations
in the 16 mm
field :



J.L. Godard directing Ben Hur II with an Aäton LTR 16 mm camera
(alternate caption : JLG with the LTR 16 mm camera — a reference for handholding).

Achievement : a hand held 16 mm camera which attains a *sound level* that many other established manufacturers have never equalled : 22 dBA 1 meter in front of the film plane (with 7247 at 25°C). This is 8 times quieter than the usual 31 dB of numerous « self-blimped » cameras.

Another achievement is the extraordinary vibrationless running of the Aäton LTR; the *sharpness* has set a new level of excellence for 16 to 35 blow-up.

Not to mention **innovations** such as the built-in 24/25/30 fps *video camera*, an ultra-low-flutter *single system*, a linear microprocessor run *photometer*, and a breakthrough in *clear time marking* for film and magnetic tape*.

* all available
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CINEMA WORKSHOP



By ANTON WILSON

THE WAVEFORM MONITOR: THE ULTIMATE SPOT-METER

The lens on the B&W video camera focuses an image on the target face of an electron tube. Inside this tube a finely focused electron beam scans this image right to left, moving slowly downward until the entire picture has been traversed. The process requires approximately 262 horizontal scans and takes about 1/60 of a second. This scanning process is graphically represented in FIGURE 1. This 262-line, 1/60 of a second scan is called a "field". In reality it takes two "fields" to make a complete television "frame". The television image is actually comprised of 525 horizontal lines. The first field scans the 262 odd lines while the second field scans the remaining 262 even lines. These two "interlaced" fields comprise the video frame.

The output of the television camera is merely a voltage that is proportional to the brightness of the point on the image that is being scanned at that instant. As

the scanning beam traverses light and dark portions of the image, the output voltage will fluctuate respectively; bright areas resulting in a high voltage and dark areas causing a lower voltage. FIGURE 2 represents a typical image and the corresponding "waveform" for the one horizontal scan (of 525) indicated by the black horizontal line in the image.

Several things should be noted from these figures. Most obvious is the manner in which the signal fluctuates with brightness. The height of the waveform is divided into 140 IEEU units (Institute of Electrical & Electronic Engineers). The picture information falls in the positive voltage area from 0 to 100 IEEU units. Peak white level is 100 IEEU units while black is 0. In actuality, the darkest elements in the scene are held at about +7½ IEEU units, slightly above theoretical black level.

Notice that even though the scene has a light background, the signal goes to theoretical black (0 level) at the very end of the scan and before the beginning of

the scan. This is called blanking level and causes the electron beam in the monitor to shut-off so as to render it invisible as it retraces rapidly across the screen to begin the next scan. (See FIGURE 1.)

The waveform monitor scale also includes -40 IEEU units below the 0 black level. This is the so-called blacker-than-black area and is used for the sync pulse. In figure two, the sync pulse can be seen at the right on the waveform. It is this pulse that triggers the electron beam in the monitor to retrace back to the left of the screen to start another horizontal line. All viewing monitors and home receivers are adjusted to overscan so that the black blanking areas on either side of the picture will not be visible. Most of us at one time or another have seen a TV with insufficient overscan, and the black blanking areas are indeed visible to the left and right, as well as the top and bottom, of the picture.

Putting this altogether, the fluctuating voltage represents the picture information (brightness) for that particular horizontal line left to right. When the beam reaches just beyond the right hand edge of the monitor, the signal goes to blanking (black) level, making it invisible. The sync pulse then triggers the beam to begin the rapid retrace back across the screen to the left side. Notice that the signal remains at blanking level well after the sync-pulse in order to give the beam enough time to retrace and actually begin the next scan invisibly. This process continues line after line until all 262½ lines of the field have been scanned. At this point the signal goes into the vertical blanking interval. Here the signal goes to blanking level, also. However a slightly larger (width) vertical sync pulse triggers the electron beam in the monitor to retrace all the way to the top of the screen to begin another field. As would be expected, the vertical blanking interval is much longer than the horizontal blanking interval and consumes the equivalent of approximately 20 horizontal scans as the beam travels invisibly back up to the top of the screen.

Basically, the B&W television signal consists of this waveform which contains the picture information, blanking inter-

Continued on Page 702

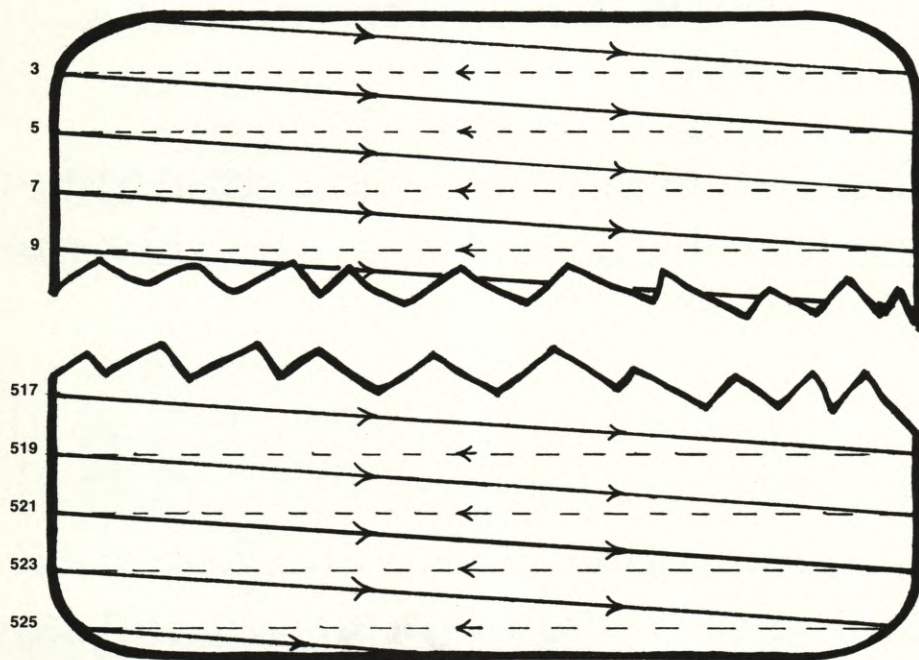
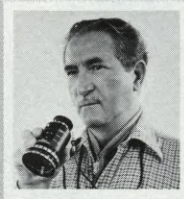


FIGURE 1—Scanning Pattern of an odd field. Starting at upper left, the electron beam in the camera tube scans the entire image left to right. Upon reaching the right edge, the beam goes into blanking mode (See text and figure 2) and then rapidly retraces back to the left edge to scan the next line. This continues until all 262½ lines of the field have been scanned. The image is reconstructed in the monitor by the reverse process. The scanning electron beam creates light and dark information on the receiving tube phosphor target proportional to the instantaneous signal level.

introducing the Mark IV

director's viewfinder

with 10:1 zoom

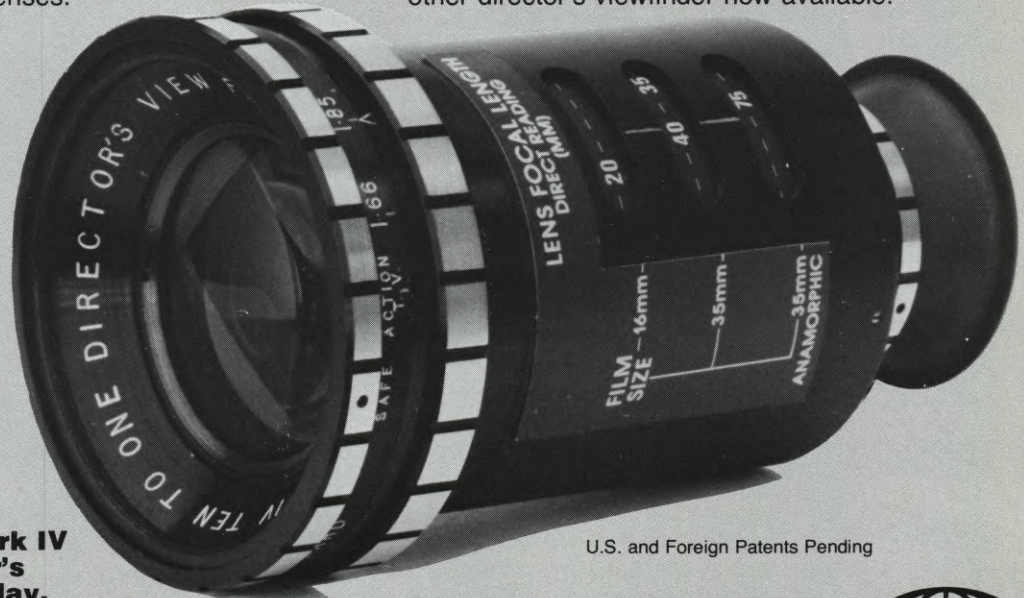


The all-new Mark IV 10:1 Zoom Director's Viewfinder is an indispensable tool for the director or cameraman in composing scenes and choosing the appropriate lenses. It is the first and only viewfinder to offer a zoom ratio of 10:1 for both 35mm and 16mm film formats, making it compatible with most standard professional zoom lenses. It is a practical, easy-to-read

viewfinder that was designed after many years of research to meet the specific needs of the film director and cameraman working in the 16mm and 35mm motion picture and television fields.

Among the exclusive features of the new Mark IV 10:1 Zoom Director's Viewfinder are:

- Easy-viewing, direct-reading scales calibrated in lens focal lengths. No numbers to compute.
- Optical-quality coated glass lenses.
- Lightweight, sturdy, precise construction. Weighs only 13 ounces.
- Focusing eyepiece with collapsible rubber eye cup.
- Smooth zoom movement patterned after camera zoom lenses.
- Click-stop aspect ratio controls for selecting formats of 1.33, TV Safe Action Area, 1.66, 1.85 and 2.35.
- Three windows on barrel of viewfinder for easy readouts of focal length of specific lens for 16mm and 35mm Academy or 35mm Anamorphic format.
- Image viewed is 50% larger and gives brighter and higher quality image than any other director's viewfinder now available.



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(Includes case and neck strap)

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SACHTLER SYSTEM FLUID-HEADS

ARRIFLEX Corporation is pleased to announce its' appointment as exclusive distributor of Sachtler System tripod equipment in the United States.

ARRIFLEX Corporation believes this new Sachtler equipment reflects the design concepts and manufacturing standards of ARRIFLEX products.

Sachtler is a high-technology company located in Munich, engaged in the design and manufacture of professional equipment for the motion picture industry.

Sachtler's fluid-heads, tripods, and accessory designs, are "state-of-the-art", new and systemized. They are produced with space industry materials and technology.

The Sachtler System concept incorporates fluid-heads, tripods, tripod extenders, light-weight rubber, and heavy-duty wheeled triangles, in a matched and unitized group.

(continued on page 2)



Sachtler Hydro-Disc fluid-head, part of the new Sachtler System of matched camera support equipment.

ARRI 35-3 DELIVERIES START

Garrett Brown, inventor of the Steadicam, casts a steady eye on the new ARRIFLEX 35-3 camera. Arnold and Richter's Chief Design Engineer, Kurt Wallner and ARRIFLEX Corporation's Volker Bahnmann describe the new camera's many features and applications.

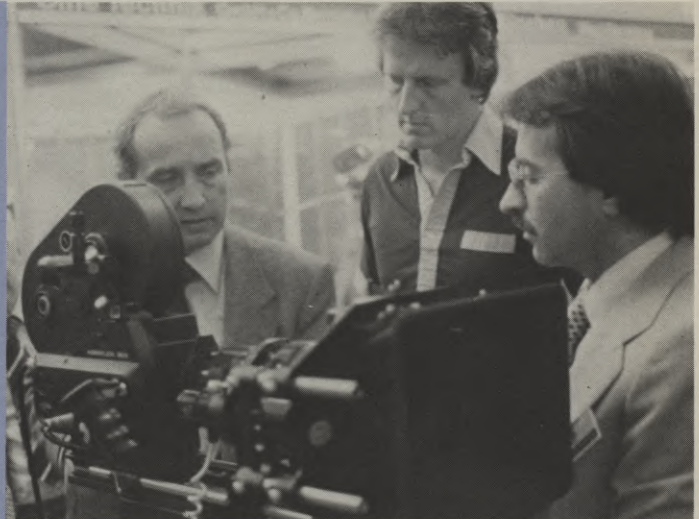
Deliveries of the ARRI 35-3 are now being made to ARRIFLEX dealers throughout the United States.

This new 35mm camera is a welcome addition to the ARRIFLEX line. It is designed for most types of second-unit and special-effects cinematography, and complements the 35BL.

The ARRI 35-3 contains a new, highly advanced movement design equipped with pin-registration to guarantee unsurpassed image-steadiness, even at its maximum speed of 100 frames-per-second.

Other ARRI 35-3 built-in features include: Universal DC motor for 12/24 volt operation up to 100 FPS.

- Crystal Control for synch speeds of 24/25 FPS.
- Built-in variable speed from 6-50 FPS.



- High-Speed 6-100 FPS with external HSU accessory.
- Automatic shutter-stop for uninterrupted viewing.
- Electronic footage-counter with memory and LED readout.
- Electronic tachometer with LED readout.
- Pilot generator for synch/recorder operation.
- Left and right side camera switches.
- All 35mm ARRIFLEX lenses, most of the 35BL accessories, and all IIC magazines can be used on the new 35-3 camera.

NEW ARRI LEASE/PURCHASE PLAN

ARRIFLEX Corporation has introduced a comprehensive Lease/Purchase Plan available through the ARRIFLEX dealer network.

The new plan offers filmmakers a flexible approach to acquiring ARRIFLEX cameras and accessories, while paying for them from income generated from their use.

For detailed information about the ARRIFLEX Lease/Purchase Plan, contact, your ARRIFLEX dealer or the ARRIFLEX Corporation in Elmsford.

FLUID-HEADS

(continued from page 1)

Currently, the 7+7 fluid-head is "top-of-the-line" for cameras weighing up to thirty-three pounds, with a larger studio model on the way.

The 7+7 contains many unique features, including:

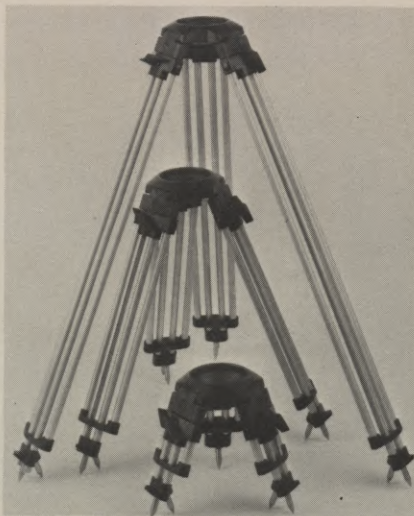
- HYDRO-DISC, an advanced method of controlling fluid and pressure to assure constant, repeatable, pan and tilt drag control through a seven-step range
- HYDRO-DISC is encapsulated in its own module and located within the head casting to make the head leak-proof
- Tilt-angle is almost a full 90 degrees
- Built-in counter-balance adjustment provides neutral balance in any position when center-of-gravity is displaced
- And, an interchangeable, quick release mounting-plate system with built-in lens support facility for long focal-length lenses.

Sachtler engineers have produced a fluid-head that is exceptionally rugged, compact, and light-weight (6 lb, 5 oz). It is designed for hard use in all types of climates and environments, and sealed to prevent damage internally from dust, sand, and moisture. The 7+7's fine appearance is protected with epoxy paints that resist wear, chipping, fungus, and corrosion.

SACHTLER SYSTEM CF* TRIPODS

The Sachtler tripods are designed to match their fluid-head line, and follow the same applications and engineering concepts.

Carbon Fiber* tripods are "top-of-the-line". They combine the strength and torsion resistance of duraluminum with the extraordinary weight-saving properties of space-age Carbon Fiber technology. As a result, CF* tripods are as strong as duraluminum, and less than half the weight. They are an important tool for the travelling documentary cinematographer.



Sachtler System matched tripod sets include the new Carbon Fiber*, high torsion-resistant, extreme lightweight units, ideal for the travelling cinematographer.

All Sachtler System tripods are highly torsion-resistant. They are easily and quickly adjustable, and lock securely in any position.

They are available in three different materials: Carbon Fiber*, Duraluminum, and Stainless Steel, in the following modes:

Long Legs

Length: Minimum 33 $\frac{1}{4}$ "
Maximum 58"

Weight: Carbon Fiber* 2 lb
4 $\frac{1}{2}$ oz
Duraluminum 5 lb 1 oz
Stainless Steel

Medium Legs

Length: Minimum 19 $\frac{1}{2}$ "
Maximum 30 $\frac{3}{4}$ "

Weight: Carbon Fiber* 2 lb
 $\frac{1}{2}$ oz
Duraluminum 3 lb 15 oz
Stainless Steel

Hi-Hat (Baby Legs)

Length: Min. Height 7 $\frac{5}{8}$ "
Max. Height 10 $\frac{1}{4}$ "
Duraluminum

An additional advantage of Carbon Fiber tripods is that they do not resonate. When they are used with the rubber triangle accessory, and new lightweight matte-box or sunshade on the 16SR, you'll have an extremely quiet camera.

One of the many accessories for Sachtler System tripods is the unique rubber triangle that locks on the tripod legs and folds inward with the legs so it

can easily be carried without removal. This makes moving to the next camera position quick and convenient. It is light-weight, won't scratch or slip on smooth surfaces, and does not transmit sound.

Tripod extenders, another system accessory, fit between the fluid-head and the tripod base, and are available in twenty-inch sizes. They can be stacked to effectively increase tripod height.

Check-out the Sachtler System yourself, at your ARRIFLEX dealer. We think you'll agree, this equipment is "state-of-the-art".

16SR SINGLE BATTERY CHARGER

Designed for the 16SR on-board batteries, this new accessory will fully charge a single battery overnight.



Smaller and lighter than the battery it is built to charge, this new SR unit measures:

Height: 1 $\frac{1}{2}$ "
Width: 1 $\frac{1}{2}$ "
Length: 2 $\frac{3}{4}$ "
Weight: 7 $\frac{3}{4}$ ozs.

It operates on 110 volts AC, and sells for about one-third the cost of the larger model.

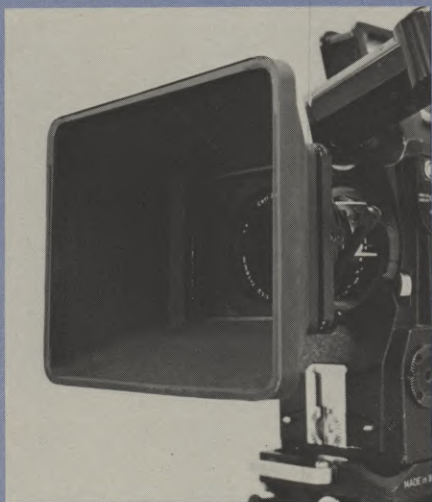
The multi-duty, dual voltage, SR battery charger will continue to be available for those who need the extra features.

If you already own the multi-duty SR charger, the new compact charger will be an excellent back-up accessory.

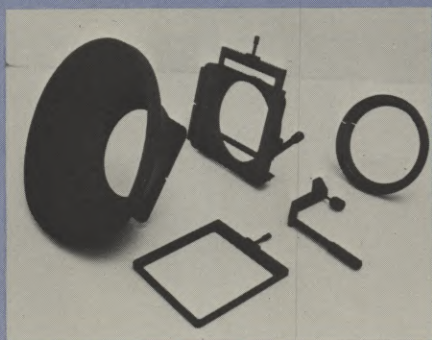
NEW LIGHT-WEIGHT MATTE-BOXES

A new series of light-weight ARRIFLEX matte-boxes is now available. They combine flexible rubber sun-shades with aluminum filter holders to achieve extreme light-weight.

The new rubber shades provide maximum anti-light reflecting inner surfaces, wear-proof, throughout their life. They are almost indestructible, and provide an extra measure of safety and quietness because they are flexible and do not resonate.



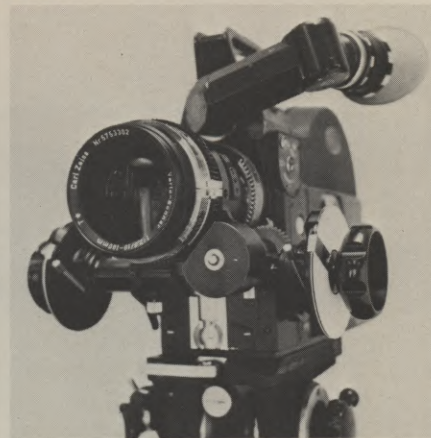
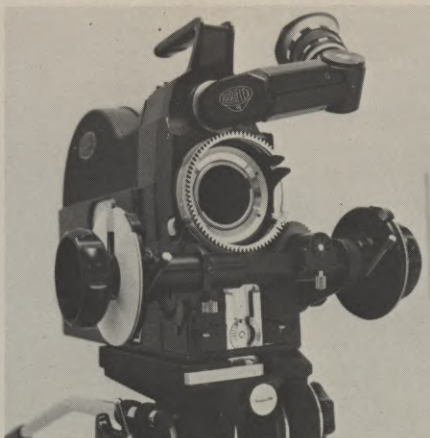
A rectangular shade is available for non-rotating lenses, and a circular shade for rotating front-element, fixed focal-length and zoom lenses.



The new ARRI rubber matte-boxes accept two 3" square filter-holders, and attach directly to the camera lens.

The new ARRI rubber matte-boxes are a product of ARRIFLEX's on-going program to make technology serve the Cinematographer.

NEW FOLLOW-FOCUS UNIT FOR 16SR



The new 16SR follow-focus unit is designed for critical focusing applications, and was well received during the recent production of the CBS movie "You Can't Go Home Again", on which it was used.

The SR follow-focus unit can be operated from the left or right side of camera. It attaches

quickly, and can be used with all ARRIFLEX fixed focal-length and zoom lenses.

When combined with the ARRIFLEX bridge-plate and production matte-box accessories, this follow-focus unit gives the 16SR the feature film production capability of a 35mm camera system.



ARRI/DEALER SEMINARS

Continued enthusiasm for ARRIFLEX seminars co-sponsored with participating ARRI dealers has ARRIFLEX Corporation's Sales Manager Richard Schreiber, on the move again.

Richard presents the seminars, usually at the dealers facilities. He utilizes ARRIFLEX motion picture and slide programs to describe technical aspects of camera operation, and to graphically illustrate the unique design and manufacturing techniques used in the pro-

duction of this equipment. A question and answer session follows with a "Hands-On" demonstration of the latest ARRI equipment.

ARRI/Dealer Seminars are scheduled into June. Watch for news of these events in your favorite trade magazine, and be sure to check with your dealer for a date in your area.

For the answers to all those questions you might have about ARRIFLEX equipment, but didn't know who to ask... Mr. Schreiber is your man. See you at the seminar.

NEW ARRIFLEX WEST COAST FACILITY

ARRIFLEX Corporation's West Coast facilities are now located in this newly constructed building at 600 North Victory Boulevard, Burbank, California, 91502.

Abbott Sydney, ARRIFLEX Western Sales Manager, is in charge of marketing in this region. For your reference, the new phone number is (213) 241-7070.

This new ARRIFLEX building contains about 10,000 square feet of space. It is designed for expanded ARRIFLEX sales, service, and warehousing activities.



ARRI SERVICE SEMINAR

Twenty-two camera technicians from major East Coast ARRIFLEX dealerships recently attended the sixth ARRI Service Seminar, a continuing ARRIFLEX training program. The seminars are designed to quickly provide updated technical information, essential for the proper servicing of ARRIFLEX equipment.

Uwe Gallert, National Service Manager for ARRIFLEX Corporation, directs the seminars. For this sixth session, he was assisted by ARRI technical representative Raimund Geigel. Mr. Geigel is based at the ARRIFLEX plant in Munich.

This latest seminar covered service and maintenance for the 16SR and 35BL 2 cameras.

Raimund Geigel, of Arnold and Richter, Munich, instructs camera technicians attending the ARRI Service Seminar.

A WORD of Caution:

ARRIFLEX equipment is of necessity highly sophisticated in design, and extremely complex in construction. It's high operating performance and extreme long life are vitally dependent on proper application of ARRIFLEX factory recommended maintenance and service procedures.

Before you entrust your ARRIFLEX equipment to anyone for service, we recommend the following:

1. Be certain to use an authorized ARRIFLEX dealer with personnel trained at ARRIFLEX Service Seminars.

2. Be certain to obtain a written estimate of work to be done.

Experience in our Burbank, California, and New York Service Centers confirms there are no "short-cuts" to correct service. Beware of "bargain service" deals, the end result could be very expensive.

ARRIFLEX HMI LIGHTS AT FORUM

The new ARRIFLEX HMI's were demonstrated at a recent MacBeth "Hands-On" lighting seminar for cinematographers and lighting directors, in New York City.

ARRIFLEX HMI's were used exclusively in filming of De Laurentis's "Hurricane". Sven Nykvist, ASC was Director of Photography.

Deliveries of the complete HMI line will begin shortly after the SMPTE Conference this October.

The ARRI News Update is published periodically by the Arriflex Corporation. All inquiries for comprehensive technical information or additional copies of News Update should be directed to:

ARRI

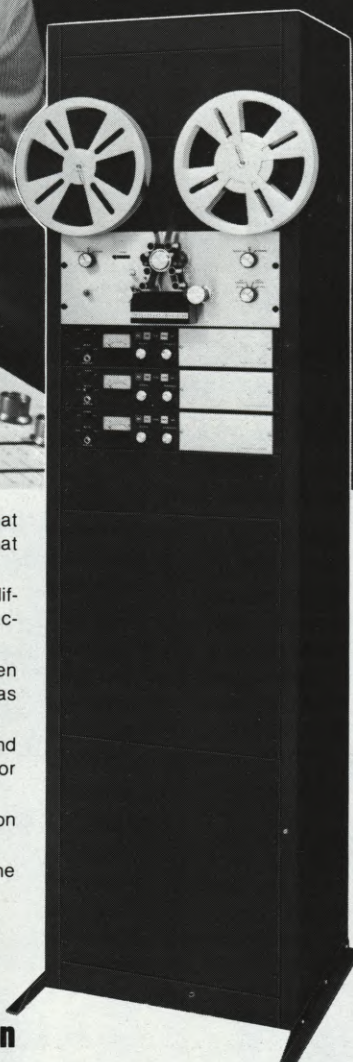
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Hollywood, California



"We thought that the amplifiers we designed and built in our own shop were the best. But that was before we bought our first Series 3000 over two years ago. Since then we've found that the electronics in the 3000 are a step beyond anything else available, including our own.

"The system's signal-to-noise ratio is extremely good, which lends itself to one of the most difficult areas of sound — sound effects recording. Even the most subtle effects can be accomplished because of the 3000's exceptionally quiet, low-distortion electronics.

"When we tested the system, the sound was so transparent that we couldn't even tell when the bias was turned on. We had to go back and punch up the recorder to find out which was live from the console and which was the tape playback. Now that's pretty damned good!

"And as far as ruggedness and reliability goes, you can't beat the 3000. We average around 50 hours a week of constant usage on our 3000, and we've never had a minute's downtime or a service call since it was installed."

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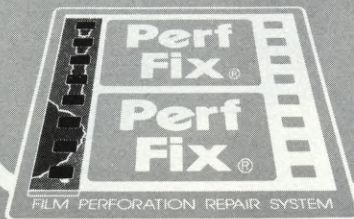
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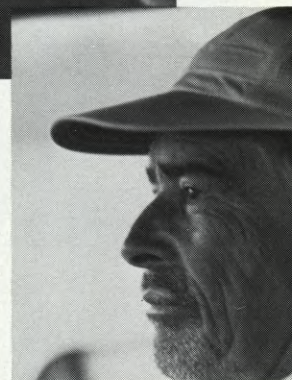
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DIRECTOR..... BARRY SHEAR & VIRGIL VOGEL
WRITTEN BY..... ERNEST TIDYMAN
DIRECTOR OF PHOTOGRAPHY..... JACQUES MARQUETTE, A.S.C.



Cinematography by JACQUES MARQUETTE, A.S.C.

The camera artistry of 28-year veteran Jacques Marquette is backed up by a record of exceptional speed and efficiency on the set, primarily, says Jacques, because he has managed to keep the same experienced crew together on every production he has filmed in the last ten years. Producers say of Jacques that he is not only a superb cameraman, but the smooth working of his team is "kind to the budget," as well . . . a winning combination that has made him one of the most sought-after cameramen in Hollywood.

... with equipment by CINE-PRO.

Like many other top pros of the industry, Jacques Marquette has learned by experience that he can depend on Cine-Pro for fast, reliable service when he's on a tight production schedule. "Whenever I need HMI lights or other equipment from Cine-Pro," he says, "I know I can be sure of the best possible service, where and when I want it . . . even in the middle of the night, if necessary. Any delay in a production schedule is costly, so I deal with people I can count on."

CINE-PRO

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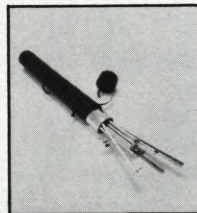
Lowel Softlight 3 Kit, empty and full

An open and shut case

Performance is crucial. But well designed location equipment must also take portability into account. Example: a softlight, by its very nature, must be large. The bigger the source, the softer the light...and generally, the bigger the problem transporting it.

Our softlight is large. Yet our softlight is easily transported. It's designed to fold in half, almost flat. It weighs far less than ordinary units, yet has a higher foot-candle-to-watt ratio. And three units fit in one case.

Another example of truly functional design is the big Lowel sun reflector—Variflector II. It has flood control, a washable surface, and rolls up to a fraction of its in use size.



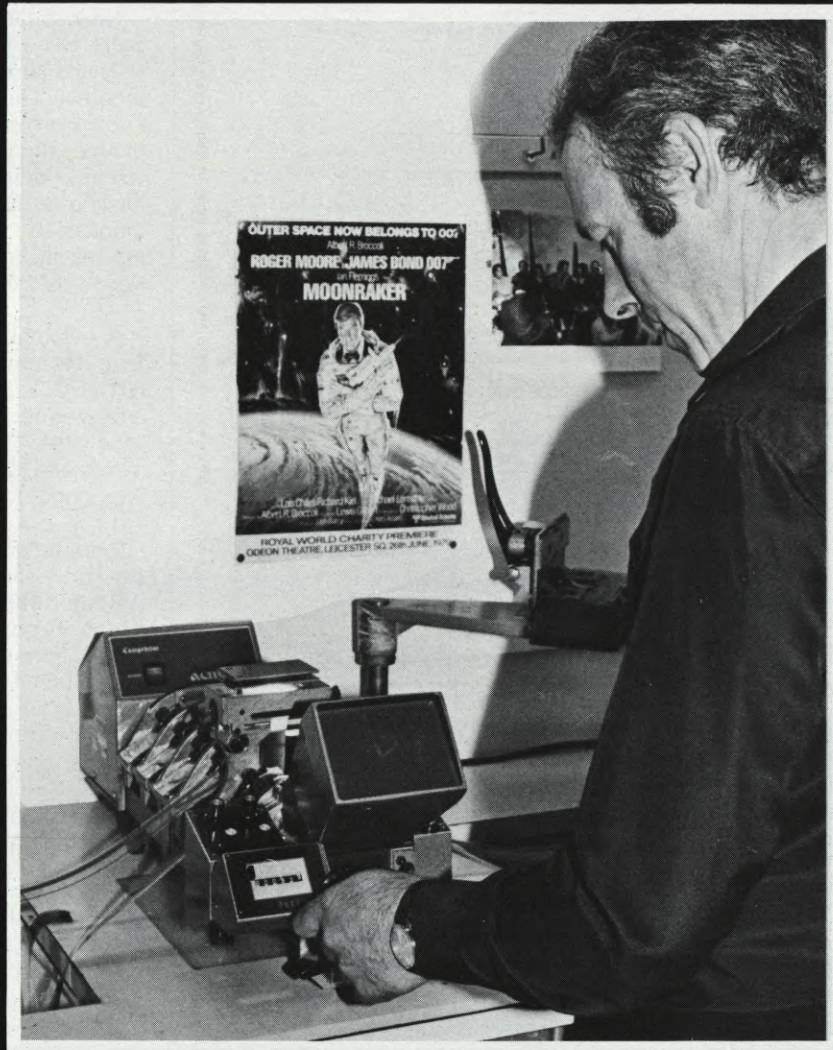
With these and other Lowel systems, you never have to choose between portability and performance.

We rest our case.

For equipment and kits see an authorized Lowel dealer. For brochures contact us. Lowel-Light Manufacturing Inc. 421 West 54th St., N.Y., N.Y. 10019 212 245-6744. Telex: 666597UW. West Coast: 3407 W. Olive Ave., Burbank, Calif. **lowel** ™ 91505. 213 846-7740

ACMADE JOINS FORCES WITH 007

MOONRAKER EDITOR JOHN GLEN SAYS: "Our Acmade Compeditor 35 has been invaluable in helping us meet the very tight deadline on 'Moonraker.' I consider it a very important cutting room accessory and on a location picture such as ours, its easy transportability has been a real asset. My staff have found it excellent for syncing up dailies, fitting wild tracks, post sync and laying effects and music for re-recording."



John Glen with his Compeditor 35 in the Boulogne Studios in Paris during editing of "Moonraker."

"Thank you John for giving ACMADE the opportunity to join your great team."

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entertaining sideview of film lore (Barnes \$15).

A humorist with literary flair, Nora Ephron punctures the media world with uncanny shrewdness and deadly aim. In *SCRIBBLE, SCRIBBLE*, she takes on, among other targets, the *Upstairs, Downstairs* series for a mirthful soap opera spoof that is both affectionate and pointed (Bantam \$2.25).

A collection of short pieces by screenwriter John Gregory Dunne, *QUINTANA AND FRIENDS* reserves for Hollywood some of his more sardonic shafts: a catastrophic out-of-town preview of *Dr. Doolittle*, stuntmen's perils, an unflattering portrait of Joseph E. Levine, and a slashing attack on Pauline Kael (Dutton \$9.95).

Selected English-language books and periodicals dealing with film are listed and annotated by Eileen Sheahan in *MOVING PICTURES*. Informative and expertly described, entries afford an authoritative tool for research and reference (Barnes \$9.95).

Mel Schuster's *THE CONTEMPORARY GREEK CINEMA* is a knowledgeable and well researched text on that country's film industry, movies, and moviemakers. A valuable source for factual data and intelligent assessment (Scarecrow \$15).

★ ★ ★

NAMES ON THE SCREEN

There used to be a time, long ago, when stars kept their marriage a secret for fear of alienating fans. But the years of innocence are over, and liaisons of all types, straight or gay, are normal grist for the biography mill. Take for instance Hector Arce's *THE SECRET LIFE OF TYRONE POWER*, subtitled "the drama of a bisexual in the spotlight." Although handled with tact and understanding, it is unexpected, to say the least, to learn that this personification of swashbuckling machismo was an active, though troubled, homosexual (Morrow \$9.95).

In *THE TWO LIVES OF ERROL FLYNN*, Michael Freedland spares us few—if any—of the actor's unconventional habits. Drug and alcohol dependency, compulsive sex as well as arduous filmmaking are told in objective and revealing detail (Morrow \$9.95).

Interviews by Charles Higham with Hollywood personalities are gathered in *CELEBRITY CIRCUS*, a straight-from-the-shoulder account of problems encountered by uninhibited individuals on a collision course with a highly structured film colony (Delacorte \$9.95).

Borrowing from his regrettably defunct magazine *Film Fan Monthly*, Leonard Maltin reprints in *REAL STARS NO. 3*

revealing interviews with such notable character actors as Laird Cregar, Lee Patrick, Mary Field, John Carradine and many others (Fawcett \$2.50).

John Travolta's love affair with actress Diana Hyland is movingly told by Mary Ann Norbom in *JOHN AND DIANA*. Although 18 years his senior and stricken with terminal cancer, she proved to be the stabilizing influence in Travolta's rising career (Bantam \$2.25).

In *TRAVOLTA TO KEATON*, Rex Reed collects his breezy and probing interviews with a scintillating array of performers: Burt Reynolds, Sophia Loren, Lucille Ball, Burt Lancaster, Susan Sarandon and 30 others (Morrow \$9.95).

In *THE DIANA KEATON SCRAPBOOK*, Suzanne Munshower presents the uncommonly intelligent and sensitive actress, fighting hard to overcome a strong streak of shyness (Grosset & Dunlap \$5.95).

Gene Tierney's *SELF PORTRAIT* (written with Mickey Herskowitz) is a charged dramatic memoir whose emotional impact is heightened by a subdued, factual style (Wyden \$10.95). *FOREVER SOPHIE*, an "unauthorized" biography by Alan Levy, a friend of long standing, is affecting reading with many intimate, perceptive touches (Baronet \$3.95).

A photo-biography that encompasses her career and her private life, *WITHOUT MAKEUP: LIV ULLMANN* combines 250 superb b&w stills with an extensive question-and-answer dialogue recorded by David E. Outerbridge. An honest and articulate portrait of an exceptional actress (Morrow \$15).

An unvarnished view of their movies appears in *THE BEATLES IN THEIR OWN WORDS*, a compilation by Miles of the performers' candid statements on films, music, drugs and politics (Quick Fox \$4.95). ■

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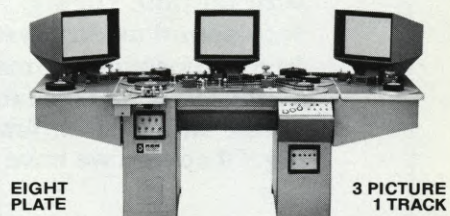
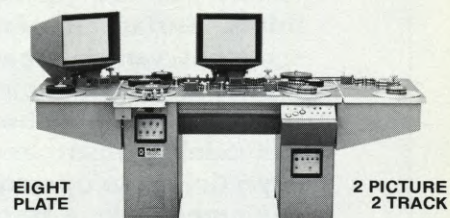
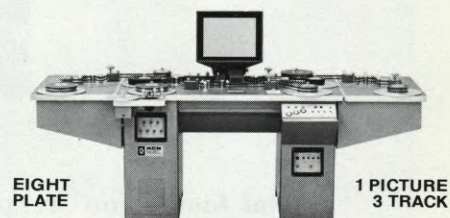
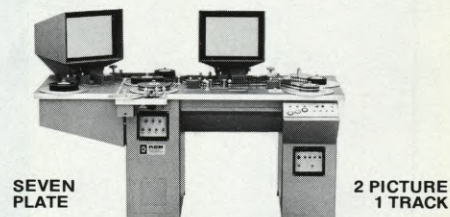
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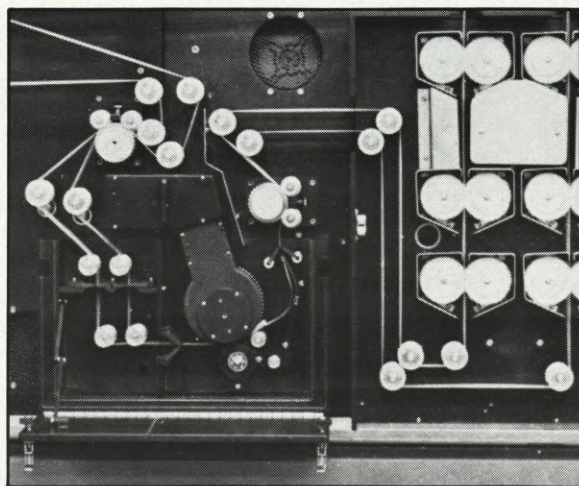
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We're part of the worldwide ARRI organization.

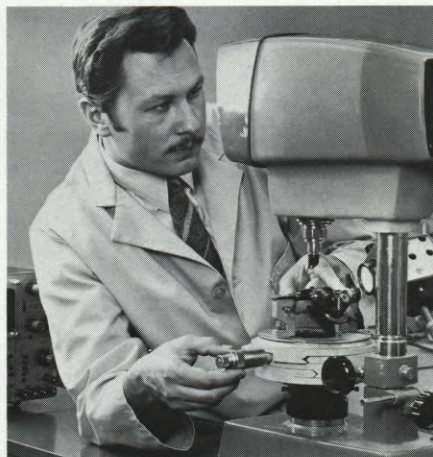
Arriflex Corporation is a subsidiary of Arnold & Richter in Munich, where the cameras are made. Some of our technicians were trained there. Their technical advisers regularly visit our facilities. They keep us up to date on specs and techniques.

We work only on Arriflexes.

Practice makes perfect. All we know about is Arriflexes — and nobody knows more. All Arriflex parts are numbered and on a computer list. And we're in daily Telex contact with the Factory. That means efficiency. Generally, service takes ten working days. By appointment, two days. In an emergency, back the same day.

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At our facilities in New York and California, we have tools specially made for us by the people in Munich. They use the same special tools to assemble a new camera. We use them here to reassemble an overhauled camera.



Checking critical relationship between claw and register-pin on 16mm ARRI movement. Tolerance is 0.0004 inch. Screen image is magnified ten times.

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When *we* use that word, it means we completely dismantle the camera. We even submerge the empty housing in a special cleaning fluid. Then we reassemble the camera, checking each part and installing a new one if necessary. In terms of specs, it's then the equivalent of a brand new camera.

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It's hard to pin down. Some people quote a lower hourly rate than ours, and

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Why did you buy an Arriflex in the first place? Partly, confidence in its reliability. Now it's service time. How much is confidence worth?

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"I rent cameras mostly to people who make commercials," says ARRI dealer Denny Clairmont. "They shoot in helicopter-blade windstorms, ocean salt spray and desert dust. They mount the camera on a car and drive it down a dirt road."

"Dust mixes with the oil and grease in the camera to form a cutting compound! If you want to grind down a metal moving part, that's the way. Bumping along the road isn't good for a precision instrument, either."

"In my experience, though, Arriflex parts will perform like new indefinitely — if you keep them clean."

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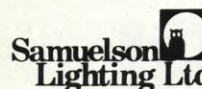
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THE PRODUCTION VILLAGE

Samuelson's Mini-Studio Complex in downtown Cricklewood

The Production Village will come to represent many things to many production companies. As a working environment it will be without equal – but its primary role is to be a functional, cost effective film and television production tool. No effort has been spared to put at the customer's fingertips the widest possible range of production services including those of skilled and experienced craftsmen backed by comprehensively equipped workshops.

When it is complete, The Production Village will comprise 9 stages varying in size from 185 ft. x 54 ft. right down to 42 ft. x 27 ft.

All stages are equipped with wrap-around cycloramas with radiused coves top and bottom and, while not sound-proofed in the conventional feature-film studio manner, all are provided with red-green light systems and are probably quieter than the vast majority of places where film is shot 'on location'.

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Samuelsons incomparable camera, lighting, sound and ancillary equipment is delivered to the 'Village free of charge. There are good restaurant facilities, a bar and a canteen.

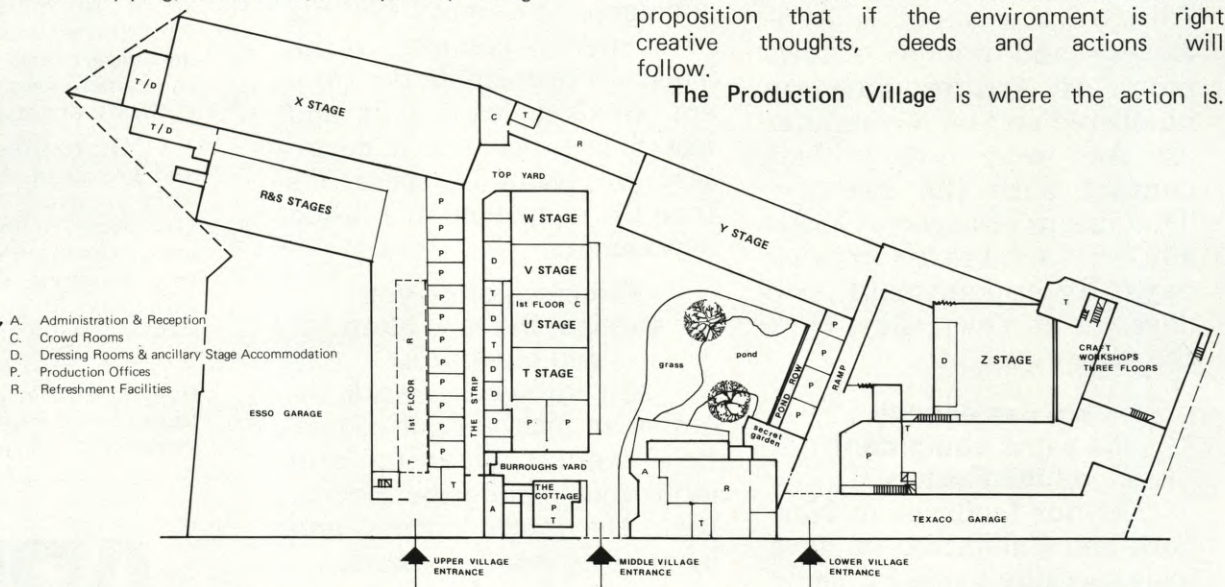
And, most important of all, there is good and skilled labour. The crafts of set construction, painting and spraying, engineering and metalwork, plaster and fibreglass work and so on, are well cared for at the 'Village.

Samfreight are there to handle your freight and forwarding, and the London Chamber of Trade and Commerce actually has an Export Carnet office located in the 'Village to speed you on your way to foreign locations.

The Production Village is only four miles from Marble Arch, five minutes from the Brent Cross Shopping Centre, six miles from Wardour Street, and, like Samuelsons of London, will be a seven-day-a-week operation.

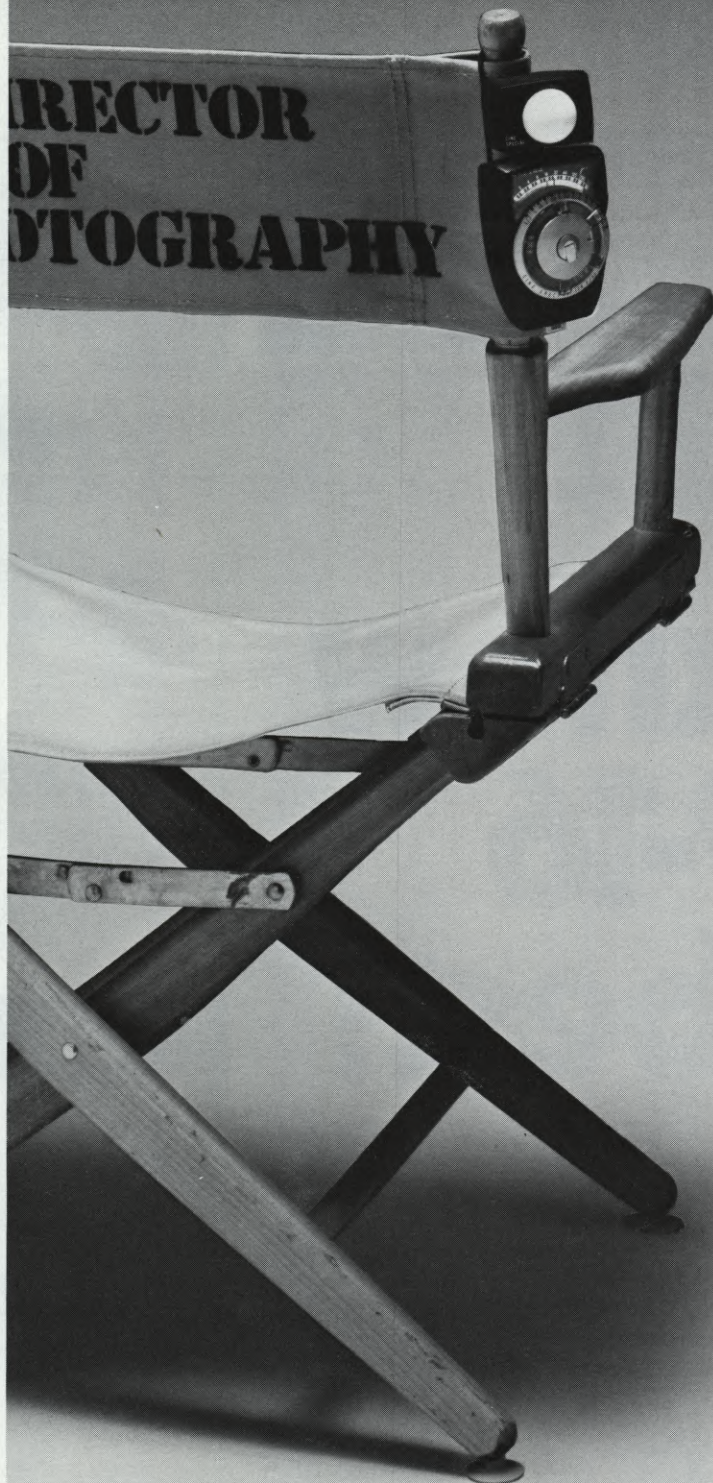
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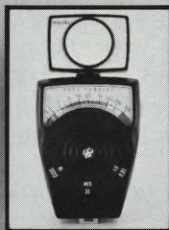
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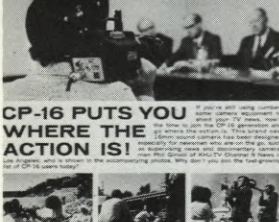
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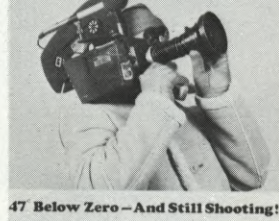
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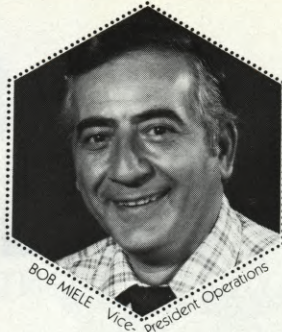
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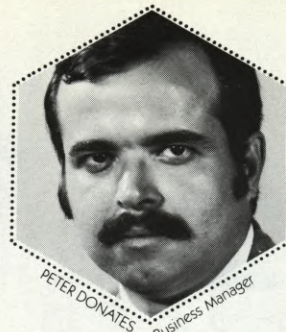
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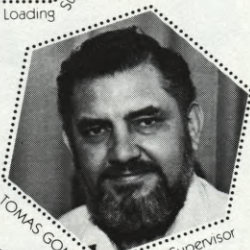
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BEHIND THE SCENES OF "THE MUPPET MOVIE"

After winning the hearts of worldwide audiences via television, Jim Henson's delightful Muppet characters are now starring in their first full-length theatrical feature movie—made in Hollywood

After winning the hearts of worldwide audiences via television, Jim Henson's delightful Muppet characters are now starring in their first theatrical feature motion picture—THE MUPPET MOVIE.

For the first time, Kermit the Frog, Miss Piggy, Fozzie Bear and most of their friends will be seen in a continuous story on the big screen. They will perform original musical numbers composed for the film by Paul Williams and Kenny Ascher.

"THE MUPPET MOVIE opens with Kermit the Frog sitting on a log in a southern swamp playing his banjo and singing. He finds Fozzie Bear doing his comedy act in a tacky night club. He meets Miss Piggy in the Midwest, where she wins a beauty contest. Lured by hopes of finding fame and fortune as movie stars, they set off for Hollywood, chased by a villainous frog legs tycoon all the way.



THE MUPPET MOVIE was filmed partly on outdoor locations. The Muppets inter-act with live actors, including about 20 stars in special appearances. A few of these guest stars appear as themselves, the rest play roles integral to the story.

"We didn't want to just do 'The Muppet Show' on film" says Jim Henson.

He describes THE MUPPET MOVIE as "the story of how the Muppets got together and how Kermit got into show

business." The characters meet on an adventurous cross-country journey from the swamps of Georgia to the sound stages of Hollywood.

Kermit is first seen sitting on a log in a southern swamp. He finds Fozzie Bear doing his comedy act in a tacky night club, the El Sleezo. He meets Miss Piggy in the Midwest where she wins a beauty contest.

As the Muppet "family" travels westward, they are harassed and threatened by the ruthless owner of a fast food chain who is determined to get Kermit to act in his commercials. This villainous character, "Doc Hopper" is played by eminent film and stage actor Charles Durning. Co-starring as his assistant "Max" is outstanding New York actor Austin Pendleton.

"THE MUPPET MOVIE," says Jim Henson, "is the flip side of 'The Muppet Show'. On the television show, we invite one guest into the world of The Muppets. In the movie we are taking The Muppets out into the real world." THE MUPPET MOVIE is a continuous story, as distinct from the stage revue format of the TV variety show.

This unique combination of Muppet magic with live actors and full-scale filmic realism provides technical and artistic challenges and opportunities for the filmmakers.

Says director James Frawley: "These characters are real to me, just as they are to millions of Muppet fans all over the world. THE MUPPET MOVIE is the story of someone who meets an agent and decides to follow his dream of becoming an entertainer. The someone happens to be a frog, and his friends happen to be a bear, a pig, a dog, a chicken, etc. All the humans in the story instantly accept them as real and relate to them without question.

"The Muppets have an exciting new dimension in the outside world, and the outside world is made a more magical place by their presence. We hope that by the time the audience comes out of the theatre, they won't be sure who's a Muppet and who isn't."

The creation of a feature film is the fulfillment of a delayed dream for Jim Henson. In 1965 he wrote, directed, produced and starred in the short (non-puppet) experimental film, TIMEPIECE, which received an Academy Award
Continued on Page 702



The Muppets do indeed find themselves in front of the cameras at World Wide Studios, after spending starry nights camping out in the desert en route. The behind-the-scenes of the real filming was almost as crazy as the fantasy itself, with Muppet operators flat on their backs being wheeled around on dollies (bottom of page) and one car mounted upside down on top of another. The film is a musical, with a score by Paul Williams and Kenny Ascher.



THROUGH THE RAINBOW WITH LENS AND CAMERA

By ISIDORE MANKOFSKY

Director of Photography

"The Muppet Show" is the most popular TV show in the world. Now the Muppets have had to make the transition to the big-screen. Not just a big-screen TV show, but a theatrical feature film made in the real world outside the TV studio. Superb direction by James Frawley made this possible. The artistry and full cooperation of Jim Henson and the other Muppeteers accomplished this difficult transition with style and great success. THE MUPPET MOVIE is a lovely, magical film.

At the start of preproduction there were many questions to be answered. Which format—1.85 or Panavision anamorphic? How would the Muppets look on the big movie screen? What focal length lens would work best? How would we film Muppets and people on the same screen? Lighting style, filters and diffusion, and the effect of colored gels on Muppet fabrics also had to be tested and researched. Answers had to be found before THE MUPPET MOVIE could swing into production.

For screen format we tested 1.85 and Panavision anamorphic. Panavision would have caused fewer framing problems, but the format proved too large and overpowering for the Muppet figures. Equipment considerations and the need for a dependable video monitoring system also helped turn us to the 1.85 screen format.

Tests were done to determine how the Muppets would look on the large theatre screen. Different focal lengths of lenses and image sizes were tested.

Image size was best from a medium closeup to a fairly wide shot. Fabric flaws became very obvious and distortion was a problem in extreme closeups. We tested shooting from above, below, and a little above eye level. Looking down on the Muppets proved to be too condescending, and the rather small size of the figures made shooting from below out of the question. The best camera height was a little above eye level. Generally, the Muppets took to the big-screen with only a few changes in normal lens-image size considerations. When we filmed Muppets and people together we used a slightly longer lens, and kept the Muppets slightly forward of the people. This technique made the Muppets look their best.

Lighting tests showed that directional soft light, hard kickers, or side light with enough fill light to penetrate the shadows

worked well. The vivid, multi-colored Muppet fabrics caused some problems. Very light Miss Piggy, mid-range Kermit, and quite dark Gonzo made it necessary to set many nets to balance the lighting. Once again the problem of filming Muppets and people at the same time had to be solved; in many instances they had to be lighted separately. The Muppets were pros at finding the key light and staying in it. Not once did they complain about lights in the eyes. We could also use reflection on them without having them squint.

I wanted the film to have a warm feel

Somewhere under the rainbow. Director of Photography Isidore Mankofsky directs the lighting for the big production number at the end of THE MUPPET MOVIE. He is shown sitting under a section of the giant rainbow stretching from a hole in the roof down to the floor of the sound stage where 265 Muppets are assembled to sing the finale song. The rainbow, in this case, is a multi-colored scrim.

and slight diffusion, so I found a fine coral-colored net which was used throughout the filming. In addition, a 1 or 2 coral filter was used selectively. Outdoor scenes were shot with the coral net and a 85B filter. Fabric color was slightly affected on Gonzo and Zoot by the net on indoor shots, but the change was acceptable.

Colored gels were used sparingly because of the varied Muppet fabric colors. Some scenes needed a theatrical look and colored gels were used extensively on the lights as any fabric color change seemed acceptable. The El Sleezo Café



scene, where Kermit meets Fozzie Bear, was filmed with the extensive use of colored gels.

It is hard to contemplate the difficulty and complexity of framing the Muppets effectively. Richard Edesa, my camera operator, did a magnificent job of keeping the frame clean. It was a constant battle to avoid seeing Muppeteers and the holes in the set where they were working, and still have a good frame. Every shot offered new problems on how to accommodate the Muppets. Keeping the head room to a minimum on a big-screen was a constant problem. Richard spent more time keeping things out of the frame—arms, heads, and other parts of the Muppet handlers' anatomy—than he did putting things into it. Ways and means of hiding the Muppeteers became a full-time job.

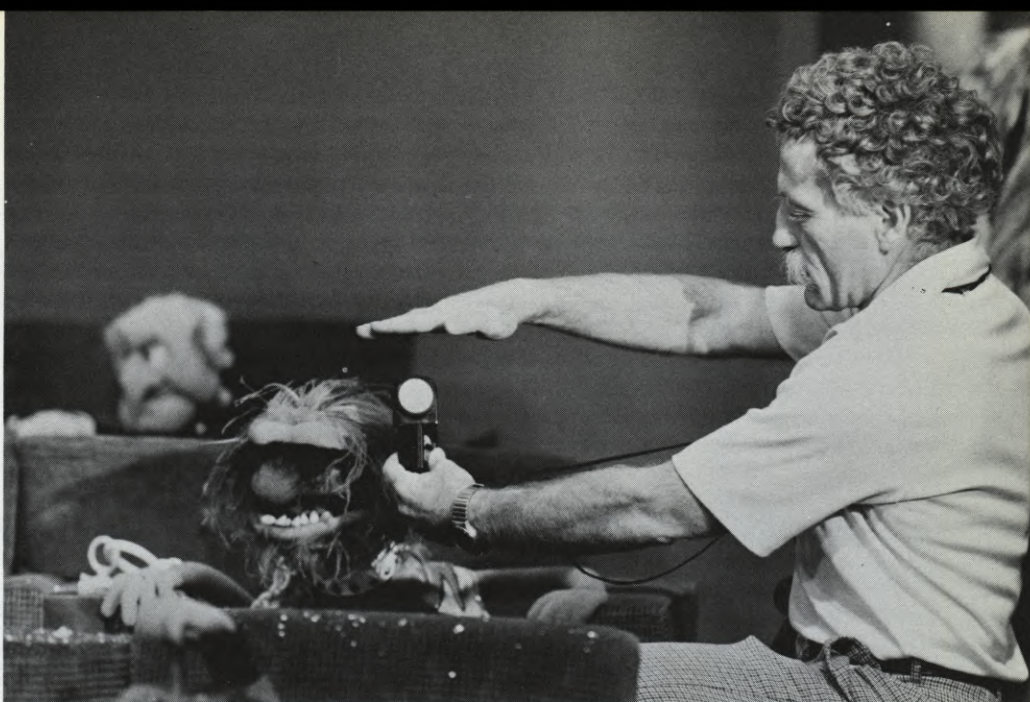
Joel Schiller, the production designer, did an inventive job on the sets. All sets were built with four-foot-square sheets of plywood for the flooring; these sheets rested on stanchions which were four feet high. Each panel could be lifted out as needed to position the Muppet handlers, who always had four feet of work space under the set. He also designed set pieces which the Muppeteers hid behind while they worked the Muppets.

Moving the Muppets from one part of the set to another was not a simple task. All types of wheeled "things" were used: chair seats with legs cut off and wheels added, furniture dollies, Western dollies, doorway dollies, special pipe dollies, and in many instances the Muppeteer's feet. Sometimes the dollies were pushed along by the Muppeteers and at other times the grips did the pushing. We had two full-time dolly grips on the crew, and there were times when we had as many as five dollies moving at one time.

From the photographic standpoint, probably the most difficult sequence in *THE MUPPET MOVIE* was the finale, which involved 265 Muppets. We had to start on an extremely tight shot of Kermit, so that we wouldn't give away the gag, and pull back to the far end of the set to reveal the entire group of Muppets and, in so doing, miss all the people who were standing there holding their hands in the air. There were about 200 people, some holding two Muppets, and we had to take the scene quite a number of times in order to avoid picking up all those people who were standing there in a hole in the floor. It wasn't easy.

In fact, throughout the entire filming, the most difficult problem we faced was trying to frame out the Muppet performers. They had to work, but we had to keep them out of the frame.

In that final shot a rainbow is supposed



Cinematographer Mankofsky checks the light on Animal, one of the frowzier Muppets. Because these creatures are made of cloth of varying textures, they cannot be lighted in the same way as humans, and some of them "soak up" more light than others. (BELOW) Fozzie Bear sits at the wheel of his Studebaker, while a cameraman in the rear seat prepares to make an over-the-shoulder shot.



to appear as we pull back, and we tried first to do it live in-camera instead of optically, so we pulled back through a theatrical net. In our close position you couldn't tell that there was a net or that there was a rainbow painted on it, but as we pulled back we revealed the rainbow going from the hole in the ground through a hole in the roof that had been blasted in a comic exercise earlier in the sequence.

In order to avoid revealing the fact that we were shooting through a net, we had to hold the camera on its dolly back and long end of the lens a lot longer than I wanted to, but that was the only way we

could avoid having the net come into focus as we came back. That would have given away the gag and, quite frankly, it would have looked terrible. As it turned out, the rainbow was finally put in optically by Joe Westheimer over a take which we made without the net. I had hoped that they would use the on-camera rainbow, but I was overruled by our director. I must say, however, that the result looks wonderful. Mr. Westheimer did a marvelous job, as usual.

An interesting phenomenon developed early in the filming. Since all of the Muppet operators had to work while look-



(LEFT) The opening scene of THE MUPPET MOVIE takes place in a swamp, where Kermit the Frog is discovered sitting on a log playing his banjo. The trees were brought in from Georgia and the swamp was created on the backlot of the studio. The odd-looking diving bell shown here was created by Special Effects Supervisor Robbie Knott so that Jim Henson could sit in it underwater and operate Kermit. He was provided with piped-in air, a headset, a monitor and a tray for his script. (RIGHT) Between takes, Henson floats around in the bottom of the diving bell.

ing at monitors so that they would have some focal point for the eyes of the Muppets, whenever my operator, Richard Edesa, would make a corrective adjustment in composition, the Muppet operators would make an additional adjustment and before we knew it we were adjusting ourselves clear off the set.

When the Muppet operators finally realized that he was making some adjustments for reasons they were not aware of, they were not as quick to adjust with him and the problem was avoided.

One would think that since the Muppet operators were watching the monitors, it would be easy for them to keep their

arms and heads out of the frame, but in fact, their concentration was so heavily directed toward their performances that, even though they did try to keep the frame clean, it was not always possible. Mostly it was up to the poor operator. His job on this film was the most difficult I've
Continued on Page 712



It's showdown time on the Western street of the studio's backlot. The Muppets, with their operators standing in a communal hole, prepare to confront the villain of the piece, played by Charles Durning. (BELOW LEFT) In a bar scene, Kermit hob-nobs with Madeleine Kahn and Telly Savalas. (RIGHT) About 30 Muppets (each with an operator and monitor under him) flock into the screening room. This was the only set built to Muppet scale, since they would have gotten lost in full-size seats.





The big production number for the finale, in which a rainbow comes streaming through the sound stage roof to bathe 265 Muppets in colored light. An old theatrical trick was tried first. A rainbow in the form of a translucent scrim was hung from the ceiling to the floor and care had to be taken so that the texture of the scrim would not come into focus during the pullback. The effect worked quite well, except that it was impossible to get the colors to register brightly enough. In the end, the rainbow was added optically by Joseph Westheimer, ASC, and his crew.

(LEFT) With boredom showing all over their faces, the Muppets wait for a tricky camera set-up to be made. (CENTER) Mankofsky takes a light reading on Kermit and friendly frog. He took as much pains in lighting the Muppets as he did with the humans, since they are, in some ways, even more difficult to light than humans. (RIGHT) The late Edgar Bergen and Charley McCarthy serve as judges in the sequence where Miss Piggy wins the beauty contest.



DIRECTING "THE MUPPET MOVIE"

Director James Frawley writes about the innovative concept of taking the Muppets out of the studio and filming them in actual locations

By JAMES FRAWLEY

"*The Muppet Show*" takes place in a Victorian Variety Theater. The audience are Muppets; everyone on stage and backstage are Muppets. Their weekly guest star is brought into a Muppet world. In *THE MUPPET MOVIE* we take the Muppets into our world and hopefully it's a better place because of it.

Even though I had been an ardent fan of "*The Muppet Show*" and enjoyed the Muppets on "*Sesame Street*", I had no specific idea of how they accomplished what they did so brilliantly. I had the opportunity to go to London and observe their work process while they taped their weekly shows. I was impressed with the technical ingenuity necessary to accomplish what appeared to be so effortless to the audience.

Inside or underneath every Muppet is a Muppet performer (or two), manipulating the character and doing its voice simultaneously. Part of the reason why their work is so precise and specific is that they use video monitors to watch as they themselves perform. They also have the added responsibility of keeping their heads and arms out of frame while the video cameras are taping.

Directors, writers, technicians and performers had done three successful seasons under the guidance of their pro-

ducer and originator, Jim Henson. The set operated efficiently, and the spirit was good. It was an ensemble that worked, and all on one large television stage—a controlled interior situation. It occurred to me that that might be the best way to make *THE MUPPET MOVIE*, to approach it like a 1940s Hollywood musical—interiors and exteriors on a sound stage, front and rear projection, forced perspectives, one-dimensional sets, a totally stylized reality.

At the same time, the challenge of taking the Muppets out of the sound stage and shooting them *on film* for the first time was intriguing. I suggested we try an experiment.

Because my background had included still photography and documentaries, as well as television and feature films, I had used the Super-8 Beaulieu sound camera as a kind of sketch book during pre-production. It's an invaluable tool in capturing the essential quality of a location on film. In this case, however, it gave me the opportunity to experiment with Muppets *on film in live locations*. One weekend Jim Henson (with Kermit), Frank Oz (with Miss Piggy and Fozzie Bear), and I (with my camera), went out into the English countryside. We drove around until a particular setting appealed to us,

stopped, shot a little improvised sequence and moved on, shooting in the car as we traveled. Jim and Frank had worked together for years and knew their characters inside and out (excuse the pun). They improvised beautifully together. Except for the occasional problem of keeping their bodies out of frame, I enjoyed photographing them in the beautiful English light and a good time was had by all.

We looked at the results a couple of days later and we were very excited by what we saw! There were a frog and a bear driving down an English road talking about the scenery and you could absolutely accept it. More than that, the characters seemed more real against the landscape and the landscape seemed more magical because the characters were there. That Super-8 film made the decision for us—we would take the Muppets out of the studio and into the "real world".

As the script developed *THE MUPPET MOVIE* became a movie within a movie. It opens at a Hollywood studio. A vintage Rolls Royce drives up to the gate, the guard talks to the passengers, Statler and Waldorf, two Muppet characters who have come to see the first screening of *THE MUPPET MOVIE*. The screening room is packed with Muppets anxious to see the movie.

As the movie begins, we discover Kermit the Frog in a Georgia swamp playing his banjo and singing "*The Rainbow Connection*". He is approached by a Hollywood agent (Dom DeLuise) who shows him an ad in *Variety* about a studio holding open auditions for "frogs wishing to become rich and famous." Kermit leaves the swamp and begins his cross-country journey to Hollywood, picking up various Muppets along the way. He meets Fozzie Bear who is working as a comic in a sleazy cafe in the South. The Electric Mayhem are playing rock music in a deserted church. Gonzo and Camila join the trip after an automobile accident. They meet Miss Piggy when she wins a beauty contest at a country fair in the Midwest. Rowlf the Dog is playing the piano, in a rustic tavern. Bunson and Beaker have a laboratory in a deserted ghost town and Sweetums is working for a used car dealer (Milton Berle).

All the while, Kermit is being pursued by Doc Hopper (Charles Durning) and his assistant, Max (Austin Pendleton). Doc sees Kermit performing and offers to

The ice cream man looks suspiciously like Bob Hope, shown here with director James Frawley. Other human guest stars include Edgar Bergen, Milton Berle, Mel Brooks, James Coburn, Dom DeLuise, Elliott Gould, Madeline Kahn, Carol Kane, Cloris Leachman, Steve Martin, Richard Pryor, Telly Savalas, Orson Welles and Paul Williams.





(LEFT) This gleeful threesome includes James Frawley, Mel Brooks and Muppet creator/producer/performer Jim Henson. The spirit of fun that prevailed the set, despite most demanding challenges, was very genuine—inspired, no doubt, by the invariably cheerful Muppets. (RIGHT) James Frawley poses with his own personal Muppet, created in his own image right down to a reasonable facsimile of his colorful Hawaiian shirt.

cast him in all the television commercials for his company, a fast food chain that specializes in french-fried frog's legs. Kermit is horrified by the idea and rejects him. For the rest of the film Doc Hopper is hot in pursuit. The Muppets eventually make it to Hollywood, deal with a tough receptionist (Cloris Leachman), and confront the mogul who heads the studio (Orson Welles). He gives them "the standard rich and famous contract". They do their big final production number and *THE MUPPET MOVIE* ends as it began, in the screening room at the Hollywood studio. The Muppets are pleased with their movie.

In the world of *THE MUPPET MOVIE*, human beings accept the presence of the Muppets without comment. When Kermit bicycles into a small Southern town, no one does a double take. It is simply a frog on a bike.

This world also exists in an indeterminate time—not 1980, not 1940, but, perhaps, somewhere in between.

Our production designer, Joel Shiller, maintained that reality in his designs. He and I had worked together on *KID BLUE* and *THE BIG BUS* and enjoyed the kind of creative exchange that makes for an excellent working relationship.

In choosing a cinematographer three things were important: technical expertise, a vivid imagination and, most importantly, the ability to accept the reality of the Muppets with absolute conviction. Isidore Mankofsky and I first worked together on a two-hour "*Columbo*" with Peter Falk. I was impressed with his ability to execute photographic concepts scene-by-scene, while maintaining a consistent overall look to the picture. We found that we shared a mutual re-

spect for a "classical" approach to photography. But most importantly, his response to the concept of *THE MUPPET MOVIE* was enthusiastic and he photographed them with genuine affection. Recognizing that the Muppets were our stars, he was as concerned with Miss Piggy's lighting as he would be if he were photographing Garbo.

He was constantly challenged by shots that included a green frog, an orange bear and a pink pig riding in the front seat of a '51 Studebaker on a country road. We wanted the sense of available light while photographing our "stars" in a way that would be both flattering and acceptable to the audience, considering the fact that they were made of cloth, foam and fabric. After extensive tests, we decided to use different degrees of coral filters. They not only softened the image slightly, but added a warmth to the photography that suited the emotional and romantic quality of the film.

Then, because we were doing a movie within a movie, it gave us an opportunity in the photography, to pay homage to certain *genres* that we admire. The El Sleazo Cafe was an amalgamation of cafes you have seen in every film since *CASABLANCA*. The design by Joel Schiller and the set dressing by Rick Goddard certainly enhanced that, but we added exotic shadow effects that would reflect the photographic style of films of the 40s.

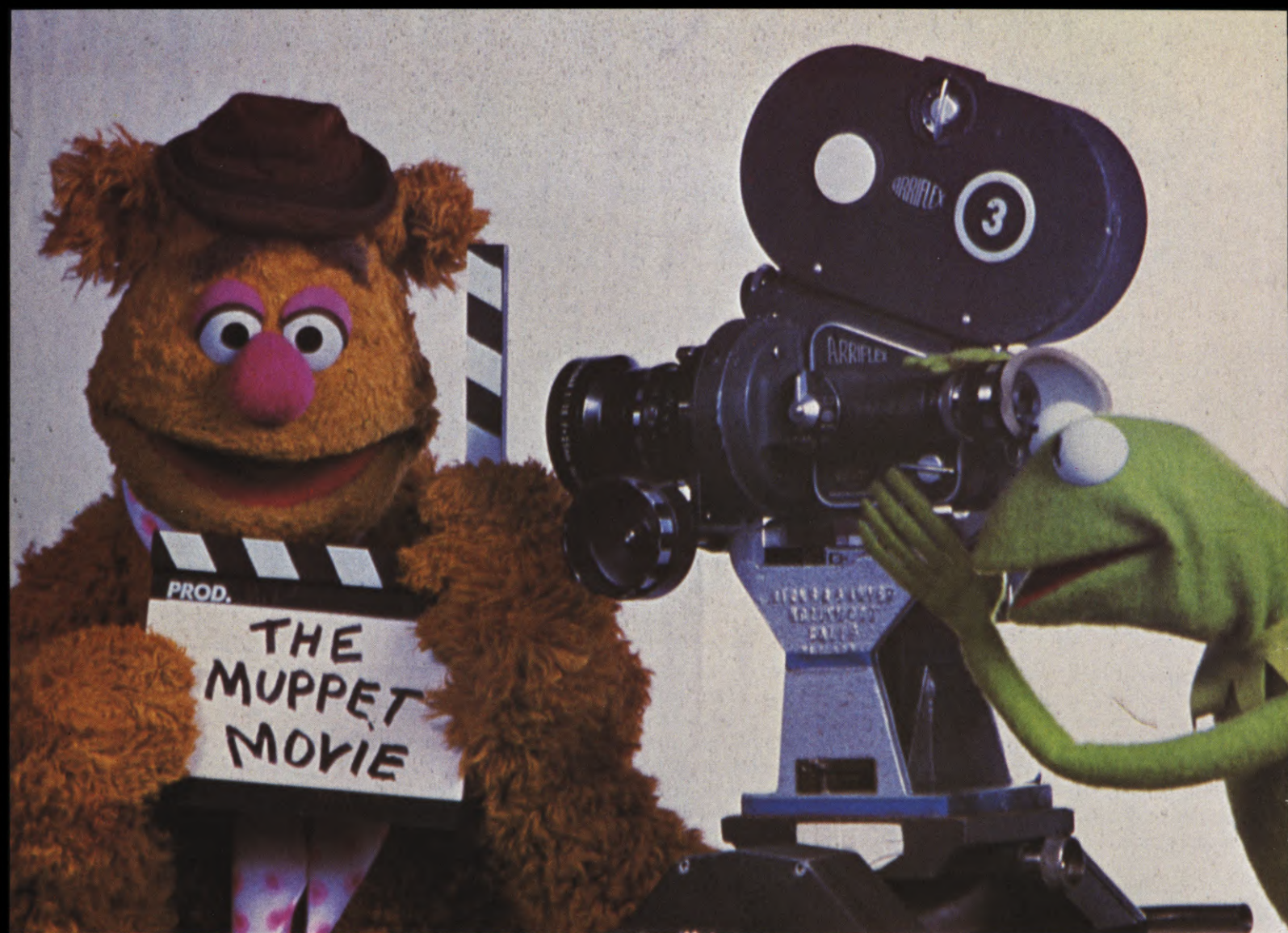
We shot a showdown between Doc Hopper and Kermit on the western street that was used in *HIGH NOON*. Our treatment of that sequence is a humorous homage to the classic Western. When Miss Piggy sees Kermit for the first time, she sings a romantic ballad, "*Never*

Before, Never Again", and fantasizes a montage of various love scenes with Kermit.

Each scene was reminiscent of a different style of love scene. For example, Miss Piggy walks down a foggy street at night and encounters Kermit leaning against a street light dressed in a trench coat *à la* BRIEF ENCOUNTER. The humor of a sequence like this is dependent upon the audience's immediate recognition of the style being satirized. All design elements have to support the style: photography, setting, staging and costumes (Calista Hendrikson).

Apart from the creative considerations involved in making *THE MUPPET MOVIE* was the technical complexity of our day-to-day shooting. As I mentioned earlier, at the end of every Muppet character was at least one Muppet performer, who not only had to be kept out of the frame, but who needed to watch that frame constantly in order to perform effectively. We used through-the-lens video viewing for every shot that involved Muppets. We also had the capacity to replay shots to check performance and to see if the critical frame lines were clear of heads or arms. I had never used a video system before, but might well use it again, even if it weren't required as it was here—a valuable tool.

All of our interior sets were built six feet off the sound stage floor, and the floors of the sets were constructed in a checkerboard fashion so that any sections could be taken up as needed according to the design of the shot. This also gave the Muppet performers freedom to work more efficiently from underneath. For example, when the group of Muppets cross into Orson Welles' office, ten Mup-



Kermit the Frog trains the movie camera on his sidekick, Fozzie Bear, who gets ready to steal the scene. The film is a joyous romp that pokes affectionate fun at the motion picture industry—at least as it was in the colorful Thirties and Forties. The Muppets are anything but earthbound this time out. They dance, ride bicycles, get hoisted into the air by balloons. It is easy to forget that they are basically hand puppets.

pet performers, each with his own video monitor and head set for sound, were standing on a large dolly with their Muppets extended above them. The shot was designed to mask the Muppet performers with foreground pieces, while the dolly moved them across the sound stage floor, giving the illusion that the characters themselves were crossing the

room. In certain exterior situations, deep trenches had to be dug for the Muppet performers in order to create the same illusion outside.

In the screening room sequences, with 25 Muppets working, there were as many performers under the set with their monitors and sound systems. In our moving shots on the road, the same principle ap-

plied: Fozzie driving an old Ford Woodie with five Muppet passengers meant that as many as seven Muppet performers were crammed under the dashboard and behind seats with their monitors and headsets. Not only does the illusion work, but, hopefully, the audience accepts it without question, much the way we accepted what we saw on the Super-8

(LEFT) The hirsute drummer of the Electric Mayhem band takes off in a wild virtuoso performance with the sticks. Making these characters believable in big closeups during musical numbers poses a very special technical challenge. (RIGHT) Jim Frawley gives directions from behind the camera. His background as an improvisational actor helped him to adjust to, and enhance, the spontaneous character of the Muppets' performances.



film in England. The difference, of course, was that Jim and Frank were working blind and I was shooting with available light and recording rough sound. Add all the hardware necessary for a feature film and the technical problems become evident.

The single most difficult sequence to execute was the one in which Kermit is sitting on a log in the swamp completely surrounded by water, playing his banjo and singing. Robbie Knott, our special effects supervisor, and his wonderful team built a bathysphere that would hold Jim Henson, his sound unit, video monitor, and air lines, and submerge him underwater so that all the camera sees is Kermit sitting on a log surrounded by water. Jim Henson was able to watch the camera setups through the monitor and maintain constant communication with us. It was not only difficult but somewhat dangerous. He needed air and needed to be as comfortable as possible while he made Kermit sing and play banjo to pre-recorded playback. He had earphones so that he could hear me and the playback. Every once in a while we'd bring him up and let him stretch and relax. Then he'd go back down again. The Muppet performers, though, are traditionally used to their bodies being scrunched into incredibly uncomfortable places and were very patient with us.

Because we were making a full-length feature for the "big screen", we needed free-standing, full-figure Muppets who could move and talk. Once again it was Robbie Knott who devised the radio-controlled mechanism that would permit Muppet performers to manipulate their characters off-camera. Although we only used them occasionally, they supported the illusion of Muppets in the "real world" beautifully.

Kermit rides a bicycle; Gonzo is hoisted, kicking and screaming, into the air by a bunch of balloons; Fozzie and Kermit stand and react to the Electric Mayhem; Kermit is carried, squirming and protesting, to a mad scientist (Mel Brooks) and his electronic cerebrectomy machine, also designed and built by our incredible special effects team. Because the illusions I have described were part of the story, we never called specific attention to them. As I said before, just a frog on a bike.

I can't give enough credit to the brilliant technicians who not only created the effects that were necessary but worked with an emotional involvement that helped keep the energy of the entire company at a high level of professionalism and pure pleasure. We were making a movie that had to do with "group energy". How the Muppets got together and how their energy mani-



Frawley gives Kermit a peek through the viewfinder of the camera. So lifelike are the Muppets in action that Frawley, like many others working on the film, would sometimes get carried away by their seeming mortality. Says he, "I would often give directions to Kermit, rather than Frank Oz. I would discuss behavior and emotional transitions in much the way that I would with a good actor..."

festated itself with humor and love. It was important that Jim Henson's group, which numbered about forty-five people, and the Hollywood crew work together in a way that would reflect the unity we were trying to create on the screen. The experience was a deeply rewarding one in that the two groups came together, dealt with each challenge creatively and soon became one group making a movie with Muppets, an ensemble that worked.

Our belief in the characters was so strong that we dealt with them in a very personal way. Since my attention was focused on what was *in* the frame and not *outside* it, I would very often give directions to Kermit, rather than Frank Oz. I would discuss behavior and emotional transitions in much the way I would with any good actor and the Muppet performers are wonderful actors. Because they were so receptive and available, I encouraged them to use their own personal feelings in order to manifest them through their characters.

There are moments of poignancy when the Muppets relate to one another on emotional levels that are very touching. To a certain extent, that's what the movie is about: their growing familiarity with one another and the realization that they all share a common dream. In Kermit's words, "to sing and dance and make people happy." The innocence and simplicity of that dream affected all of us.

In the final production number, an ac-

cident causes a huge arc to explode, blowing a gaping hole in the roof of the sound stage. The Muppets gather together and look up as a golden light comes through the hole and falls on them. Kermit turns to the camera and sings the last verse of "The Magic Store". "Life's like a movie, write your own ending. . . ." The camera begins a slow pull-back from Kermit's closeup, revealing 265 Muppets all singing in unison. As the shot widens it reveals a rainbow coming through the roof and falling on the group. It's the last shot of the movie within the movie and works very effectively.

Because there aren't 265 Muppet performers, actors from Los Angeles had to be brought in and hastily trained by Jim Henson and his group to operate the Muppets. We had to make the shot in one day; it required a great deal of pre-planning, pre-lighting and extensive design before we could attempt it. Photographically, the shot started at the long end of a zoom (500mm) and slowly armed up on the Titan crane, widening to a 25mm during the last phrase of the song. It was beautifully executed by our camera operator, assistants, dolly grips and crane drivers.

Every member of the crew brought their technical skill, energy and dedication to the project. I'm personally grateful for their support, because without that, THE MUPPET MOVIE wouldn't have been possible. ■

MECHANICAL SPECIAL EFFECTS FOR "THE MUPPET MOVIE"

Physical "gags" that have never been done before—like getting Kermit the Frog to sing and play his banjo in the middle of a swamp, and making it possible for Muppets to drive real cars down real roads

Credited for Special Effects on THE MUPPET MOVIE, Robbie Knott hastens to explain that these are physical (mechanical) effects, as differentiated from opticals. The two types of effects have always coexisted in motion picture production and there are points where they overlap in compositing, but they remain two very separate and distinct crafts.

Robbie Knott is typical of a new breed of special effects technician—youngish, with a quiet but vibrant enthusiasm for what he does and, more often than not, operating independently of any major studio affiliation.

In the following interview, Knott talks about the unique demands made upon his skills in the production of THE MUPPET MOVIE:

QUESTION: Would you describe some of the main challenges and problems you encountered in working on THE MUPPET MOVIE?

KNOTT: Well, I think the number one challenge going in was the fact that there was no script. A treatment had been written and there was a basic format, but no one on the film crew was really aware of how the Muppets worked. In the beginning, coordinating the various elements was difficult—especially with a co-producer who was in England. It was a strange beginning, but as the script developed, the gags began to develop. Some of the effects were basic and there were a lot of monofilament gags, but also there was much that was new and different. We were working with cloth puppets which, 15 minutes into the film, you would believe were living creatures in terms of the way they related to each other and to human beings. There was a sort of tongue-in-cheek flavor to the whole thing—Jim Henson's flavor.

QUESTION: The Muppet people had been used to working with English TV crews, for the most part. What happened when they were suddenly put on the same set with a Hollywood film crew?

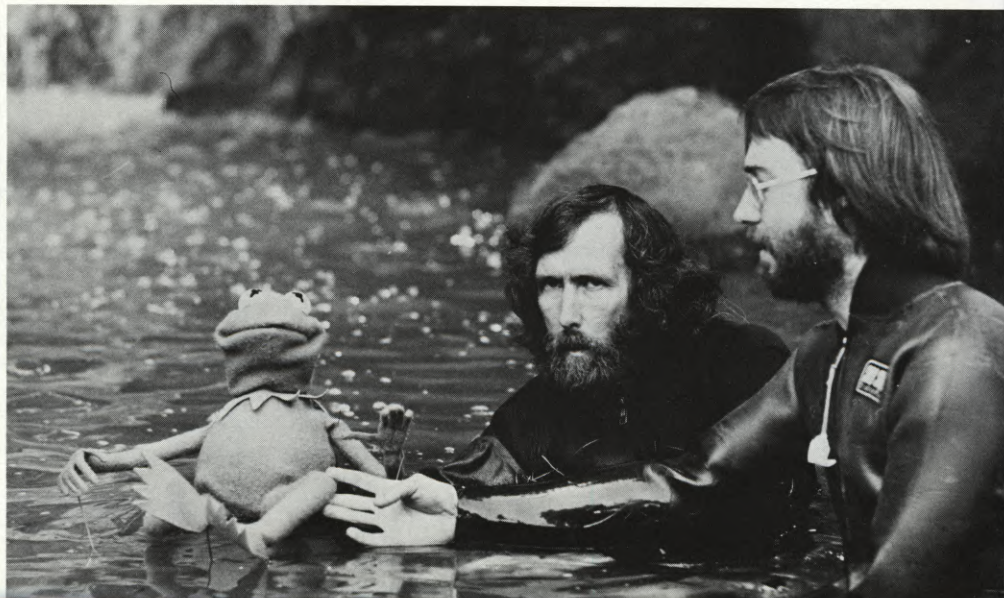
KNOTT: The flavor became a bit different with a Hollywood film crew in there. The crew was made up of people who, by the time the project started, were very eager to be involved with the

Muppets. Their attitude was: "Gee, wouldn't it be fun . . .?" They started to add something to it, and so it changed. I don't think it ever really stopped changing right up to the last day. The biggest challenge was that, not having a script, you never really knew from day to day what was going to happen. There were things like having to pull six-foot custard pies out of your hip pocket within a week—plus a mechanical billboard to

throw the pies. We were asked to provide very top-budget film-type gags, with no time to do them. But it was fun, and I think we pulled off the better part of those that we wanted. The ones that were dropped were cut because you just got so full of everything having an effect in it. Every shot was an effect shot: The Muppets were driving cars; they were underwater; if they weren't underwater, they were flying through the air



Kermit the Frog plays the banjo and sings a song, at home in a southern swamp. This deceptively simple looking scene required a horrendous amount of work on the part of Jim Henson, working underwater in a bathysphere to animate Kermit. (BELOW) Muppet creator/producer/performer Jim Henson helps Kermit take a scenic dip, aided by a staff member. This charismatic frog is the "star" of THE MUPPET MOVIE.



On top of that, we were working video as a complement, so they all had to have monitors to work off of. It was like working three film crews all at once. Those were only some of the challenges. I could go on for a couple of days about challenges.

QUESTION: In a film full of unusual "gags", there must have been one that stood out as more unusual than the rest. Which one was that?

KNOTT: We created the world's largest puppet. (We'll probably get into the Guinness Book of Records.) We only built the head, collar, arms and hands—but it was a 15-foot head—a little larger than King Kong. It was housed inside a building for a scene in which one of the Muppets eats a growth pill. The growth pill takes over while Kermit is having a showdown with Charles Durning. The ground begins to rumble and the character comes crashing through the top of the building. We see this huge, huge puppet that is a duplication of the hand puppet. The main challenge for me was how to build it cheaply enough to fit into the budget—and also hide it, so that I wouldn't get too much criticism on it until it was finished. Something of that size you can't look at too closely; it really has to be seen in its proper setting. We had four or five people working on it over a period of months and they kept asking, "What is that big thing we're working on?" We built it out of very lightweight materials and then rigged it so that Frank Oz, the animator of the small Muppet, could operate it by himself. That was in the interest of maintaining the purity of the Muppeteers' art, the thing they are best at. Anyway, we found a location where we could shoot it against a blue sky and arrange for debris to fall in a clean shot. We crashed it through the building and it was wonderful. I was totally delighted.

QUESTION: Did you really have to build it that large? For the sake of time and budget, couldn't it have been done some other way—as a miniature, for example?

KNOTT: Yes, it could have been done as a miniature; it could have been done as a matte—but when the camera comes around on the back side of it and goes for an over-the-shoulder shot of this huge puppet, you know that it's 50 feet tall—and that realism said something for this particular film. It was still a puppet, but it was huge and you could see that on the film. That's what we did all through the picture. Anytime I could do a physical effect that would otherwise be



Two cars (one upside down on top of the other) are driven "blind" by technician packed into the trunk of one of the cars. The controls were extended by Robbie Knott to allow for this remote driving. The driver steers by means of a monitor relaying picture from a small video camera in the front of the car. The Muppets appear to be driving.

an optical, we went for it and gave it a try, because there was a real way of playing off that which allowed Jim Frawley to shoot some scenes he couldn't have shot otherwise. Of course, sometimes he wanted more than we could give, too.

QUESTION: What were some of the other really unusual gags you had to dream up?

KNOTT: One of the most amazing bits in the film—Kermit riding his bicycle—turned out to be the simplest. I had a great core of very young people who were interested in effects working with me and we got into radio-control quite a bit. We had a radio-controlled bicycle that would ride by itself, but it was extremely fragile and it broke on location. So we went to the simplest means—wire control. We monofilamented it, marionetted it, and it is wonderful. I understand that this gag gets more reaction than anything else in the picture. It amazed me, but it proved that some-

times the simplest gags are the ones that really come across. *THE MUPPET MOVIE* is a pile of effects, and even though we had months and months to shoot the film, time to build the gags was very short. In my area we had to coordinate between reality and total fantasy—and hit a mark somewhere that would keep the film believable. How do you do that in this kind of comedy, where you have the basic unreality of Muppets working alongside human characters? On top of that, there was the constant challenge of having to hide the Muppet operators. I had to keep thinking of how big they were and how I could hide them. I ended up again with the simplest device—keeping a lot of foam around, cutting it up and padding the area.

QUESTION: You spoke of using wire control, the marionette method, for having Kermit ride his bicycle. How did you keep the wires from showing?

KNOTT: We actually used monofilament, Continued on Page 684

"We use Tiffen filters exclusively at Opryland Productions. We've tried others, but have always returned to Tiffen."

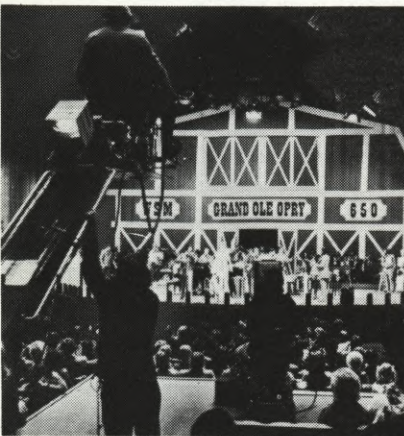


Truett K. Smith

"Tiffen optical filters have enhanced our television production capabilities considerably, here at Opryland Productions.

"We are presently using Tiffen filters exclusively in our television cameras. We have tried other types, but have always returned to Tiffen for our needs.

"We have seven RCA TK-45 color cameras, two RCA TKP-45 cameras, and one RCA TK-76 color camera. Each camera presents us with its own unique filter requirements, and Tiffen filters have met each requirement successfully. The TK-45 cameras have an eight position filter wheel. The filters screw into each of the eight positions. Tiffen offers filters *already mounted in the proper threaded mounting ring*. There is no hassle with trying to buy a filter from one company and a mounting ring



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"The same unique situation applies to the TKP-45. It requires an unusual rectangular filter in a custom slide-in mount. Once again, both are available from Tiffen. Since the filter is rectangular and obviously can't be rotated, as the circular ones can, for desired orientation of a four point starburst, Tiffen gives us the option of a 'cross' or an 'X' orientation.



commercials, outdoor commercials around bodies of water where reflections on the surface are a problem, or outdoors where a deeper blue sky is desired. The polarizing filters are also useful for eliminating any undesired reflections and glares which would otherwise distract from the finished product.

"Price is of course always a consideration in choosing any item we purchase, whether it be an optical filter or a complete color camera system. We have learned,

however, that it is very easy to be 'penny wise and pound foolish.' The prices of



optical filters vary greatly from manufacturer to manufacturer. The most expensive we have found, are not necessarily the best. Tiffen's prices are well within reason—they are not the cheapest, but neither do they fall in the most expensive group. Tiffen's lower cost

means that we are able to buy more

Tiffen filters and still remain within our budget.

The Tiffen filters we use have been very satisfactory. The availability, delivery, reliability, variety, and prices make Tiffen our first choice at Opryland Productions."

Truett K. Smith
Senior Video
Engineer

"We have a complete assortment of four, six, eight and twelve point star filters to offer our clients. In the early days of the four and eight point starburst filters, we felt that we should offer something different—Tiffen came through with an assortment of six-point star filters for each of our cameras. We also use Tiffen's assortment of low contrast, diffusion, and fog filters. Many a complexion has been softened in a close-up shot by a Tiffen low contrast filter. Tiffen's line of low contrast and diffusion filters offer a range great enough to take care of any situation. The filters are effective and yet subtle enough to give the desired diffusion without giving any indication that the picture is being softened.

"We use the Tiffen series of Fog filters when we want to create a "dream" look in our productions. This effect was used several times on the production numbers of the 'Dolly' show taped here at Opryland Productions. The heavier fog filters are especially effective in producing this 'dream' look.

"We also use Tiffen's polarizing filters. These filters are very useful when we are shooting car



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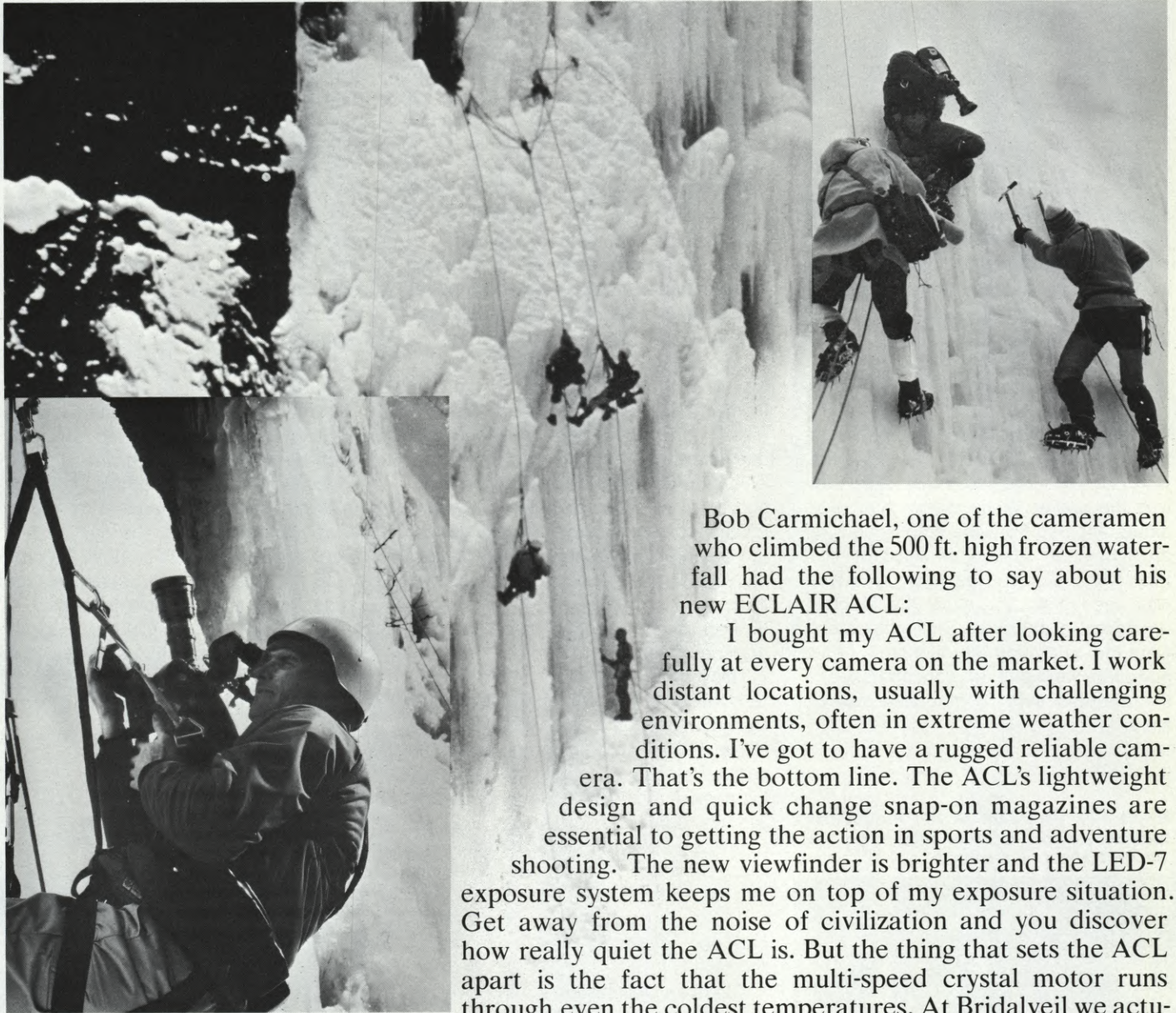
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FILM-VIDEO SYSTEM PLAYS KEY ROLE IN SHOOTING "THE MUPPET MOVIE"

By BOB FISHER and DON KADER

It happened during a short lull in the production of THE MUPPET MOVIE on Stage 15 at The Studio Center. The Muppet operators kept their places under the four-foot-high platform, since the cameras would be rolling again at any moment. Bob Lowry, who was operating the video console, noticed the Muppeteers (a conjunction incorporating marionette and puppeteer) were relaxing by reading, chatting or just day-dreaming. Then he glanced at the video monitor still focused on the Muppets above the platform. They were scratching their heads, yawning and talking. "It was like they had minds of their own," he says.

Throughout the 17 weeks of the extraordinary production, it was easy for the crew and the all-star cast to phase into the fantasy world of Muppets and forget there were Muppeteers making them work. However, behind the illusion, that was the reality. While many other dividends accrued from the employment of the film-video system provided by Hill Production Service, the main reason it was needed was to allow the Muppet operators to see what their characters were doing during production. These operators were usually working beneath the elevated sets or otherwise out of sight.

Bruce Hill, President of Hill Production Service, mounts a video camera onto a CP-16RP 16mm film camera.



To achieve this, all the film cameras used during the production had been modified to incorporate compact, high-resolution video cameras that displayed the images on the ground glass of the film cameras. This is achieved through the use of an optical "pick-off" assembly behind the film camera ground glass which shares the image with the camera optical viewfinder. The use of the film camera's viewfinder is in no way inhibited by the splitter assembly. These electronic images are carried by cable to the control console where the information is recorded on 3/4-inch videotape and simultaneously displayed on TV monitors.

As many as 15 monitors were used at one time, though there are no practical limits inherent to the system. Most of these were small monitors placed for easy viewing by individual Muppeteers. This allowed them to see that the Muppets they were operating were correctly positioned; e.g., looking at the camera or at the characters to whom they were talking, etc. Larger monitors were used by the production staff to verify that no wires, arms or other evidence that the Muppets aren't real appeared in frame.

This marriage of film and video production techniques for THE MUPPET MOVIE started with a phone call to Bruce Hill from ITC Entertainment during the earliest stages of production planning. Initial meetings involved Muppet creator Jim Henson, director James Frawley, cinematographer Isidore Mankofsky and Hill. "They wanted to produce a feature film using production techniques perfected during videotaping of the Muppets' popular weekly television program," Hill recalls.

The film-video system that Hill evolved during the past decade proved to be more than adequate for the task. Hill first became interested in film production with the immediacy of video viewing and replay more than ten years ago while he was a vice president of Mitchell Camera Company. He organized Hill Production Service, in Hollywood, California, in 1969 for the purpose of developing and renting specialized equipment for this application.

Until 1973, Hill concentrated on converting 16mm cameras for video viewing and recording. His initial idea was to provide an inexpensive way for TV producers to use videotape production

techniques for recording multi-camera production on 16mm film.

A director at the control console could decide which film camera to activate by viewing the feed from the various cameras. This would provide all of the advantages of immediacy and camera pre-editing without sacrificing the "film look". While one network seriously considered the concept, the idea was never launched, because most experimentation was done with color reversal film, which just didn't come up to 35mm color negative quality standards. "My guess is that if the current Eastman Color Negative II film 7247 stock had been available during that period, the idea would have taken hold," Hill opines.

However, the 16mm film-video system was used for the production of many rock concerts, jazz festivals and similar types of special programs. After Hill began renting 35mm cameras modified for video viewing and recording, the system became very popular with commercial producers. Although it has been used for production on such feature films as LOGAN'S RUN, THE TOWERING INFERNO and others, Hill estimates that some 80 percent of the rental systems to date have been used for making commercials.

Video tape engineer Robert Lowry makes fine-tune adjustments, while seated at film-video control console.



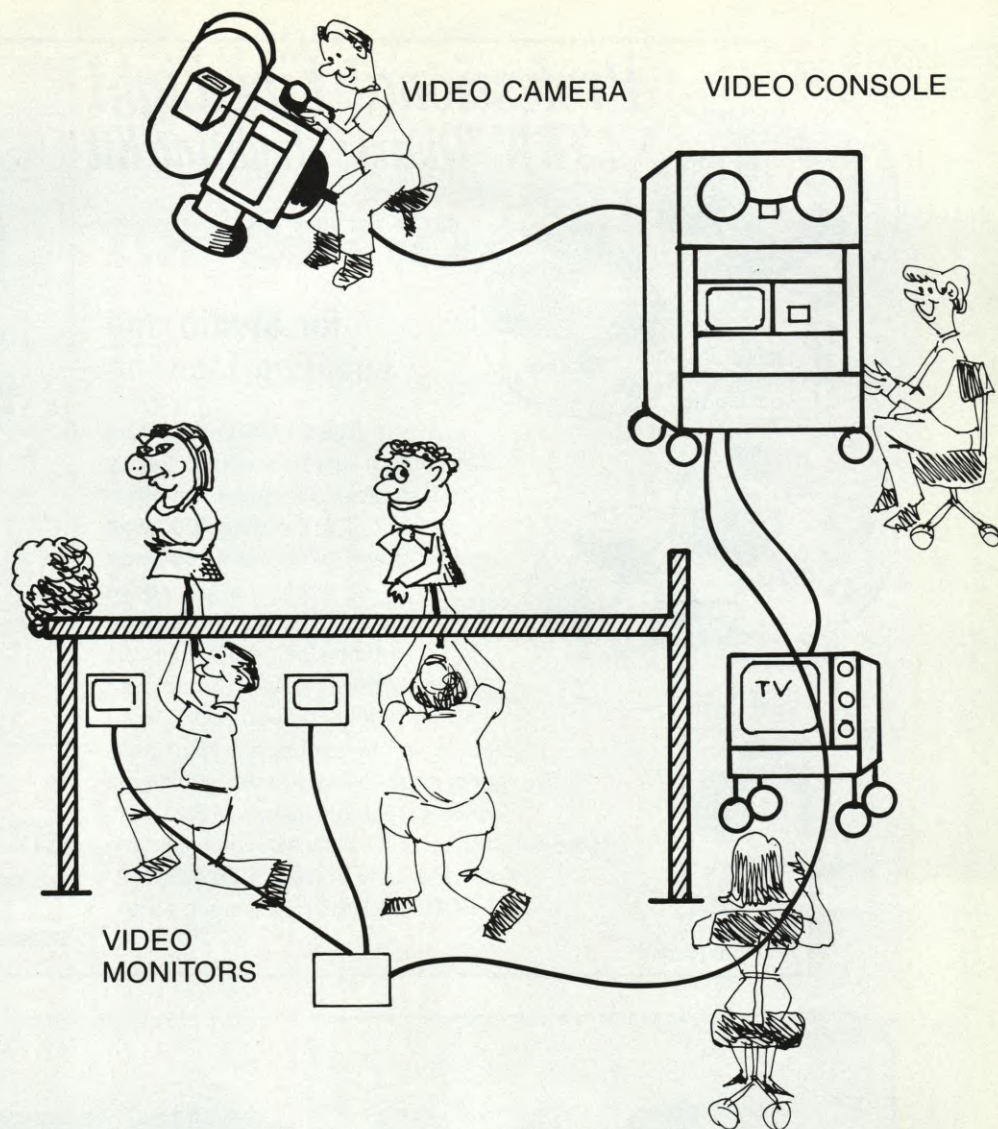
FILM CAMERA

Ironically, with the emergence of the improved Eastman Color Negative II film 7247 stock, an increasing percentage of this work is now being done in the 16mm negative format. Several 16mm and 35mm camera manufacturers are now providing new cameras already modified for video viewing. Hill believes this, and the impact of *THE MUPPET MOVIE* will provide the spur for wider use of film-video systems in entertainment production for theaters and television.

THE MUPPET MOVIE production crew used five Hill cameras modified for video viewing and recording. These were a Mitchell BNCR, an Arriflex 35BL, an Arriflex IIC, a Mitchell Mark II and a Cinema Products Universal Steadicam. The first two cameras were primarily used in the studio, while the Arri IIC and Steadicam were employed on locations. High-speed special effects filming was done with the Mitchell MK II. When the Steadicam was used in certain action sequences, a lightweight coaxial cable was plugged into the rear of the body vest of the operator for transmission of the reflex viewfinder images to the video control console for continuous viewing on the monitors, and for recording on the 3/4-inch videotape cassette recorder.

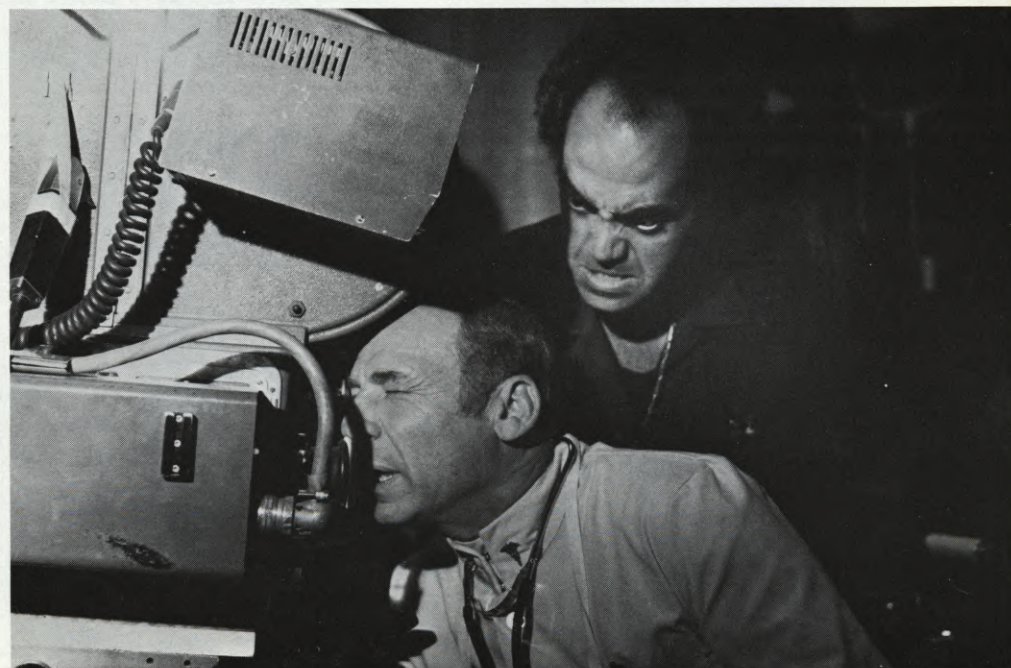
"We use industrial-type video cameras designed for surveillance and scientific applications, because they are compact and have high-resolution image-producing capabilities," Hill explains. "The video cameras have to be modified extensively to make them compatible for use in a filming environment. Our redesign includes the installation of specialized video tubes and related circuitry to gain a high degree of sensitivity without undesirable side effects, such as uncontrollable blooming problems when filming in high-key situations. The ideal is to produce a bright, noise-free video image while stealing the minimum amount of light from the film camera's reflex optical viewing system," Hill says. "Our current design produces a good, usable video picture with less than two footcandles of light striking the tube face.

"Pellicle reflex film cameras such as the Cinema Products BNC/SPR 35mm sound stage camera are ideal for a video viewing system, since they produce a smooth, flicker-free, high-resolution video image when operating, though a 1/3-stop light loss to the film is inherent. On the other hand, rotating mirror reflex cameras do produce some image flicker on the video screen, and a slight degradation of video resolution, but there is no light loss to the film." The pellicle, flicker-free video image was especially important for the production of *THE MUPPET MOVIE* because of the need to frame
Continued on Page 704



A typical sound stage layout of the film/video system equipment used to film *THE MUPPET MOVIE*. Muppet operators, manipulating the hand puppets from below four-foot-high platform, view what the camera sees by means of small individual video monitors which provide "eyes" for their otherwise sightless Muppet actors. The image is transmitted from a video camera shooting through the lens of the film camera. It passes through the video console, to be displayed on the main monitor and separate small monitors.

Director James Frawley simulates hostile jealousy, as actor-director Mel Brooks has a look through the video-laden camera. The system is a fine tool for the director, because it allows him to see exactly what the film camera is recording, and also makes possible instant playback of each scene, thus avoiding costly retakes because of errors which ordinarily would not be obvious until viewed in the rushes the next day.



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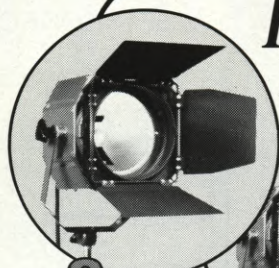
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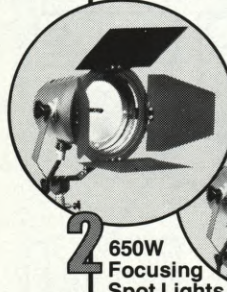
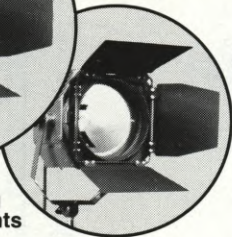
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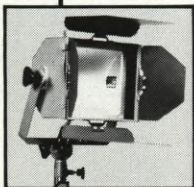
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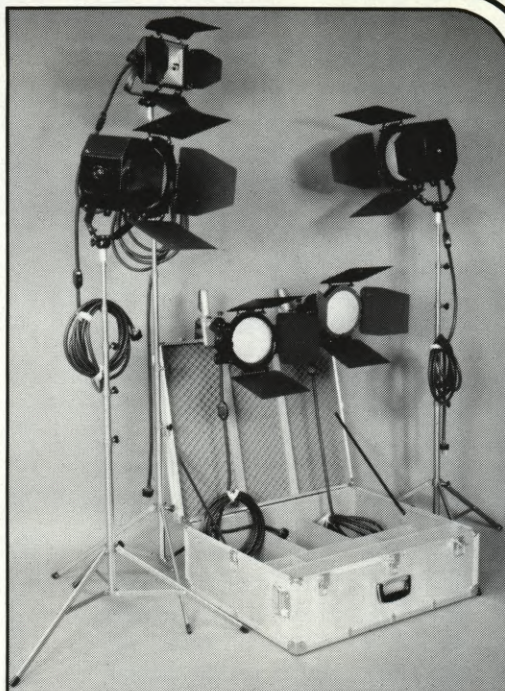
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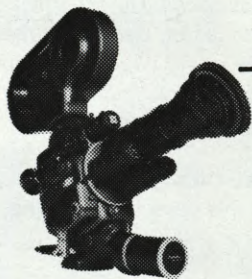
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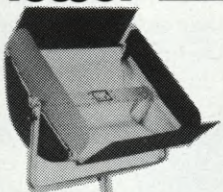
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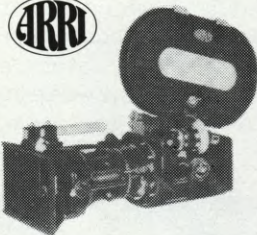
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MECHANICAL EFFECTS

Continued from Page 677

the absolutely lightest gauge that would work. We tried to be very mindful of the wires picking up reflections of the light, but it was still tough. We did flying of the Muppets on balloons that were controlled by guywires attached to fishing rods, and we had to move them freely around in the air. This meant that we were forced to make the effects work for 360-degree movement. In other words, they had to be fully contained and portable, so that they could operate within themselves and be taken on location. We often didn't know where the location would be until the last minute. The spe-

cifics of a location make a big difference in how you would normally build a gag or rig an action prop. You always have to plan it out ahead of time. The only solution in this case was to carry a fully-equipped shop with you wherever you went, so that you could just sort of pull these gags out of the hat. A lot of it was just that. I had a basic concept for each gag and plenty of materials to back it up, so that we could pick the one that would best fit the situation, the winds, the weather, and the angle from which they were shooting.

QUESTION: One of the things in the picture that spellbinds audiences is the fact that the Muppets actually ap-

pear to be driving cars. Could you discuss that a bit?

KNOTT: The cars, which were blind-drive cars, were originally designed for a particular scene, almost as if it had been story-boarded, so they were built specifically for that. But as it ended up, we were driving on mountain roads, with cars piled up one on top of another, and so on and so forth. Some things get bigger than what you originally anticipated. I took the responsibility for driving the cars in those cases, because I realized one day: how could you tell someone to not run off the road with Jim Henson and Frank Oz in the front seat?

QUESTION: Can you tell me a bit about how the cars themselves were conceived?

KNOTT: Conceived? They were conceived in panic. That's what it got down to. They said, "Well, gee, we need cars and we're going to have Muppets driving them, and obviously the performers can't drive the cars, so do something!" The problem was how to build those cars in a short period of time so that they could be blind-driven. We had to utilize the cars as closely as possible to the way they were, because there was no time to totally rebuild them, so we put the driver in the back seat or the trunk with extended controls. Bruce Hill gave us a video camera that could be mounted on the front of the car and a small monitor for the driver to use. It was quite hair-raising. There were times, especially toward the end of filming, when the cars had done everything but throw a rod, and we had been doing just everything we could to keep them running. On the last day of the show, as we were doing some pick-up shots, smoke came curling into this trunk where I was sitting, driving with headphones on and watching this monitor, trying to shift the transmission that was breaking, while the fumes were filling up inside. At this point, Frank Oz turned to me and said, "Isn't this fun?" And I said, "You can get driven off a cliff, too." The Muppet people were just so tolerant of things like that and kept such a level attitude. A lot of performers wouldn't put up with many of the things they put up with.

QUESTION: Aside from the blind-driving of the cars, were there any effects in the film that could be called dangerous?

KNOTT: We were, of course, very mindful of safety all the time, but there were no "hard" effects (forceful explosions) in the picture. There were some pretty ex-



Miss Piggy and Kermit are captured by the evil Doc Hopper. Here Jim Henson (standing in hole) and Frank Oz (upper left) prepare the rope-bound Muppets, while crew member looks on. (BELOW) Crazy Harry, the Special Effects man, operates a dimmer board in the big finale number, blowing a hole in the roof of the sound stage and inadvertently letting the rainbow shine in.



plosions that we set off near the end of the picture, going for a fantasy effect, but even though there were no hard effects, the explosions had to be big in size and scope because we were working in full-sized sets. The question of scale was always with us. How big do you build a prop? When you conceive a gag with Kermit riding his bicycle, does he travel 50 feet or 450 feet?

QUESTION: I should imagine that one of the things that definitely sets this feature apart from the Muppets' TV show is that you show the Muppets full-height and free-standing in action, isn't that so?

KNOTT: Yes, there are sections in the film when you see Kermit and Fozzie standing free on their legs with their heads and mouths moving, and there are shots of Muppets flying through the air with their heads moving. That's where the radio-controlled "hand" was very helpful. At first we didn't know whether we should build radio-controlled Muppets and try to duplicate what Jim Henson does with them, or what. But after a long process of getting to know Jim, we ended up with a radio-controlled hand that has all these movements in it and we just left it inside the Muppet. We have a couple that we developed after that point which were a little more sophisticated, but we gave the best control to Jim Henson and it allowed him to operate the Muppet from some distance back. I tried not to assume that we could duplicate, do better or even compete with what they were doing.

QUESTION: When it came to the Muppets that had to be operated by means of monofilament, did your people operate them or did theirs?

KNOTT: Oh, it was sort of back and forth. The bicycle gag I took care of, because it was just the nature of the beast. And there were a couple of other ones that we did—like when Kermit flies through the air, and so forth. Day by day we would switch off with their performers quite a bit. They are all very skilled. A Muppeteer takes two years to develop, and even then they are personally selected by Henson. Since he's the best in the world, it's really quite an honor for them to be chosen.

QUESTION: Can you tell me about the details of that opening sequence where Kermit is seen sitting in the swamp, playing his banjo and singing?

Continued on Page 710



The Muppets gather in a Hollywood studio screening room for the first showing of their movie. Jim Henson views his monitor for a shot of Kermit. The movie-within-a-movie device takes the audience back to the "Golden Age" of Hollywood, with all its hyperbolic nostalgia. The film studio itself serves as an apt and colorful locale for such goings on.

The "biggest" gag created by Robbie Knott and his crew for THE MUPPET MOVIE is the creature with an overactive pituitary and a 15-foot head (bigger than that of KING KONG). He supposedly eats a growth pill inside this building and grows right out the top. The main challenge for Knott was how to build it cheaply enough to fit the budget, and to keep it hidden so that it would not get too much criticism in advance.



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“I’ve developed a nighttime lighting style—some people would call it ‘bold or gutsy’—that wouldn’t be possible without the availability of a process like TVC’s Chem-Tone”. It’s the look that Kenyon & Eckhardt requested when they asked me to shoot a package of commercials in Milwaukee for their client, Ford Motorcraft.

“The agency had devised fast-action storyboards which called for cops-and-robbers-style footage—a combination of dialogue and dangerous auto stunts. And more than half the scenes were set at night.

“I always prefer to utilize ambient nighttime light to its fullest, working with a minimum of supplemental lighting and avoiding fill light wherever possible. And with Milwaukee in the grip of a frigid winter storm during our three-day shoot, with temperatures regularly dipping below zero, we couldn’t have worked with a heavy lighting situation and the big crew needed to operate it. Our efficiency would have been cut down too far.



Ray Rivas Director/Cameraman
Rivas/Aronson Film Associates, N.Y.

“The availability of Chem-Tone meant that I could reliably shoot many scenes we needed in downtown Milwaukee using only the ambient light provided by street lamps, shop windows and the flashing gumballs on top of the police cars. I knew that I could safely push my 5247 to 400 ASA and still obtain black blacks, vibrant colors and hold my contrast down. And by shooting night-for-night, I avoided the blue-green cast associated with day-for-night photography.

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ACHIEVING THE "BIG PICTURE" LOOK WITH SUPER-VISION

An expanding modifier for projection lenses, which enlarges 2 to 15X original size without deterioration in terms of grain or distortion

Super-Vision is described by its developers as a unique optical system designed to expand the magnification capabilities of normal projection lenses without degrading image quality. Edge-to-edge sharpness and resolution is maintained at all levels of magnification without focus shift or color defects. The image is completely free of distortion regardless of the projected image size. In diopter, plano-concave auxiliary lens. In

use, it is placed beyond the focal point of the prime lens. At this point, the image is fully formed and inverted. The distance from the prime lens to the Super-Vision lens determines the amount of magnification. Focusing is achieved with the prime lens as usual.

Universal Mounting

The Super-Vision lens is housed in a barrel which is threaded to fit the end of

the prime lens. Adapter rings are available to accommodate the threads of any make or brand of prime lens. Adapter rings also are available for 16mm projectors. The lens is moved with respect to the prime lens by means of knobs on the outside of the barrel. No modification is required to the projector.

With a given prime lens, the Super-Vision lens will provide continuously variable magnification ranging from two to six times enlargement. In some applications, 15-times enlargement is possible. A 35mm film can fill a 70mm-size screen or a standard anamorphic screen. A 16mm film can fill a standard 35mm screen and Super 8mm and all sizes of slide films can be expanded to fill large screens. A 180° curved screen can be filled with 16mm, 35mm or 70mm film without any degradation. Because of the unique construction of the Super-Vision lens, two of them can be used in conjunction to increase magnification even further.

Numerous Applications

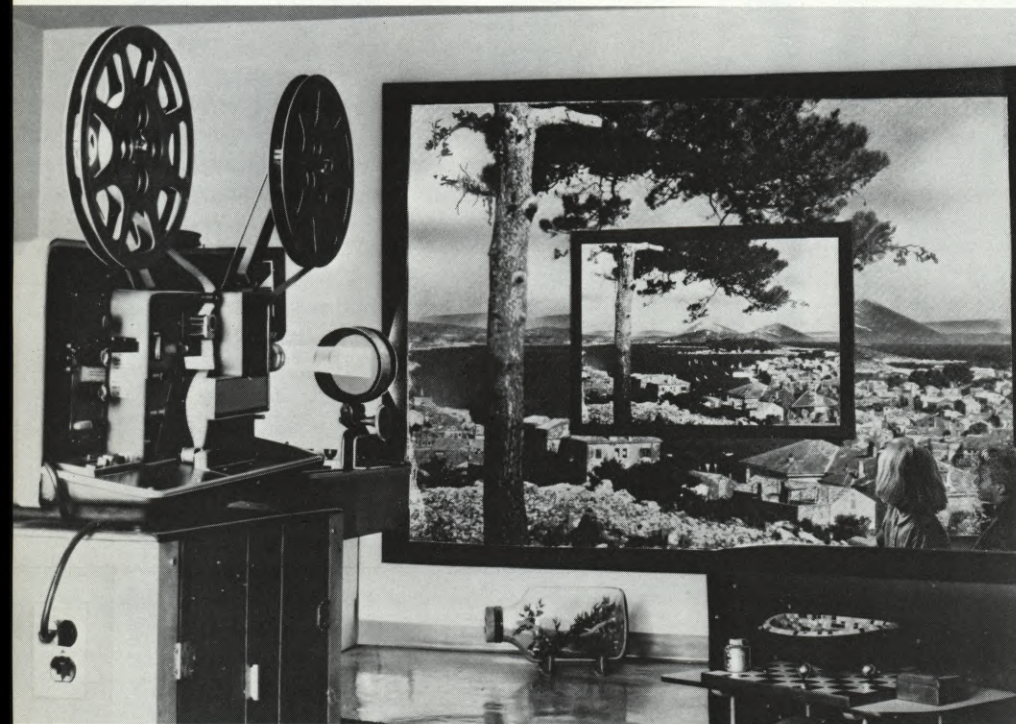
The new lens has been used in a variety of applications. A large number of them are being used in audio-visual applications and many are being used in background projection where the throw for a given size screen has been substantially reduced. The lens also is being used with darkroom enlargers, laser beam expansion and copy machine enlargements.

Another proposed use in the 35mm theatrical projection field is to release pictures with a two-perforation height and expand them to fill the standard screen with the Super-Vision lens. Films will play with standard four-perforation pulldown and without loss of image quality.

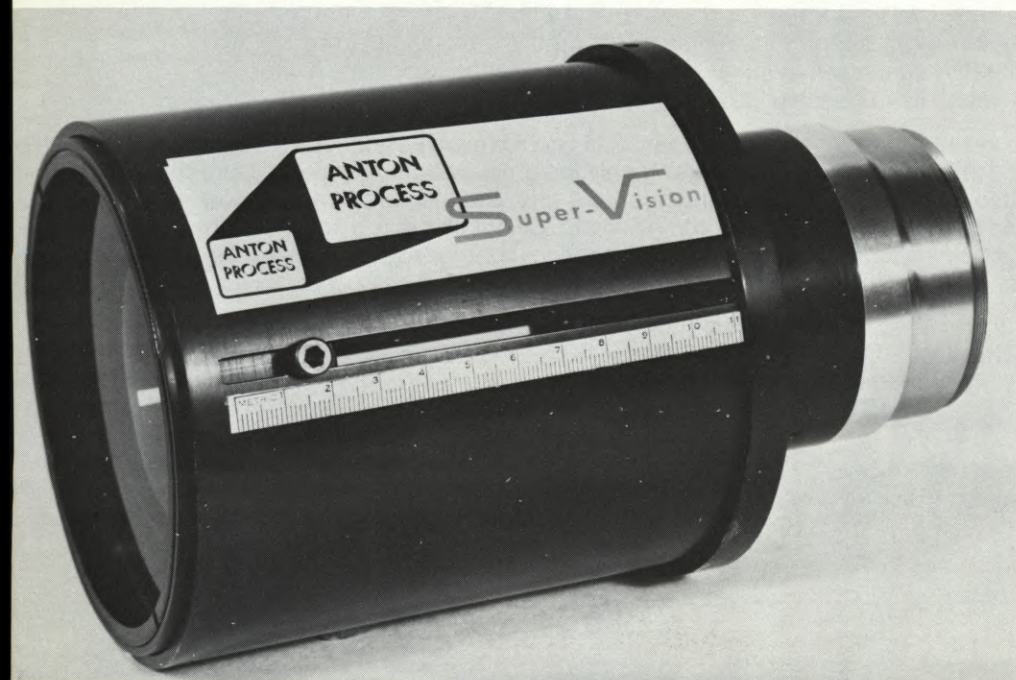
The Super-Vision lens was used in both the 1978 and 1979 Academy Awards Presentations for the projection of films clips on the stage of the Dorothy Chandler Pavilion of the Los Angeles Music Center.

In the following dialogue, Barnard L. Sackett, President of the Super-V Corporation, was independently interviewed (not by a member of the *AMERICAN CINEMATOGRAPHER* staff) and he discusses the various capabilities of the new lens system:

QUESTION: At the Burbank Studio demonstrations you kept telling your audiences how your Super-Vision



A 16mm projector with a 17-foot projection throw. Using only a two-inch prime lens, the resultant image is 40 inches wide (inset on screen). The combination of a 4-inch-diameter Super-Vision lens with a two-inch prime lens results in an image 96 inches wide. By moving the Super-Vision lens only a short distance farther from the prime lens, the resultant image could be 10 or 12 feet wide. (BELOW) The Super-Vision Lens screws into the projection system's prime lens.



lens will revolutionize the film industry. What is so different about your expanding lens? It's been done before.

SACKETT: It's like asking, what's so great about the 747? After all, the Wright Bros. had an airplane, too. Expanding lenses have been used before. The distinctive difference between Super-Vision and all other so-called expanding modifiers is Super-Vision's capability of delivering a larger image without loss in resolution; the light factor is equal from edge to edge; there is no deterioration of the original source material; there is no added grain and there is no distortion. That's the difference.

QUESTION: What's so distinctive about Super-Vision that has all these plusses, like you say.

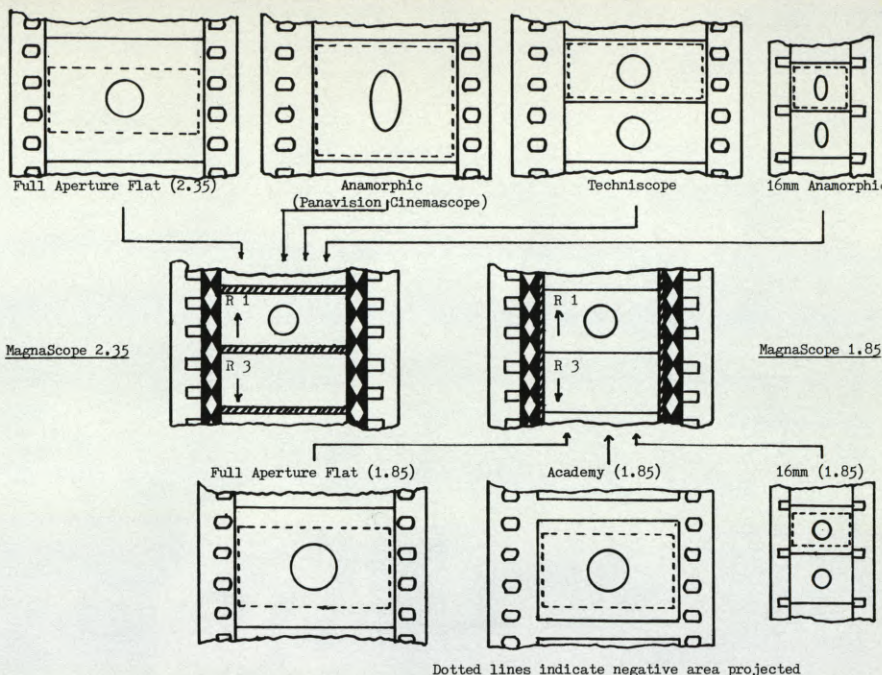
SACKETT: Firstly, it's not "like you say". Hal Denstman, *Industrial Photography*, made an independent in-depth analysis of our lens and wrote of his findings in the October issue, 1978. CBS-TV, prior to using our lenses for rear projection, also made their own optical bench experiments. So it's not "like you say" but what has independently been proven by experts. We have a superior variable focal length modifier capable of enlarging images 2 to 15x the original size (that's using Super-Vision in the 4" diameter), and working with any projection system from Super-8 to 70mm, plus, in fact, any other kind of projection system.

QUESTION: You said "4-inch diameter" . . . does that mean you have more than one size?

SACKETT: We can go as small as one inch and as large as an 8" diameter, which means, of course, bigger enlargements. We can even put two Super-Vision lenses together and really throw you out of your seat.

QUESTION: What's in the Super-Vision lens that makes it so unique . . . so perfect? Negative diopter, plano-concave lenses are not brand new.

SACKETT: Ah, but the genius of Evan J. Anton made it unique. He calls it the Anton Process. He perfected the power curve. Anton invented this lens. He found the right combination of curves, focal length alignment and spacing to be designed within this one-piece element. It took him fifteen years and almost one million dollars to get the perfection and also the patent.



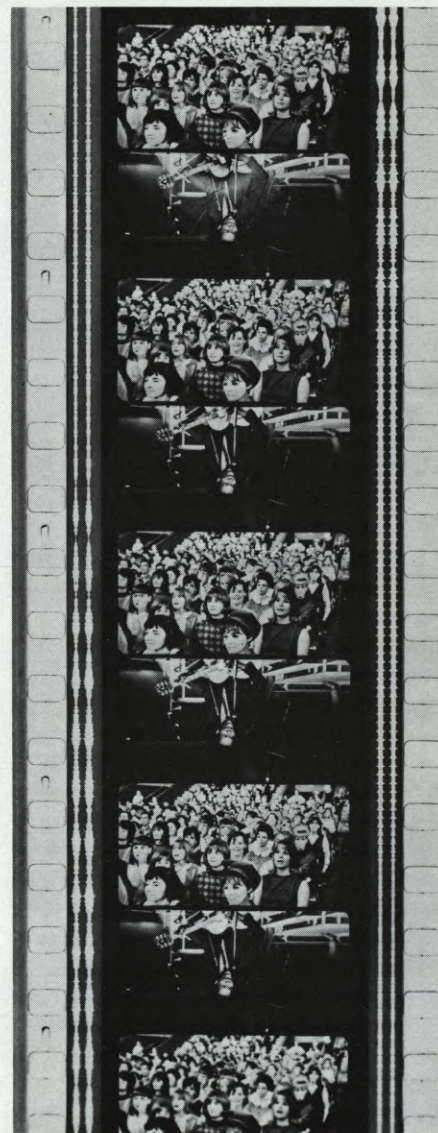
Dotted lines indicate negative area projected

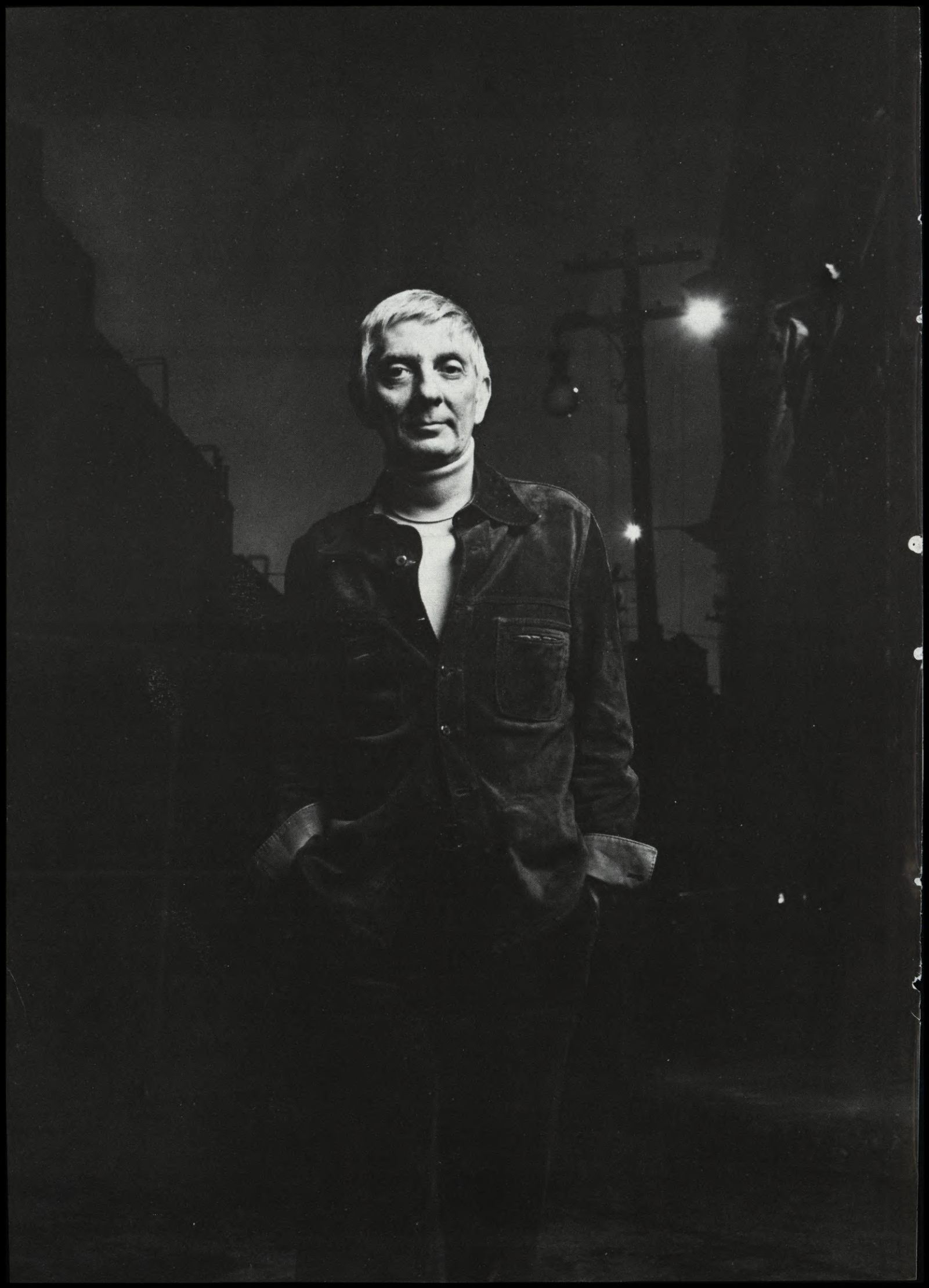
The above diagram by Joseph W. Schmit, of the Super-V Corporation, indicates various format applications of the MagnaScope System, to be projected with the Super-Vision lens. MagnaScope is a two-perforation-high process designed to provide substantial savings in the costs of release prints. (BELOW RIGHT) Interlaced MagnaScope print with two sound tracks, one for each successive pass through the projector.

QUESTION: What happens when you demonstrate your lens before other optical engineers? Are they quick to see what you have or do they challenge what you've got before they even see it?

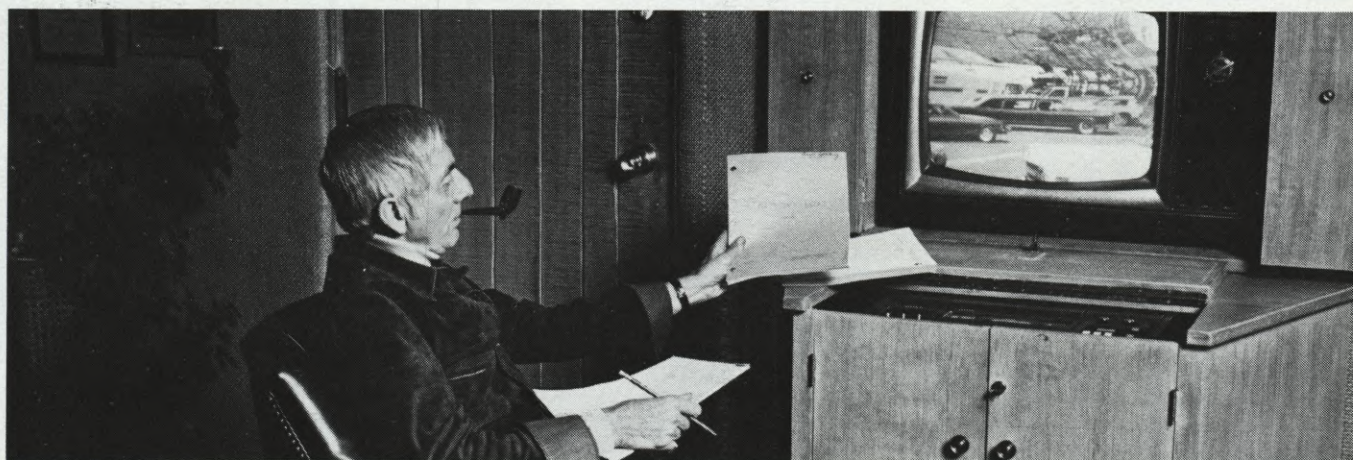
SACKETT: You're so right. They don't want to believe and they don't want to see it. You almost have to play games with them to just look at it. My lens grinder told me about a NYU professor who taught optics and he just flatly refused to believe or even want to discuss it. When I called this pedagogue on the phone he just kept refusing to see a demonstration. Every time I called him he would keep repeating that same old song, "I'm an optical engineer myself, and what you say you have is impossible. Absolutely." On my sixth call I finally told him that if he didn't favor me with a visit I was going to call the Dean and say that they have a closed-minded professor. The next morning he was at my apartment in New York. "I've got five minutes for you, Mr. Sackett. And I'm only here under threats of blackmail." I just smiled. I ushered him to a seat and threw on the switch to the 16mm projector. I asked him to carefully study the big picture. He was still fighting me. "Listen, I can see the big picture. I know it's a big picture. You don't have to tell me that. I came here to see your Super-Vision. So just show me how wonderful it is," he added snidely. I just kept asking him if the picture was sharp and clear. ("Yes!") If the edges were as

Continued on Page 725





SPELLING



"There are some people the camera just loves."

Meet the phenomenally prolific Aaron Spelling. He heads Aaron Spelling Productions and is Co-President of Spelling-Goldberg Productions. In the course of a day, he may turn his talents to any of his current prime-time winners—including Charlie's Angels, Love Boat, Starsky and Hutch, Family, Vega\$, and Friends—all of which he shoots on Kodak film. How does he get it all done? Some answers at the end of a long, long day.

"Television is a medium of detail. I think the only difference between our shows and others is that we try to pay a little more attention to detail. I think that makes ours better—such details as scripts, sets, wardrobe, editing, music. We do a lot of location work. We average 3 to 4 days on location for every show we produce.

"Details. Some people say another stock looks exactly like Kodak film. I tell you it doesn't. It doesn't have the look. That's just my opinion, of course. The audience can't know—they just know something is missing. They don't feel part of the scene. They don't feel involved in it.

"We tried a show four years ago on tape, but it looked like a soap opera. I think for soap operas tape works, because all the scenes are played in a little apartment somewhere, and they shoot between your nose

and your eyes anyway. But in an action series, it didn't work for me. All my shows are shot on film.

"I think a camera either loves you or it doesn't love you. Once I was doing a *Zane Grey Theatre* with Akim Tamiroff, and he'd come in every morning and go over to the camera and say: 'Good morning, my darling, take care of me today!' And he would kiss the camera. There are some people the camera just loves. You can't change that. You're lucky when the camera loves you.

"The concept is the main thing. If you have a good concept, it's going to work. If you have a bad concept, you can shoot it in Africa one week and Paris the next, and it's still not going to work. And you've got to be blessed with stars. The whole concept works through them. It's those people that make *Charlie's Angels* special.

"Television is a producer's medium. You decide to go from story to script, from script to film. You hire the director; you hire the actors; you supervise the editing, the scoring, the dubbing—and if it's no good, it's your fault.

"Ratings don't take notice of what's opposite a show. To me a 'bomb' is when you get a 32 and you're opposite nothing. That's worse than getting a 20 when you're opposite some sensational show. There's always a rating system of some sort. The per-

son at the box office deciding whether or not to buy a ticket for your motion picture—that's a rating system, too.

"A lot of new writers demand the opportunity to write; but when you ask to read something they've written, they don't have anything. They're filled with terrific ideas; but you know, so is my barber. Somebody has to be able to write those ideas.

"I think the day-to-day job of being an executive is boring, and writing isn't. I like producing, but I just won't pack up my tent and run away if I don't have any shows on the air. I'll say—that's terrific, I've had a great time and a great ball club and we've won a lot of pennants, and I'll go back and write. I love that."

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Kodak... Official motion picture consultant to the 1980 Olympic Winter Games.

3M INTRODUCES NEW PROTECTIVE COATING FOR MOTION PICTURES

A process designed for the protection of internegatives and prints in all film formats, that not only extends their useful life, but retains the clarity of image without scratches or dust.

A protective coating for professional motion picture film which reduces scratches, thereby extending the life of the film has been introduced by the 3M Photographic Products Division.

Originally developed to coat plastic lenses used for light-emitting diode displays on wrist watches, 3M's patented PHOTOGARD coating came to the motion picture industry several years after discovery in the company's Central Research Laboratory.

Colorless, clear and flexible, PHOTOGARD coating is applied to motion picture or still film, negative or positive, to

protect against scratches, static electricity, spills, smudges and cracks. An additive to the PHOTOGARD coating applied to color paper prints significantly reduces color dye fade caused by ultraviolet exposure.

Applications for PHOTOGARD coating are numerous, and fall into four basic categories:

1) Motion Pictures—PHOTOGARD coating is used to protect internegatives and release prints of 70mm and 35mm theatrical releases, 16mm industrial and commercial films, and Super-8 point-of-purchase films.

2) Graphic Arts—PHOTOGARD was recently introduced as a coating for typesetting film fonts. Also, the coating may be used to protect halftone screens, printed circuit negatives and positives, printed matter that is exposed to the elements or possible defacing (e.g. subway maps), and bar code labels to maintain information readability.

3) Photofinishing — PHOTOGARD coating can provide a clear, tough coating for amateur snapshots, professional and commercial prints, school and other group photos and portraits.

4) Micrographics — PHOTOGARD coating can be used to protect conventional 16mm and 35mm rolls of microfilm and sheets and rolls of 105mm microfiche.

The PHOTOGARD coating is applied to both sides of motion picture film at a new 3M coating facility in New York City. The coating is designed for protection of internegatives and release prints of 70mm and 35mm theatrical releases, 16mm industrial and commercial films, and Super-8 point-of-purchase films.

The protective coating prevents a wide variety of physical damage to release prints and laboratory intermediate stocks. The 3M PHOTOGARD service will provide a rapid turn-around coating service to the trade, according to John M. Lupo, 3M's market development manager for Abrasion Resistant Products, St. Paul, Minn.

"PHOTOGARD has been tested successfully by several of the largest film makers in the nation," Lupo said. "We have discovered a potential use beyond our original expectations. The coating not only extends the life of prints, thus providing a production cost saving, but it retains the clarity of the image, without scratches or dust, from the first showing to many hundreds of screenings."

Coating services are performed at 3M's new PHOTOGARD Coating Facility at 321 W. 44th Street, New York City. Paul Brewer is the operations supervisor of the facility and Kurt Wulliman in New York and Ned Whiting in Los Angeles are sales representatives.

In addition to providing high abrasion resistance, PHOTOGARD coating creates a barrier to the deteriorating effects of solvents and static electricity which attract dust to film. Dirt and other particles can be easily cleaned off the

Located in the heart of New York's film district, this 3M-designed PHOTOGARD coater applies a clear, tough protection to motion picture film. It reduces damaging effects of scratching, solvents and static electricity. Dirt and other particles can be easily cleaned off the film without generating a static charge or leaving scratches. The coating will not crack in heat or cold, nor will it affect the color of the protected image.



(TOP RIGHT) 3M PHOTOGARD coater is housed in a "cleanroom" environment. (CENTER) Operations Supervisor Paul E. Brewer demonstrates how protective coating is applied on both sides of film. (BOTTOM) Film enters the coating stations (at left) and travels to curing station (at right). A combination of film cleaner and static eliminator is at top left.

film without generating a static charge or leaving scratches. Oil, dust, fingerprints and other material can be wiped away easily without marking or smudging the film.

The coating will not crack in heat or cold, nor will it affect the color of the projected image. "In fact," Lupo said, "PHOTOGARD will help preserve the overall image quality longer than non-coated films."

PHOTOGARD coating is also antibacterial and will protect archival footage against organic contamination.

Spills or streaks on a PHOTOGARD-coated surface can be wiped clean rapidly with a damp cloth. Grease and felt-tip pen marks also clean up quickly. The surface of film remains new-looking with no signs of damage.

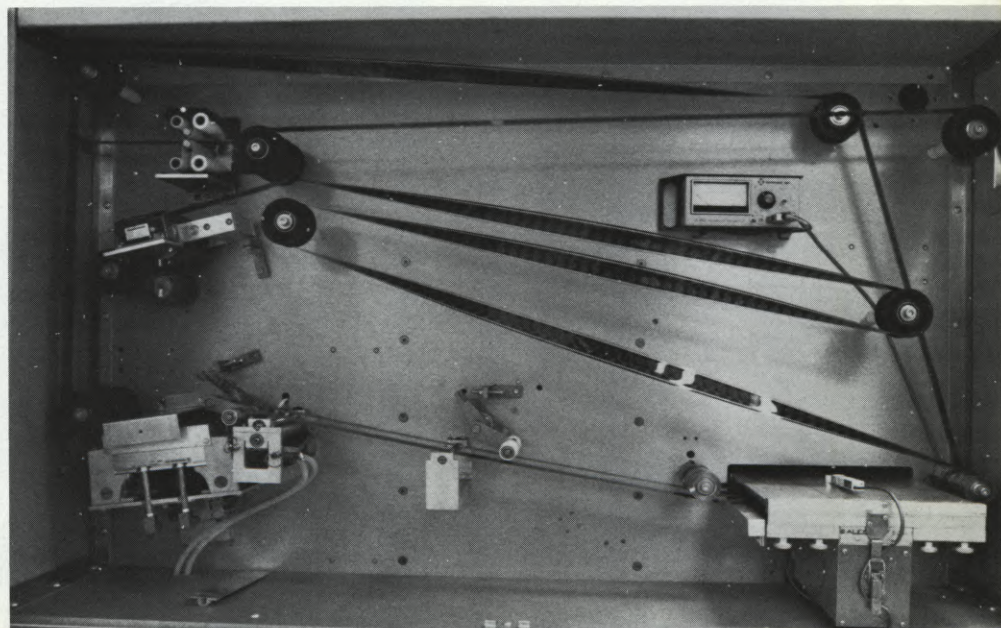
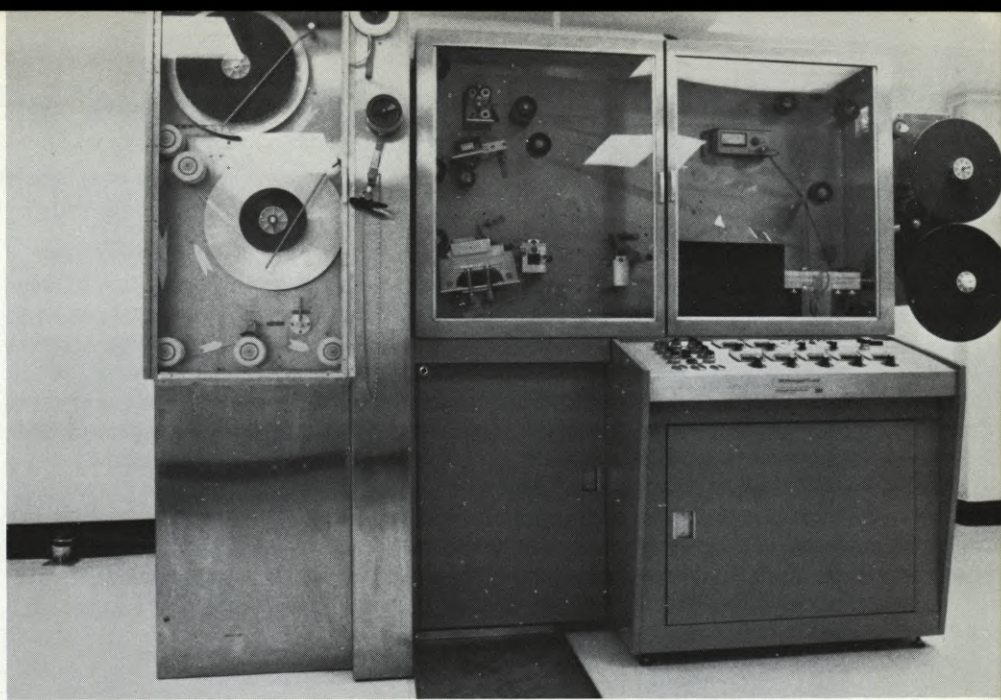
3M's theatrical field tests were made in early 1978 on single prints of Warner Brothers' *THE GOODBYE GIRL* and Universal Pictures' *JAWS 2*, each partially coated with PHOTOGARD. "After approximately 200 showings, the PHOTOGARD reels were free of scratches and dirt/dust accumulation. They continued to exhibit 'show-case' quality. Uncoated reels contained serious scratches, dirt, etc., which impaired screen quality," Lupo said.

Subsequent field tests continue to confirm the print quality and longevity benefits of PHOTOGARD for TV syndication prints, 16mm industrial and commercial films and Super-8 point-of-purchase applications.

In addition to motion picture film, PHOTOGARD coating has applications in photofinishing, the graphic arts, and in micrographics where a tough, optically clear, abrasion-resistant surface is required.

The 3M Photographic Products Division is a manufacturer of a variety of imaging products including private label amateur film, professional color paper, X-ray films, graphic arts films, microfilm, document recording film and cameras, surveillance film and cameras, as well as a recently introduced COMPAS computerized analyzing system for processor photofinishing. The division also operates a nation-wide network of Dynacolor film processing laboratories.

For more information on PHOTOGARD, or any 3M photographic product, write Ph9-23, P.O. Box 33600, 3M Center, St. Paul, MN 55133. ■



THE SAMUELSON STORY

A tribute to an outstanding company which functions as world-wide provider and manufacturer of equipment to the film and TV industries

By SCOTT HENDERSON

(EDITOR'S NOTE: Over a period of several years, it has been the continuing policy of AMERICAN CINEMATOGRAPHER to, from time to time, focus the spotlight of attention on various companies which have made outstanding contributions to the motion picture industry. Organizations so honored in the past have included Arnold & Richter, Eclair, Cinema Products Corporation and Panavision, Inc., among others. The article which follows continues the tradition by paying tribute to an establishment, Samuelson Film Service Ltd., which has carved out a unique niche for itself, not simply as a world-wide equipment rental facility, but perhaps more importantly, as a manufacturer and innovator of special equipment precisely tailored to the needs of film technicians.)

In the world of professional motion picture production, when film makers talk about camera, lighting or sound recording equipment, Samuelsons, together with Panavision, whom they represent in Europe and Australia, sets the standards by which others are judged.

It all started about 20 years ago when Sydney Samuelson, a freelance cameraman, bought his own camera in order to be able to take on work, there being no established rental house in Britain at that time as there was in the United States.

When Sydney was unemployed himself he loaned his camera to fellow freelance cameramen, for a rental fee, rather than it lie idle on the shelves.

Inevitably the time came when Sydney was offered a job but could not accept because someone else was using his camera. When this became a habit Sydney suggested to his brothers that they each chip in £100 as a deposit on a second camera. At that moment Samuelson Film Service Limited was born.

Two of Sydney's brothers, David and Michael, were also cameramen, employed on a full-time basis by British Movietone News. The fourth brother, Tony, was trained as a lawyer but at that time was employed by a firm of stock-brokers in the City.

The need for equipment grew and between the brothers they ploughed back all their income into the business, buying one of the first Arriflex 2A cameras to be imported into Britain, equipping it with Cooke Series II and III lenses when these became available and generally striving to provide the latest and the best, as is necessary for a rental company (no one likes renting dog-eared, obsolescent equipment) all packaged together in a manner that Sydney, and later David and

Michael when they joined him full-time, would require to have it for their own use.

The first feature film they serviced was TOM JONES, a turning-point film for both the British film industry and Samuelsons. It started a vogue for film-making on location independently of a studio base, which the brothers were happy to supply.

In the middle of the '60s Sydney, making his first trip to Los Angeles, knocked on the door of Panavision and met Robert Gottschalk for the first time.

As Panavision became the accepted standard for anamorphic lenses, 70mm cameras, etc., supplying such European-based pictures as LAWRENCE OF ARABIA and DOCTOR ZHIVAGO it became necessary for the Panavision organization to have a London representative. Robert Gottschalk took the advice of Freddie Young, the Director of Photography, and Academy Award winner for those two films, and appointed Samuelsons as Panavision's



The deceptively unimposing facade and main entrance of Samuelson Film Service Limited, located in Cricklewood Broadway, London, four miles northwest of Marble Arch. Here a staff of 300 services film companies all over the world. (BELOW) The "nerve center" of Samuelson's, where incoming and outgoing orders on a global scale are coordinated. The company prides itself on servicing emergencies of film-makers anywhere at any hour of day or night.



European Managing Associates.

This was the start of a long and fruitful relationship which has enabled Panavision to have their equipment made available internationally and for European film makers to have the best equipment in the world available on their doorstep.

Other aspects of Samuelson's operation grew in parallel with the supply of equipment for feature film production. They also provided regular 16mm and 35mm equipment to makers of TV commercials and TV program makers, together with sound recorders, lights, generators and, where necessary, crews also. For many of the early years David continued to work as a cameraman, using the company gear, shooting such TV programs as CANDID CAMERA and WORLD IN ACTION.

Throughout the early '60s, the company continued to grow until it could be claimed to be the most complete, and perhaps the largest, film facility company in the world.

The international aspect has always been an important one, indigenous British financed, produced and scripted film-making industry being somewhat limited for no other reason but that Britain accounts for only 4% of the world box-office gross. However, as they share a common language with the United States, it became more and more convenient for American-generated pictures being made in Europe to take their equipment out of London.

The stories of servicing pictures overseas from Britain are many like the case of the crew who phoned from Malta late one afternoon to say they had just dropped their Mitchell Mark II camera in the sea and "could they have another". Samuelsons prepared a replacement, compiled and typed shipping lists, got the replacement to the airport in time to catch a night freighter and the crew was shooting with a fresh camera early the next morning.

Today, in continuing to satisfy these needs, every outfit and item of equipment which they supply is programmed into a computer which can type out shipping lists and prepare carnet documents instantly at the press of a button and have their own London Airport freight company, Samfreight Limited, to ship equipment quickly and efficiently all over the world.

Meanwhile they expanded abroad and now have operations in Paris, Sydney, Melbourne and Johannesburg.

At their Cricklewood Headquarters, just 4½ miles north of London's Marble Arch, Samuelsons have almost 300 staff taking orders from clients—mostly on the telephone—preparing them with the



The Brothers Samuelson. (LEFT) Sydney, who founded the company more than 20 years ago when, as a working newsreel cameraman, he began renting out his own camera between jobs. (RIGHT) David, who is responsible for many of the innovative pieces of equipment designed and manufactured by Samuelson's. (BELOW LEFT) Michael, who likes to lead crews in the filming of Olympic Games and World Cup matches. (RIGHT) Tony, a lawyer by training, who races airplanes and horses (though not at the same time) for relaxation.

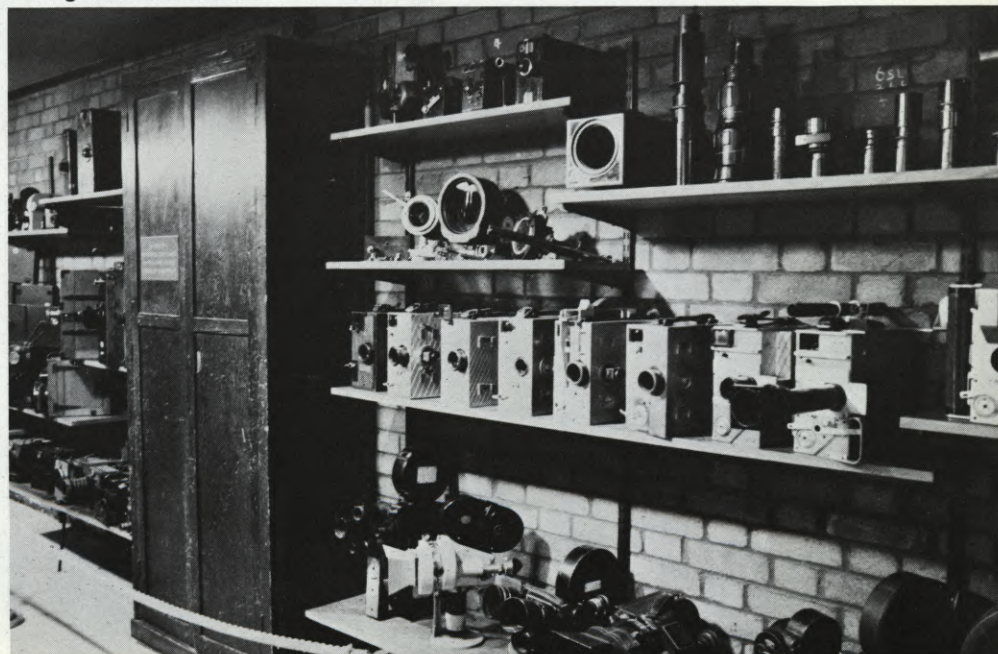


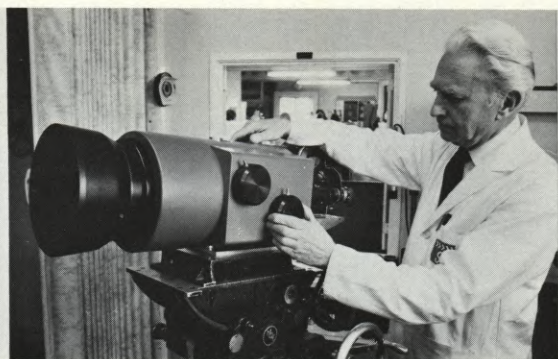
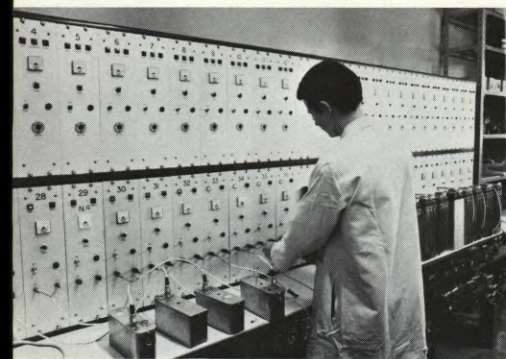
same philosophy as when Sydney did it himself, designing and manufacturing items which they cannot go out and buy, supplying audio-visual and television equipment, operating a large fleet of specialized vehicles and now building a studio complex especially orientated to TV commercial makers.

Samuelson's manufacturing facility became necessary, in the first place, in order to be able to interface all the different items they supply. Panavision, Mitchell, Arriflex, Eclair, Aaton, Photosonics,

Beaulieu, Bolex, Cinema Products and Auricon cameras on the one hand, must be able to be fitted, where possible and practical, with Panavision, Cooke, Angenieux, Zeiss, Kilfitt and Canon lenses and with support for the heavier lenses. Filter holders and matte boxes to fit everything must be supplied, all manner of camera supports must take all manner of cameras, and so on. Additionally Samuelson's innovates much specialized equipment. Among the many items is the first 20:1 zoom lens for 35mm

Part of the Samuelson collection of early and exotic motion picture equipment. The cupboard to the left is a constant reminder of humble beginnings. A plaque on its door reads: "In 1956 this cupboard contained Samuelson's entire stock of equipment." Today that stock consists of many thousands of items of equipment in several divisions throughout the world.





(LEFT) Samuelson's battery charging department. (CENTER) Always on the lookout for interesting lenses, Bill Woodhouse, Chief of Optics, checks a Canon zoom lens with a range of 20mm-500mm and a maximum aperture of T/1.8. (RIGHT) Doris Irving, Manageress of the filter department, checks out a set of Samcine nets. (BELOW LEFT) Samcine case fabrication department. (CENTER) Checking out a 16mm projector in Samuelson's Sight & Sound division. (RIGHT) Part of the camera equipment rental store. The section shown here is only for specialized lenses, and contains only those that are "in" at the moment.



usage; they were the first to modify a 28-280mm Cooke zoom lens made for TV cameras to 25:250mm, which Cooke now calls the Cine-Varotal. They have a 22-220mm T/2.5 wide-angle/wide-aperture zoom lens and have recently produced the widest-angle, lightest-weight hand-holdable zoom lens for 35mm shooting, which has a range of 18-100mm and weighs only 5 lbs. with a silent zoom motor, also of their own design.

They hold patents on an adjustable limpet camera mount (a method of at-

taching a camera to a vehicle which they pioneered), a depth of field calculator with separate scales for fixed focal length, zoom lenses, etc., a front projection rig with additive color light source (in co-operation with a leading British cameraman, Harry Waxman) and an inclining prism which can be used with any lens of 24mm focal length or longer (12mm with 16mm cameras), which enables a cameraman to shoot at zero camera height with correct image orientation and without loss of quality or effective aperture.

Since its very beginnings, Samuel-

son's has pursued a policy of providing unique and exclusive items of equipment, "even if they have to make them themselves".

In the earliest days the ideas for specialized items usually came from the brothers themselves, based upon their experiences as working cameramen. Some were quite simple devices, some have been quite major engineering undertakings.

For instance, to take a simple idea, when they bought their first Arriflex 35mm 2A cameras as cameramen they noticed that the "swan neck" adaptor that was supplied to fit the camera onto a flat-top tripod head, such as a Worrall or Moy geared head, had a circular shaped base, which meant that the cameraman had great difficulty in ensuring that the camera was correctly aligned on the tripod head in a fore-and-aft direction. One of the first Samcine products, therefore, was a support bracket with parallel sides, and with provision for attaching matte-box and lens support bars thrown in for good measure.

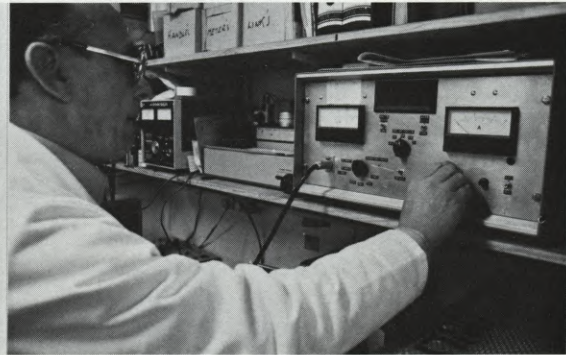
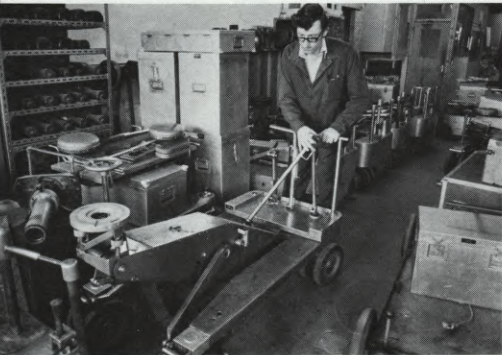
In the early '60s, when Eclair introduced the 16NPR it was noticed that the tripod head adaptor of that camera, which took the form of a shoe fitted to the underslung camera motor, was short at the front—meaning that when the camera was free-standing and fitted with a zoom lens, it would tip over onto its lens when

Work in progress at Samuelson's Production Village, conceived as a studio complex of stages of various sizes, and related equipment, principally adapted to the production of television commercials. Excavation for the "village pond", to be surrounded by lush landscaping, can be seen in the foreground. The Village is scheduled for completion the first week in July.





(LEFT) Tyler Helicopter Mount department. (CENTER) Camera equipment rental check-out department. Before any outfit leaves, every part is examined and the camera is run with the batteries that will be supplied with it. (RIGHT) Checking out Samuelson's new ICL 2903 computer. The computer has a 36,000-word main memory and a 140-megabyte on-line disk storage. (BELOW LEFT) The dolly department. (CENTER) Prototype of Samuelson's new battery testing device which actually measures a battery's ability to retain a charge. (RIGHT) Vehicle maintenance department.



the magazine was removed. Furthermore, the regular base was attached at the rear of the motor, so that it could not be used hand-held. Thus, when a camera was in the hand-held mode and put down on the ground it had to lie on its side, maybe with the lens in the mud. So a new motor shoe was designed for the NPR which would not tip over, which could be hand-held and was lightweight. It was a cameraman's base designed by a cameraman.

When the very first closed circuit TV cameras were introduced, also about 1960, it was realized that a TV viewfinder could be an important aid to film-making. For their prototype TV finder, which they called the "UC2" they fitted a beam-splitter in front of the camera taking lens so that the closed circuit TV camera (which was fitted with a zoom lens so that it could be matched to the film camera lens) could see the scene without any parallax errors. Shortly afterwards they

developed a system of taking a TV picture off the ground glass of a mirror-shutter reflex camera which they called "Samcinevision" and which was first used by Oswald Morris when he photographed OLIVER in 1967.

Samcinevision has been in constant development ever since. Nowadays they have models to fit almost any 35mm film camera and the system is available in color as well as black and white.

Currently they are working on an inexpensive TV frame store system to replay a scan or frame immediately after it is recorded during the period that the film camera shutter is closed to the ground glass and TV camera. This should improve the TV quality appreciably.

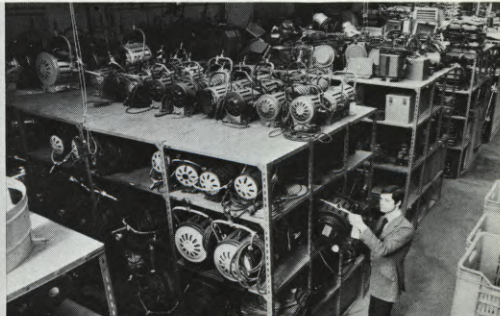
Another "first usage" with Oswald Morris as the Director of Photography was the Samcine "shimmering filter". When Samuelson bought their very first star filters, which were of a deeply grooved type, David noticed that if they

were rotated in an eccentric circle in front of the lens a point source of light would appear to shimmer or sparkle. As a result, the Samcine shimmering filter was devised, a motorized rotating filter holder which moved the filter in front of the camera lens in an eccentric circle. Ossie used it to great effect in the "Christmas Tree" scene of SCROOGE.

Many years later David, who collects early film equipment as a hobby, bought a set of early filters in Sweden, one of which was a deeply grooved star filter. He was told that this was used in the very first Garbo film and that the Swedish cameraman moved it about in a circular motion to make the point light reflections in her eyes appear to sparkle. There's nothing new.

The same motorized filter holder, which fits into a regular 6.6-inch matte box, is now used, without the eccentric action, for their special set of 16 different multi-image lenses and for a "dove" opti-

(LEFT) "Rentacamera", Samuelson's over-the-counter operation, situated in the heart of London's filmland. It rents still, as well as cine equipment and houses the "Book City" film bookshop. (CENTER) a corner of "Book City", which specializes in film technology books. Samuelson's sells 500 copies of AMERICAN CINEMATOGRAPHER each month. (RIGHT) Equipment store for Samuelson Lighting.



cal turnover prism.

Samuelson's Engineering Department is always dealing with oddball requests for special camera mountings. In recent times they have made a rig to place a camera next to a horse's hoofs for a Polo picture, on a Hovercraft-type lawnmower for a football picture, on a lance for a jousting picture, on crash helmets, on racing cars, on bikes and motorbikes, on all manner of vehicles, and so on. To do this they have developed a whole series of mounting systems. They were possibly the first people to use suction cups to attach a camera to the side of a motor car and the Samcine Limpet Mount is still the only one which hinges out to any angle and can take either an Arri Bowl-type pan and tilt head or a flat camera plate attached to an Arri Bowl, so that the camera can be levelled, pointed precisely in any direction and locked off in any position.

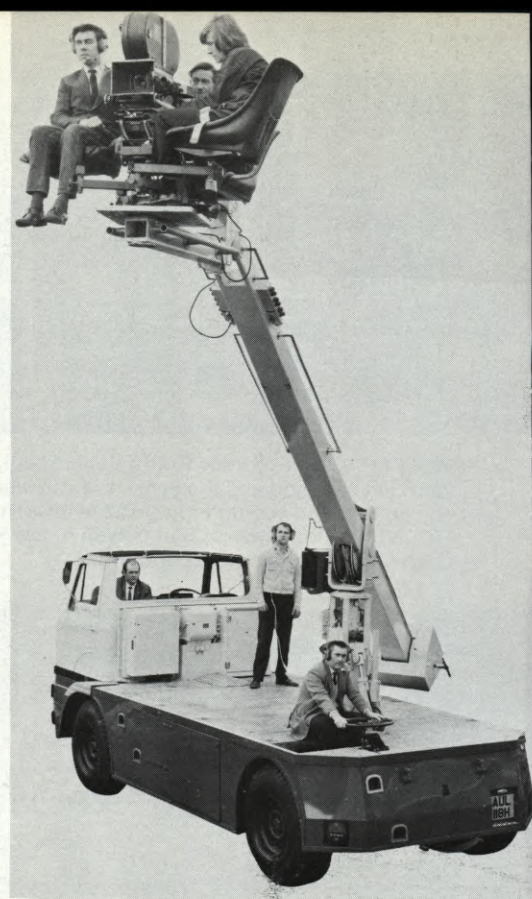
The idea of using a female Arri tripod bowl as an interface for mounting either a tripod head or a flat plate camera fixing has been further developed into an item they call a "paddle mount", a female Arri Bowl attached to a short length of regular scaffold tube which can then be affixed to all manner of supports from the roll bar of a Grand Prix racing car to a scaffolding tower to isolate the camera support from

the "flexible" floor which people move around on.

Other support systems manufactured by Samuelson's include an Arri Bowl-to-Mitchell adaptor which can also be used as a high hat to affix to a flat surface or which can have a 1 1/8" lighting spigot screwed to the underside, so that any lighting stand can be used as a camera "tripod".

Similarly they have made a levelling high-hat for Mitchell-type tripod heads which can either be used as a leveller on top of a tripod, as a high-hat on a flat surface, with a spigot adaptor on a lighting stand or Molevator, or with scaffold clamps to attach a camera directly to a scaffold tube rig.

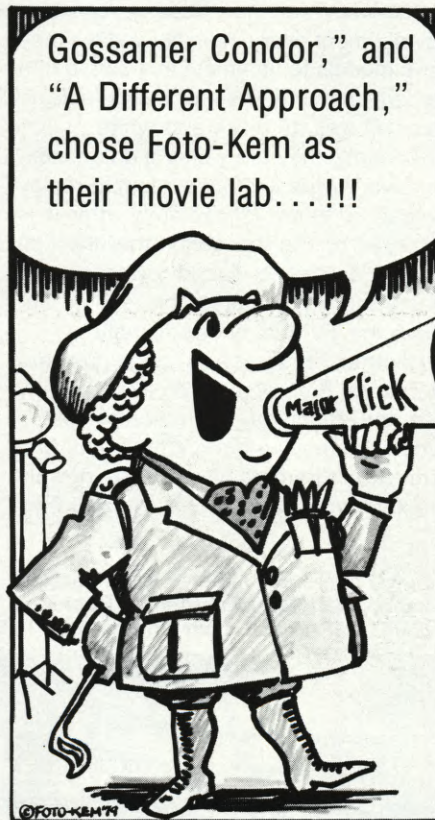
Many years ago when Sydney was attending a BSC meeting the conversation got around to the problems of multiple reflections encountered when gelatine daylight-to-artificial light compensating filters were placed on windows. It was suggested that if a flat and rigid filter could be made, the reflections could at least be limited to one only per lamp, which might then be avoided altogether. Sydney came into the office the next morning, found a supplier who was prepared to manufacture large (8 x 5-foot) sheets of "85" and ND.3, .6 and .9, 1/8" thick filter and "Samcine Acrylic Window



SAM-MASTER camera crane reaches maximum height of 27 feet. Balancing is by electrically operated traveling counterweight on boom arm. Vehicle is powered by six-cylinder gasoline engine.

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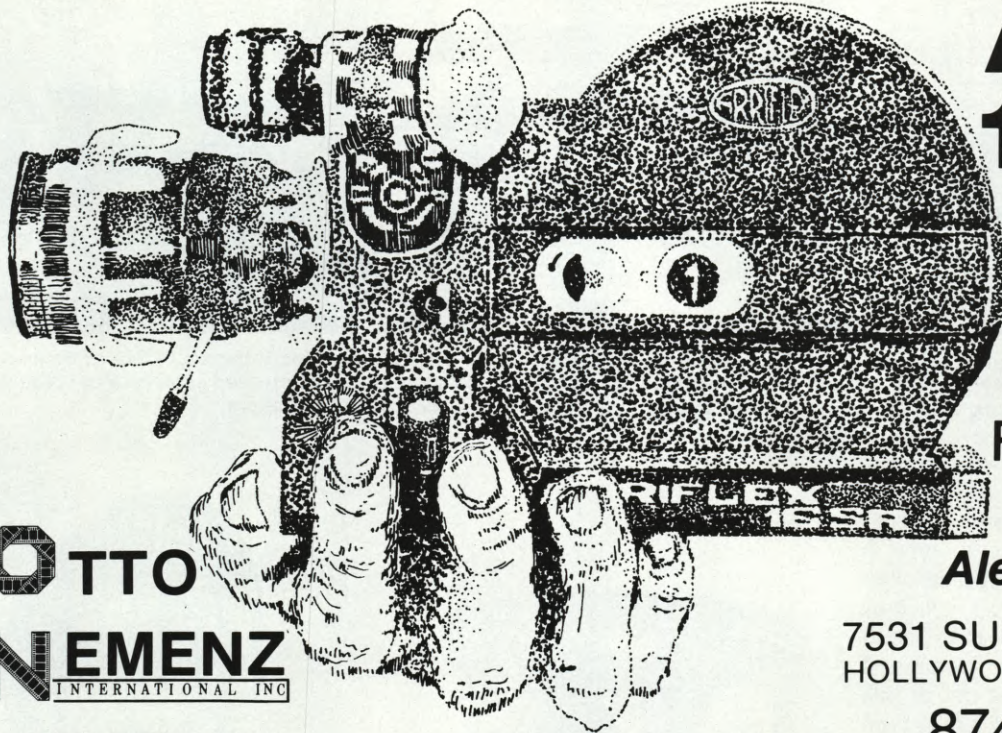
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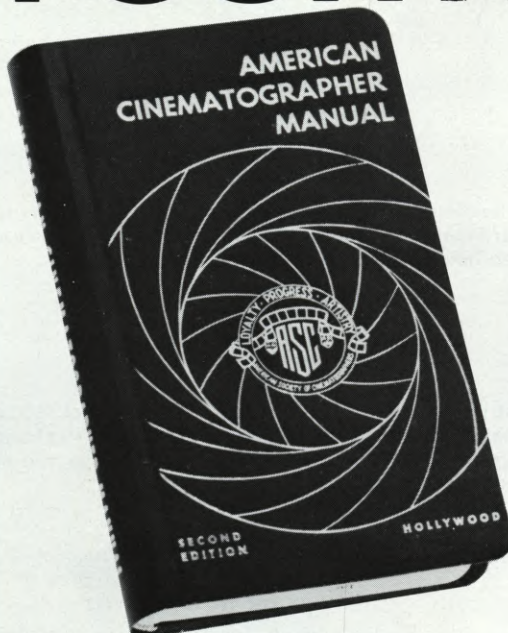
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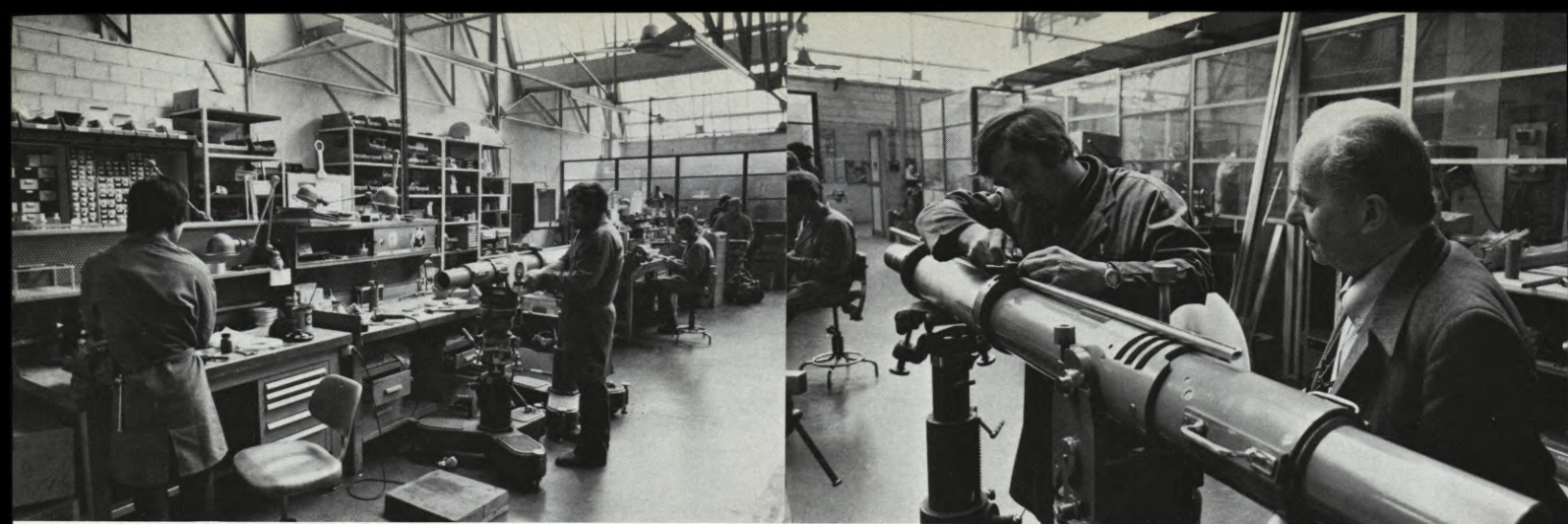
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(LEFT) The Camera Maintenance department of Samuelson Alga-Cinema, Paris. **(RIGHT)** Manufacturing a LOUMA at Samuelson Alga-Cinema. Albert Viguier on the right. The LOUMA is a lightweight boom that supports a remotely controlled camera. Most recently used in the filming of Steven Spielberg's "1941", it is expected to open new horizons for creative film-makers.

Filter" was born.

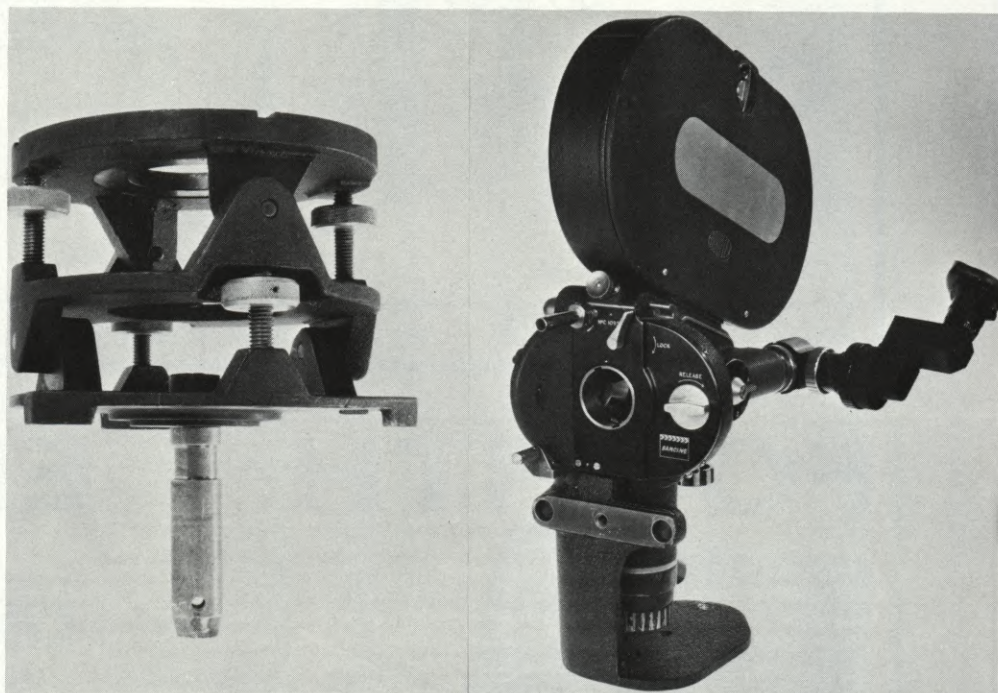
Another "filter" product born of discussions with Directors of Photography is Samcine Nets. Cameramen would often talk of the little pieces of old silk voile they had found in an attic and liked to use to give a nice soft look to their pictures. It was explained that window net or silk stockings was not the same as the type woven with square corners "like grandma used for her veil". The exception was Oswald Morris, who prefers nets with round corners.

To satisfy the demand, Doris Irving, the head of Samuelson's filter department, was sent to the various fashion centers of Europe where fine silk voile might be available to buy quantities of the various types. From these a set of five was selected, all slightly different, four with square corners and one with round, and arbitrarily numbered one through five. They were made up into rigid frames in various sizes to fit all types of matte boxes. Since then, whenever a set of Samcine Nets is supplied, the number 1, or whatever, will be the same as the number 1 supplied the previous time that the cameraman used Samcine Nets. Shortly afterwards cameramen asked for white nets, to give a soft desaturated look and these were found too. Nowadays they even have them multi-colored.

One day an optical factory which supplied them with diopter lenses from which they made up their sets of five full or split diopters, another Samcine product, gave David a book illustrating dozens of different types of prisms that could be made.

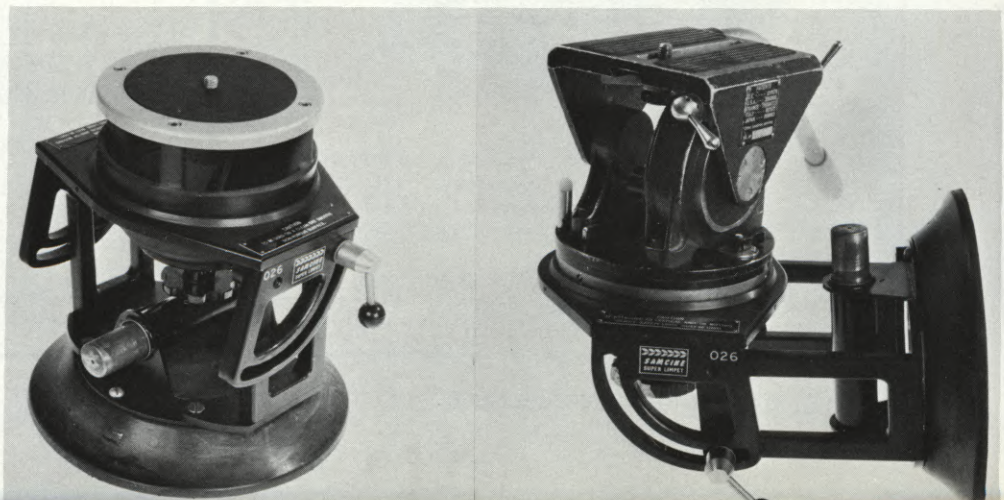
Among them he noticed one called a Bauernfeind prism "used in the eyepieces of astro telescopes to bend the light paths so that the instrument could point upwards, but the eyepiece be horizontal". For this particular form of prism the light is both reflected and re-

Continued on Page 708



(LEFT) Samcine "Mitchell" fitting levelling high-hat, with lighting spiggot adaptor. **(RIGHT)** Arriflex 2C with Samcine hard-front lens mounting, Samcine Any-Angle Orientatable Viewfinder and Samcine Swan-neck adaptor with parallel sides.

(LEFT) Samcine Super Limpet Mount in horizontal position with flat-top adaptor fitted. **(RIGHT)** Super Limpet Mount in vertical position with a pan and tilt head fitted. The Limpet is a mount with tremendous holding power for mounting cameras to flat or curved surfaces of vehicles, and is adaptable to a number of other applications.



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**BEHIND THE SCENES OF
"THE MUPPET MOVIE"**
Continued from Page 666

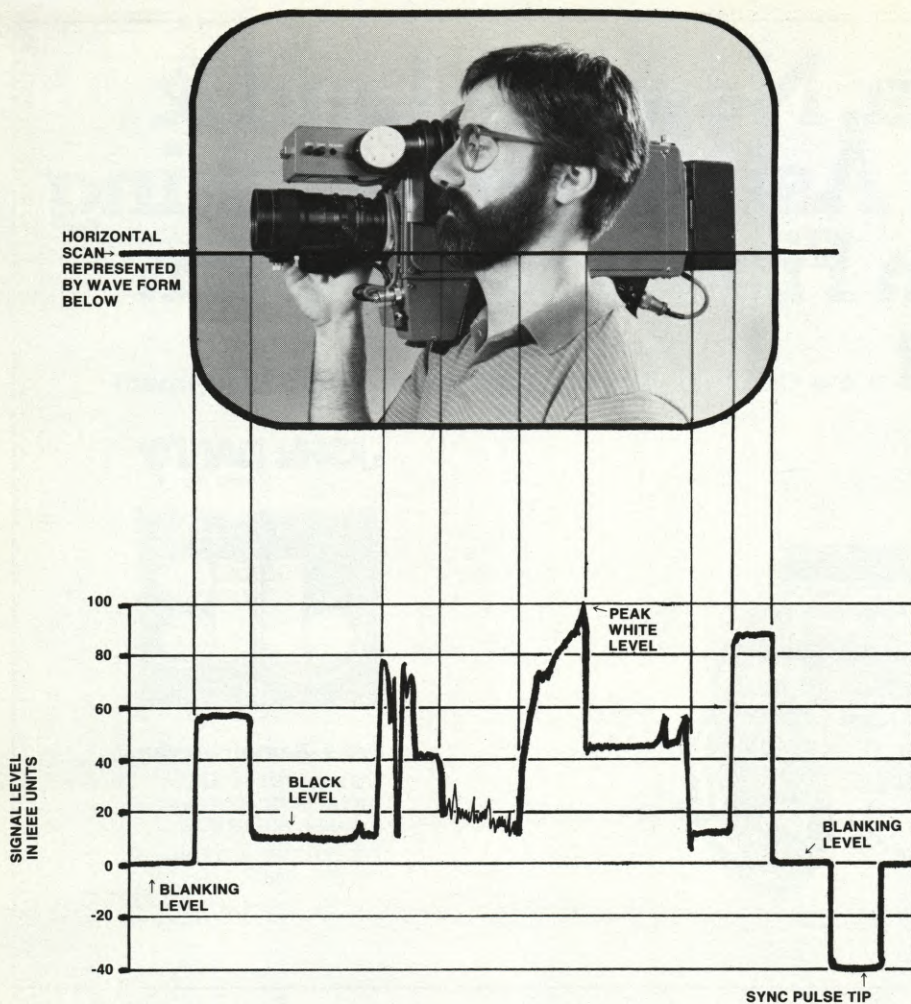


FIGURE 2—The waveform monitor visually displays the instantaneous video signal level and is the ideal graphic representation of the video process. The picture of the cameraman has one black horizontal line through it. This represents the one line out of 525 that we have singled out to analyze. While some waveform monitors can actually display one particular horizontal scan in this manner, most display all 525 lines continuously in real time. Due to persistence of vision and the slow decay time of the monitor screen phosphors, it usually appears that the waveform for all 525 lines are superimposed on one another.

Note that before the picture information begins, the signal is at blanking level (0). As the picture information begins, the signal goes to an intermediate level (50 to 60 IEEE units) representing the gray background. The black lens causes the signal to go to its minimum level. Note that the minimum black level is not quite 0 level, but usually adjusted slightly higher to approximately $7\frac{1}{2}$ IEEE units. In a similar fashion the signal continues to respond to the light and dark portions of the scan. Upon reaching the right edge, the signal goes to blanking level, and then the sync pulse triggers the electron beam to rapidly retrace to the left edge for the next scan.

CINEMA WORKSHOP
Continued from Page 652

vals and sync pulses. The color signal does not appear much different as the color information is "superimposed" or "encoded" onto this basic signal. Other reference information can be added to the signal during the horizontal or vertical blanking intervals without affecting the picture. These signals need not concern the cinematographer, as his attention should be focused on the picture information portion of the waveform.

Why should the cinematographer understand the waveform monitor? Be-

cause it is the ultimate spot exposure meter. It displays the exposure of every spot in the entire scene at a glance, all 250,000 of them. It shows precisely where the scene may be too bright or too dark or if the scene is well balanced with the proper contrast ratio. It will indicate if the luminance range of the video system is being exceeded or if the obligatory white and black references are present. While the picture monitor will obviously reveal most of these same aspects, the waveform monitor (scope) provides significantly greater quantitative information enabling the cinematographer to more accurately control and develop his visuals. ■

nomination and several international awards.

Starring in "The Muppet Movie" are the beloved Muppet characters and the uniquely talented Muppet performers—featuring Frank Oz (Miss Piggy, Fozzie Bear, Animal, Sam the Eagle); with Jerry Nelson (Floyd Pepper, Robin); Richard Hunt (Scooter, Sweetums, Statler, and Beaker); Dave Goelz (The Great Gonzo, Zoot, and Dr. Bunsen Honeydew); and Jim Henson (Kermit the Frog, Rowlf the Dog, Waldorf, Dr. Teeth).

Guest stars in THE MUPPET MOVIE cameo roles include (in alphabetical order): Edgar Bergen and Charlie McCarthy, Milton Berle, Mel Brooks, James Coburn, Dom DeLuise, Elliott Gould, Bob Hope, Madeline Kahn, Carol Kane, Cloris Leachman, Steve Martin, Richard Pryor, Telly Savalas, Orson Welles and Paul Williams.

The original screenplay of THE MUPPET MOVIE is by Jack Burns and Jerry Juhl.

THE MUPPET MOVIE is a presentation of Sir Lew Grade, the legendary British showman whose ITC Entertainment organization gave "The Muppet Show" its launching pad to international popularity.

The ITC film is a Jim Henson Production, directed by James Frawley and produced by Jim Henson, with Martin Starger as Executive Producer. David Lazer is Co-Producer.

The musical comedy was filmed at Studio Center in Los Angeles and on various locations in Los Angeles and elsewhere.

This unique project comes at the peak of "Muppetmania". "The Muppet Show", now in its second season, is one of the most popular television programs in the world and already a milestone in family entertainment. It is seen in more than 100 countries, including at least 150 markets in the U.S. During filming of THE MUPPET MOVIE, "The Muppet Show" won the Emmy for Outstanding Comedy-Variety or Music Series.

Director James Frawley's variety of credits include the films KID BLUE, an offbeat western, and THE BIG BUS, a cross-country satire on disaster movies.

He won the Emmy for his direction of the MONKEES television series and has directed several television movies including DELANCY STREET and CAPRA, as well as three COLUMBO segments.

Frawley has acted on and off Broadway and was a charter member of the innovative improvisational comedy group, The Premise. ■

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FILM-VIDEO SYSTEM
Continued from Page 681

with precise accuracy to avoid the tell-tale signs of wires, hands, etc. controlling the characters. "We can provide both rotating mirror and pellicle film cameras modified for video viewing," Hill states.

While much production was done on the sound stage under comparatively controlled conditions, the Muppets also used a variety of locations, including moving cars, the desert, streets and a swamp. The film-video system proved to be very flexible for all this work. It was also used on cranes, car rigs and long dolly moves. For the drive-by car scenes in which the Muppets are the only visible *persona*, a small video camera, equipped with a wide angle lens, was installed in the front grill of the vehicle. This camera fed a video picture of the roadway ahead to a monitor fitted in the trunk of the car where the driver was located. Utilizing this video method of "seeing", the driver was able to operate the vehicle without difficulty. The Muppeteers were located on the floor of the car, where other monitors fed them images of the Muppets as they were being filmed.

In another scene, Kermit was seated on a log in the swamp in conversation with actor Dom DeLuise, who was in a rowboat. Henson operated Kermit from a submerged diving bell directly under the log. He reached through arm holes cut in the bell and log that were fitted with waterproof, heavy-gauge rubber shields and watched a TV monitor to guide his actions.

The Steadicam stabilization device was used to cover a fight scene staged in an old barn where Miss Piggy and Kermit were prisoners of actor Mel Brooks and his band of goons. Brooks was getting ready to use a machine to deactivate Kermit, who was also being menaced by

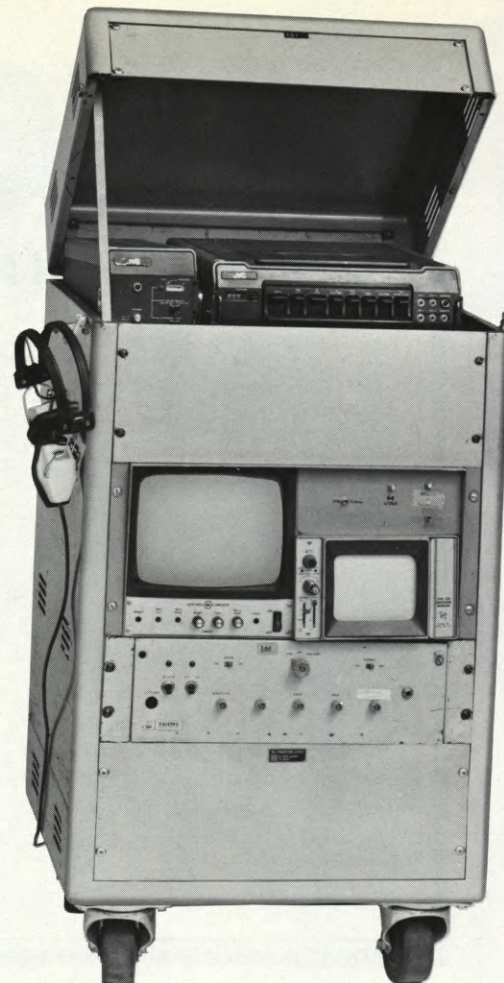
the gunmen. That was more than Miss Piggy could stand. She flew into a rage and used practiced karate chops to wipe out the villains. The Steadicam was used to provide a smooth, steady image of the fast-paced action, while it simultaneously fed a "live" signal to the video recorder and monitors.

All cameras were used to film a scene where a simulated Hollywood studio was blown up. Two of the cameras, including one set up for high-speed operation, were wired for video recording and viewing so Frawley could be certain the key action was recorded the way he wanted it.

Throughout the course of production, the film-video system provided many time-saving and creative bonuses. For example, in several situations where the soundman couldn't be located within view of the stage, a monitor was provided so he could follow the action. Many times, the script supervisor replayed portions of the tape to assure proper setups. Master shots might have been recorded days earlier, and it was much faster and easier for the script supervisor to review the tape than rerun the dailies. In some situations, the dailies weren't yet available.

Often Frawley videotaped rehearsals, and then made adjustments before filming. All of this saved time and film, and helped keep production on schedule. The latter was extremely important, because there was absolutely no slack in the Muppets' schedule. The shooting had to be completed in November because of other commitments.

The video viewing system was also valuable to camera crews, since there was little time for testing before production started. One of the Muppets, the Great Gonzo, has an eight-inch nose. Another, Kermit the Frog, has a five-inch nose. Because of the large noses, especially in comparison to the rest of the

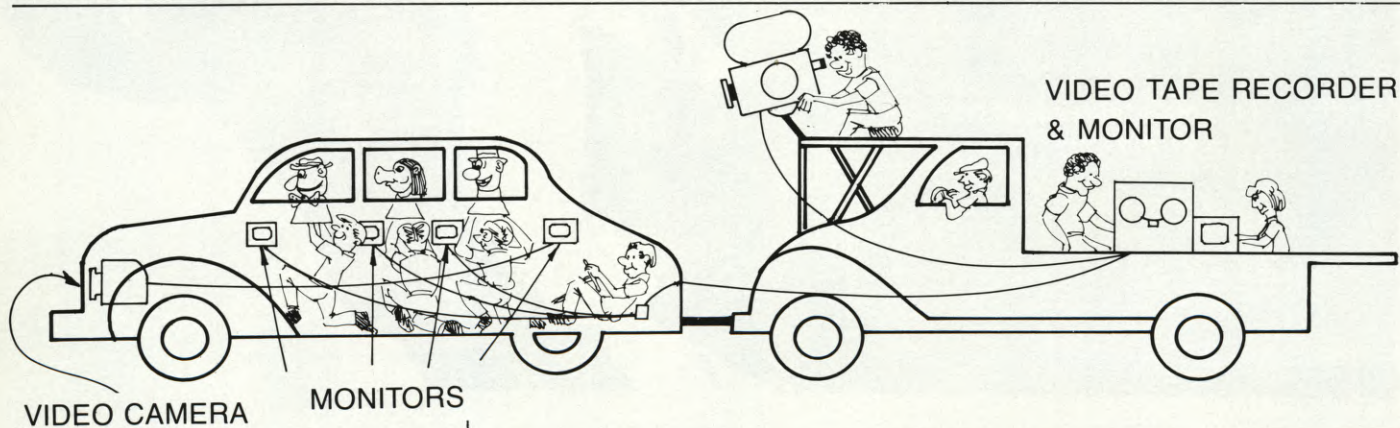


Hill Production Service Roll-around Video Control Console, containing 3/4-inch video cassette recorder and audio control.

bodies, camera operators had to be especially careful with focus, particularly on tight shots. The same was true in scenes combining the Muppets with live characters. The two had to be placed in very careful juxtaposition to maintain proper perspective, and the video viewing system provided the necessary real-time verification.

Hill is especially proud of the fact that all the equipment in the film-video sys-

Diagram showing arrangement of the mobile film/video system equipment used to film the "blind car" running shots. The driver, scrunched up in the trunk of the automobile, operated the vehicle with extended controls and viewed the road on a monitor located in front of him, picking up the image from camera mounted on the front of the car. Muppet operators were flat on the floor of the car viewing image on their individual monitors. Quick disconnect cables allow "blind car" to drive out of shot.



tem operated faultlessly throughout the tightly scheduled production. The video cameras, recorders and monitors never malfunctioned. The only problems were minor, and these were quickly traced to cables. "We sometimes had cable stretching hundreds of feet, and occasionally they would be kicked or run over by a vehicle," Hill says. Replacement cable was kept close at hand, and changes were made when necessary, usually in moments.

Since the film-video system operates quietly, it can be used in a sound stage set without concern by the sound department.

"We were usually very close to the camera crew," video operator Robert Lowry recalls, "which made it easier for the director, Mr. Frawley, and the cinematographer to ask for replays of specific scenes without leaving the set."

The latter was also done quickly and efficiently. A log was kept keying scenes to numbers displayed on the video recorder counter. Whenever someone wanted to review certain scenes, all Lowry had to do was find the proper notation on the log and rewind to the counter number with the proper cassette in the recorder. This was occasionally beneficial to the film editor, who used the video viewing system to preview scenes before watching dailies.

Some valuable lessons were learned during the filming of THE MUPPET MOVIE, and Hill says these are already being applied in other production. "Until now, we have usually been working in more static situations where we could draw power off conventional AC generators," he says. "Now, most of our equipment can also be used with DC battery power, and we have made lighter, more compact and portable rolling consoles that can be moved faster and easier on location.

"I think we can now go almost any place and do anything that a standard ENG video system can, with the exception of producing color video tapes, which, of course, would require a color camera," he adds. "Although we have done some experimenting, color doesn't seem practical at this time. A high-resolution color camera is less sensitive than a monochrome system, and, therefore, the film camera's optical viewfinder might be starved for light. This could be a problem, especially in situations where the film is being 'pushed' to a higher exposure index. Also, it would be extremely difficult, if not impossible, to get matching color between the video display and film," Hill points out.

The film-video system is being used to create some very sophisticated special
Continued on Page 714

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OPTICAL MAGIC FOR "THE MUPPET MOVIE"

A rainbow that's not bright, a bear and a frog dancing in space and a pie that won't fly present stimulating challenges to this master of the optical printer, who makes everything look right

By JOSEPH WESTHEIMER, ASC

In THE MUPPET MOVIE there were certain opticals that were not very difficult to do. These were normal, routine effects of the type one would expect in a show that aimed at providing a take-off on certain period effects. Included were wipes and other more or less dated opticals that were done that way on purpose to provide a feel of the "old Hollywood".

But there were several sequences in the film that called for more ambitious optical effects. One of these was a sequence in a saloon which shows two Muppets, Kermit the Frog and Fozzie Bear, dancing on a stage and singing. It is one of the few times in the picture that you see full-body Muppets with their feet, arms and heads moving. They are shown in long shots, supposedly on a stage with members of the audience in the foreground.

As is often the case, we went back to an old process, described as follows in a paper entitled *COMPOSITE PHOTOGRAPHIC PROCESSES* by H.D. Hine-line:

The complete disclosure of the process using a traveling mask as now known is first found in patent No. 1,273,435, issued July 23, 1918, to F. D. Williams. In this process, the action is photographed against a black background, yielding a negative that is transparent except for the action. A print of this negative is then made in such a way that the area of the action is left transparent, the background area being made opaque and as dense as possible by intensification. The print thus produced is the first mask. A print is then made from this mask, producing the second or reverse mask. The action negative and the first mask are placed over the raw film and printed; then the background negative and the second mask are substituted and the raw film is printed again. The first exposure of the action is protected by the mask, the area of the background being protected from fogging by the first mask during the first printing. The disclosure suggests also that the first and second printing may be both of action, as a duplication of a single actor. The claims of the patent are rather broadly drawn to the double mask-

ing features of the invention.

Certainly there was nothing new in our application of the process to composite the dancing Muppets with the surrounding shot of stage and audience. The Muppets were first shot against black. We used a very fine black velvet which would not reflect any light that was incident upon it. The people who ran the Muppets (and there were four controlling each Muppet) were completely clothed in black. As a result, in the dailies the dancing Muppets were surrounded by nothing but black. From this negative we generated positive and reverse negative mattes and composited the scene. We used the matte with the black center to print the background scene, and the matte with the white center to block out all the material around them.

I asked Isidore Mankofsky, the Director of Photography, to flat light the Muppets and also to overexpose them by a full stop for these shots, because I knew there would be no pick-up in the areas where the black velvet was and that this would allow the Muppets themselves to print with a lot of density. The black areas would remain clear on the negative to further help us get a matte without rotoscoping. Rotoscoping would have been very difficult, because the hands and feet were moving so rapidly. Blue screen could not have been used because the Muppeteers would have been in the way.

It was necessary to do some rotoscoping in one of the shots where a person in the audience waves his hand. The hand had to be rotoscoped (by projecting the scene frame by frame and painting a matte for the hand), so that it would appear to be passing in front of the Muppets, instead of getting blocked off by them.

An earthquake sequence in THE MUPPET MOVIE involved duping the scenes and blowing them up a little, so that the edges would not cut into the frame as we moved the picture up and down and sideways. This was a very meticulous process, in that some scenes needed only a light earthquake effect, while others needed a heavier effect—different degrees of movement for different cuts. At one point during the process the director turned some of the wheels on the optical printer, so that the earthquake would have the effect that he wanted.

Probably the most difficult optical effect to execute in the entire film was the rainbow sequence. There were actually two shots in that sequence. In the first one, the Muppets look up and see a hole in the motion picture sound stage, as the colors of the rainbow start to shine through. We cut to the Muppets as the predominantly yellow color of the rainbow fills their faces and they start singing the final song in the picture. The production camera starts moving away until we include the entire side of the stage and 267 Muppets singing the song.

The rainbow, of course, had come into the scene at the beginning of the pullback, and as we pulled back, this rainbow was tracked frame by frame during the 50-foot move and zoom that took place. The rainbow was a piece of artwork which was tracked on an animation stand frame-by-frame to match exactly the movements of the camera.

After the pullback stops, a superimposed title appears which reads: THE END. However, three feet before the end of the cut, the Muppet called Sweetums breaks through the picture, because what we have seen is supposedly on a motion picture screen in a theater. It was originally thought that part of the image of the rainbow and the Muppets should be visible over him, but after seeing that effect, we realized it looked much better with him in the clear.

Due to the fact that during the pullback, when superimposing the rainbow over the scene, it was necessary to change diffusion several times, a series of dissolves had to be made over the length of the pullback. This created a problem, because little glitches or bumps would be apparent which were not noticeable on the rainbow pullback. This was finally beaten on one of the takes we made, and we tried to do it again to get a good rainbow shot with the title and Sweetums coming through the screen, but in the time allotted it was so difficult to get all this together with a successful rainbow pullback, that we went back to the original rainbow over the scene that we had done four or five weeks before, and we composited with that. As a result, it necessitated a double dupe in order to make the date.

The second rainbow shot was a fairly simple one. That's the one in which the rainbow comes through the open roof. It was merely a wipe-on of a section of the

Continued on Page 724



After it became obvious that a rainbow painted on a scrim would not be colorful enough, the Westheimer Company was called upon to add an optical rainbow to the finale scene of *THE MUPPET MOVIE*. (LEFT) Kermit and friends look up as the rainbow comes through the roof. (CENTER) As the camera pulls back to reveal quite a group of Muppets, the rainbow grows brighter. (BELOW LEFT) The full long shot, with 265 Muppets and a bright rainbow. (RIGHT) An optical composite. Fozzie and Kermit danced against black velvet and were printed in with cabaret background scene.



As the Muppets are being chased by the baddies, their car goes out of control and rams into a signboard with a little old lady holding a pie (LEFT). The pie is supposed to fly straight across the screen and out frame right, to hit the baddies' car in another cut. Obviously it didn't do that, but dropped straight down (RIGHT). Westheimer, with his magic optical printer, made the pie fly right.



THE SAMUELSON STORY
Continued from Page 700

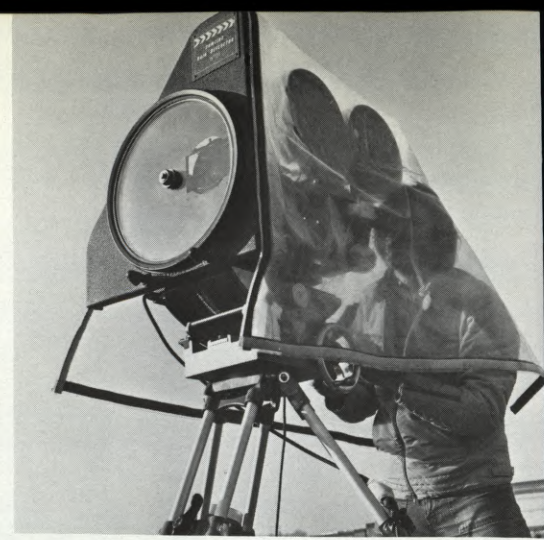
fracted and because it is bent twice comes out the other end the same way as it went in (not like a mirror or a right-angle prism) and with insignificant losses in both optical quality and transmitted light. He thought: "Why not put such a prism in front of the lens, instead of behind; so that it could be used for very low or very high angle photography?" The application was so novel that he was able to obtain patents in Britain, the USA and many other countries. It is now very much used, especially when filming miniatures.

Samuelson's has designed and built many vehicles over the years including a very large prime mover camera crane, the Sam Master, which incorporates many unique features (removable and interchangeable low, tall, short and long front camera platforms, motorized travelling counterweight for rapid balancing, cabling for camera power supply, lighting power supply and TV viewfinders built into the zoom arm, etc.) and which can give a maximum lens height of 27 feet, two mobiles (not as much used in Europe as in the USA), a large insert car (with a

seven litre engine, optional four-wheel drive, out-rigger towing, many camera positions and an AC alternator to power HMI lighting), a small insert car which involved converting a four-wheel vehicle to a six-wheeler, and so on. Their fleet of specialized vehicles, generators, alternators, lighting trucks, camera cars, delivery vans and other vehicles numbers more than one hundred, all of which are serviced in-house.

On another occasion Bill Pollard, who had designed the Kelly depth of field calculator agreed with David that that calculator was not accurate for zoom lenses and that an entirely new design was required. The latest model, the Samcine Mark II calculator has separate scales for both fixed focal length and zoom lenses, as well as many other features. When David visited Elstree Studios recently he saw Stanley Kubrick shooting THE SHINING using some ultra wide aperture lenses full open. Stanley told him how much they relied on the Mark II calculator and how accurate it is.

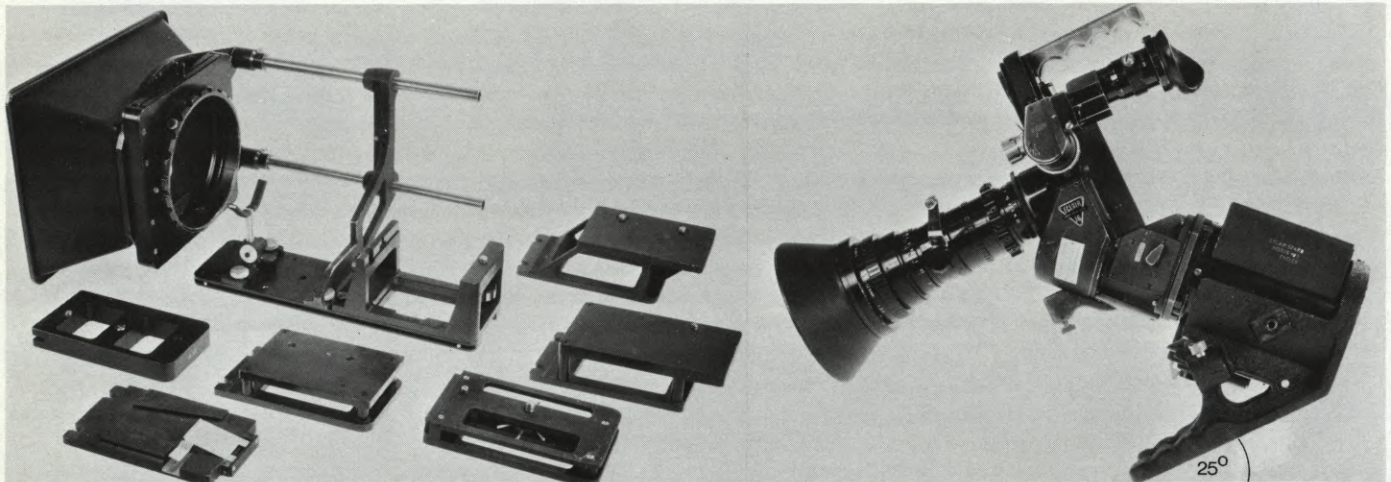
A problem for a company such as Samuelson's is interfacing one type of equipment with another. For instance they have many cameras with different types of lens mounts (Aaton, two types of Arriflex, C-mount, Cinema Products,



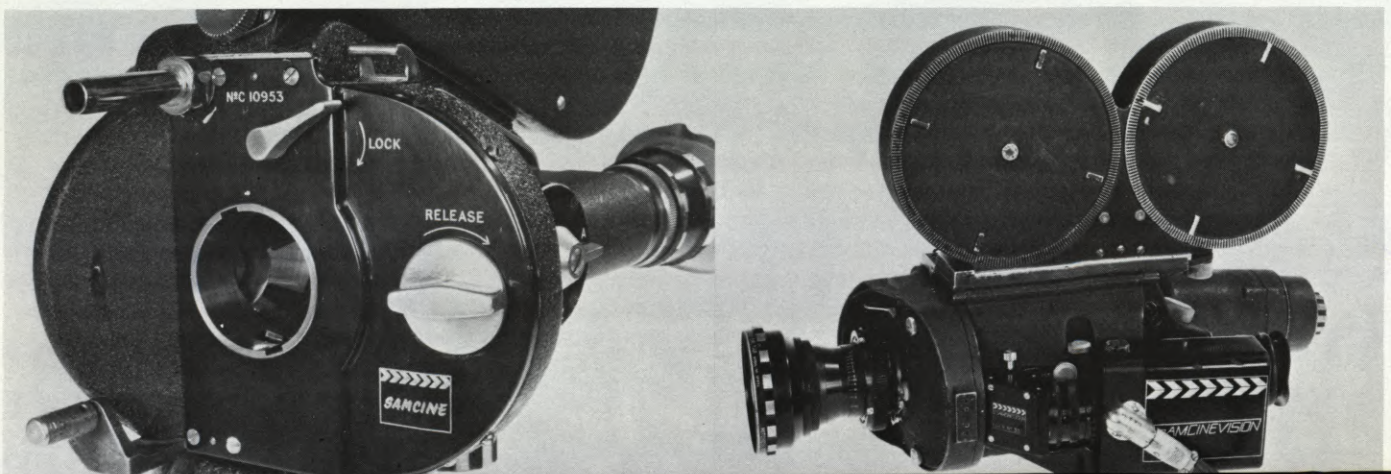
The Samcine Rain Deflector is handy for filming storms at sea. The whirling glass disk in front of the lens keeps the field free of water spray.

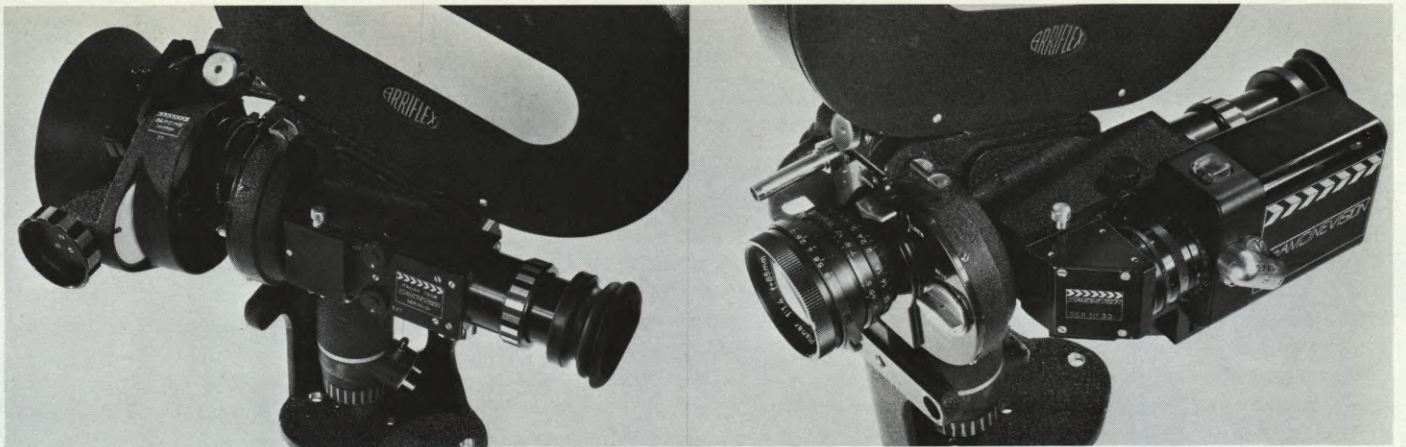
Eclair, two types of Mitchell and Panavision), and goodness knows how many zoom, telephoto and other specialized lenses which must very often be able to fit onto any camera and be adequately supported.

To fit any lens onto any camera, the first requirement is to hold flange focal distances on both camera and lens mountings to very tight tolerances, so that the zooms remain in focus throughout their range and focus scales remain



(LEFT) Samcine Type 180 Support System, here seen with adaptor to Arriflex 2C, "Y" type lens support and 6.6-inch matte-box, and with adaptors for Mitchell S35 Mark II, Arriflex 2C with Cine 60 base, Arriflex 35BL, Arriflex 16SR and Eclair CM3. (RIGHT) Eclair NPR camera fitted with Samcine Base. Note how camera can be tipped forward without tipping over. (BELOW LEFT) Samcine hard-front modification to an Arriflex 2C. (RIGHT) Mitchell S35R Mark II camera fitted with Samcinevision TV viewfinder.





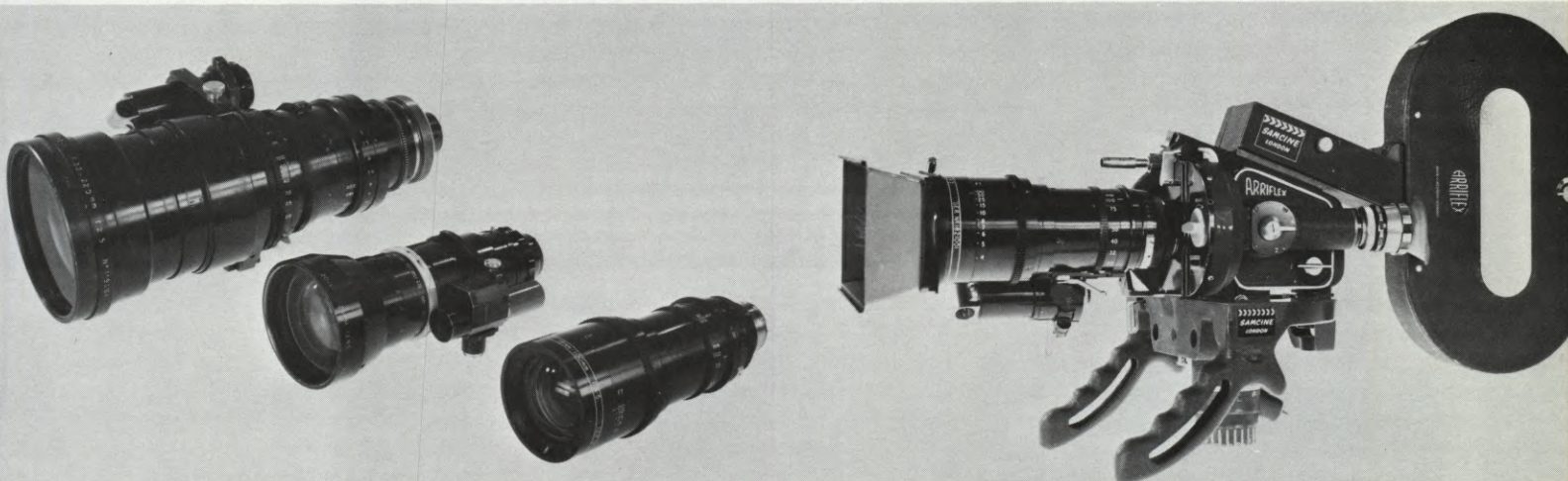
(LEFT) Arriflex 2C with Samcine Follow-focus Matte-box and Samcine "Italian" Door. (RIGHT) Samcine "Italian Door" and Samcinevision TV Viewfinder. Samcinevision was first used by Oswald Morris, BSC, for photographing OLIVER in 1967. Samcinevision has been in constant development ever since. Nowadays Samuelson's has models to fit almost any 35mm film camera, available in color, as well as black and white.

accurate. The second is a support system, with adaptors to fit any camera, with supports to place any heavy lens in an exact position to line-up with the camera and to provide an adequate sunshade and matte-box which takes two sliding and rotatable filters, plus a rotatable pola-screen. The Samcine "Type 180" support system does all of this and has proven to be an indispensable item for a major rental company, which just cannot be bought outside.

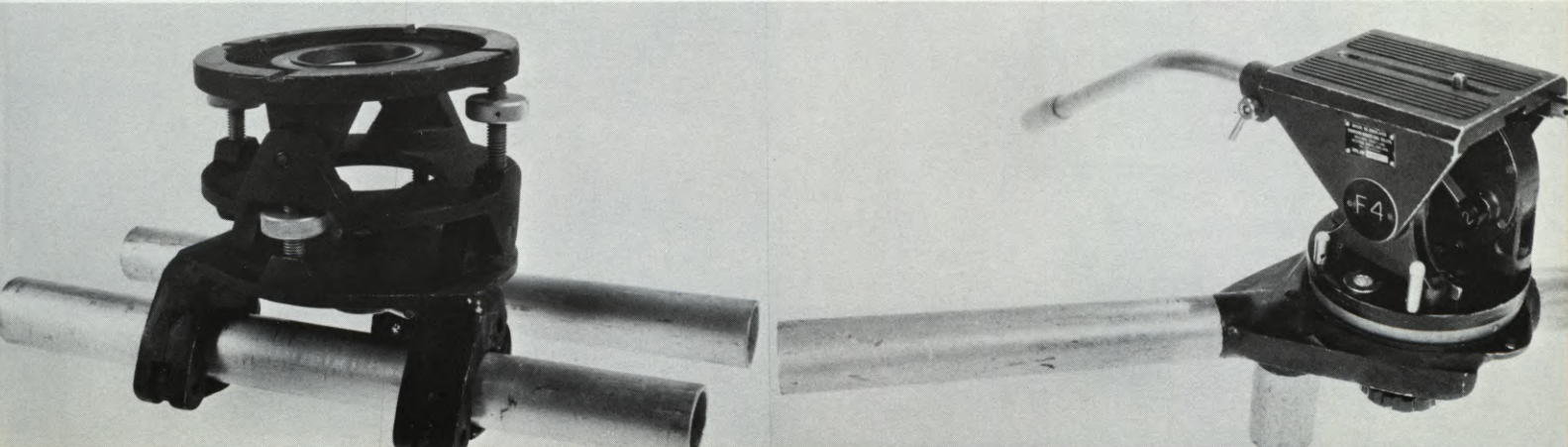
Spinning disk-type rain deflectors are another interesting item. Originally developed (not by Samuelson incidentally) for the storm sequence of RYAN'S DAUGHTER, Samuelson's now has three heavy-duty types in service, plus a lightweight hand-holdable type most suitable for 16mm usage. As with virtually everything else, the Samcine Rain Deflector can be used with a dozen different cameras and with all types of lenses from wide angle to telephoto or zoom.

In association with Mike Fox, a prominent British camera operator, Samuelson's is producing a new "Fox Wedge" to give additional tilt and camera balancing facilities to flat-top tripod heads, such as the Moy, Worrall, Vinten, etc. The earlier models of this item are highly popular in Britain and elsewhere and the new updated model should find great acceptance.

The introduction of HMI lighting and
Continued on Page 719



(LEFT) Three of Samuelson's special zoom lenses for 35mm cinematography. (Left to right:) 22mm-220mm, 1/2.5 wide angle, wide aperture, 10:1; 25mm-50mm, T/9, 20:1; 18mm-100mm, T/5.2 wide angle, lightweight. (RIGHT) Arriflex 2C fitted with Samcine 18mm-100mm zoom lens, Samcine hard-front modification, Samcine shoulder magazine and Samcine handgrip. (BELOW LEFT) Samcine "Mitchell" fitting levelling high-hat with scaffold clamp adaptor. (RIGHT) Samcine Paddle Mount.





(LEFT) The playful Kermit makes like a movie director, complete with turned-around cap and megaphone. (CENTER) A group of Muppets, their operators under the floor, is lined up for a scene. Jim Henson checks them out on a monitor to make sure no operator's arm or head is showing. (RIGHT) The bathysphere in which Jim Henson worked underwater for the swamp sequence was specially made of two jet engine containers. Here he floats around in one between takes.



MECHANICAL EFFECTS
Continued from Page 685

KNOTT: Well, Kermit is sitting on a log in the middle of a swamp, and the original concept was to shoot it on location in Florida or one of the other swamp states. The problem was how to hide the Muppet operator in the middle of an area of water. But that's what they wanted, so I built a portable diving bell that he could

Gonzo, borne aloft by runaway balloons, takes off into the wild blue yonder, with the help of monofilament that had to be kept invisible.



sit in. Inside he had his monitor, a headset for communication, fresh air, and we gave him a tray as a place to put his script. This thing was made out of aluminum and it could be sunk on location and leveled in the water. We were going to carry this into a real swamp in a small boat, but we ended up on the backlot at Studio Center. I have to say that, after having worked in a couple of real swamps, the one that was created for the film was the most beautiful. The Production Designer, Joel Schiller, and everybody else involved really put out on that one and it was gorgeous. We even got dragon flies. I don't know how, but we had dragon flies flying through almost every cut in the sequence during the entire five or six days that we were shooting.

QUESTION: Was the tank on the backlot deep enough to submerge your diving bell completely?

KNOTT: No, the water in the tank is only four feet deep, whereas the diving bell was built five feet deep to be submerged in a real swamp. So I walked up to Henson one day and said, "They want \$20,000 to cut a hole in the bottom of the tank, so how would you like to sit in about 20 inches less space?" He said, "Well, if I can fit, I'll do it." And this man sat in a container the size of which you wouldn't believe. He was scrunched in the diving bell in a sort of yoga position. (Luckily, he's very flexible.) He would sometimes be sitting there for two hours or more at a time. We had rubber gloves that came

Continued on Page 722

Miss Piggy and Kermit prepare for a romantic desert interlude in front of the camera, as Isidore Mankofsky takes a light reading on them. An odd couple to say the least, the passionate pig and green Galahad generate a certain touching emotional quality.





The daylight sequence of the Muppets stranded in the desert was filmed in real desert, but for the night scenes (LEFT) the desert set was duplicated inside the sound stage. This was done in order to have full control of the sequence and to create stars and a moon that would register on film—an impossibility in the real situation. (RIGHT) A free-standing Kermit goes for a solitary walk in the desert. Getting what are essentially hand puppets to move in this independent way required much monofilament and an enormous amount of skill, but it is the main characteristic that differentiates this feature movie from the Muppets TV show.



(ABOVE) Monofilament was brought into play again to fly Gonzo beneath some balloons, while keeping his head, hands and feet moving. A technician sits on a platform at the end of a Titan boom crane arm and dangles the Muppet, with balloons from a fishpole. (BELOW LEFT) Kermit and Fozzie drive along in the Studebaker, bound for Hollywood or bust. (RIGHT) Mechanical effects technician, tucked into the trunk, checks out his monitor in preparation for doing the actual driving.



THROUGH THE RAINBOW

Continued from Page 670

ever seen an operator have to perform.

There is a sequence in which Kermit and Fozzie pull up to a church out in the country. The Electric Mayhem Band begins playing inside and the whole church starts vibrating in time to the music. This meant that Special Effects had to rig all of the boards in the entire church with vibrators—the windows and everything—and as they vibrate, we have streaks of light coming through the walls and windows. It was extremely difficult to get the lights into the right positions because of the very narrow slits that the light had to come through.

The opening scene of the film is a shot

of Kermit sitting on a log in the swamp, strumming a banjo and singing. This scene was originally scheduled to be shot on location in Georgia, but that proved to be impractical for one reason or another, so Special Effects built a submersible container in which Jim Henson was encased, with his arms sticking up through a log and an oxygen supply fed in to him. There was one instance when he spent more than three hours underwater, trapped inside this container. His only contact with the outside world was his little monitor which gave him a visual account of Kermit's performance.

For this sequence an entire swamp was built in the lake on the backlot of

Studio Center in Hollywood and about 40 cypress trees were cut down and flown in from Georgia. We started with the camera mounted on a 40-foot extension on a Titan crane and dissolved from an aerial shot made in Florida as we pulled in and zoomed from 25mm to 500mm, finally picking up Kermit in closeup. The most difficult part of it was that we had to get the crane out over the water without rippling the surface or giving away the fact that there were grips trying to steady the crane move. It was one of the most remarkable crane moves I've ever seen anyone perform. Originally we were going to try to do it with a snorkel camera, but it proved to be much too complicated.

I suppose the most difficult continuing problem we had during the filming was trying to find ways of making places for the Muppet operators to work from. Even though our sets were built in the air—four to six feet off the ground, depending upon the particular set—specific arrangements had to be made to provide places for the Muppet operators to hide in. This often proved to be more difficult than it looked on the face of things, particularly in some of the car sequences. We often had to put four or five people in the front seat or on the floorboards of a car, and it was amazing how these people could cramp themselves into an area that small with their TV monitors and still be able to perform as marvelously as they did, but one way or the other it always worked out.

There were a number of times when we were working outdoors where we had to dig big holes for the Muppeteers to hide in. For example, on the Western street of the Columbia lot we had to dig a large hole and put 14 or 15 Muppet operators into it, cover them with plywood, cover the plywood with sand and cut holes just large enough for their arms to get through. I'm glad none of them suffered from claustrophobia.

None of the moving shots were done as process, rear-screen or matte shots—not even "poor man's process" (where you shoot against a blank sky with someone shaking the car). The rationale behind this was that if we were going to get the Muppets out of the studio, then we were *really* going to get them out of the studio and not double up and use process plates or anything of that sort, even though the temptation was very great to go to plates. In the end, it worked out fine and we were able to get all of our moving shots with not as much difficulty as we had anticipated.

There was one sequence that took place inside a redone school bus and there, again, we had about ten Muppets inside the bus and the 14 or 15 people it took to operate them. It wasn't a very big



Reviewing a scene on video monitor are director James Frawley, star Kermit the Frog, Muppet creator Jim Henson and cinematographer Mankofsky. Decisions were often a group thing, with the Muppets sitting in. (BELOW) Gaffer Lee Heckler and Director of Photography Mankofsky plot out the lighting for the big Hollywood finale musical number.



vehicle, so the floor of the bus looked like a disaster area. The big trick in working with the Muppets was to make them look like they were in the big world and, whenever they were associating with real people, to ignore the fact that the Muppets were Muppets and the people were people. The director, Jim Frawley, managed to bring this off marvelously, with the help of the super-talented Muppet people, like Jim Henson and the rest.

When Kermit finally gets to Hollywood he goes into the screening theater, and that was the only set that was scaled down for the Muppets. All the rest of the sets were full-size, but the reason for scaling down the theater was that the Muppets had to be sitting in seats and full-size seats would have been too large for them. The theater contained about 30 seats, each one of which had a hole cut in the center of it for the arm of a Muppeteer. Underneath that set we had as many as 17 or 18 video monitors going at one time. The floor looked like a spaghetti factory with all the cables that were necessary. There were cables for the playback, cables for communication between the Muppet operators and the director, cables for the live recording onto tape and cables for the video sound. Every Muppet operator had to have a set of earphones and a microphone. It was probably one of the most complex recording jobs ever performed for a movie.

It was very difficult during the entire filming to realize that the Muppets couldn't actually see anything—that they had no point of reference. It was one thing to say to a person, "Look to the left of camera." But if you say that to a Muppet, there's no reaction, unless the camera is pointed directly at the Muppet. The Muppeteers are blind, except for what they see on their monitors. Even when they were just rehearsing, the cameras had to be turned on and working. Otherwise they had no visual reference; they had nothing to work from. Without the video monitoring system, this show wouldn't have been able to function.

Because of the many colors of fabrics on the various Muppets, we had to use colored gels very carefully. If the wrong color of gel was used on any given Muppet, it would change or degrade the color of his fabric—and yet, there were certain sequences that cried out for a theatrical look and, in those instances, we let the visual requirements of the scene take precedence over a couple of Muppets taking on strange colors. Actually, there were only a couple that were really critical—one was Gonzo and the other was Zoot. They seemed to take the colored light the worst, but in the El Sleezo Café and one or two other sequences we



Mankofsky greets an impressed visitor to the set of THE MUPPET MOVIE. This project marked a unique encounter and blending of a Hollywood technical crew with the Muppet people who, although mainly Americans, work in England, where the Muppet show is shot. After an awkward first meeting, the two crews merged into a superbly functioning group, with the Hollywood people adding their own special flavor to the already successful formula.

had to subordinate the odd colors of the fabrics to the overall visual look of the film.

In discussing the show with Jim Henson and some of his technical people in England before we started filming, we were informed by them that they liked to work with the 25mm lens and the wider angle lenses in fairly close to the Muppets and, in making our tests, we discovered the same thing. Generally speaking, if we used a longer lens, which we occasionally did, it tended to compress the Muppets and they didn't look quite as good. Although we did find out that the limitations weren't quite as narrow as we first anticipated they would be, we generally tried to stick to the wider angle lenses whenever we could.

There were occasions when we went to very long lenses to get a special effect—as in a love scene between Kermit and Miss Piggy—and it worked out very effectively. We did find out, for instance, that unless you had enough stop, if you focused on the tip of Kermit's mouth, his eyes would go out of focus, and vice versa. So we generally had to work at an f/3.5 or f/4 stop in order to maintain Kermit in focus from the tip of his mouth to his eyeballs.

Quite a number of the Muppets have what might be called "ping pong" eyeballs and these are quite white. On their own show they have made a number of tests using slightly grayed-out eyes. For purposes of the movie, all our Muppets

Continued on Page 716

FILM-VIDEO SYSTEM

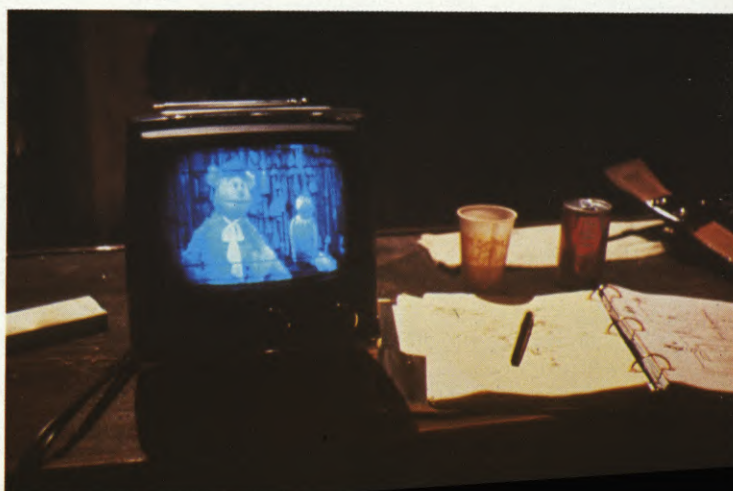
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effects. "We have designed a control console that utilizes a special effects switcher that can superimpose two separate genlocked video images on a single monitor," Hill states. Utilizing this video matting system, any scene that has been filmed and videotaped can be played back through one switcher input to a monitor. Through a second video input on the switcher, the "live" image from the camera can be very accurately superimposed over the previously recorded, frozen image and exact matching of the two images can be realized, in or out.

This system becomes the electronic equivalent of the frame punch method, whereby a processed frame of film is installed in the ground glass holder of the film camera as a reference to establish scale and positioning of the matching scene that is to be filmed. The advantages of the video matte system are numerous. A scene just filmed and video-



During filming of **THE MUPPET MOVIE**, video monitors were everywhere and were heavily relied upon, not only to check composition and performances, but to make sure that arms and heads of Muppet operators did not intrude into the scene. "Keeping the frame clean" was a full-time preoccupation involving most of the crew. The special optical system that was a feature of the film/video linkage allowed direct transmission of the filmed image to video cassette recorders and monitors located strategically around the set.



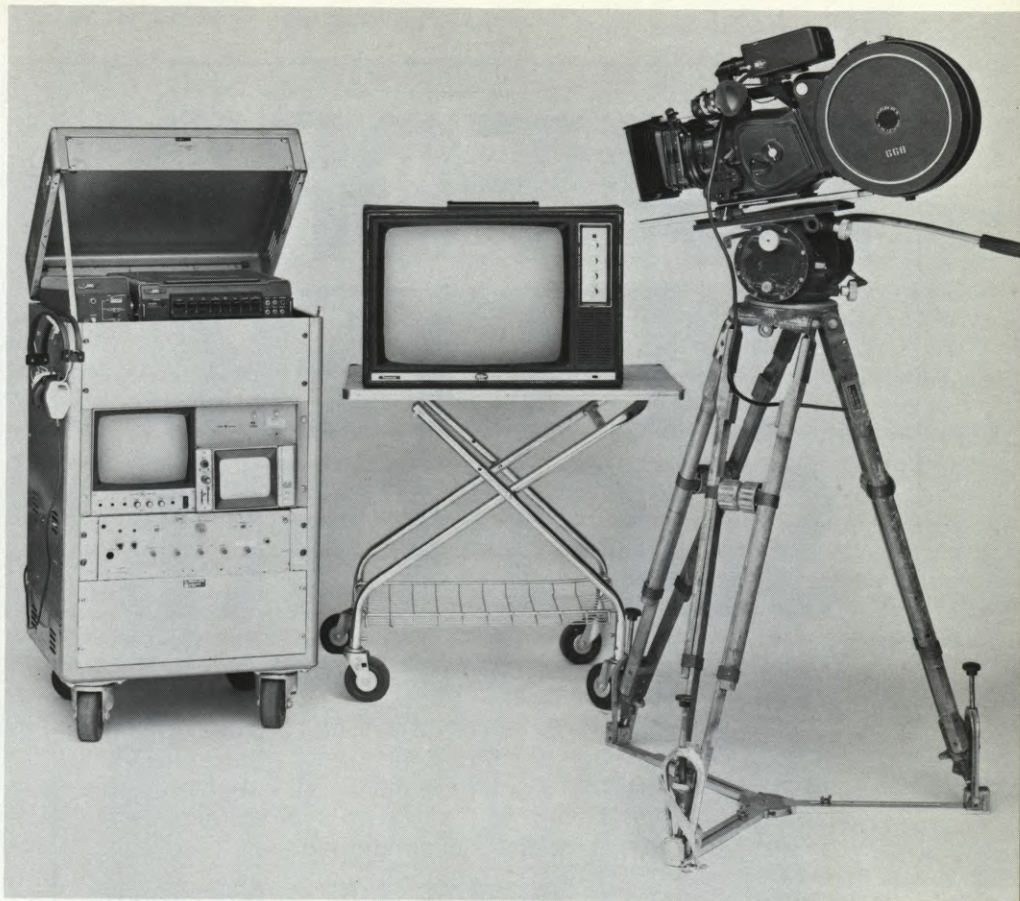
taped can be utilized immediately to line up the next matching shot. In the case of an actor being repositioned to match a previous scene position, a monitor with a reversed "mirror image" can be placed in the actor's line-of-sight and very accurate matches can be achieved by moving the body position until the camera's live video image matches the previously recorded frozen video image. Many clothing commercials are filmed with this video matte system which allows a complete change of wardrobe in a hard cut without an apparent shift in the actor's body between the two scenes. This system was also used during the filming of special effects for PRISONER OF ZENDA, which allowed certain scenes that were shot in Hollywood to be matched to scenes previously filmed in Europe.

Multi-camera filming has always enjoyed a limited degree of popularity for covering certain stage presentations, such as rock concerts and other special programs that require extensive camera coverage of a one-time event. The development of the film-video multi-camera system by Hill Production Service greatly extends directorial control of all cameras, and by utilizing the remote-run control and built-in automatic slating features of the system, considerable raw stock and lab cost savings can be realized. During the past two years, there has been a growing interest in filming with the multi-camera film-video system.

"We attribute much of the increased multi-camera activity to 16mm hidden camera commercial projects," Hill says. "Although 35mm multi-camera film-video systems are now receiving stronger consideration for certain feature productions. RICHARD PRYOR IN CONCERT, a comedy feature currently in release, was filmed with our 35mm film-video system, which provided seven-camera coverage during the live concert.

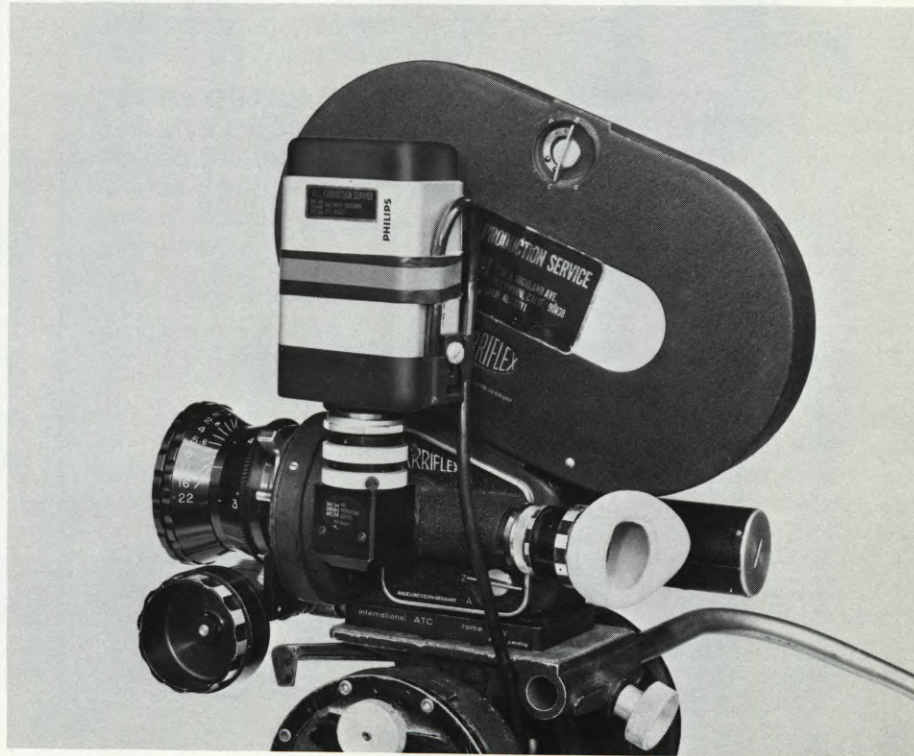
"Film cameras with built-in video viewing appear to be here to stay. When we started ten years ago, some in the film industry were skeptical, and more than a few were at least a little leery about the concept," Hill states. "However, as film-video systems equipment and techniques for using it become more sophisticated, the advantage in time and money saved, together with increased creative latitude, seem to become more apparent.

"But don't take my word for it. Ask Miss Piggy, Kermit, Fozzie Bear, The Great Gonzo, Animal, Statler, Waldorf, Rowlf the Dog or any other Muppet you meet. They'll be at your local theatre soon, and we're very proud to have played a part in bringing them to the big screen," Hill concludes. ■



The Hill Production Service Film/Video System shown being used in conjunction with the Arriflex 35BL camera. It is also routinely used in combination with the Arriflex IIC camera and the Mitchell BNC Reflex SPR film camera. The extreme mobility of all components makes the system very fluid on the set. Preparations for the use of the Film/Video System were made during the earliest stages of production planning.

The Arriflex IIC Film Camera with video camera installed. The compact high-resolution video camera displays its image on the ground glass of the film camera. This is achieved through the use of an optical "pick-off" assembly behind the film camera ground glass, which shares the image with the camera optical viewfinder. These electronic impulses are carried by cable to the control console, where the information is recorded on 3/4-inch video tape and simultaneously displayed on TV monitors. As many as 15 monitors were used at one time during filming of THE MUPPET MOVIE.

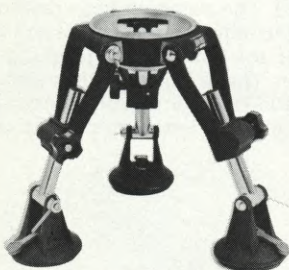


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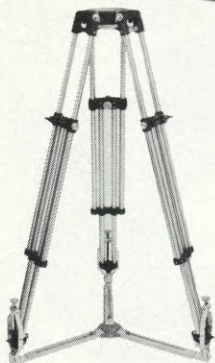


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THROUGH THE RAINBOW
Continued from Page 713

had the eyes in about Tech 2 or Tech 3, so that they wouldn't glare so much when they got hit by the light.

An oddity which worked out quite nicely for me as cameraman was the fact that the Muppets looked quite good in light coming from high up. When you light people that way they generally get big dark spots under their eyes and it's not a very agreeable lighting. But for some of the Muppets with oddly shaped faces—like Kermit, Miss Piggy and Fozzie—if you had to, you could light them from quite high up and they would look good. Such lighting didn't seem to have an adverse effect on them at all and, in a lot of the sets, there was no alternative; they had to be lit from above.

In our tests—and drawing from Jim Henson's experience with the TV show—we found that the Muppets didn't look good with a rather hard back-light or cross-light. I generally tried to keep their key light directional and soft, so that there weren't any dark shadows. Since this was a fantasy, the effect wasn't as good with dark shadows.

There is a sequence in which Miss Piggy gets into a fight with a number of heavies and we tried to figure out how we could get a not exactly realistic effect (because one can't call a fight with a pig realistic), but something that looked believable, while keeping the Muppeteers out of the shot. Of necessity it had to be done in short pieces with a Steadicam and it required many, many takes before we could get the thing so that it worked out right.

Normally most films these days are shot in either the 1.85 or the anamorphic format, and one usually protects for TV or the Academy aperture. In this particular film there was no way of protecting anything but the 1.85 format. In fact, there were many occasions when, if the composition were not framed exactly to the 1.85 aperture ratio, you would see a head or an arm or something in the frame. That being the case, there is no way this film can go out to release except with a hard matte on it. Since it was determined very early in the planning that we would not be able to protect for TV, we were able to frame more successfully.

At one point in their odyssey across the country, the Muppets camp out overnight in the desert. We shot the early part of the sequence, the daylight part, out in the desert near Palmdale, but then on the stage a set was duplicated to double for

the location at night. The main reason for building the desert set on the stage was that we wanted to have stars and a full moon in the sky and we didn't want to optical them in. I can't be sure why, except that cameramen would always rather do their own tricks in the camera instead of having somebody else do them.

In this case we had a still picture taken of a full moon. We blew it up to 40" x 40", put it in a light box and hung it against a sky cyclorama behind the desert set. One of the reasons for doing it in this way is so that we could position the moon in any place on the set that we wanted. Also, Special Effects rigged hundreds and hundreds of little bulbs in the sky for stars.

Again, we had to use a set rather than an actual location, because our Muppeteers had to have someplace to work and in the desert it would have been difficult to dig holes for them. In the sequence Kermit takes a long walk in the desert and we would have had to dig some trenches and tunnels for him, but on the set we merely pulled out four-foot-square sections or cut holes as required and we were able to perform our dolly shots of Kermit walking off from the campfire, with the moon and stars behind him.

One of the great occupational hazards on THE MUPPET MOVIE was the abundance of holes that had to be cut or dug in the set to give our Muppet operators a place to work. It's ironical that after I'd spent a lot of time warning people to watch out for the holes, the first one to fall into one was me.

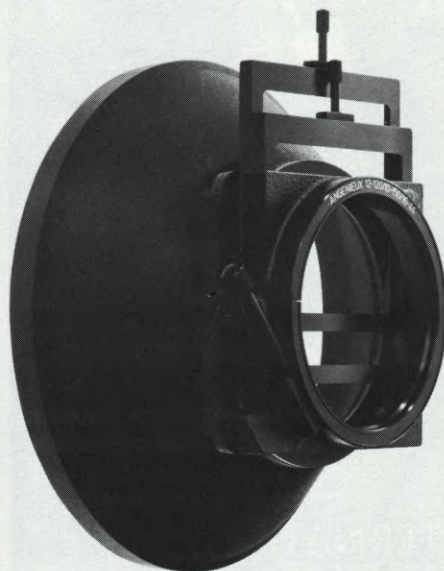
My gaffer, Lee Heckler, did wonders in rigging the lighting for the Muppets. They did require special lighting to make them appear at their best, and the most difficult thing was when we had people in the scenes with them. They just couldn't be lit in the same way, so you were faced with double lighting. First you'd light the Muppets and then you'd light the people. Then you'd have to keep the Muppets out of the people's lights and the people out of the Muppets lights—which generally wasn't all that difficult, because the people were always taller than the Muppets.

One of the oddities that people seemed to accept about the Muppets is that they are normally quite small when they are down on the ground—17 or 18 inches tall, or something like that. Yet, whenever they were brought into direct relationship to a person, they were brought up to shoulder height for their medium shots and closeups. This never seemed to trouble anybody, including us. It's just one of those oddities of film and



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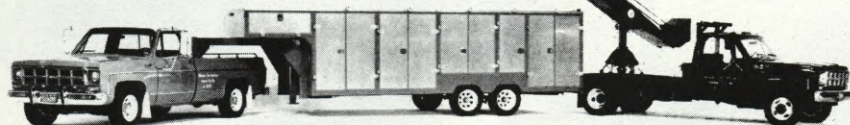
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perspective that people don't worry about—which is fortunate, because it would have made a difficult framing situation impossible if we'd had to cope with a Muppet standing on the ground and a person standing straight up. All we would have had was wide shots.

On the other hand, if we had never shown a complete Muppet the audience would have felt cheated, and rightfully so. That's why several of the major Muppets were constructed with armatures in them to show their full-length figures. Occasionally throughout the film we would show Kermit or Miss Piggy or Fozzie as complete Muppets and this served to establish the idea that they weren't just half-figures. The audience could see that they did have legs and torsos and all the rest, and this helped put across the idea that they were more than hand puppets.

Kermit travels across country in a variety of automobiles, all of which were specially rigged with controls in the rear end—either in the trunk or the back of a station wagon. There would be a TV set-up looking out of the grill and the driver, working from the back of the car or the trunk, would drive the vehicle. This sometimes proved a bit difficult, because a 10mm lens on the camera doesn't quite give a person the same perspective as his own eyes, and we occasionally got into difficulty trying to drive the car blind, but the enchantment and marvel of seeing Kermit or Dr. Teeth or Fozzie or Gonzo driving one of these vehicles is one of the more fascinating elements of this movie.

Filming the Muppets in the cars was very much like filming any moving vehicle sequence. We towed the cars or shot them from alongside and we would light them in much the same way that you would light people in a car. The only difference was that we would have our Muppet operators on the floor or in the trunk with their monitors, so that they could see what they were doing. I wouldn't say that these shots took any more time than standard automobile shots, except that shoe-horning the Muppet operators into these cars sometimes took a bit of time.

Robbie Knott, in charge of special effects, modified the Muppet cars so that all the controls were operated from the car trunk. Someone would drive the car using a video monitor for eyes while Gonzo or Fozzie appeared to handle the wheel. The Muppets actually looked like they were doing the driving. It was incredible to peer inside the car and see three or four people cramped on the floor manipulating Fozzie, and the car.

Our camera video equipment was supplied by the Bruce Hill organization and worked superbly for our needs. All

our cameras were equipped with video monitors which were eyes for the Muppeteers. It would have been virtually impossible to make the movie without the monitor system, as the monitors provided the only means by which the Muppeteers could follow their own performance. We also taped all the shots to double-check that nothing sneaked into the frame that wasn't wanted. Even with a number of people checking the playback an occasional unwanted arm or head would show up in the rushes. On location, Hill supplied a DC battery-operated video system. The monitor system performed without a hitch throughout the entire shooting schedule. Any shutdown of the video system would have meant a production shutdown, but this didn't happen once.

THE MUPPET MOVIE is a lovely, magical super-film. My director, James Frawley, whose confidence, great demands, and expectations gave me a chance to produce, was a challenge to work with. Jim Henson, Frank Oz, and all the Muppet people were marvelous to work with—total pros and very supportive. Everyone from production to the hard-working crew contributed, making THE MUPPET MOVIE the most pleasureable experience of my career. ■

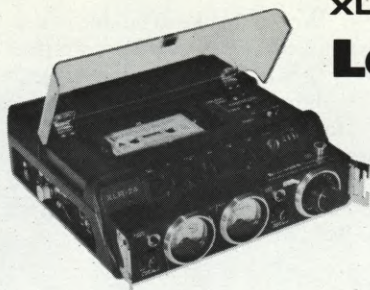
THE SAMUELSON STORY Continued from Page 709

the need to distribute to 220-240 or 280-volt AC safely on location (even in the wet) has introduced a problem to Samuelson's Lighting Division. Kliegle-type stage plugs, HI and spider-boxes, "Technicolor Lugs", etc., used to distribute 110-volt DC are potentially lethal with high voltage AC and prohibited for such use. Furthermore, there is now a mandatory requirement in Europe to have an earth leakage device in an AC circuit which will automatically detect if there is a short circuit to earth (ground) and switch off the power should it occur.

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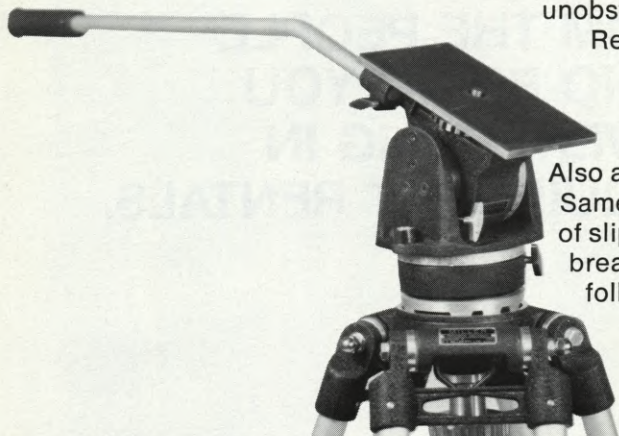
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the lights during a take. Other features of the system include the ability to check each circuit independently to trace and isolate an earth leak should one occur and a unique means of raising the unit on stilts when it is required to be used on wet ground.

Meanwhile, no doubt, camera manufacturers will be supplying cameras that don't do everything that they might; lens manufacturers will be providing lenses without adequate provision for filtering, supporting and mounting and cameramen will be suggesting new ideas.

Among the new ideas currently being developed are a second eyepiece on the side of a camera for the focus assistant to look through without disturbing the camera operator, a transportable fully-blinded front projection rig which will have several new features incorporated, a battery test rig which records the ability of a nickel cadmium battery to hold a charge, (very important in these days of small "on-board" camera batteries which don't run for long even at the best of times), a miniature mixer for Nagra recorders (especially the ISL), and so on.

As in the beginning, that most ubiquitous of all 35mm cameras, the Arriflex 2C comes in for the most modifications and additions in Samuelson's current range of equipment. They have removed the three-lens turrets and fitted single-port hard-fronts which take either an Arri steel bayonet mounted or a standard mounted lens and which incorporate a locking system that pulls even the heaviest zoom or telephoto lens into exact register; they have an orientatable viewfinder eyepiece which can be set in any position with the image remaining erect, a viewfinder extension tube which incorporates viewing filters, an "Italian door" which incorporates Mitchell S35R optics and which also has provision for fitting a TV viewfinder system (B & W or color) and the necessary beam-splitter pellicle, which can also have a de-anamorphosing optic incorporated, a shoulder magazine and hand-grip system for the steadiest possible hand-holding, a "follow-focus" matte-box for fixed focal length lenses, a special support to take the Samcine inclining prism for low or high angle cinematography and a monocular auxiliary "sports" viewfinder to use with very long telephoto lenses. And they still supply the same "swan-neck" adaptor to a flat-top tripod, which has the parallel sides just like the one they made in the first place.

Every item of equipment is supplied in lightweight protective cases, Samcine Rigidised Cases, which they manufacture themselves.

Their present major project is to build, in cooperation with their Paris office,

another six LOUMA camera support systems. The LOUMA is a lightweight boom which supports a remotely controlled camera. It is a unique item of production equipment which will open up as many opportunities for creative film makers as did the floating camera systems, the hand-holdable silent camera and the giant camera crane (which it replaces) in the past.

In the heart of London, just off film-land's Wardour Street, Samuelson's has another operation: "Rentacamera" which rents out still cameras in addition to cineware and has a bookshop, "Book City" specializing in film books, for both film buffs and technicians.

As if all that was not enough, the brothers have become very involved in other industry activities. Sydney, for instance, is a past Chairman and a Trustee of the British Academy of Film and Television Arts. For the Cinema Trade Benevolent Fund he organizes a major fund-raising concert of film music, called Filmharmonic, at the Royal Albert Hall every year. This year he produced the entertainment which preceded the Royal Film Performance, and for 10 years he was a Governor of the British Society of Cinematographers.

Michael is a past Chief Barker of the Variety Club of Great Britain and now an International Vice-President of that great children's charity, and he loves to make films about Olympic Games or World Cup Soccer events. David is Chairman of the Kinematograph Manufacturer's Association (which since 1913 has administered the British Board of Film Censors and appoints the film censor), is a past President of the British Kinematograph Sound and Television Society, is a Vice-President of UNIATEC (the International Society of Film Technical Societies), serves on innumerable industry committees including the Film Industry Council of Great Britain, is Contributing Editor for the *American Cinematographer* magazine, and has written three books on the choice, use and care of motion picture cameras.

Tony dissipates his non-Samuelson Film Service energies elsewhere. In the past he has taken up race horse breeding, flying helicopters and Spitfires, and currently keenly races scurry ponies. ■

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MECHANICAL EFFECTS

Continued from Page 710

out of the top of the diving bell to shield his arms, and we would shoot for hours on end with two cameras. The whole picture is filled with gags like that. They're subtle and they blend in and they go by so quickly that you could never imagine how much work some of them involved. This picture was a totally different experience for all of the departments that worked on it.

QUESTION: Were you involved in the rainbow sequence?

KNOTT: The rainbow occurs inside the sound stage near the end of the film. Crazy Harry, the special effects man, plays with an electrical dimmer and blows up an arc lamp, and this explosion blows a hole in the stage roof. Blue sky comes through and then a rainbow appears. It was easy enough to say, "Let's do it optically, but everybody decided to give other things a try. A scrim was tried, an old-fashioned stage technique. It was just a back-lit scrim and it looked very interesting, but in the end, the rainbow was done optically. There was a lot of glitter in the explosion and I added glitter material filtering down through the hole after the explosion for both the scrim shots and the matte shots. We experimented with prisms and high-output lights and dust particles in the air and we learned a lot from that experimentation. We were all hoping for something like a real prism rainbow, but that was one of the ideas that was dropped. The final effect, done optically, looks very pretty.

QUESTION: What about the sequence that takes place inside the church?

KNOTT: The church sequence is one that Isidore Mankofsky, the Director of Photography, and I worked very closely on to light. As the band was playing in this old church, we wanted the building itself to creak and rock and roll, with light streaming through the slats—all in time with the music. We got into some high-intensity light work and Issy did some experiments in shooting light through colored windows, and so forth. We had every board of the whole church rigged with solenoids, and these were rigged to a keyboard. A musician played this thing in time to the music playback track and the whole building moved in tempo. We had these lights outside and put smoke into the air, a smoke which we developed that has a very high degree of re-

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flectability. The light came streaming through in shafts and it was very pretty. The whole sequence was one of those experimentations that keep film alive.

QUESTION: THE MUPPET MOVIE is unique in that there were few precedents to draw from in making it. Didn't that create certain difficulties?

KNOTT: It didn't give you a lot to draw from, but, on the other hand, it gave you a certain amount of freedom to let your creative juices flow. You don't have anything to copy from, so you tend to do it the way you see it. That's when I feel best and put out the best of myself. I've always worked very closely with cameramen and I'm doing that more and more now. Whereas Art Directors used to design a lot of the working props and gags, they're not the engineers they used to be. The new breed of effects men who are coming in are more designers, rather than just riggers. The same goes for working closely with cameramen. If you don't light rain correctly, you don't see it. Snow can either look like plastic or it can look just wonderful. So I cannot, as an effects craftsman, stand back and say, "You tell me. I've got it here. I'll turn the switch on." The field of physical effects is becoming very interesting and it interests the hell out of me. These are not to be confused with opticals, but I try to keep up with what is going on, so that I can make an accurate judgment as to whether something should be a physical effect or an optical effect. They are definitely two different worlds. On THE MUPPET MOVIE, the motto was: "Ask for the world, and someone better give it to you." For me it was a great, great experience. Someone would say, "We're going to make cars that drive from the back. Sounds like fun. Let's do it." You didn't have time to think about it. You just sort of sailed right into it and gave it your best shot. It was wonderful fun, even though it was a bit tough at times. ■

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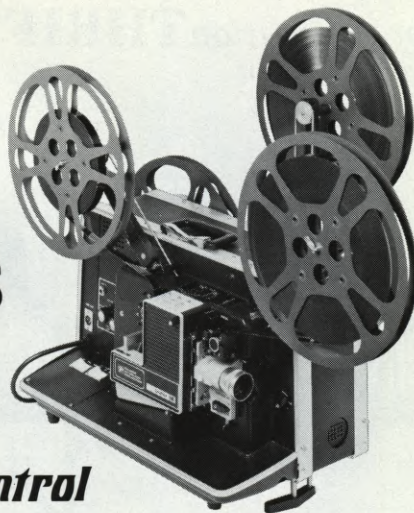
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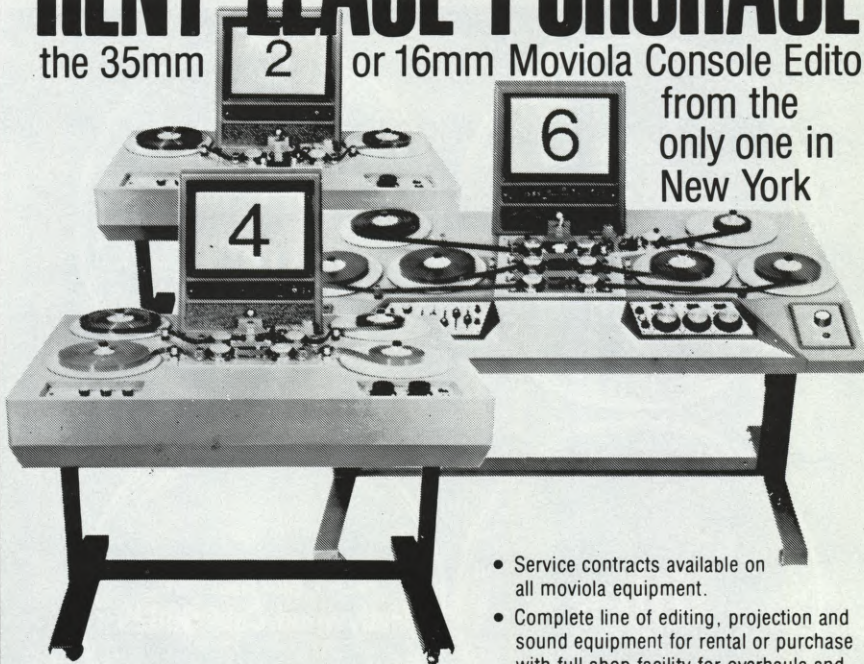
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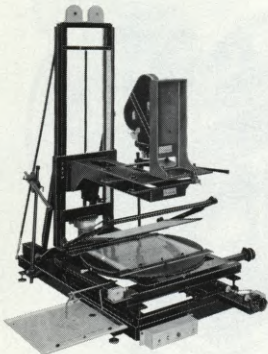
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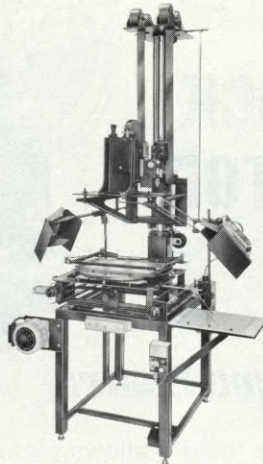
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OPTICAL MAGIC

Continued from Page 706

rainbow artwork that we made for the big rainbow pullback.

Probably the most complicated effect that we had to do was the one that we called "the pie shot". The pie shot is the last of the non-ordinary shots in the picture and it starts with an automobile full of Muppets driving along a road. They are being chased by a black car that is racing along behind them. As the camera pans with the Muppet car, it picks up a signboard with a little old lady on it who is holding a huge three-dimensional pie in her hand. When the Muppet car goes out of control and smashes into the signboard, the impact is supposed to send the pie flying out of her hand and out of the frame to hit the pursuing car in another cut.

It didn't work. They shot it several times and the pie must have weighed 600 pounds, because instead of flying straight across the screen and out of the picture, it fell straight down and smashed on the ground.

One of the technical problems with the shot was that after the camera came to rest on the signboard it was not steady. It jiggled around a little bit. So our first problem was to steady the shot, after which we photographed a pie travelling across the screen and out the side of the frame. The pie we photographed was a still shot of the pie she was holding in her hand. In looking at a daily print of the pie shot, we realized that several frames, five or six, would have to be dropped out, so that the hand would remain in the same position after the pie left it. This enable us to successfully substitute our own photographed pie and move it across the screen. The transition from the real pie to our photographed pie flying across the screen was made as a direct cut by balancing the two photographically on the optical printer.

We also had to employ several split screens in order to take the dust from the left side of the frame and move it to the right side, in order to cover the broken pieces of pie lying on the ground. Soft mattes were used to split screen different sections of the picture on the diagonal, from the lower left to the upper right of the frame. ■

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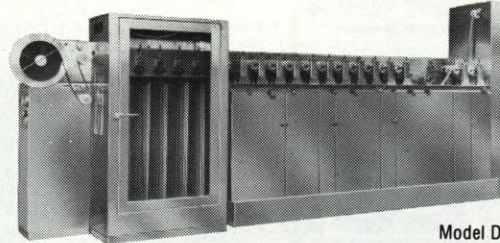
sharp as the center. ("Yes, yes.") To look at the overall quality of the picture. No noticeable grain or distortion. "Mr. Sackett, you're wasting my time. I know what this picture looks like, now just show me what your lens can do!" At this point, I removed the Super-Vision lens away from the prime lens and refocused the prime to the much smaller image. There wasn't a sound in the room. He just sat there. I was standing perfectly still just holding the lens in both of my hands. He got up from his seat, took the lens to the window and examined it inch by inch. Then he took out the prime lens from the projector and looked at it. His five minutes stretched to over two hours. When he finally left he muttered, "I still say there has to be a trick. I don't know what you did but you sure did do it and I say, it's got to a trick." And then with a begrudging slight smile, "A damn good trick."

QUESTION: Why did he have that attitude?

SACKETT: Not unusual. The same attitude seem to come from most of the other optical engineers who perhaps are slightly frustrated in their own work or with inventions of their own that are marking time. A multi-media producer in Washington, after he saw what the lens could do, couldn't care less. He was furious because his own optical inventions weren't getting any recognition or even getting patented. He just wanted to know what pull my patent attorney must have, how long it took, any bribes involved . . . you'd be surprised at what he had to say. Once I went to a so-called optical expert who was in charge of chairing a new projection equipment seminar at a convention. When I told him what I had, he just kept brushing me off. He called me "a fool", a "time waster" and that he knew positively I had nothing. When I kept asking him how he could say all these things and never saw the lens demonstrated, he sharply boasted, "I don't have to. I'm an optical expert and I know. What you say you have is absolutely impossible. And I'm going to tell others to stay away from you because you're a stupid person who knows nothing about projection optics!" The next day I came across an optical house salesman who said to me, "I see you made a friend yesterday. Mr. B told me what he told you. Know what I said to him? I said, 'You're wrong. Absolutely wrong. I know Mr. Sackett and I've met the inventor. What Mr. Sackett says he's

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got, he's got, that's all there is to it.' But Mr. B just keeps repeating to me, 'But he can't have what he says he's got. I've already told a lot of people here at the convention to stay away from him. Now if you tell me it does work, hell, do you know what that's going to do to me? It's going to hurt my credibility.'"

COMMENT: I can't believe there are people like that.

SACKETT: Listen, if I ever wrote a book about what's happened to me on this lens, especially in Hollywood, I think it would be as bizarre as any book some star would write divulging unsavory exploits. Then again, there are those gentlemen optical engineers who will readily admit they've changed their mind. Alan Gundelfinger, a well-known optical engineer in Hollywood, wrote me a letter, "I must admit that I went to the demonstration with a 'wait and see' attitude, but I came away convinced that I had witnessed something worthwhile. The screen picture was sharp from the center to the edges and corners, the color was excellent and the geometry was rectilinear (undistorted). Had I not known differently from the start, I would not have suspected that an auxiliary lens was being utilized. It was a very creditable showing."

QUESTION: And there were others who finally came around, too?

SACKETT: It took eight months of phone calls and letters to convince Arthur S. Milinowski to come to America for a demonstration. I was willing to go to his home in Ft. Erie, Canada. During this time period he kept telling me it was absolutely impossible to truly have what I said I did. And this man won ten commendations from the American government for optical inventions, including the periscope for the Apollo. After the demonstration he wrote to me. "I would like to repeat here that I was really startled by your demonstration of the Super-Vision lens system. It was well worth the trip from my home in Ft. Erie, Canada. You certainly do obtain a very high resolution enlargement with a flat field and no discernible distortion. I would not previously thought this possible, except with a considerably more complex system. It just goes to show there are still surprises in the optical field, even for us oldtimers."

QUESTION: So tell me, how does this one-of-a-kind optical system work?

SACKETT: Wait a minute. I only own the camera, remember? I didn't invent the



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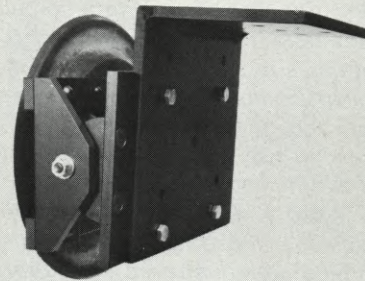


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lens. What I've learned about lenses came from my technical consultant Joe Schmit, Alan Gundelfinger, the inventor Mr. Anton and other friendly optical masters who shared their knowledge with me. I can tell you how it works. I can't tell you why. Come to think of it, I think Marconi once said the same thing when someone asked him how his wireless operated. As in many great inventions, Super-Vision is ingenious in operation and simple in principle.

QUESTION: Then explain the principle.

SACKETT: The Super-Vision lens works from the focal plane of the prime lens. In other words, whatever picture is formed by the prime lens, Super-Vision merely picks up this image from the aerial plane and then enlarges the image, according to its aspect ratio. The further you move the Super-Vision lens away from the prime, the bigger the image. And every time you move Super-Vision you must always refocus the prime. You must also remember never to overshoot the diameter of the Super-Vision lens.

QUESTION: And the enlarged picture is always perfect?

SACKETT: Only . . . and I must repeat that . . . the enlarged image is only as good as the original optics, the source material and the light source.

QUESTION: Don't you lose a lot of light?

SACKETT: As against what? Let's take the 16mm projector at 17 feet. Using a 2" prime lens the normal picture would be about 30" x 40". Now, if we add the Super-Vision lens to the prime we can get a picture up to 12 feet wide. In order to get the same size picture with only using the 2" prime lens, you would have to move the projector back another 44' for a total of 61' from the screen. If you take a light meter reading at this point, versus the same size picture at 17 feet plus Super-Vision, you will find there is more light and better quality using Super-Vision. If you want to, at 17 feet, you could also use a 5/8th-inch lens to get the 12-foot-wide picture. Know what you'll get? A much darker picture and quality loss. In other words, Super-Vision plus a longer focal length lens, in any projection system, will give you more light and better quality than shorter focal length lenses.

QUESTION: So you're saying if there are any distortions or aberrations you're not going to blame Super-

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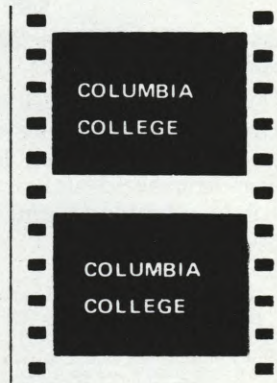


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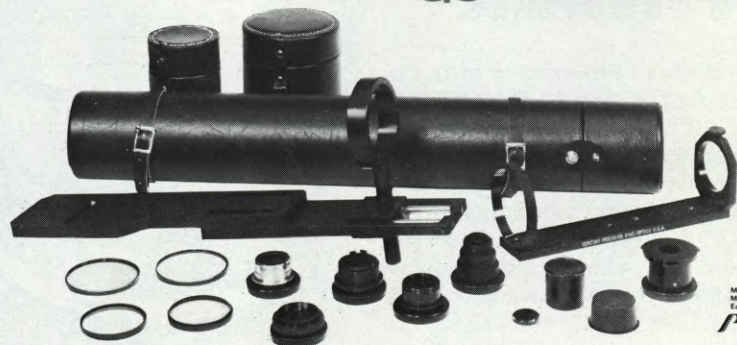
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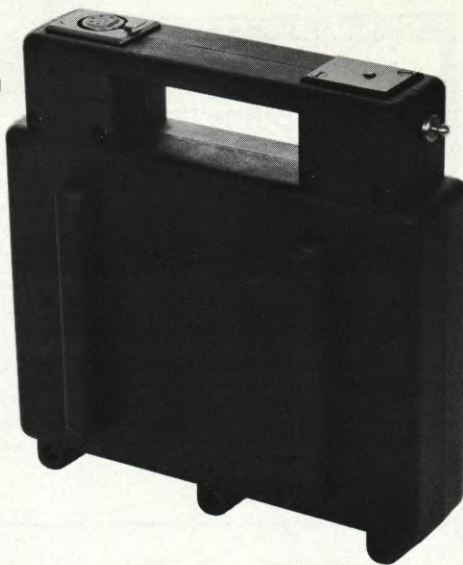
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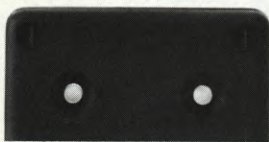
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Vision?

SACKETT: There's a computer expression, "garbage in, garbage out." Same goes for the output of Super-Vision. If there is any aberration you must check out the original source material projected only through the prime lens. You'd also be surprised how inferior a lot of prime lenses can be. We only blow up what's there in the areal plane. I remember a projection equipment house in Hollywood wanted a demonstration. On 16mm. The vice-president warned me he had seen this particular print a hundred times and it was perfect. For the first three minutes everything was fine. He and the other officials were very impressed. Then came a band parade. There on the right side of the film was a soft area. Quickly he jumped up from his seat and ran to the screen, pointing. "You see, you see. Look what you did. This wasn't here before." He stood there defiantly. I knew that an explanation would be worthless. He had me on the defensive the moment I came on the premises. He had to be shown. So I re-wound the film back to that specific point, removed the Super-Vision lens and only projected the film through the prime lens. There it was. The same soft area, smaller, but it was there.

QUESTION: What did the VP say then?

SACKETT: After a few throat clearances and tucking at his suit jacket for a few moments, he admitted he had never looked that closely at the film before. I replied that was because, this time, he was sitting in judgment. If you're just relaxing and enjoying a movie, you take whatever softness to be part of the film and never question it. But when you know something is different in the projection, automatically you are looking for problems. Everyone wants to become a critic. Everyone is ready for the pounce. If you stop to think about it, isn't it much easier to say you hate something? To say you love is difficult.

QUESTION: If the Super-Vision lens, because it is a magnifying element, can enlarge what distortions there are in the original material, isn't there another use in the film industry for this type of application?

SACKETT: You're quite right. In fact, BATTLESTAR GALACTICA used our lenses for that very purpose.

QUESTION: In what way?

SACKETT: The director set up a special screening room for the dailies. Right on

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the set. In a very short projection throw they got this huge picture and they were able to spot problems they would otherwise not have caught as readily.

QUESTION: What is this about using your lens instead of an anamorphic lens to shoot a scope picture.

SACKETT: That's not exactly correct. Super-Vision is not a taking lens. Not just yet. Though it can be used as a taking lens. Richard Kline, ASC, first saw this application but Jimmie Newcomb had the time to experiment. Jimmie still is experimenting. When he introduces the Super-Vision lens in front of the prime he increases the wide-angle 100% with no distortion. But we're ahead of ourselves here. Once Jimmie has all the facts we'll release them. Now, getting back to your question, let me answer it this way: because of Super-Vision it is no longer necessary to shoot scope pictures with anamorphic cinematography or project anamorphically.

QUESTION: How does Super-Vision accomplish this fact? You already said it's currently not being used as a camera lens.

SACKETT: It's all in the projection. It's that easy. Super-Vision merely allows for the scope format of the regular Academy to be projected onto the scope or 70mm size screen.

QUESTION: You have to explain that more fully.

SACKETT: What we're doing is taking the first part of Technicolor's old idea of Techniscope but not going to part II, that's making the four-perf squeezed Academy for projection. It's no longer necessary.

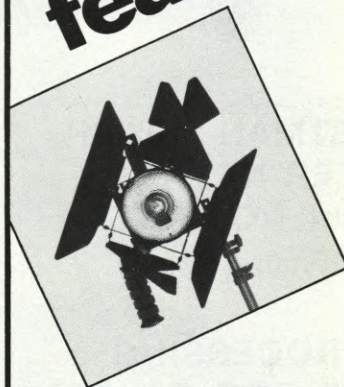
QUESTION: You'll have to tell me more.

SACKETT: First off, the person who invented the two-perforation-high format (as used in part I of Techniscope), was Ernesto Zollinger, 1912, in Italy. His idea was to save film stock. He did this by putting two, two-perf-high formats onto one Academy, running in opposite directions. Strictly for the wide-screen, .980 x .374. Remember, they didn't have sound tracks in those days. Then, in 1963, two other Italians, Giulio Monteleoni and Giovanni Ventimiglia, took the wide-screen format and expanded it to an anamorphic dimension, .868 x .374, which blew up to the squeezed four-perf pull-down print. These two men gave Technicolor their answer to Fox's

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CinemaScope process. What we're doing is going back to the original Zolinger two-perf-high format and allowing Super-Vision to enlarge the image to the scope screen strictly through standard theatre projection. You don't need a squeezed print to be unraveled.

QUESTION: You talk about the two-perf-high format. Are you suggesting that the cameraman shoot two-perf-high information, too?

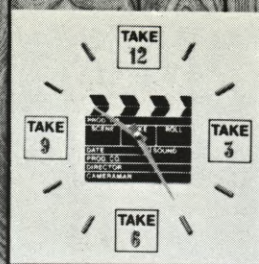
SACKETT: If the release print will be in MagnaScope, yes, because there are more money savings up front in projection. But this would be strictly for presenting scope pictures through our lens. If the producer is not sure he wants to go MagnaScope, would like to play the picture either flat or in scope, he can shoot the picture another way and get both at the same time. And it wouldn't cost any more money, either.

QUESTION: Now, you're telling me that a producer can shoot his picture both in scope and flat, both formats in his film and use either one he wants? You've got to be clearer for me.

SACKETT: I'll try to say it as simply as I can. The cameraman frames 2.2 (that's .747 x .341) in the ground glass. (By the way, I say 2.2 because Joe Schmit, our technical consultant says that most anamorphic height screens are the same size as flat screens (1.85), and if theatre managers want to go 70mm as well as scope, the 2.2 aspect ratio is more precise. Anyway, while the cameraman is framing 2.2, he is also covered for 1.85. Should he want to save more money for the producer he can also protect for 1.33, ready for TV. Now, if the producers want to use the Super-Vision lens in theatre projection, the projectionist merely cuts a 2.2 aperture and he's got himself a scope picture. Or a 70mm picture. Makes no difference. And where small theatres have scope size widths the same as flat, then Super-Vision lenses aren't needed and the projectionist uses the standard 1.85 aperture and he's still in business. Then again, this same film can be reduced to MagnaScope for either flat or scope.

QUESTION: Have any producers expressed an interest in this 2.2 and 1.85 combination on film?

SACKETT: Oh, yes. Gloria Geale, who is producing DEAD MAN WALKING, the Johnny Garcia Story, is preparing her shoot this way. Richard Bernstein is going to do it with BLOW GUN. And Igo Kantor, involved with a Telly Savalas pic-



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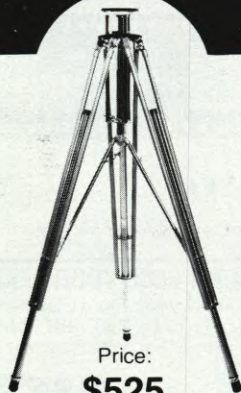
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ture, said he's considering this method, too. There are others.

QUESTION: You feel that this process for scope is just as good as what we have now?

SACKETT: Better. In fact, let me quote exactly from the TechniScope II/Arriflex 35 people, who were pushing, sometime ago, the shooting of two-perf pull-down for scope pictures. Our principle is identically the same whether you shoot two-perf pull-down or standard four-perf with 2.2 framing and covering for 1.85 and 1.33. Getting back to that direct quote, "The loss of negative image area is offset to a very great extent in (2.2 or 2.35) photography by using only spherical lenses, since spherical lenses alone generally give better resolution and better contrast than spherical lenses combined with cylindrical lenses, or than such lenses with anamorphic supplementary lenses. Moreover, the resulting halved taking focal length gives a better depth of focus while maintaining the same field of view."

QUESTION: Are there any other plusses, as you see them, in shooting this new "scope" method?

SACKETT: Definitely. Firstly, you don't have to lug around heavy anamorphic equipment or special taking lenses. And like the Arriflex people said, "There's also substantial savings in the cost of special studio lighting, since without using anamorphotics the razor-sharp image definition can be obtained by using spherical lenses with larger apertures." Then there's the greater depth of field that can be obtained by using lenses with half the focal length. Also, all normal lenses can be used, including zoom lenses, and still have the same field of view as anamorphic systems.

QUESTION: That's it?

SACKETT: Well, as long as you asked, there are other reasons. Like 16mm anamorphic prints which have not been that great. So framed also for 1.85, the 16mm market can have a good sharp original without being concerned for a "scope" reduction print. When you think about it, this three-for-one idea is kind of interesting.

QUESTION: Tell us more about MagnaScope.

SACKETT: If the producer really wants to save a lot of money, he can go back to the original Zollinger concept, which we call MagnaScope, an interlaced print with

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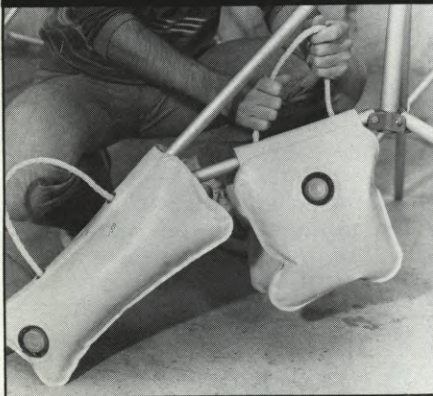


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two, two-perf-high formats to each Academy, each format going in the opposite direction with corresponding sound tracks. Using MagnaScope prints the producers save on print costs, cutting his footage in half, along with costs for half the storage space, shipping weight, reels, cans, etcetera. This optically-reduced print, when projected through the Super-Vision lens will either fill up the flat or the "scope" screen. Of course, the cameraman can shoot a straight two-perf pull-down and you can save even more money up front in production. And in a sense, he could shoot both flat and "scope" formats at the same time, too. A little tricky, but it could be done.

QUESTION: Would you say that theatres might be better off having the standard film which can either go flat or "scope" or 70mm for that matter?

SACKETT: You'll have to admit it does answer any size screen situation. It's very innovative and that's what we are trying to put across. Our problem is finding the innovative producers. We have a few but not enough and we're just waiting for that first producer to make up his mind and fly. Too many head men swim in a sea of indecisions.

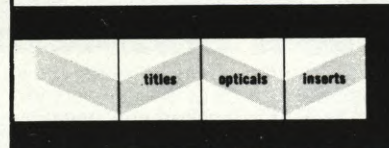
QUESTION: The film industry seems to be noted for this.

SACKETT: Don't I know it. The real creative artists are the cameramen, the cinematographers, the set and costume designers, the writers, and of course, the director. But unfortunately, they're not the ones who handle the money and make the decisions. In Hollywood, it's the studio heads and they're constantly worried they might lose the next payment on their swimming pool or rented Rolls.

QUESTION: You sound bitter.

SACKETT: Confused. Here we have a way of putting out excellent quality films and at the same time saving millions of dollars but too many are afraid of change. So what happens? The so-called decision makers wait until the other sheep make the first move. It happened in TV. Studios waited to make sure TV was here to stay. Remember ZIV Television Productions? ZIV paved the way and then Hollywood moved in. Take 16mm for instance. One studio told us we're five years ahead of our time trying to convince theatre owners to convert. Can you think of the additional millions that can be saved with 16mm theatres? When you put the 1.85 aperture in with the 16mm film and project through

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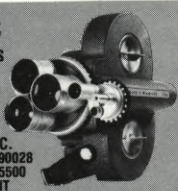
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your MagnaScope release print idea
could also stop piracy.

SACKETT: No, not stop, but thwart.
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image on the film it would require optical
printing, which is slower and more costly
and less easy to get on an overnight
basis. More technical people would be
required to make the setups. It's not a
quickness situation anymore.

QUESTION: How about transfer to
tape?

SACKETT: Joe Schmit tells me that film
to videotape requires a telecine chain
with special aperture and special copy
ratio. A facility with a telecine chain
would not be as likely to change during a
lull in standard legitimate operations. Of
course, the pirates do have alternatives.
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could sell our lenses along with the pi-
rated prints.

QUESTION: It also sounds like the
cost of pirated prints would go up,
too.

SACKETT: I'm sure of that. However,
until the pirates find the new ways to
circumvent the smaller picture image the
producers and studios could save
immediate millions. It is something to
consider.

QUESTION: Is it true that projection
through just one of your lenses can
circumvent the same curve as the old
Cinerama which took the help of three
projectors to accomplish.

SACKETT: Firstly, Cinerama was only
146°, utilizing three projectors.
Secondly, one Super-Vision lens can
circumvent a curve of 180° and what's
more important, you don't have to shoot
with fish-eye lenses. We're doing that
right now, projecting standard film fare
onto 180° domes like Benedum Science
Theatre, Ogelbay Park, Wheeling, West
Virginia; Yonkers Planetarium, Miami
Planetarium and Heritage Park, New
Hampshire, to mention a mere few.

QUESTION: How do the labs feel
about your introducing MagnaScope
and cutting the print order in half?

SACKETT: It'll take time for them to move
with progress. Sidney Solow, who then



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headed C.F.I., was the first gentleman to call Joe Schmit and me. He thought the idea inventive and said his laboratory would move ahead with the producers. Saul Jeffee, president of Movielab, is also interested in moving with the "state-of-the-art". TVC in New York is another lab ready to move. Whereas another executive, from another major Hollywood lab, said he would fight us all the way to the bank. He said he would warn shipping companies, raw stock dealers and anyone else he could to keep his profits high. Yet, the president of the same company, when told of these statements, said there really is no loss; they would probably get new business. Not everyone will change overnight and he, too, would consider proper pricing. But remember, Universal played around with this interlaced idea for fifteen years through a man named Walter Bayer.

QUESTION: If Universal played with the idea for that long and did nothing, what was wrong then that is supposedly right now?

SACKETT: First, the new dupe stock available now makes one-light dupes easier and less expensive. Second, there's Super-Vision! No one had the kind of prime lenses to properly blow up the smaller image. Shorter focal length lenses couldn't carry it off. But, Super-Vision, being a variable focal length modifier, you can get the exact screen size you need. You don't have to bastardize the picture because of fixed masking that so many theatres have. That's what stopped us going with "HAIR" in major situations.

QUESTION: Was HAIR shot with your new idea, 2.2 and 1.85 at the same time?

SACKETT: If HAIR was shot like that we wouldn't have had any problems. That film really cries for the big screen presentation. And what a difference when you see it against the standard flat. Milos Forman personally saw what our lens could do in filling the larger screen, but he wanted to keep the 1.85 aspect ratio. This meant, as we widened the picture we'd also go higher. In order to keep the 1.85 ratio the top masking on the screen would have to move, too. But how many theatres have moveable top borders? We would have opened the Filmex program if the top curtain moved at the Plitt Theatre. But it didn't. However, it did move at the Fox Theatre in Las Vegas. So HAIR played on the big screen for the ShoWest delegates last February.

QUESTION: What happens to other

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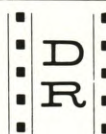
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flat films that producers feel they'd like to play on the scope size screen with your lens. It's already shot flat so there's nothing more they can do. How can they do it, I mean, if you can't move the top curtain as you're enlarging the picture to fill the "scope" area, isn't something cut off from the film?

SACKETT: This all depends on how tightly the 1.85 format is used. Michael DeGaetano, who wrote, produced and directed DRIBBLE wanted to project through Super-Vision. But it's a basketball picture and there are a lot of scenes on the basketball court. If you cut the 2.2 aperture to accommodate the film the baskets in this situation would be out of sight. Yet, there's a picture now playing across the country called THE FANTASTIC BALLOON VOYAGE starring Jeff Cooper. This is a marvelous G picture with lots of animals, scenery and adventure. Fortunately, the full 1.85 frame wasn't used. So the picture is playing theatres with a 2.2 aperture, nothing is really missing and this flat picture is filling "scope" and 70mm-size screens. Recently, in Albuquerque, at three theatres, our lenses were used with SMOKEY AND THE BANDIT, UNMARRIED WOMAN and CALIFORNIA DREAMING. Pictures were all shot flat, but according to the manager, the films looked great on the big screen.

QUESTION: I heard you really had a problem with BUCK ROGERS.

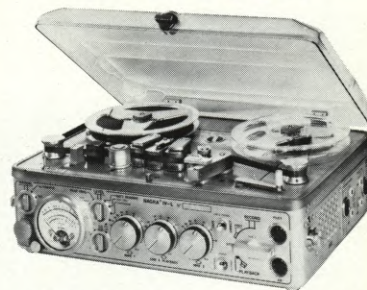
SACKETT: Could have been a trade-off situation. Firstly, it was made for television. That's 1.33. Then they decided to release it theatrically. That's 1.85. Now we come along with a 2.2 aperture. So, we had big beautiful navels but some of the gorgeous heads weren't there to go with them. The fights looked great on the bigger screen but Plitt's head man didn't like so many dancing eye-brows alone on the screen. Personally, I thought the action made up for the cut heads. Yet, we signed a contract with Enrique Torres, one of South America's leading producers, who is using our lenses with his flat pictures. But he's also working on his first picture, SIX TICKETS TO HELL with John Russell and Mala Powers, which will be distributed in MagnaScope and our lenses. Not only that, he's involved with a major film lab in South America that loves the MagnaScope idea and is pushing it with other clients.

QUESTION: Does it look like any other lab coming in on your side?

SACKETT: There is a president of another large lab who said he would be

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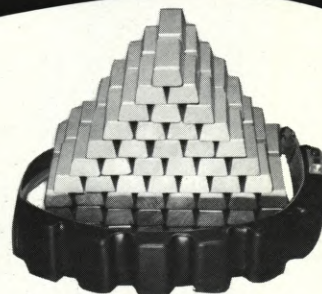
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interested but only after he saw the MagnaScope print projected against the standard Academy size. When I told him I would do it, provided that he would have to guess which was the MagnaScope or the regular film, he only wanted to know if I could use another enemy! I asked him how he now judged flat prints. "On its own merits," he replied. So I asked why he couldn't judge MagnaScope on its own merits, too? I told him that when Joe Schmit read our paper at the SMPTE Convention in New York, 1978, and the technicians in attendance judged the MagnaScope print on its own merits, why couldn't he do the same. To which he immediately replied, "We don't have to do business, you know." Like Joe said, "When CinemaScope was first introduced, what did they pitch that against?" Of course then came all the competitors like Vista-Vision, SuperScope, Techniscope . . .

QUESTION: What about the future?

SACKETT: I hear that the Academy Awards might be moved to larger headquarters in 1980. If they do, I hope they will still be using our lenses for the third year in a row. Steve North, Background Engineers, who handles projection services for the Academy, was the first projection technician in Hollywood to really grasp what this lens could do for shows. He didn't waste any time. I met him in December, '77, and right off he used it for rear-projection with the Steve Martin show in Anaheim, and in April, '78, he introduced it at the 50th Anniversary Academy Awards Presentation. He used the lens to enlarge the nominated filmclips onto the screen at the Dorothy Chandler Pavilion. The same thing again this year. Its use has actually been seen by millions all over the world.

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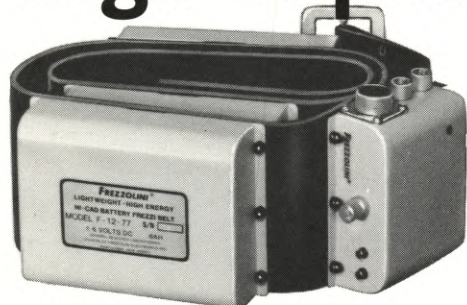


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