
American
Cinematographer
International Journal of Motion Picture Photography and Production Techniques
SEPTEMBER 1977/$1.50
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# The Electronic Bolex H-16 EL. By any other name it would cost twice as much.

Having built professional 16mm cameras for close to 40 years, we can offer this assurance about our H-16 EL:

There isn't another 16mm camera within thousands of dollars of the EL that gives you anything like its quality, its reliable performance, and its up-to-date all-round capabilities.

You have crystal control of the motor for wireless sync sound. Sync-pulse generator permits automatic slating. Solid-state electronics control other motor speeds from 10 to 50 fps forward and 18 fps reverse, single-frame exposures, and LED exposure readout in the reflex finder.

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And, save enough on everything to pay for hundreds of extra rolls of film, or additional equipment you thought beyond your budget!

For full-color literature about the EL, as well as the other Bolex 16 cameras and sound projector, write for Lit/Pak P-77. And if you'd like to see a film about the EL, we'll be glad to arrange it.

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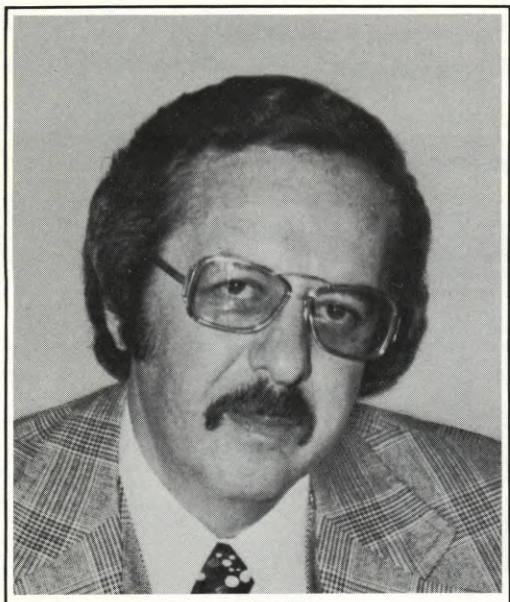

*Samuel "Chick" Hyman,*
*President of CAMERA MART*

# "Chick" Hyman likes the FRENCH ECLAIR ACL

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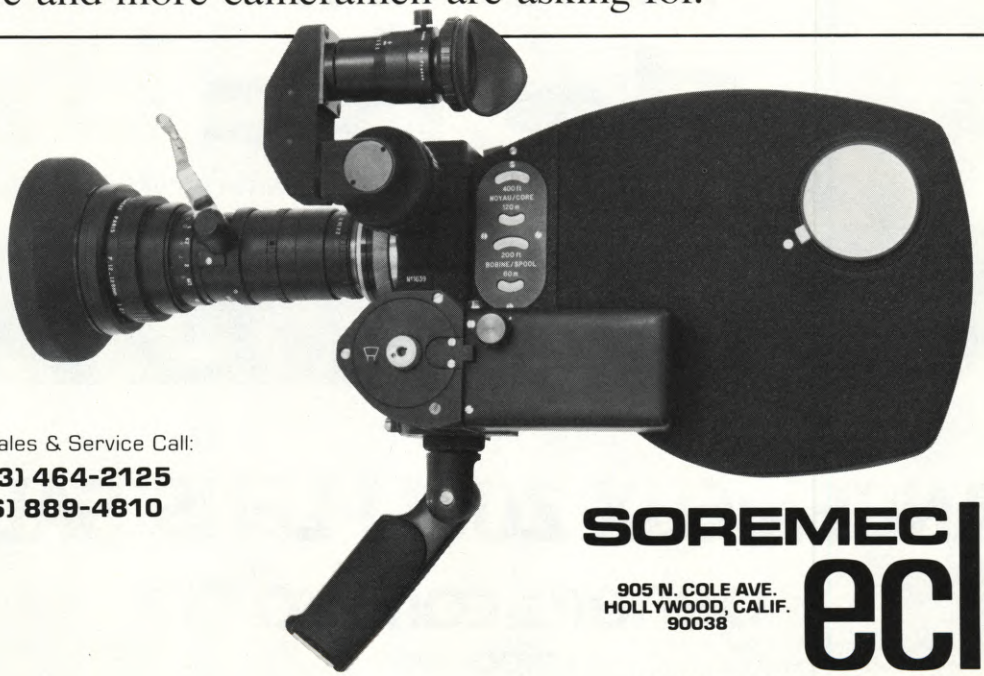

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# American Cinematographer

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.*


**SEPTEMBER, 1977** **VOL. 58, NO. 9**





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## • FEATURE ARTICLES



## • DEPARTMENTS



ON THE COVER: A photomontage of famous sights in London, England, scene of the recent FILM '77, the 5th biennial International Technology Conference and Exhibition, sponsored by the British Kinematograph, Sound and Television Society.


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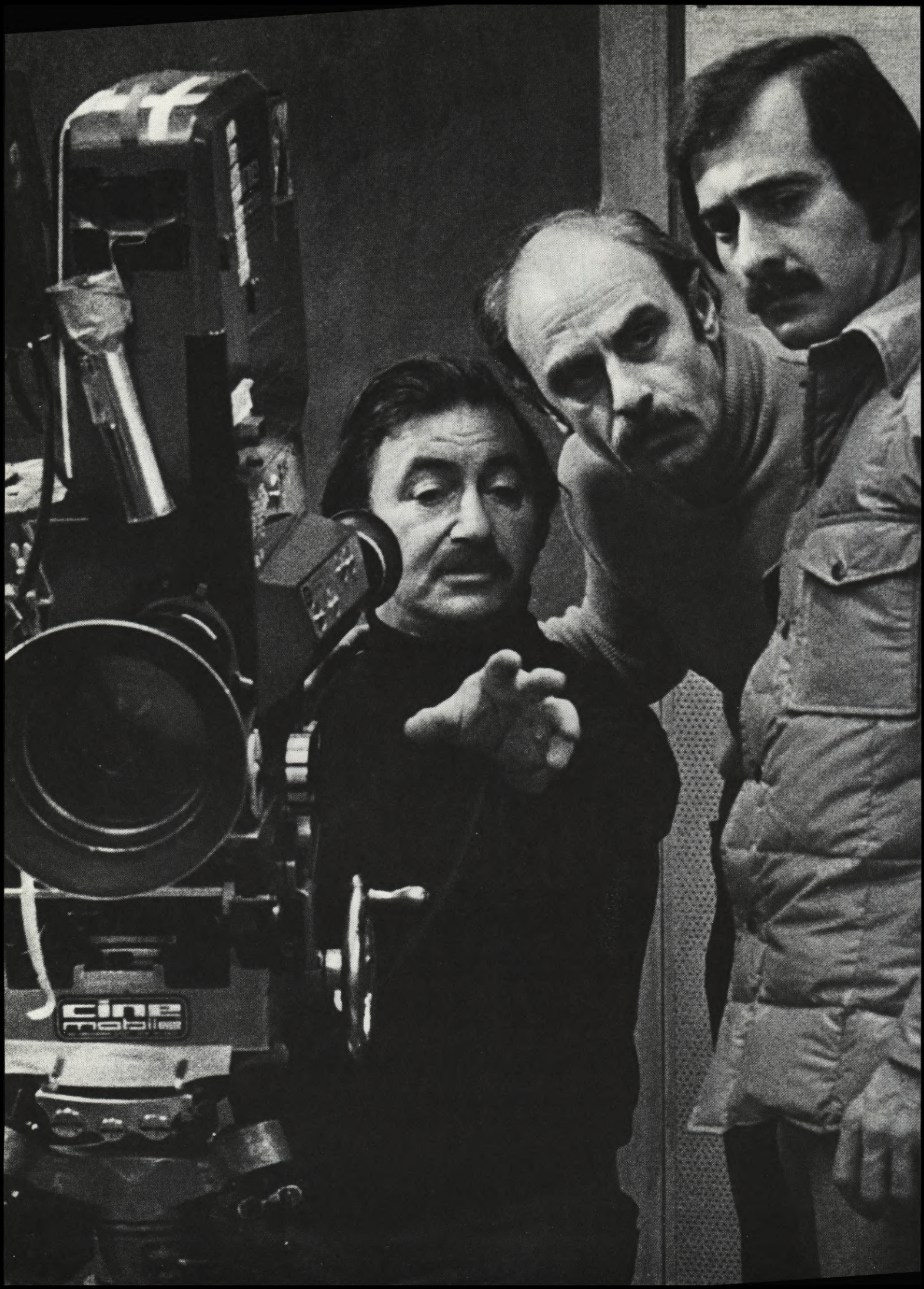
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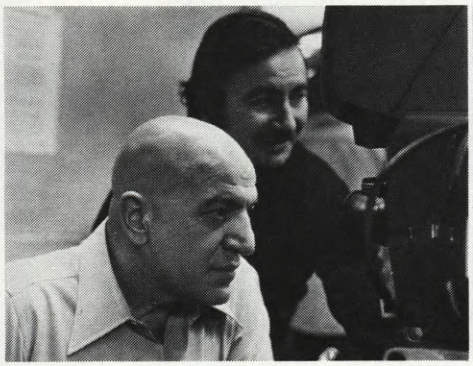
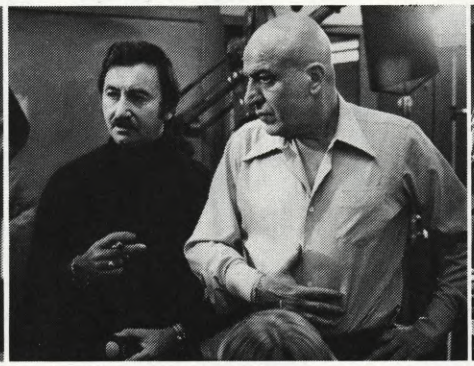
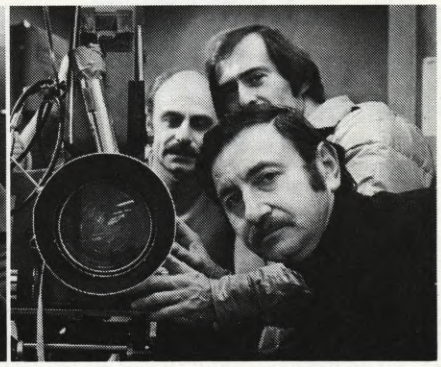
mobil

# SOL NEGRIN







Cinematographers, constantly confronted with unique problems of light control and balance, tend to see things from a highly specialized perspective. So when Sol Negrin, ASC, talks of "areas like canyons with the sun streaking on one side," he is referring not to Death Valley but to Manhattan's Lower East Side. For Sol Negrin, New York City is one huge back lot, whether it's for setting up a shootout or choreographing a chase.

But if you think there's a lot of action on the popular Kojak series, you should see the kind of action that goes on behind the scenes. Each show has a six-day shooting schedule, so director and film crew are under tremendous nonstop pressure to deliver not only quality but quantity. And they do deliver.

"Keeping our director as free from restrictions as possible," is how Sol, director of photography on the New York-based shows, defines the job. "I work with one of the best operators in the business, Lou Barlia. I have a terrific assistant, Maurice Brown, an excellent 2nd assistant cameraman, Don Biller, and a fine electrical and grip crew. This crew has performed miracles. The Eastman color negative II film 5247 helps us average eight to eleven pages a day. That's 25 to 35 setups, and sometimes as many as 40—more than double the amount you do for a feature film. Most of the action sequences are shot first, especially during the short winter days. We do the close-ups when the sun goes down and light them to look like daylight."

You can judge how brilliantly Sol handles perplexing light variables by the fact that two episodes have earned him Emmy nominations. But accolades are nothing new to the many-faceted Negrin. He learned the hard way and, he believes, the best way—by being in the business. He began his career with a small industrial film company where he was required to do everything. He became a member of Local 644, I.A.T.S.E. Then he progressed rapidly from assistant cameraman to camera operator, from second unit director of photography to director of photography. Screen credits on some of the finest features and TV series filmed in New York document his contribution to cinematography.

In fact, his contribution takes many forms. Some of the top cinematographers in the field were once his assistants, and he shares his vast knowledge of film techniques and camera equipment generously. During his term as president of the cameramen's union, Local 644, he arranged seminars at which members could exchange ideas and find out about the latest technical advances.

"We also had very productive seminars with Eastman Kodak Company, set up by my good friends Len Coleman, Cal Hotchkiss and John Zeman. I think Kodak has improved its products because the company has listened to the cinematographers both in New York and California. There's a good rapport between the cinematographers, the labs, and Eastman Kodak Company, working in accord to make the best possible product. The Kojak series," adds Sol, "is a good way to test film because we deal with so many different light situations. And I've found the 5247 film to be the finest all-around film on the market."

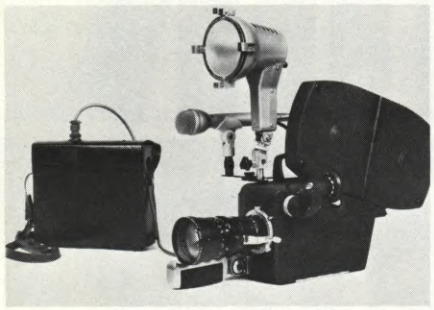
Sol has a profound and passionate commitment to film and its potential. "I've worked with videotape. It's all electronic and you can see it instantly and maybe that's a big advantage. But certainly film has another dimension, another quality, which is entirely different." Exploring this difference, experimenting with multiple lighting effects and different kinds of filtration is something Sol enjoys almost as much as he enjoys pooling cinematographic know-how.

"For many many years, in the '30s and '40s, when the mystique of the camera was even stronger and you really had to take a reading by the seat of your pants, the director of photography was a very important individual. Today we have sophisticated cameras to work with, good exposure meters, good laboratories, better control. On the other hand, we have to cope with the stringencies of economics and time. So the challenge is still there. But it's a different kind of challenge. As for the mystique, I don't believe in secrets. I believe in the interchange of ideas. Every day is an education. After all, can one ever stop learning?"

*In our new publication, "Kodak Professional Forum," Sol Negrin discusses his work in more detail. Future issues will contain interviews with other interesting film personalities and news of our latest technical developments. If you would like to be on our mailing list, just write Eastman Kodak Company, Dept. 640, Rochester, New York 14650.*

# WHAT'S NEW

*IN PRODUCTS, SERVICES AND LITERATURE*



### NEW CP/NEWSLITE 12V/100W LIGHTING SYSTEM AVAILABLE FROM CINEMA PRODUCTS

Cinema Products Corporation announces the availability of the new, lightweight CP/NEWSLITE 12V/100W lighting system—ideal for use with the new, faster film stocks (Eastman VNF 7250 and Fujicolor RT400, both rated at 400 ASA) in most television news-gathering, documentary, and similar applications.

The entire ultra-lightweight lighting system consists of a *focusing* CP/NEWSLITE, a 100-watt/12-volt 3400°K "Quartz" lamp, and a CP 12V *Battery* (with built-in charger).

Designed to be top-mounted on CP-16, CP-16R and other 16mm cameras, the rugged *focusing* CP/NEWSLITE weighs only 19 oz. (with cable and connector), and is priced at $85.00 (less lamp). The CP/NEWSLITE also features a convenient integral handle and a detachable yoke.

The CP 12V Battery (with built-in charger) weighs approximately 6 lbs, and recharges overnight. It is priced at $275.00. (A black leather case and shoulder strap is included.)

For further information, please write to Cinema Products Corporation, 2037 Granville Ave., Los Angeles, CA 90025. Tel: (213) 478-0711.

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### OPENING OF DISNEY'S "THE RESCUERS" MARKS 40th ANNIVERSARY OF THE OSCAR-WINNING MULTIPLANE ANIMATION CAMERA INVENTION

When "THE RESCUERS" opens as Walt Disney Productions' first all-animated feature in four years, it will mark the 40th anniversary of an innovative animation device created by the studio — the multiplane camera.

First used on "THE OLD MILL" (1937), this huge and complex camera mechanism gives a three-dimensional effect to moving animated camera shots. Whereas a simple live action dolly shot (camera moves in on subject) takes a few hours to set up and moments to shoot, a multiplane shot achieving the same effect in animation can take weeks to prepare and shoot.

The lengthy opening sequence of "PINOCCHIO" in which the camera moves over rooftops cost $45,000 in 1940. The same shot would be in excess of $300,000 today.

"THE OLD MILL" won Disney Studios the Academy Award as Best Cartoon, and a separate Oscar in the Scientific and Technical Class for "design and application to production of the multiplane camera."

Bill Glarity, head of Disney's camera department, invented the device which places glass plates painted with backgrounds from 12 inches to three feet apart. Animated action takes place between the planes, while the camera moves into the backgrounds. The operators move the camera a fraction of an inch, expose a frame of film, then move the camera again in a laborious process.

One of the early jobs of Disney president, Card Walker, was technician on the multiplane camera.

Each level of the mechanism is adjustable, as is the camera itself which is aimed vertically through the levels. In all, camera, backgrounds, foregrounds and action are capable of 64 separate settings for each frame of film.

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### MAGNASYNC/MOVIOLA INTRODUCES 35MM CONSOLE EDITING TABLE AT SMPTE

A six-plate, 35mm console editing table — the M35AH — will be introduced by Magnasync/Moviola at the 1977 SMPTE Conference at the Century Plaza Hotel in Los Angeles, October 16-21.

According to Sam Lane, Magnasync/Moviola vice president-marketing, the M35AH "has been designed and engineered to the most exacting requirements of the motion picture and television industries." Lane added that "we went into the field and asked film and video editors what they wanted in a 35mm editing console, and the M35AH incorporates those wants."

Some of the M35AH's features include a unique footage/time digital readout system with memory; a picture transport with Magna Scope hollow flickerless prism; two separate sound transports with ASA single-track magnetic heads; pushbutton advance/retard control; manual inching on all transports; crystal-controlled sound speed; independent torque motor control for each of the six platters; heavy duty torque motors with positive braking action; and multiple picture capability.

Extra-cost options include composite optical head; selectable three-track sound head; and a 17.5mm ASA single-track sound head.

The basic M35AH lists for $13,595, f.o.b. North Hollywood, CA. Complete specifications are available from Editing Sales, Magnasync/Moviola Corporation, 5539 Riverton Ave., North Hollywood, CA 91601; telephone (213) 877-2791.

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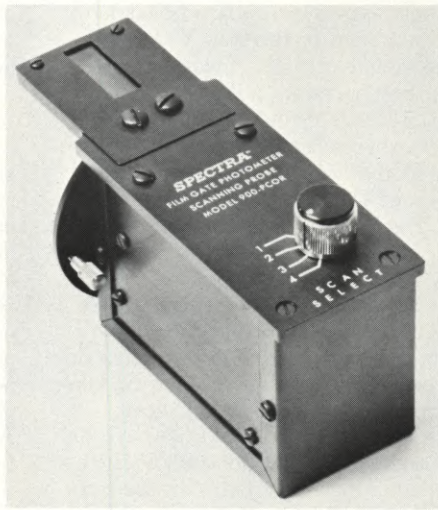
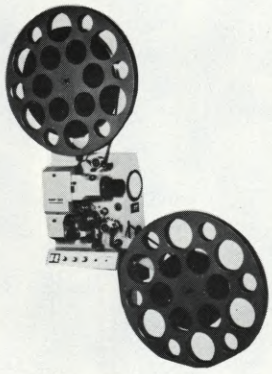



### NEW SCANNING PROBE FOR PETERSON CONTINUOUS OPTICAL REDUCTION PRINTERS

Pioneer Marketing Corporation announces the availability of their new scanning probe for the Peterson

**Continued on Page 982**

# We cordially invite you to see the latest Alan Gordon Enterprises line of professional motion picture equipment at the SMPTE Conference and Exhibit, Oct. 16-22, Century-Plaza Hotel, Los Angeles.



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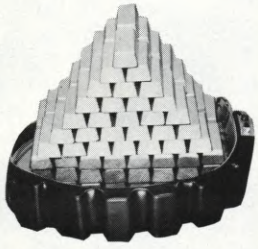
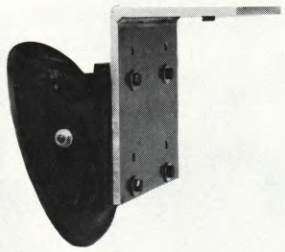
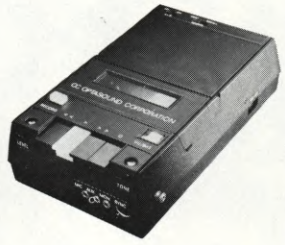


**GOLDTOP BATTERY BELTS AND PACKS**
The newest concept in battery power for professional motion picture and TV cameras.

**ZEPPELIN SOUND SYSTEM**
Combining the Zeppelin Windscreen with the new Independent Suspension Shock Mount.



**SUPER GRIP**
The camera mount designed to be attached to curved, irregular or flat surfaces.



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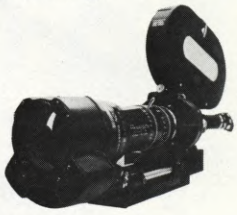

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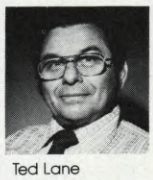
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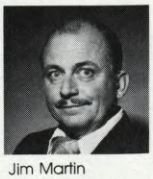
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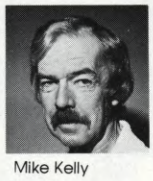
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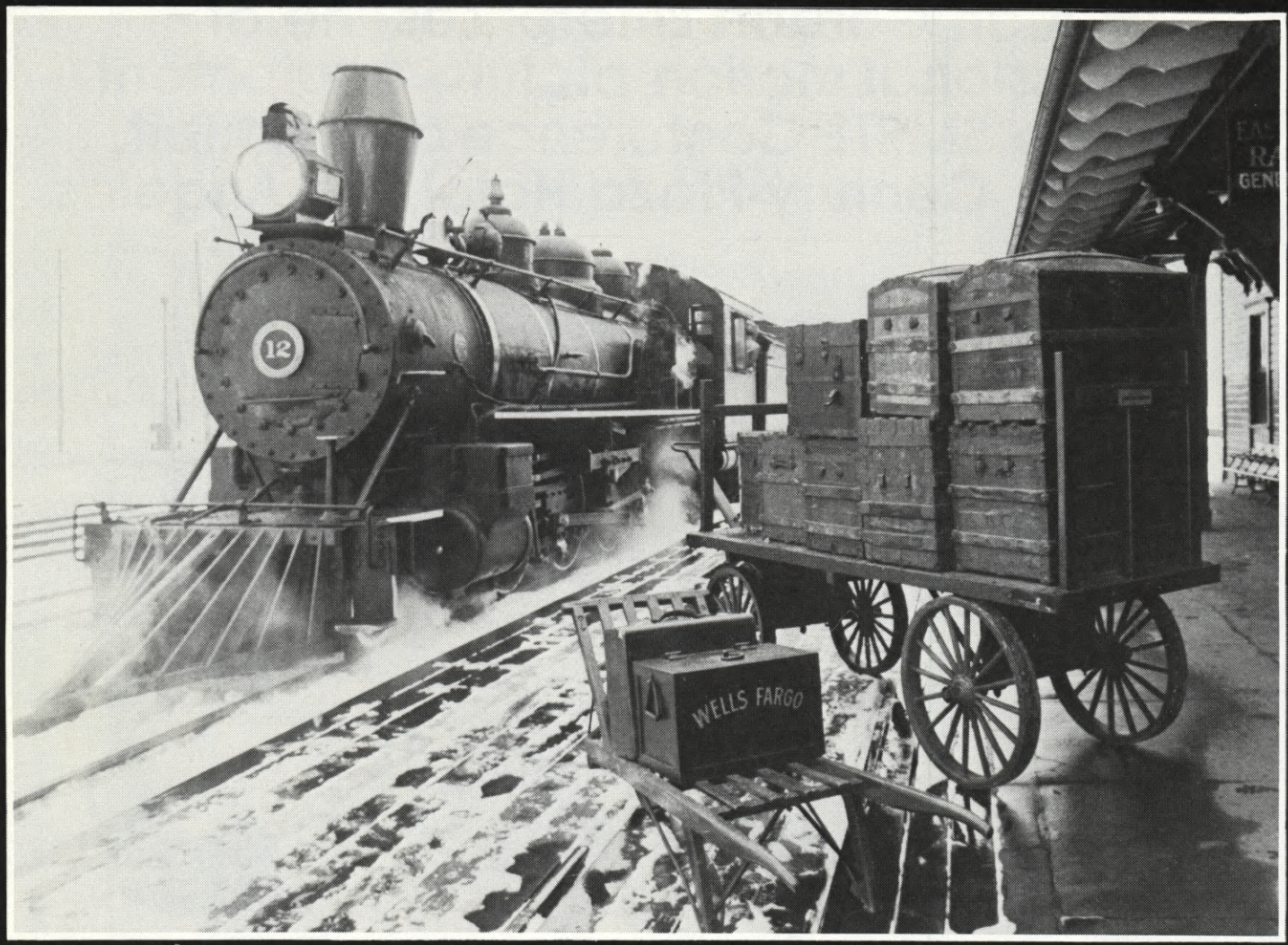


# "On *American Enterprise*, TVC gave us beautiful dailies. Then they gave us beautiful prints—7,000 of them."

"The incredible story of *American Enterprise*—from an idea to the most widely-seen educational film series ever—began in the spring of 1975, when we presented Phillips Petroleum Company with an idea and a challenge: to tell the story of how this nation evolved from an underdeveloped country to the economic marvel it is today.

"A series of five films was proposed. And, since America's economic 'sets' were still largely in place—the mills of New England, the canals, the railroads, etc.—why not crisscross the country and use them?

"Phillips accepted the challenge, and *American Enterprise* was born.

"For seven months our crews travelled more than 100,000 miles to 104 locations in 31 states. We had only one day per location.

"Time was of the essence. We needed a stock and a lab we could count on, both of which had to be fast.

"Our choices were 7247 and TVC. Throughout the job TVC gave us beautiful dailies . . . then they picked up where they left off and gave us beautiful release prints—a total of 7,000 of them.

"Starting in September *American Enterprise* will be seen by a million school children a month—the first time this magic number has been reached! And, beginning in October, *American Enterprise* will be seen on commercial prime time TV in more than a dozen major markets.

"*American Enterprise* worked because it tapped a need. It was the right combination of ideas, talents and people at the right time. TVC was very much a part of that combination.

"Thanks, TVC."

*James C. Crimmins/Executive Producer/Playback Associates, Inc.*

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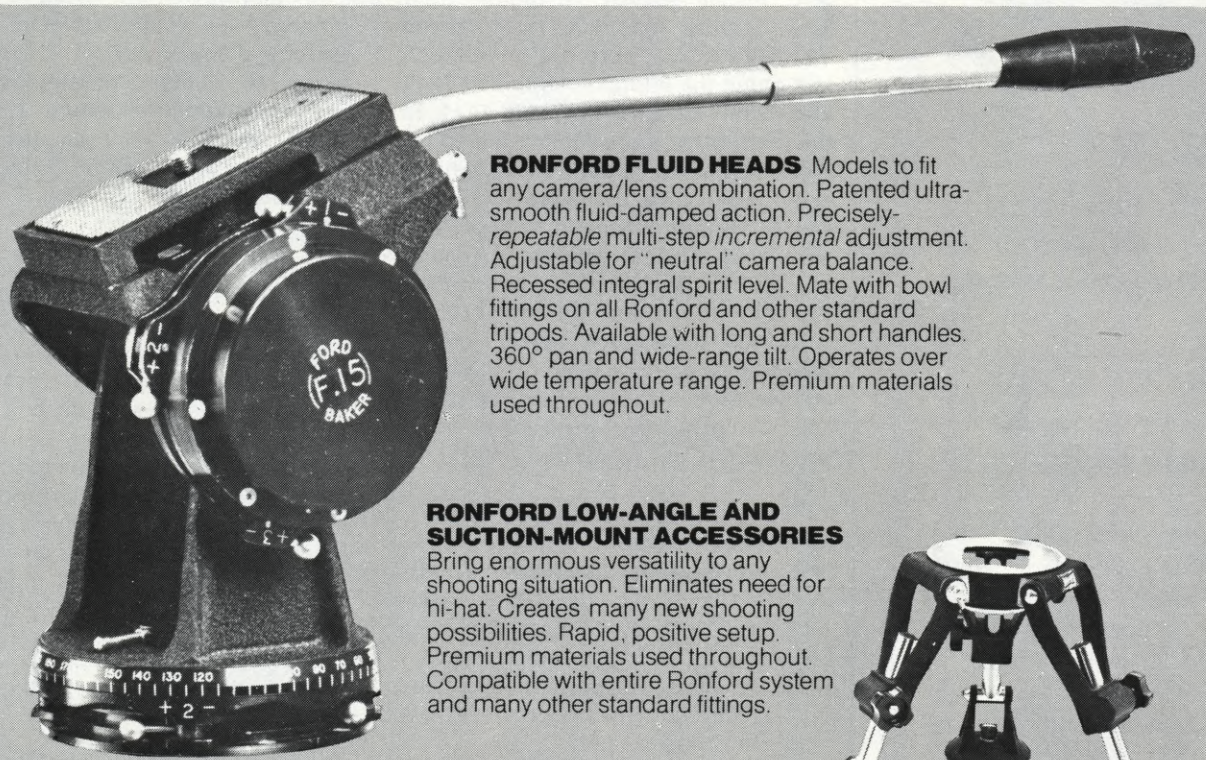


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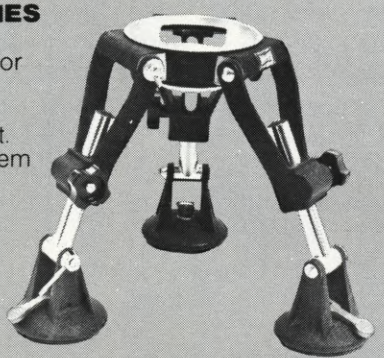
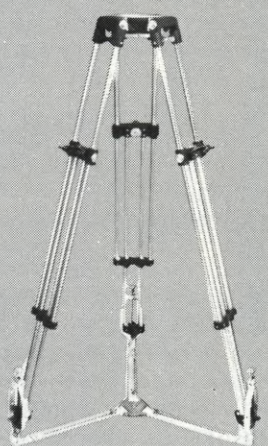


Working with a Ronford is like getting behind the wheel of a Rolls: the machine responds precisely and unvaryingly to your directions. Thanks to the way it is designed and built. With many refinements, large and small. Lavish use of costly materials. Precise, prideful fabrication and finishing. And an inordinate attention to detail.

"Designed to last indefinitely," is not a Ronford salesman's boast, but a case of British understatement. You owe it to your reputation to find out more about the Ronford line. Or better yet, trying their products for yourself.



**RONFORD STANDARD LEGS** Available in light, medium and heavy duty models. Absolutely rigid in all positions. Positive, quick-action lock. Exclusive "no-stoop" height adjustment. High strength/weight ratio. Premium materials. Fully guaranteed.

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# QUESTIONS & ANSWERS


Conducted by CHARLES G. CLARKE, ASC.
and WINTON HOCH, ASC.


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

**Q Please answer an inquiry concerning matching post-flashed VNF with ECO. There has been much talk about the improvements that 7240 and 7239 have over 7242 and 7241. In the past, when a production called for night shots, or uncontrolled lighting shots where the standard film used was ECO, a post-flashed 7242 or 7241 was used for that sequence (though not intercut in the same sequence). The VNF films, and now the 7250 of ASA 400 have been highly recommended for good results on TV. Would you recommend using them for 16mm release print end-product-type of productions not necessarily made for TV?**

A The new VNF films that you mention represent another step forward in the technology of film manufacturing. They can be post-flashed to reduce contrast in the same way that the older films can be. Similarly, they can be forced in development to enhance their speed rating.

In regard to the ultra high-speed film, we recommend that it can be used successfully when needed. It is good photographic policy to employ films whose speed ratings are appropriate for the individual circumstances. In other words, you can obtain a better quality image by using slower films if the lighting conditions are favorable.

**Q I am using an 85B filter, with 7242 film on my zoom 16mm lens, taking exposure readings with my Gossen (auto) meter, and have excellent results. I recently purchased a Tiffen 85POL filter to replace the 85B filter. It has a lever at the top so that it can be revolved for desired effects. Are there any rules as to operating this type of filter? Using the lever atop the revolving unit I presume would be in a sort of neutral position and the result would be similar to using the straight 85. Can you suggest any examples where the 85POL filter would help improve a scene such as landscapes, sea scenes, etc?**

**When filming inside, I would have to remove this filter as I do with the 85. Would this lever likely be on top position for holding back sky or scenes involving a large portion of water?**

**In photographing from a plane window, I use an ultra-violet filter. With average plane speed of 350 mph at 16,000 to 18,000 feet altitude, what average exposure would I use. I usually shoot at 1/60 per second for most all my ground shots. Should I use my meter for determining the aerial shots?**

A When you use a polarizing filter such as the 85POL instead of the regular 85, you are introducing a different concept in the control of light. A polarizing filter absorbs most of the divergent rays of sunlight and, therefore, is useful to darken skies and remove reflections from water, glass, etc. For maximum effect, the polarizing filter must be rotated to a position determined by the *angle of sunlight.* The best angle can be determined visually by looking through the filter as you rotate it before the eye. If you are using a reflex type of camera, then, of course, you can observe the effect through the lens. Regardless of how it is rotated, the pola filter has an absorption factor of its own (2.5) and allowance for that must be considered for the correct exposure.

Polarizing filters for movie work are most useful for removing unwanted sky reflections from water surfaces. Because we frequently pan the movie camera on landscapes, this somewhat limits the effectiveness of polarization because of the change in sun direction.

The lever on the top of your lens does not necessarily indicate the "neutral" or least absorbing angle. That position is determined by the angle of sunlight illuminating the sky and scene.

The UV filter, which has no filter factor, is used to absorb excess ultraviolet light and, therefore, helps penetrate haze. When photographing from the air, seascapes or extreme vista scenes, it is advisable to use a UV filter with *daylight type* color films. It is not necessary to add a UV to the 85 filter as the later, in itself, absorbs the UV radiation. Use your meter, read through the plane window, to determine the exposure for aerial shots. Scenes made from high altitudes are seldom satisfactory regardless of what filter is used because of excessive haze and lack of detail. ■

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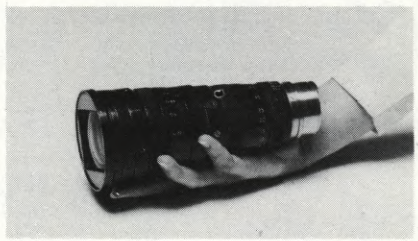

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# CINEMA WORKSHOP

## By ANTON WILSON

### OPTICS III

Spherical aberration is probably the most graphically simple of all the optical distortions plaguing a lens. By definition, a lens should focus all incident parallel rays into a single point. This is represented by FIGURE 1. Unfortunately, a simple spherical element falls short of this ideal.

In reality, the rays farthest from the center of the lens will be refracted to a greater extent than those passing through the center of the lens. The result is the condition depicted in FIGURE 2, where the outside rays are refracted more strongly and thus intersect the axis closer to the lens. A caustic is formed by the envelope of these variably refracted rays. This is known as the spherical aberration caustic. In FIGURE 2, point 'A', or the apex of the caustic, is known as the "paraxial focus". The spherical aberration can be measured either transversely or longitudinally. FIGURE 3 depicts these two methods of measurement.

Spherical aberration can be minimized by careful lens design. In addition, any residual spherical aberration can be further reduced by stopping down the iris. When the lens is wide open, the image is constructed of both edge and axial rays. However, when the iris is stopped down, the edge rays are the first to be eliminated. Thus, the image is predominantly comprised of central rays. From FIGURES 2 and 3 it can be seen that this will reduce the spherical aberration. Theoretically, the image will increase in sharpness as the lens is stopped down and one would suspect that f/16 and f/22 would yield the best image, as almost all edge rays are eliminated. This is *not* the case. Unfortunately, a phenomenon known as *diffraction* begins to degrade the image as the lens is stopped down. So, on the one hand, stopping down will reduce spherical aberrations, but increase diffraction. The best compromise seems to be two to three stops down from maximum aperture.

Visually, spherical aberration will show up as a general lack of sharpness. Referring to FIGURE 3, an infinitesimal point will be photographed as a circle with a radius of TSA'. If TSA' is greater than the established "circle-of-confusion", the image will be literally out of focus. ■

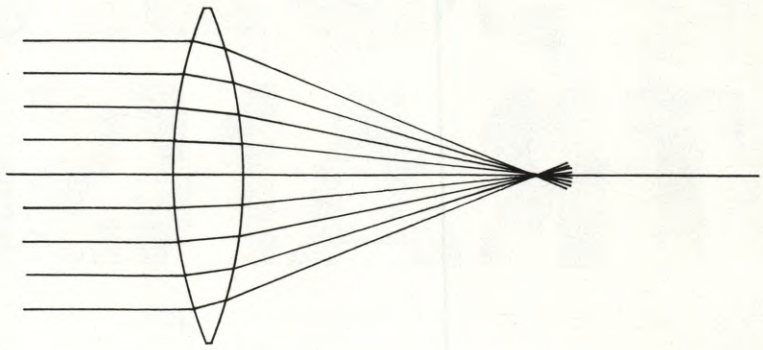


**FIGURE 1 — An ideal lens will focus all incident parallel rays into a single point.**

**FIGURE 2 — In reality, a lens will refract edge rays more than center rays. It can be seen that the central rays cross the optical axis farther away from the lens, while the edge rays intersect the axis closer to the lens. This condition will obviously impair image sharpness.**

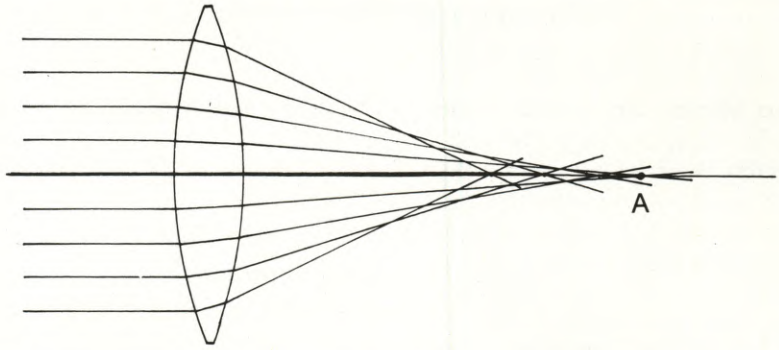
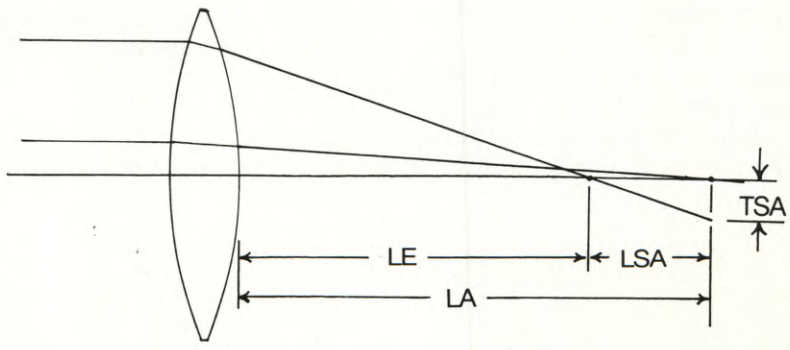



**FIGURE 3—The amount of spherical aberration can be measured either transversely or longitudinally. LE is the back focus distance of an edge ray, while LA is the back focus of an axial ray. The difference between these two lengths, LSA, is the longitudinal spherical aberration. The distance TSA is the transverse spherical aberration. In essence, an object that is an infinitesimal point should be focused as such (FIGURE 1). However, because of spherical aberration, the point is focused as a circle with a finite radius TSA. If this distance TSA yields a circle larger than the allowable "circle of confusion", the image will be visually out of focus.**



# "The XR35 is a winner!"
## Sol Negrin, ASC

**"This is the ideal camera... whether on the streets of New York or in a studio," says Sol Negrin, ASC.**

"The XR35 is a versatile, high-performance 35mm camera with a terrific viewing system," says DP Sol Negrin, in charge of the New York location shooting of the new Japanese feature *Proof Of The Man.* "After filming 19 complete New York-based shows on *Kojak,* I am convinced this is the ideal camera to be used on any production, whether on the streets of New York or in a studio. The XR35 is a winner!"

Director of Photography Sol Negrin, ASC, in charge of the New York location shooting of *Proof Of The Man,* checks a camera angle. Behind him, at right, is Japanese DP Shinsaku Himeda, of *Tora, Tora, Tora* fame.

**"The thin, low profile of the XR35 permits placing the camera in tight spots and corners," says Walter Druker.**

"F&B/CECO has been renting the Cinema Products XR35 lightweight studio camera for three years now," says Walter Druker, Vice President and General Manager of F&B/CECO, Inc. "The camera has performed well on feature films and television commercials out of both our New York and Hollywood rental facilities."

When Lee Haas, president of ProSerCo (the producers' service company that handled all the New York locations, crews, etc., for the Japanese feature *Proof Of The Man)* first discussed equipment with him, Druker suggested the XR35 as the prime camera.

"As it turns out, many scenes of the film were shot in tiny Brooklyn tenement hallways, apartments and narrow streets," says Druker. "At times, there was barely enough room for the crew and one or two lights. The thin, low profile of the XR35 allowed the director and the crew to place the camera in tight spots and corners in order to get the desired look for this high-action feature.

"The production really moved all over New York City. Utilizing a Cecomobile for camera, lighting, grip and sound equipment, the crew was able to get in those extra set-ups every day... bringing the picture in on schedule and within budget."

Walter Druker, Vice President and General Manager of F&B/CECO, Inc., and DP Sol Negrin with Cinema Products' XR35 lightweight studio camera.

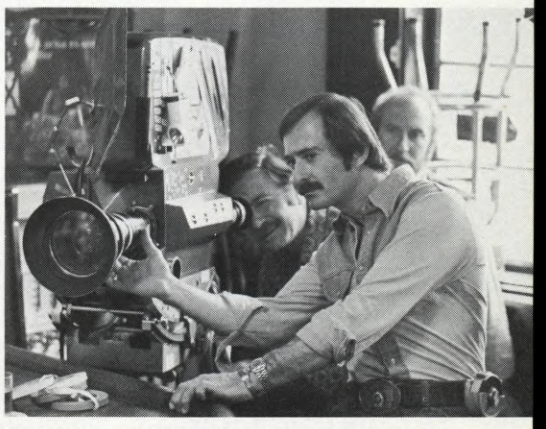
**"I can pick it up by myself.." says Maurice Brown.**

"The XR35 is a pleasure to work with," says First Assistant Cameraman Maurice Brown. "I can pick it up by myself if need be, for those quick moves that seem to come up all too often.

"I especially like the small details that were built into the XR35... like the threading light in the camera body that shuts itself off once the camera door is closed; or the light over the lens which permits the iris and distance indicator marks to be seen on night shots or when in deep shadow on dark interiors. Even the bubble level is illuminated."

**"The viewing system is bright and very easy to focus," says Howard Block.**

"From an operator's standpoint, the XR35 is a very good camera: the viewing system is bright and very easy to focus, and the camera balances and moves well," says Camera Operator Howard Block. "The XR35 is every bit as good as any Panavision camera I have ever used."



Filming *Proof Of The Man* interiors on location in New York, Sol Negrin lines up a shot while First Assistant Cameraman Maurice Brown adjusts lens. Camera Operator Howard Block looks on.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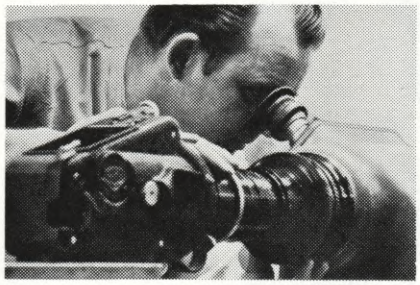

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# THE BOOKSHELF

By GEORGE L. GEORGE

**ARTISTS AT WORK**

A supreme craftsman in his field is expertly profiled by Joseph Andrew Casper in VINCENTE MINNELLI AND THE FILM MUSICAL, a serious and documented study that analyzes the director's background, his approach to the dramatic, musical and choreographic elements of film, and finally his directorial techniques. (Barnes $15.)

Bob Hope's tale of his "40-year affair with the movies", THE ROAD TO HOLLYWOOD, is a sentimental and hilarious recap of a truly incredible career. Written by the comedian with an assist from Bob Thomas, this is an ideal book for film buffs as well as data collectors. (Doubleday $12.50)

The days of Hollywood glory are recaptured in THE LIFE AND LEGEND OF GENE FOWLER, the screenwriter/novelist whose zest for life, irreverent ways and talented craftsmanship are brilliantly set down by H. Allen Smith. (Morrow $10.)

Charles Schwarz's fine biography of songwriter COLE PORTER dwells at length on his successful film musicals *(Can Can, Les Girls, The Gay Divorcee),* his Broadway hits as well as his flamboyant private life and his thinly disguised homosexuality. (Dial $9.95)

Expanding its series of star biographies, Belmont-Tower has issued four more books, notable for their informative and accurate content, good illustrations, and enough gossip to please the fans: WARREN BEATTY by Jim Burke, ASTAIRE AND ROGERS by Suzanne Topper and two by David Hanna, FOUR GIANTS OF THE WEST (Stewart, Fonda, Cooper, Wayne) and BOGART. ($1.50 ea.)

Flamenco dancer Jose Greco, whose career included several MGM films, has written a lively memoir, THE GYPSY IN MY SOUL, in which his artistic triumphs are recalled with as much enthusiasm and frankness as his countless love affairs in Hollywood and elsewhere. (Doubleday $10.)

* * *

**CASE STUDIES**

An increasingly popular form of film literature consists of books that deal with the actual production of a picture, covering generally pre-production, the

shooting proper, and preparations for release. Financial data, on-the-set happenings, off-the-set gossip and interviews with the principals are included, as well as numerous stills.

Recent volumes in this category list INSIDE THE DEEP, directed by Peter Yates and written by Peter Guber, the film's producer. (Bantam $1.95). Barbara Pallenberg does a competent job on THE MAKING OF EXORCIST II: THE HERETIC, directed by John Boorman (Warner $1.95). In THE MAKING OF THE OTHER SIDE OF MIDNIGHT, Bruce Bahrenberg seems to have a hard time separating the extent of producer Frank Yablans' participation in (interference with?) the work of director Charles Jarrett. (Dell $1.95). Screenwriter William Goldman evokes the shooting of the film he wrote, STORY OF A BRIDGE TOO FAR, directed by Richard Attenborough. (Dell $1.75)

Copyrighting works in the artistic domain is covered by specific laws and practices discussed in two recent texts. Walter P. Hurst's COPYRIGHT, an eminently practical volume, takes the reader step-by-step through the procedures intended to protect his ownership of a work of creative art in an unusually clear summary of legal complexities. (Seven Arts Press, Hollywood, $10.)

A more technical work, CURRENT DEVELOPMENTS IN COPYRIGHT LAW 1977, is a must for all legal departments of the entertainment business as it spells out the relationship between the 1909 copyright law and the present status. (Practising Law Institute, New York, 2 vols. $20.)

The destructive effects of television on children and the family are discussed in Marie Winn's articulate and well-researched book, THE PLUG-IN DRUG, a hard-hitting exposé of the feelings of dependency, passivity, inhibition of verbal skills and acceptance of violence in its youthful audience. (Viking $8.95)

* * *

**VIEWS AND ASSESSMENTS**

Peter Cowie's EIGHTY YEARS OF CINEMA is a comprehensive chronological compendium of the evolution of the art, focusing knowledgeably on the significant films of each year and their distinctive qualities. (Barnes $17.50)

Hollywood's early times are brought to life in I. G. Edmonds' saga BIG U: UNIVERSAL IN THE SILENT DAYS. Between 1912 and 1929, that studio played an often decisive part in the movies' progress in casting, literary material, technique and financing. (Barnes $15.)

In EARLY WOMEN DIRECTORS, Anthony Slide traces the careers of some 30 women who helped shape the American silent film. Lois Weber, Alice Guy Blaché and Dorothy Arzner are probably best known now, but this well researched, illustrated volume adds many names that were better received in their own times. (Barnes $9.95)

A notable French art director, Georges Wakhevitch reveals the secrets of his art in designing exceptionally evocative sets for such directors as Jean Renoir, René Clair, Jean Cocteau and Marcel Carné. His L'ENVERS DES DECORS (Behind the Scenery) also offers invaluable comments in terms of stage as well as film work. (Laffont, Paris, F.48.)

Jay Leyda's impressive scholarly anthology, VOICES OF EXPERIENCE, assembles in one hefty volume direct quotes from over 600 film personalities who provide insightful and informative views about every aspect of the medium. (Macmillan $9.95)

The contribution of surrealism to the arts — and notably to film — is knowledgeably explored in a sumptuous, large format volume, SURREALISTS AND SURREALISM. Author Gaetan Picon expertly analyzes the historic conjuncture that gave birth to the movement, probes its most prominent exponents, and offers superb illustrations of its main works. (Rizzoli $50.)

Experimental cinéasts of sundry allegiances are scrutinized in ABSTRACT FILM AND BEYOND, Malcolm Le Grice's perceptive study of the manipulations of the time element by moviemakers searching for an alternative to the illusion of time and space as found in the commercial cinema. (MIT Press $12.50)

Translating Shakespeare from plays into movies is discussed with scholarly awareness in SHAKESPEARE AND FILM, Jack J. Jorgens' study of 16 such movies. (Indiana U. Press $15.) ■

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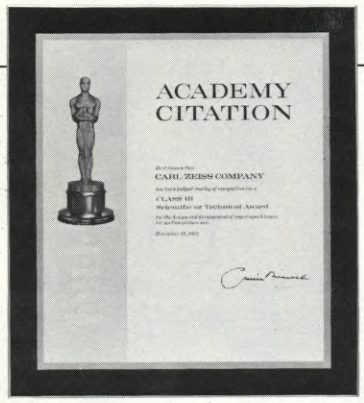


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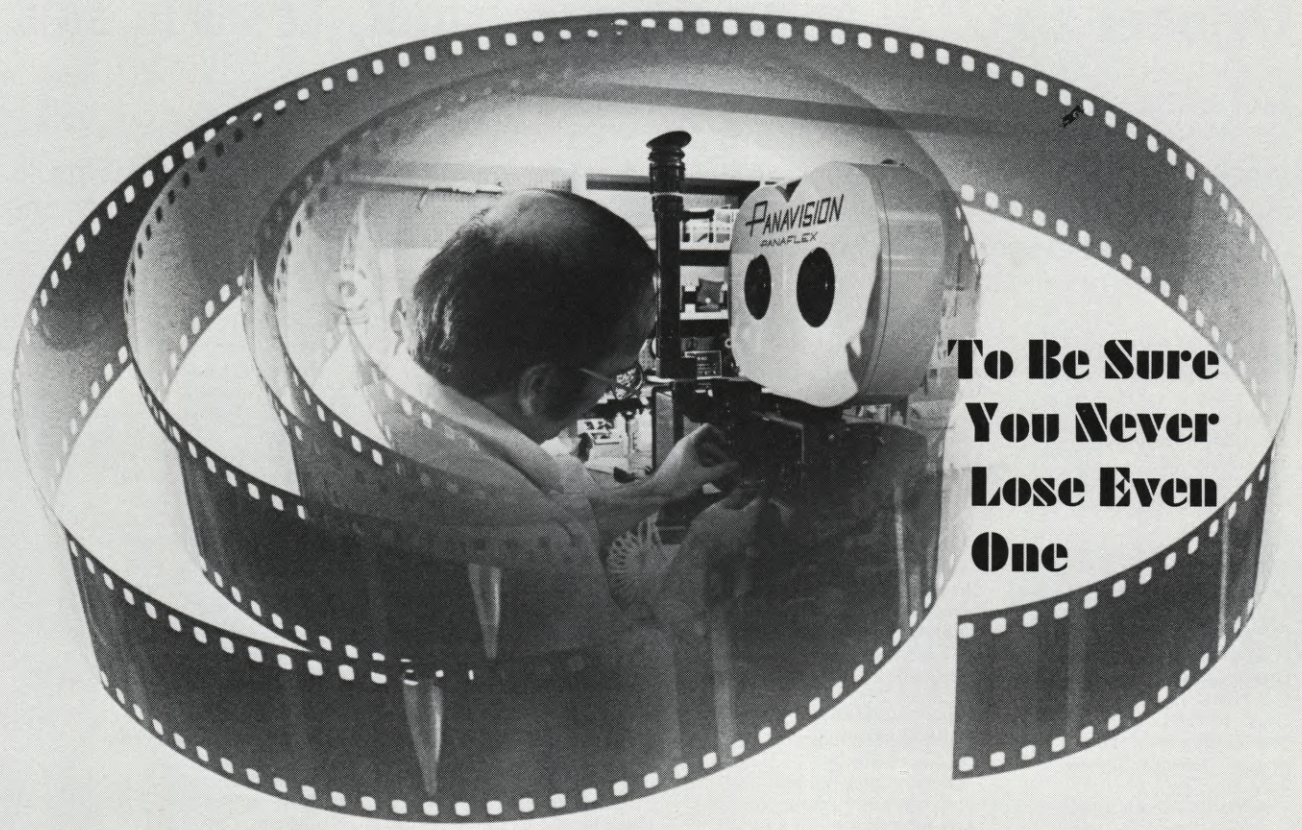


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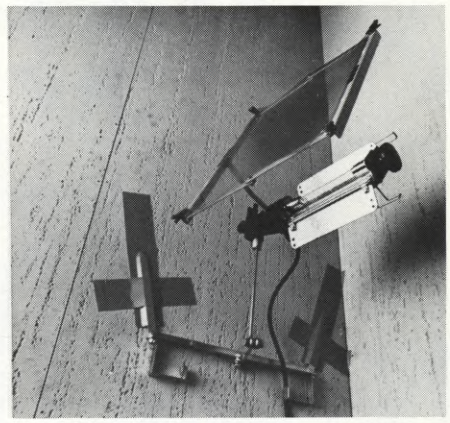
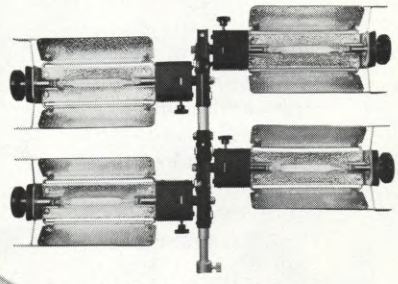
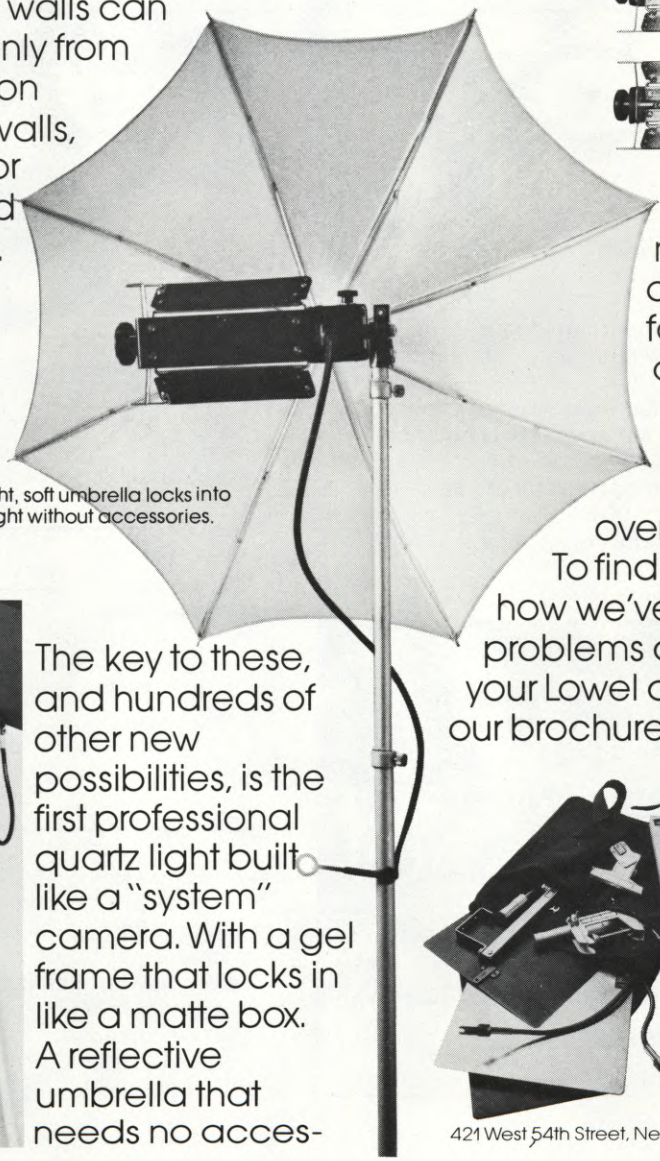


Tota-Light tapes to walls and windows; frame holds precut conversion and diffusion gels.



Stacks on stand or clamp.



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**The system.**

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In addition to the Auto Meter II, Minolta makes a wide range of professional meters. They include 1° spot meters, and meters for flash and color temperature measurement. For information, see your Minolta dealer or write Minolta Corporation, 101 Williams Drive, Ramsey, N.J. 07446. In Canada: Minolta Camera (Canada) Inc., Ontario.

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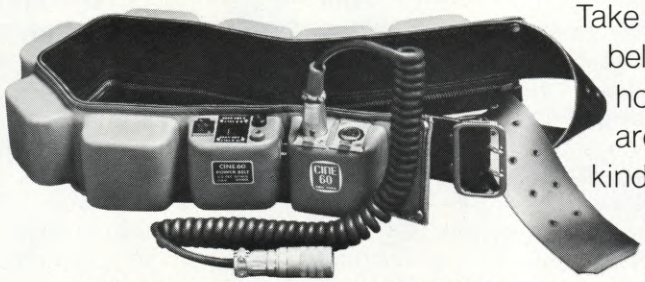

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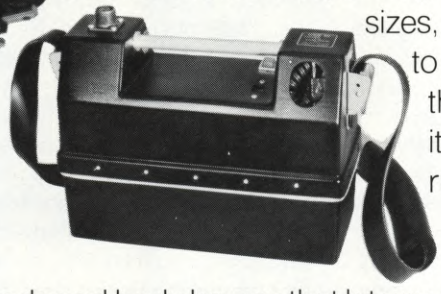

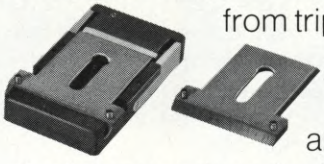

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# REPORT FROM film 77

**London's 5th International Technology Conference and Exhibition, sponsored by the British Kinematograph, Sound and Television Society, draws record crowd of delegates from all over the world**

**By HERB A. LIGHTMAN**

**LONDON**

Never, in my dozens of visits to the British capital, have I seen it so crowded. Someone tells me that 11,000,000 tourists have come to Britain this year (many to celebrate the Silver Jubilee of Elizabeth II) and they all seem to be in Oxford Street at the same time. The sidewalks and shops are packed, and while Londoners are far more polite in public than, say, New Yorkers, there are just too many of them. Taxicabs are largely unavailable and underground trains are almost as crowded as those in Tokyo. All in all, it is not my favorite moment to be in one of my favorite cities.

The once-proud Grosvenor House Hotel seems to be buckling under the strain of playing host simultaneously to hundreds of tourists and FILM '77, the 5th International Technology Conference and Exhibition of the British Kinematograph, Sound and Television Society. This year, the biennial event, having outgrown its accustomed digs at the Royal Lancaster Hotel, has moved to the venerable Park Lane hostelry, where the exhibition area is much more commodious, but the service leaves something to be desired.

No matter. It's worth a bit of exasperation to be reunited with colleagues from all over the world in what, during the last decade, has become (along with *Photokina* and the SMPTE Conference) a foremost forum for the exchange of motion picture and television technology.

BKSTS President, D.J. Kimbley, kicks off FILM '77 by welcoming the delegates, after which he introduces Sir Charles Curran (Director General, BBC), who delivers the opening discourse. Innocuously entitled *"TECHNOLOGY AND THE CONSUMER"* (see Page 916), his paper states a premise which is music to the ears of those of us who are basically film people: *"So much is being said and written about electronic picture generation that film might be thought to be becoming obsolete. The world's television services consume very much more film than the cinema industry, and though television engineers are always looking for quicker and more effective production methods, there is little probability that their consumption of film will be diminished . . . Electronic picture-making continues to progress and camera mobility, sensitivity, and ease of editing are but three of the aspects of film operations where there is pressure from the competing technique. So far the evolving technology of film has met the challenge . . . There is in current production circles a great urge to get out of the studios and use the new film stocks, cameras and lenses to the full. The BBC has had its busiest film year yet."*

The ENG people in the audience, though less than enchanted by these sentiments, are very gentlemanly about the whole thing. Nevertheless, it is clear that the film-vs.-video tape battle has once more been joined and that it will continue as a *leitmotiv* throughout the Conference.

In the next paper, *"A SURVEY OF CURRENT FILM PRODUCTION TECHNIQUES"* (see Page 918), David Samuelson illustrates his comprehensive state-of-the-art summary with a dazzling display of slides and film clips. It is a stunning presentation and one which neatly defines film technology as it exists today.

In a paper entitled "BEYOND TECHNOMANIA" (see Page 920), Lars Svanberg, noted cinematographer and Technical Director of the Swedish Film Institute, calls attention to a dilemma which is beginning to confront the film and television industries and which will continue to do so with increasingly disastrous effect unless the trend is reversed—namely, the proliferation of *technology* at the expense of *creativity*. Like a modern-day cinematic Cassandra, he warns that unless the current preoccupation with the machinery of image-making is balanced by increased attention and resources paid to production matters and the creative processes of programming, there will be a deadly dearth both of quantity and quality in product to feed the ravenous demands of communications satellites, cable TV, pay TV, interactive television, videophones, video discs, etc., in the '80s. Listening to him, some of us have the gnawing feeling that the point-of-no-return has already been reached.

The papers program progresses steadily, but uneventfully, with nothing much that is new or startling being revealed. Then, in Session 6, devoted to FILM TECHNOLOGY, two papers are read that pertain to Time Base Coding, the burning to-be-or-not-to-be technological question of the moment. In a paper entitled *"A TIMECODE SYSTEM FOR 16mm PICTURE FILM AND MAGNETIC TAPE"*, A. Heller describes the familiar proposed EBU/IRT system, in which film and tape

**Continued on Page 944**

**Delegates from many nations gather for the opening of the Papers Program of FILM '77, held in lecture hall of the Grosvenor House Hotel. It was hoped that representation would exceed that of FILM '75, which attracted more than 1,250 delegates from 50 countries, in addition to the several thousands more attending the Equipment Exhibition.**

**(ABOVE LEFT) Smartly attired delegates and their ladies crowd the Grand Ballroom of the London Hilton Hotel for the formal banquet which is traditionally the final social event of the biennial Conference. (RIGHT) British Kinematograph, Sound and Television Society President D.J. Kimbley welcomes delegates to the FILM '77 Banquet.**

**Observing from the balcony above the Great Room (main ballroom) of London's Grosvenor House Hotel, it is possible to note Equipment Exhibitions on two levels. Having outgrown its former headquarters at the Royal Lancaster Hotel, the BKSTS Conference made good use of the increase in equipment exhibition space available at the Grosvenor House.**

**(BELOW) The FILM '77 Equipment Exhibition drew record attendance, but, thanks to the considerable increase in space, did not seem as crowded as in previous years. More than 80 exhibitors from scores of countries were represented at the exhibition, but even so, many more had to be turned away because of lack of space. The event grows bigger each year it is held.**




# TECHNOLOGY AND THE CONSUMER

film 77

**The Opening Discourse of FILM '77, despite its innocuous title, turns out to be a ringing affirmation of the primacy of film at a time when rumor has it that ENG may be about to take over**

**By SIR CHARLES CURRAN**
*Director General, BBC*

In November 1972, I addressed the Institution of Electrical Engineers on "The BBC in the Eighties". I gave a subtitle—"The Relationship between Broadcasting Policy, Programme Needs and Technological Potential". I dealt, among many other things, with the relationship between film and electronic recording. This is what I said nearly five years ago:

*"At the moment film has all the advantages of flexibility of editing. It is more expensive than electronic methods in the studio, but it is incomparably more mobile outside. It is also easier to duplicate and more universal as a medium from which to originate transmissions in a world where systems differ. It is more expensive in certain respects, which is why our Television Centre was originally constructed on the assumption that the great bulk of our output would be electronic. But this state of affairs may not last forever. I have seen simple and mobile recording gear in Japan—and no doubt, it exists elsewhere—capable of most effective reproduction of colour pictures. I have also seen very small portable colour cameras, smaller than a normal briefcase. The picture quality was already very good, but our broadcasting engineers would probably say that it was not up to professional broadcast quality. But the day is quite clearly coming when it will be possible to take an electronically-based picture with as much flexibility as can now be done with a film unit. What will happen then to all the union expectations about the handling of picture-making gear in a mobile setting, I don't know. But it is impossible to believe that the 1980's will not see the development of practical systems of electronic recording in the field which could replace the film camera."*

Now that I am asked to address the Convention of a learned society, devoted to film technology, on the needs of the consumer and the technical potential, it is valuable—and also expedient—to review the situation again, to weigh up the progress that has been made and then to see where I need revise my 1972 forecast of broadcasting in the eighties.

There is no denying that electronic picture generation has made substantial strides in the five years. There have been developments of apparatus and techniques which promise much greater mobility and flexibility in picture-making than we had at our disposal in 1972.

But, on the other hand, film has been far from standing still. The introduction of a range of new lenses for cine cameras, for example, has had a major effect on the style, and type of shooting and on the cost of production. "SAILOR" could not have been made as it was without them. New film stocks, simpler and more consistent processing, coupled with an even greater ease of editing, have adjusted the balance between the two media, so that it can hardly be said to have come down firmly in favour of one. The programme-making consumer's choice hasn't become any easier in the five years.

Each individual will probably be influenced by particular factors which he sees as being of overwhelming priority, even though the next man may accord little weight to the same factors.

Whether they are actively involved or not, most broadcasting organisations have followed with close interest the possibilities of electronic news gathering. When I say "news" in this context, I include Current Affairs generally and documentaries of the sort composed on the spot in an operation which is now being called electronic field production. Some broadcasters are developing lightweight mobile units and are equipping themselves to link these units back to a central point by microwaves or by cable. It will certainly give greater immediacy to television programming and enhance further that sense of participation in an event which television conveys so well.

The European Broadcasting Union set up a Working Group within its Technical Committee to study the requirements for electronic picture-making facilities. You may think it significant that almost the first statement they make in their draft report is that a good 16mm news film be taken as a reference for the third step in a five-step quality scale for subjective assessment. Clearly, they hope to do better at times than a good 16mm news film—and so they should, because 16mm news film would not be claimed by this Conference to be the ultimate in "state of the art" quality.

In offering guidance on videotape recorders, the EBU also use 16mm film as a yardstick for quality. Here, they say, the pictures recorded on tape should be comparable with pictures obtained on *good quality* 16mm film. But with admirable wisdom they go on to remind the reader that the tape actually broadcast will probably be a second or even third generation copy.

The acceptability of a recording machine for electronic picture making will depend on the results as they show up after repeated duplication. As I have already said, there have been substantial improvements in videotape recording by machines smaller and less expensive than the two-inch quadruplex models, but that is a fairly formidable standard to match. Light-weight transportable or portable videotape recorders of very respectable performance are most certainly available. But their manufacturers have not achieved standardisation, so there is no interchangeability between tapes. It would also seem that portability of the machine is not very likely to go hand-in-hand with ease of editing the tape. Electronic picture-making will probably develop in the direction of a highly portable videotape recorder supported by a larger and more versatile base station machine on which the material will be edited.

Even if you can buy an electronic camera which is comparable in size and portability with a 16mm film camera, the videotape recorder will remain a fairly substantial debit in the portability account, and the alternative is a microwave link back to base. In terms of the amount of equipment to be carried to the scene of an event, electronic picture-making will be very hard pressed to equal film, but, as I have already indicated, for some purposes this will be seen as relatively small cost when considered against the other advantages which it confers.

On the other side of the equation, the avoidance of clutter when filming or recording is always important. The triaxial television camera cable may be a big advance on the old-fashioned multicore cables, but it is still unwieldy. In filming it is now possible to get rid of all cables between the cameraman and the sound recorder, and yet maintain sound synchronisation. We await a similar development in electronic picture-making. A battery-powered television camera with radio or other wireless link to the recorder is needed to match the new mobility of the film camera.

It would seem that we are still in the prototype stage although we may be just about to enter the full application era. The consumer can see very clearly how he will use the new facilities to advantage and he can also say, with some certainty, what it is that he wants and what is still to be developed. The rate of progress will be determined by the advances of the technology. There is very rarely a problem in deciding how to put a new technique to good use. When it comes to innovation in programme-making, the *demand* for *technical resources* exceeds the supply.

Most innovation seems to create personnel and training problems. Film technology is very well established, and, guided by the unseen hand of comparatively few professional technologists, such as the company assembled here, the everyday business of film as a system can be handled by operators. In electronic picture production we are still in the stage of having to have qualified engineers working at many points in the chain to be able to cope with the unexpected problems stemming directly from our inexperience as designers or users. We have to deal with the training of personnel and the retraining of people, already skilled in film, for electronic production.

If we are to go to all this trouble to use electronic picture generation, what do we expect to get out of it? Greater immediacy, more time for editing news because of reduced processing time, immediate on-the-spot verification of the pictures and—a factor which will rate high on many organisations' lists of priorities—low running costs for materials. And, let it be said frankly, at the moment some of the interest is stimulated by a wish to "keep up with the Jones's".

The eventual success of electronic picture-making for all location work calls for further substantial advances in the technology before it will be generally worthwhile. At the moment, its untapped potential excites interest, but it will have to be more than exciting if it is going to prove its capacity to earn a living and settle down to being an everyday workhorse like film. Let me suggest a few of the problems.

Perhaps the biggest hurdle to be overcome will be to make it simple to edit and then produce an adequate number of clean copies. The warning voiced by the EBU that the electronic videotape eventually broadcast will be a second or third generation copy is timely. And remember, the problem has to be solved in the context of lightweight or relatively inexpensive base machines, rather than the two-inch machines which, after many years, are still necessary to produce broadcast quality copies at the third generation or more.

The requirement for improved performance and standardisation in videotape operations has never been greater, and I see it as a more important ingredient to the success of electronic picture-making than the design of the lightweight television camera. This is a case where technology could fairly be said to be holding back the scope of production. If film is ever substantially replaced by videotape, I feel sure it will first have to see international standardisation, combined with the ability to edit and duplicate efficiently. The cost of setting up videotape editing facilities will have to come down dramatically.

The main problem of videotape editing remains the same as it has always been. It has to do with access, sorting, chipping away at the picture—and the changing mind of the programme-maker. He needs time to think. The challenge is to provide an electronic solution to the editing problem which can be applied to 75 or 100 individual editing rooms in a single broadcasting establishment at a cost which will let the programme-maker have exclusive use of it for six or eight weeks if he needs it. In the BBC we are already running into cumulative problems or overrunning bookings on videotape editing channels, with precautionary block-bookings not taken up and, therefore, wasting valuable engineers' time. All this because video-editing facilities, being very expensive, are in limited supply, and yet becoming more and more the accustomed tool of the programme-maker. It is a familiar technological problem.

Some would say that the filming process is one of muddle and self-indulgence. Perhaps there is more of this in filming than in electronic television, and we cannot afford waste. But we don't want the needs of the programme-maker to be rationalised out of existence. It is the flexibility of film which allows the necessary margin for programme thinking—and even for the human inevitability of a little muddle.

I know that many engineers think the application of digital techniques to magnetic video recording will provide the answer to these problems. They may well be right. A solution on those lines may even be just around the corner, but it is not here yet.

What can we expect of film while the electronic approach is examining its shortcomings and taking steps to eliminate them? What are the drawbacks of film? I would think that the cost of the recording material—the film base itself—and the time taken to process new film are two areas in which the protagonists of film have to look to their laurels.

Colour motion picture film is obviously a complicated product, expensive to make. Once exposed, it is committed forever and it cannot be re-used. Videotape is a less expensive material and one need not give much weight to the ability to re-use it. The claims of future programme-makers, overseas sales and library archives, make it necessary for broadcasters to retain a high proportion of their recorded material.

Processing is an inconvenient but inherent necessity in the film business, and although most broadcasters have equipped themselves with the necessary machinery and facilities to process their own topical material, the tanks and pumps and smells do not integrate well with a Television Centre. This must be rated as a fairly substantial disadvantage for film in the television world.

Frankly, I think the length of time taken to produce a processed film is inclined to be overemphasised by the electronic adherents, although the lack of immediate verification of the pictures is undoubtedly a disadvantage. There can be no argument about that. But it is fair to mention that film techniques are improving. Some organisations, including the BBC, are using electronic viewfinders fitted to film cameras and these show promise of im-

**Continued on Page 986**

**As British Kinematograph, Sound and Television Society President D.J. Kimbley (left) looks on, Sir Charles Curran, Director General of the British Broadcasting Corporation delivers the Opening Discourse of FILM '77. Although he gave a fair appraisal of both media, Sir Charles surprised many by seeming to favor film in the current film-tape debate relative to television.**

# A SURVEY OF CURRENT FILM PRODUCTION TECHNIQUES

**An overview of the highly sophisticated "tools" which the modern film-maker now has at his disposal to make his work easier, more creative and more economical**

**By D.W. SAMUELSON, FBKS, BSC**

My task today is to review the tools available and currently used for making motion picture films. The films may be for exhibition in cinemas, on television or privately. They may be shown by projection or via telecine and TV to entertain, inform or enquire.

To be honest, this report must be somewhat personalised and refer to equipment with which I am familiar and know is actually in use, not pipe dreams for the future or inventor's, scientist's, manufacturer's, financier's, salesmen's or journalist's kite-flying exercises. I want to tell you about what is being used NOW, in 1977, and is likely to still be around when FILM '79 happens. Beyond that I cannot predict.

To commence, I am pleased to inform you that since FILM '75 there has been a major breakthrough in two items of equipment used in the most important aspect of successful film-making. One item glides along with greater smoothness than ever before. With the other, it is possible to instantly review work already completed and to incorporate alterations and improvements without the necessity of repeating work already completed satisfactorily.

As you will all have guessed, I refer to the latest Ball Pental writing instruments and the IBM and Xerox word processing machines—typewriters with memories. For without a good script, or subject, there cannot be a successful *film*.

What is the single most significant factor governing the choice of motion picture equipment for a particular production? The subject? Maybe. The budget? Perhaps. The venue? Not really. The preferences or prejudices of the cameraman, local availability, chauvinism? Not to any significant extent in our competitive international world. No—it is the size of the screen on which the finished product is likely to be shown, and if there is a chance of distribution in a drive-in movie in Texas (where they measure the screen in acres), forget Super-8, Super-16 and tape-to-film transfer, for the people who make our next film possible, the paying customers, vote with their feet . . . or tyre treads, as the case might be.

We ask a lot of film. An anamorphosed image 21.29mm wide is quite likely to be blown up to fill a screen 15 metres (or 47 feet) wide, a linear enlargement of over 700 times and what is more significant, with the audience, when we are fortunate enough to have a full house, sitting within one screen-width of the screen. Sit that close to a TV screen and it looks like a Times crossword puzzle; sit five screen-widths away from a cinema screen, as is the norm for TV, and you'd be sitting in the Odeon Leicester Square to see what's on at the Empire. Let those advocates of TV for everything never forget this fact. Not for us a screen with only eight hundred—or even a thousand or so—bits of information across.

Ever since its first beginnings, *knowledgeable* authorities on the subject have confidently predicted the immediate demise of the cinema, and yet it is still with us and the use of film, for all systems of display, continues to rise, rather than fall. Even Edison, when asked to forego his small screen machine in favour of a large screen projector estimated that "there will be a need for maybe 10 machines in the United States and perhaps for fifty for the whole world."

Lumiere put it more succinctly "The cinema can be exploited for a certain time as a scientific curiosity, but apart from that, has no commercial value whatsoever."

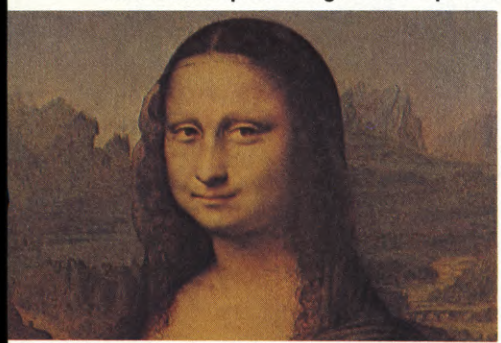
We who are here today are *professionals.* That means we depend upon people to pay to see our work, whether it be at the box office, by licence fee or sponsorship—and ironically the most important person to consider when working on a production is not necessarily the person for whom we are working at the moment, but the person who will see the current effort and employ us in the future. By this criterion, only the highest standards, commensurate with considerations of economics, are acceptable.

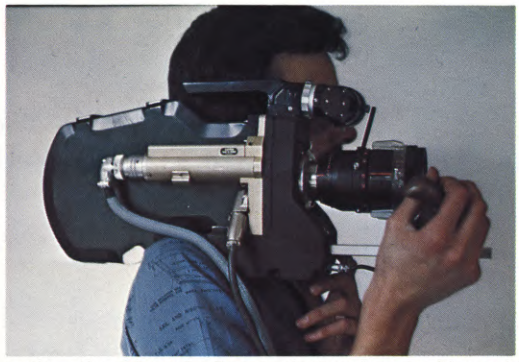
So let us start by looking at a purely technical aspect which is common to all formats and forms of image recording and ask what is new?

We have to have lighting, whether shooting 35mm, 16mm, or Super-8 film—or even television. By *lighting,* I mean creative painting with lights, not mere illumination.

For the past few years we have heard, read and experienced much about the *Metal Halide* lighting revolution. Surprisingly enough, we are still using the old lamps. By Metal Halide lights I mean both CSI and HML. The promise is well known: up to 102 lumens of light per watt of electricity, compared with 27 for a tungsten halogen lamp (half that if you have to use a blue filter to match daylight), no need for a generator, enough light for most purposes off the house mains, lighter cables,

**(LEFT) The Mona Lisa as it is. (CENTER) The Mona Lisa with flesh tones corrected for 3200°K. Says the author: "No one handed Leonardo daVinci, when he was painting the Mona Lisa, a tube of paint marked 'Flesh tones for 3200°K'. He made her complexion the colour he wanted it to be, and so it is with cinematography." (RIGHT) Irritated at the way the sides of the film image are often cut off during in-flight projection, the author asks: "What would happen if a Boeing 747 were forced to fly under the same conditions as they subject our films to with Super-8 non-anamorphic in-flight motion picture projection systems?"**





**(LEFT) A four-man "portable" video crew shooting the Olympic Games in Innsbruck. Alongside them stands one man with an Arriflex. (CENTER) The Aaton 7 camera, shown equipped with TV viewfinder attachment. (RIGHT) Aaton cameraman with his director, who is holding a small battery-powered TV monitor to check the cameraman's coverage. The Aaton, long in development, represents a high-point in sophisticated camera design.**

easier to handle, less heat—rare earth's gift to the cinematographer.

There are just one or two little snags. Flicker is one. We have been promised high-frequency and square-wave ballasts and, indeed, I am sure they are here—or coming shortly, but if the price is heavy, bulky or expensive units, the impossibility of using the highest-wattage units, or ANY other restriction, then they are unlikely to be acceptable.

In any case, there are already too many flicker-prone lamps in use owned by the lighting service companies, the studios, and the proprietors of public places and stadii lit by Metal Halide lighting (where news and documentary filming must often take place regardless) and who are unlikely to go to the expense of retro-modifying with expensive ballast units just for our occasional benefit. Experience has shown that the answer is to get the arithmetic right.

In Europe we are very fortunate. With 50Hz mains supply we can shoot at 25 fps and flicker-free results can be guaranteed, especially if the camera shutter is at or near 180°. But if you are not shooting for TV, try telling an American Superstar that her voice will sound just the same if we shoot at 25 fps.

In a recent research document, the BBC Research Department has clearly defined the theoretical "windows" of lighting frequency, shutter openings and camera speeds which will result in flicker-free cinematography. The degree of tolerance at 24 fps is very little indeed, and certainly far less in the shadow areas than the manufacturers of MH lights would have us believe.

There's a new requirement for manufacturers to state exactly what the shutter openings of various cameras are. For instance, in the past Arnold & Richter have stated that the Arri IIC has a 180° shutter opening. In fact, it is 165°, well outside the 24/50Hz flicker-free window *tolerance*.

We recently built a new MH test rig and display to compare MH light against tungsten and actually measure the mains frequency while we are filming.

As these tests show, we can safely shoot at 24 fps with a shutter opening at or very near 172.8°, but how many cameras can you adjust like that? Or to 144°, which is optimum for 60Hz supplies?

Putting an MH setting on a variable-shutter camera or modifying a fixed-opening shutter to 172.8° has become a modern necessity on cameras used for feature film shooting. The *alternative,* which is finding a great deal of favour, is to fit a constant speed governor to mobile alternators and generate 48Hz AC to provide light for cameras running at 24 fps. Indeed, many DC generators are now having an alternator added so that they may also power MH lights.

Manufacturers of cameras without adjustable shutters have a real dilemma today. If *they* make their shutter opening 180° it is only good for 25 fps running with 50Hz lighting, and for 24 fps off 48Hz. Other shutter openings have their own restrictions and a wise and learned cameraman should take a *frequency* meter and pocket calculator to work with him.

There are other snags to be overcome before the big changeover. Metal Halide bulbs, which cost around £300 or $500 each, *break* much too easily when unsympathetic electricians handle them with the same care they have always lavished on comparatively inexpensive tungsten bulbs. They become *opaque* prematurely and the consistency of colour between individual lamps is far from guaranteed.

The problem of handling high-voltage AC on location, and in the rain has also to be completely solved. Since we last met, the authorities in the UK have called for, and have been satisfied with, greater safety standards in respect to UV radiation, high-voltage handling and how much mercury vapour would be released into the atmosphere if a bulb burst. It's all happening, but miracles, as it is said, take longer and there is still a long way to go.

Another recent lighting advance is the compact camera or Obie lamp which can be dimmed in-shot without affecting colour temperature or lighting spread. The necessity of doing this is vital if the intensity of the light on the subject is to remain constant as the relative distance between camera and subject is varied. Variable intensity Obie lights are not new, but who cannot look at the new Panalite with its variable reflector and say "Why didn't I think of that!"

Allied to lighting are lighting control media. There have been many improvements in this direction in recent years.

The breakthrough in heat-resisting gelatine-type filters has been a very important one for the film cameraman.

No one handed Leonardo da Vinci,

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**At FILM '77, David Samuelson, a world authority on filming equipment, illustrated his paper with a dazzling array of slides and film clips.**

# BEYOND "TECHNOMANIA"

film 77

**Man does not live by zoom lenses alone . . . and it would appear that the technological tail is beginning to wag the creative dog — so the time may be ripe to take stock of priorities**

**By LARS SVANBERG**
*The Swedish Film Institute*

A few months ago I read a news item which stated that five major broadcasting companies in the United States have now adopted a method for testing the impact and popularity of their TV news commentators, whereby videotape recordings of their performances are screened to a selected audience equipped with transpiration detectors in the palms of their hands. The secretion of hand-sweat is supposed to be a scientifically approved measurement for how involved, frightened, amused or angry you get in front of the TV set. Some forty news commentators produced perspiration mostly in their own hands and were fired as a result of the verdict of the electronic test instrument. One of them cried out in despair: "If you let Adolf Hitler read the news, I'm sure that the test instrument would collapse, but that doesn't make the SOB a good news commentator!"

That, to me, is a both amusing and sad example of *technomania* at work. Technomania to me means a technological development which has lost its anchorage in human beings and in certain basic, humanistic principles. It creates a society in which we favour *technical* solutions to human-social problems. This certainly does not apply only to the Big Brother society created by unlimited computer power and usage, it is also of significance in the motion picture and television industries—technology-demanding industries in which the creative mind is confronted with an ever-increasing degree of technical complexity.

I.A.L. Diamond, screenwriter (and co-writer to Billy Wilder) recently stated that "If most young directors today would be given the choice between a good script and a new type of zoom lens, I'm afraid that they would choose the latter". That, of course, is not the whole truth, but there's an important grain of truth in it. I think that there is a shortage of good scripts in Moscow, Stockholm, London or Hollywood, but a surplus of new lens gadgets around.

Motion pictures and television, as a whole, can be divided into at least four major areas: *production, distribution, technical* and *creative.* The last decade has brought considerable expansion and growth in two of these areas—in distribution and technical and in *distribution techniques* in particular. In my opinion, the importance of distribution matters and distribution technique has been overemphasized during the 70's, largely due to the growth of broadcast television and the emergence of the "new" television represented by videograms, cable and satellite transmission, teletext, two-way communications, computer access, videophones, etc. Production matters and the importance of the creative processes have been pushed into the background for too long.

Let me use an allegory which comes straight from the heart, so to speak. A blood circulation system consists of three major components: a) *a pump* (the heart), b) *transportation lines* (blood vessels and veins), and c) *blood.* All three are equally important for the total function of the system.

In a film, television or video context, the "pump" would then correspond to the fundamental economical-political conditions; the veins would correspond to our elaborate distribution system for pictures and sounds; and the blood, finally, would correspond to the stuff which flows through the veins of our media industry—films, programs, instruction, entertainment, sales arguments, facts, news, etc.; in other words, the production, the programming.

The international media industry is now building up a vast and probably oversized blood circulation system with dazzling transmission capacities, using the super-technologies of today and reaching more and more consumers in more ways than before. This development is not balanced by a similar growth in the production of new blood. The media moguls of our times seem to think that there exist more or less endless resources of ready-made programming to be drawn upon. It's just a matter of getting it out to the millions of hungry consumers as fast, cheap and profitably as possible.

It isn't quite that simple; is it? Art or anything that requires artistic interpretation or form doesn't appear mysteriously from nowhere. Art is produced by mortal men like you and me, and at a price which gets higher every day.

I see a triangle turned upside-down. In its upper and broader part, I see a huge, swelling distribution machinery—now leaving a world of surveyable mechanical traditions behind and entering the unsurveyable world of electronics—supported by large corporations, by political goodwill, by enormous R&D funds and stimulated by the competition for new markets created by electronic extravaganza.

At the bottom of it all, at the point of the triangle, I see a lonely person sweating away at a typewriter. That's the way the majority of all creative activity starts today—as words or figures on a piece of paper . . . be it a three-hour Panavision epic, a 15-second shampoo spot or a documentary on cod fishing. That typewriter or that blank piece of paper is the fragile base upon which the entire media industry rests. That's where the blood for the media veins is created. Simple, modest and even uninteresting in technological terms. If things stop happening down there at the typewriter level, I'm afraid that the majority of us would have to go out to find other jobs for ourselves.

I attend many technical conferences and I have gotten the feeling that administrators, businessmen and technicians in the film and television industry are a strong, healthy and prosperous kind of people who multiply at a fast rate . . . at least, judging from the turnout here today.

People who are more directly involved in the creative processes, on the other hand, seem not to multiply quite as fast. I have a feeling that we are faced with a serious shortage problem in our industry—a shortage of creative energy. Our collective creative energy is *not* an endless resource. If we find ourselves in a shortage situation it can probably be traced back to the wastefulness, the over-consumption, the bad planning and the technomaniacs of yesterday.

The American film industry, from what I've heard, is now having big problems in producing films at the rate and in the quantities required by the gluttonous American distribution system, a system which today not only consists of broadcast television and cinemas, but also of pay-TV, cable-TV and subscription-TV via satellite and videogram distribution.

The international video industry, as such, seems to suffer from an acute case of anemia. The slow-flowing stuff which trickles through its fancy video networks does barely qualify in my blood system allegory. In certain cases, it would be more fitting to refer to a less glamourous distribution system—a sewer system. It seems to be much too easy to forget that a

piece of so-called crap remains the same, even if it's being pushed forward by random-access buttons, scanned by a laser beam, computer generated or arrives in digitalized form from outer space.

I once said that *"technicians make television, businessmen make video cassettes and artists make films"*. It is, of course, a great oversimplification, but there's something to it which makes people react. Art and video are yet to meet, television and art sometimes meet, but art and film have an 80-year-old alliance. Film is also the one medium which suffers the least from technomania and technomaniacs. It is based on relatively simple mechanical and chemical principles, and the built-in slowness of its production and post-production processes is well adapted to the natural slowness of human thinking and creative decision-making.

Back to the blood and the typewriter. In Sweden we have just started a network of regional radio stations, preceded by extensive political activity. One important thing was forgotten, however—money to buy or produce high-quality programs for them. The airtime is spent mostly on reporters reading aloud from the local newspapers! Typical of our times, I would say. For some reason we are today more concerned with the blood vessels than with the blood itself, with life itself. We do not hesitate to create blood systems *without blood*.

The blood vessels increase in number, get wider and wider and are soon charged with enormous laser beam muscles.

The blood-pressure sinks and the blood gets thinner and thinner.

It disturbs me. Doesn't it disturb you?

Some of you might find my viewpoints odd or even stupid. Haven't hundreds or thousands of brilliant directors, screenwriters, actors, producers or cinematographers been born while I have been saying this to you? Probably so, but I am basing my arguments on the simple mathematics of supply versus demand.

What have mini-cinemas, Electronic Noise Gathering (ENG), videodiscs, communication satellites, micro-computers or 24-channel supercables meant to the total supply of creative energy in the film and television industry today?

Nothing!

(But they keep BKSTS and SMPTE going.)

These new technologies, primarily concerned with distribution, have, however, greatly increased the *demand* for creative energy and will go on doing so . . . unless, of course, we are prepared to accept a future Repeat Culture, a culture based on the films and the TV programs of yesterday. What a dreadful thought.

I think that there are many good reasons for stopping and thinking for a while before we become totally deluded by the electronic wizardry now approaching us, before we dilute the blood further and get too used to a life without quality.

After the distribution mania and technomania of the 70's, I think it is absolutely essential that we now give production matters and the creative processes more attention and more resources!

We must direct our attention away from the blood vessels to the blood itself. We have to prevent anemia and heart failure from happening in the communications industry of the 80's!

We have to go *beyond* technomania and ask ourselves some serious questions as to what film, television and video are *really* about.

Thank you for lending your ears to my personal views, the only area in which I can speak with a certain authority in front of a sophisticated, technical audience such as this one. ■

**Noted cinematographer and Technical Director of the Swedish Film Institute, Lars Svanberg feels that we are neglecting creativity in our manic preoccupation with technology.**

**Continued from Page 919**

when he was painting the Mona Lisa, a tube of paint marked "flesh tones for 3,200°K." He made her complexion the colour he wanted it to be, and so it is with cinematography and with all the many new light control media now available for both colouring and diffusing light; the creative cameraman has an increased palletteful of fine control at his command.

The great thing about gelatine filters, compared with dichroics, is that the Director of Photography can call for a full, half, quarter or even eighth blue, or orange, or whatever, to tint the light to exactly what he wants it to be.

Next in line in image control is what goes into the matte box.

The art, in cinematography, is in the lighting, *and* the degradation or manipulation of the image in the *matte box* in terms of *creativity,* the most important part of a camera.

It is a fact that in recent years the definition and contrast of lenses, and especially zoom lenses, has improved beyond all recognition—to say nothing of other aspects which I shall deal with later. And how have cameramen responded to this increased definition and "bite"? By using more and more diffusion filters, low contrast filters, fog filters, double fog filters, star filters, defraction gratings, black nets, white nets and even silk stockings. Nothing new in that, only in the extent to which it is used, for if the gutsy image was not there in the first place, the creative cameraman would not have the latitude for image *control.*

Look at your television any night of the week; the advertising commercials are a riot of soft, smooth images which seduce the viewer into a subliminal reverie of wishful thinking.

The big news in lenses is faster and faster lenses. Wide angle fast lenses for preference. They can save a lot of money or make filming possible under conditions of lighting which hitherto would have been impossible.

There are perhaps more facts to confuse the consumer written about lenses in their promotion, than in the evocation of any other cine product. Not all are quite as good as their proponents would have us believe, and with some there are definite hidden snags.

On the other hand, there are new lenses around today that are vastly better than anything ever seen before—wider apertures than ever before, wider angles, zooms which give better definition and contrast than heretofore and wide-angle, wide-aperture zooms which reduce the need for standard lenses.

Insofar as cameras are concerned, we live in an age of versatility and liberation from the fetters that bound our predecessors.

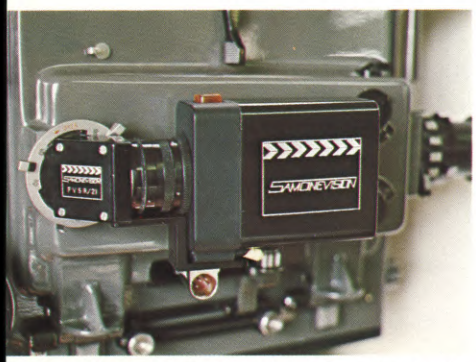
Much has been said of the quiet hand-holdable camera. The introduction of the Eclair NPR in the early 60's revolutionised camera work. But by modern standards, that is not enough.

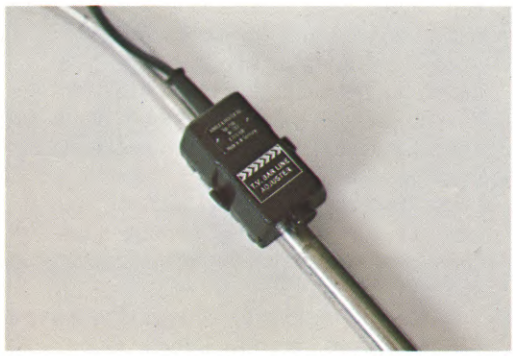
We need cameras which are equally good on a tripod or in the hand, for there is many a cameraman who has made his reputation hand-holding, and maintained it by using a tripod.

We need cameras with a noise level of 25 or 26 dB or better, with film in the camera, and with any lens on. Even now we have precious few 16mm cameras which have broken through the 30 dB barrier, and too many sync sound cameras capable only of shooting entertainment type film in discotheques.

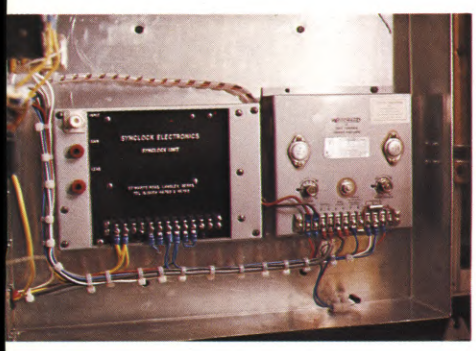
Even with 35mm cameras, true quietness is not easy to achieve. Some film stocks are noisier than others, temperature and humidity make a difference; the angle to which the camera may be tilted up or down will affect sound level; some lens blimps put restrictions on lens control which are not altogether acceptable, while the size and weight of some cameras and camera ensembles is still far too large and heavy.

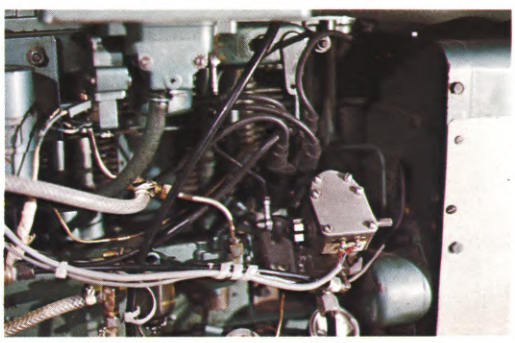
While it is perhaps true to say that if a camera cannot be used hand-held, the next question is whether it needs a block and tackle to put it on a tripod, all weight and size makes a difference in regard to the time it takes to change from one set-up to the next. Two minutes here and two minutes there adds up to two or more

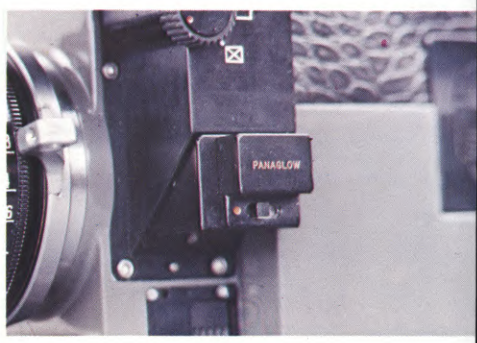



**(LEFT) The Samcinevision TV viewfinder camera, shown mounted on a Panavision Silent Reflex camera. (CENTER) TV Bar Line Adjuster, used to eliminate flicker bar when filming TV monitors. (RIGHT) Digital frequency meter. (BELOW LEFT) Phase interlock equipment used to accurately control the speed of an AC generator or to interlock it to the scanning of a TV remote unit. (CENTER) Governor control on the engine of an AC generator. (RIGHT) The Panaglow on the Panaflex camera.**







set-ups a day and a couple of days on the schedule—and that's money!

An additional important aspect of some new cameras is built-in TV viewfinders, usable even while the camera is handheld. Today in television we have a generation of TV directors who, with or without justification, do not trust the cameraman. They are so used to seeing what they are getting while they are getting it, calling shots and reducing the cameraman to the level of camera pusher/aimer/focuser, that they are lost when they go out into the great outdoors with a creative film cameraman.

A TV viewfinder puts the buck right back with the director.

TV viewfinders, after almost 17 years of hesitant acceptance, are at last coming good, and are used as a tool to burnish and to polish a take to perfection, particularly in a TV commercial. They are also often used in feature film production, where the director likewise plays a leading part.

Lining up a low key shot accurately, within say a 1.85:1 or TV format, when the frame lines etched on the ground glass cannot be distinguished from the background of the scene, has long been a problem. Operators, particularly, will find the Panavision Panaglow illuminated viewfinder reticle to be a significant step forward.

Another interesting aspect of camera development in recent history is the use of highly sophisticated electronics to control camera speed. We have now reached the stage when to service a camera is beyond the scope of the man in the field, who can't always be relied upon to maintain correct polarity when plugging a camera into a battery.

If the economics of it can be made to make sense, the EBU Time Base Code system of picture and sound sync identification is an important development. Here we have a totally admirable sophisticated electronic system of identifying both picture and sound with the actual time of exposure so that various lengths of picture and track may be identified and sync picked up at any point. Unfortunately for the system, what it replaces is two pieces of wood held together by a hinge, called a clapper board.

Oh well, I suppose one mustn't stand in the way of progress, at whatever the cost. For a major TV network, however, it must make a lot of sense.

Also in the field of electronic control of cameras we have the ability to lock a camera into the phase of a TV set and to advance and retard the exposure period to eliminate the barline.

More and more often we see practical TV sets as props in films and it is a pleasure to note that phase bars are a thing of the past, even from the U.S. and other 60Hz countries where it is necessary to use a camera with a very precise 144° shutter. Such cameras have long been available for 16mm usage but are now also available for 35mm.

Cameras have to be put on something. If it's a tripod there are improvements in heads; if on the shoulder, they are now more comfortable and can be held more steadily in a static situation, and if it's a floating camera that is required, then since FILM '75 there is a new generation of these.

Let's look at heads first. A mounted camera must be able to be panned and tilted smoothly and accurately. For the higher echelons of feature and TV commercial production geared heads are the preferred method.

We now have a completely new geared head from the United States, the Panahead, which not only incorporates all of that, but also uses a completely new form of tilt drive which eliminates the old problem of wear in the centre of the tilt quadrant, compared with the rarely used extremes. It is lighter in weight and may be used in a free head or gyro mode by the simple expedient of adding a pan handle.

It has always been somewhat of a mystery to film men why it is that TV camera mounting never went "fluid" years ago. Perhaps it was because no fluid head was large enough for their heavy cameras, or perhaps it was because the fact of television was sufficient in itself. Certainly it wasn't because TV coverages of horse racing, for instance, is so perfect that the distance from the nose of the leading horse to the edge of frame never varies throughout a long shot. Larger fluid heads are now available and TV cameras are now smaller and there is every sign of a forthcoming and lasting marriage between the two.

Of all the developments which have created interest within the two years since last we met, the so-called "floating camera mounts" have received the most attention and, indeed, have had the most development time and money lavished upon them.

Two years ago we saw impressive films taken with the aid of the Steadicam and now we have two models of that device from Cinema Products, one incorporates an Arriflex IIC and another will accept any camera, be it 16mm or 35mm, or ENG video.

There are also two models available from Panavision. One incorporates a lightweight version of the Panaflex, and so can be used while recording sync sound dialogue, and the other involves an Arriflex IIC so highly emasculated to save weight that not even its own mother would recognise it.

In 1911, when E.F. Moy Limited of this country, and still going strong, manufactured the first ever hand-holdable electric camera for aerial filming it too incorporated a stabilising device, a *gyroscope,* which, as it said in the patent specifications, was necessary "to overcome the nervous movements of the camera operator", and when you recall what the aircraft they flew in at that time were like, you won't be surprised. Even when used for filming from a balloon the results were not very steady.

"Floating" helicopter mounts have been around for a long time now and the techniques are highly developed. I have always believed that a good helicopter shot starts from where the dolly or crane leaves off. Anyone can shoot steady aerial shots from 500 feet without assistance; to do it from 15 needs specialised equipment, an experienced cameraman and a pilot who flies a camera.

One may ask how the new "floating camera systems" are to be used.

They don't replace a tripod, or dolly or crane—that is for sure, for when you need a camera supported steadily so as not to attract attention to itself, the original supports are still the best. Rather, they introduce the possibility of shots that were just not done before, because they were impossible. Their effect can, I think, best be likened to that of a low level helicopter. Cameras may now swish up and down stairs, float across barriers, run ahead of a pursuing artist and operate over types of terrain which heretofore, had the shot even been possible, would have involved laying tracks and/or using a large camera crane.

For a standing still shot, I am old fashioned; I still prefer a tripod.

So where do we go in the future?

To TV-originated film? Not in the foreseeable future for the big screen certainly. The arithmetic of the number of possible bits of information across the screen does not permit it. That was made very clear recently when two feature films about the same subject, the successful release of hostages from Entebbe, were released simultaneously. One film was shot on video, played to empty cinemas and was slated by the critics for its poor quality. The other was shot on film, had queues forming around the cinemas in which it played, and was hailed as a great success.

There are those who like to claim that ENG will replace film on TV. For hot news, especially where there are two or three networks competing, it is necessary, for prestige purposes, that the XYZ network should not be scooped by DEF or GHI.

For the consumer it is less important. There are so many news bulletins now on TV that if we, or they, miss out on one,

**Continued on Page 984**

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# THE ZOPTIC SPECIAL EFFECTS DEVICE

film 77

**An ingenious, but relatively simple and inexpensive device makes it possible to utilize both front and rear projection in order to achieve a wide range of spectacular special effects**

**By ZORAN PERISIC**

*(EDITOR'S NOTE: The Zoptic special effects device, introduced at PHOTOKINA '76 in Cologne last fall, was briefly described in the December 1976 issue of* American Cinematographer. *Shown at FILM '77 in London, together with some impressive film clips showing what it can do, the device attracted considerable attention. The accompanying article describes its capabilities and methods for achieving various effects. Further information about the equipment may be obtained by directing inquiries to: Neilson-Hordell Ltd., Central Trading Estates, Staines, Middlesex, ENGLAND.)*

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The Zoptic special effects device enables the subject to appear to move "in-depth" while its real position relative to the camera remains unchanged.

This is achieved by projecting the background image (by means of front or rear projection) through a zoom lens and rephotographing that same background and a subject placed before it by means of a matching zoom lens on the camera.

The two zoom lenses are interlocked either electronically (or mechanically) with identical focal length matching so that their focal lengths change in unison.

So, when the projector is projecting a large picture its lens is operating at a short focal length and, because the camera lens also adjusts to the same focal length in order to photograph the whole of the larger projected picture, the size of the static object in front of the screen will appear distant or small in frame. (Fig. 1).

The reverse of this applies when the projector is projecting a small picture with its lens operating at a longer focal length and the camera lens follows the same zoom change to pick up this same small area. The effect is that the projected image appears unchanged when seen through the camera viewfinder, but the subject in front of the projected image has become very much enlarged and appears to have travelled forward towards the camera. (Fig. 2).

An auto-iris is used on the projection lens to compensate for the changes in the brightness of the projected image.

### Front-projection

Zoptic can most easily be used with front-projection because of the inherent advantages of this system over back-projection. The camera and projector lens can be lined up without great difficulty even when they are both on the same base. When a properly adapted or specially-designed project for front-projection is used there is no problem in getting the two lenses to line up correctly. The line-up is checked by projecting a grid with the same markings as the camera graticule: when camera and projector are correctly lined up these two grids will match all the way through the zoom.

A misalignment between the camera and projector will result in a drift to one side. This drift can be exploited deliberately in some cases because it appears as a pan if the projected image is larger than the area being photographed, otherwise the background picture appears to drift out of frame area.

Zoptic lenses can be fitted to most projectors with various degrees of modification. However, the Neilson-Hordell projector is designed to take Zoptic lenses without modification.

### Pan and tilt

The camera can be panned and tilted on the nodal head during the Zoptic effect within the same limitations as for conventional front-projection. The projector lens is set at a wider angle setting than that of the camera lens. The extent of this difference will depend on the amount of panning that will be required.

The two zooms are then locked in this chosen relationship and a Zoptic effect is achieved as well as the pan. Naturally, the extent of the coupled zooming is reduced proportionally to the difference between the two zooms. When two 10:1 zooms are used (such as Cine Varotal) there is still a very effective 5:1 ratio left when the zooms are set at halfway position to each other.

### Moving the compound

The path which an object follows "in

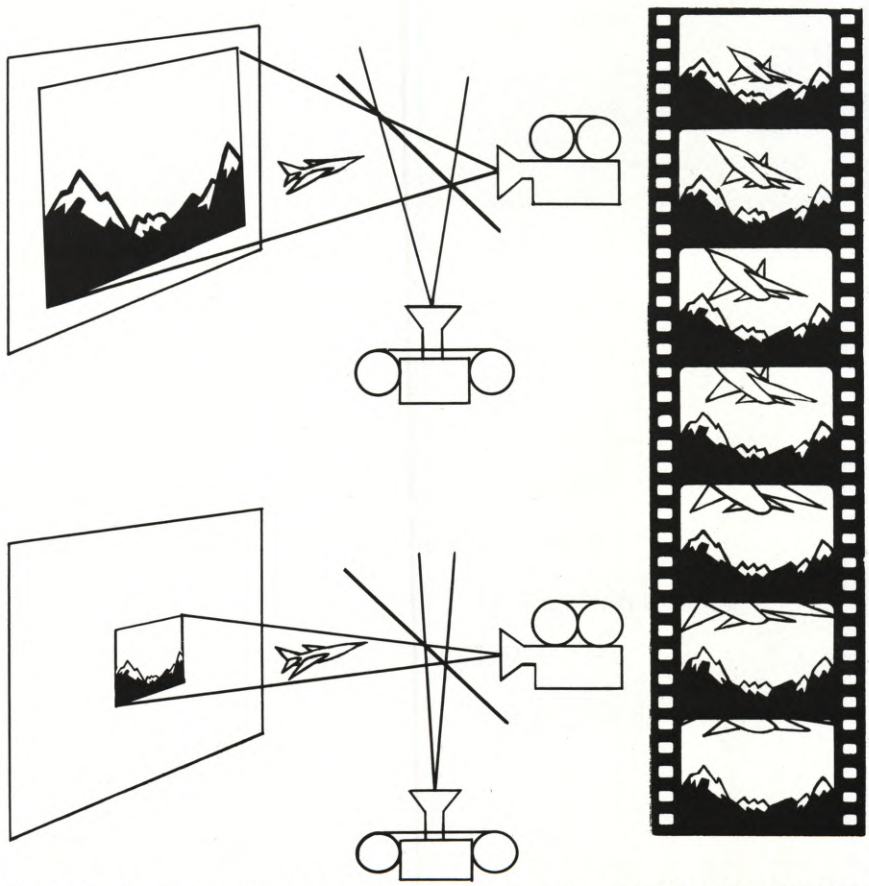


**Fig. 1 (Top) Projector projecting large background scene and position of the model as seen by camera in relation to background. Fig. 2 (Bottom) Projector projecting small background scene with lens zoomed to a longer focal length. Camera lens follows this to give effect of model moving forward.**

depth" is determined by its relative position to the lens centre. For example, if it is left of centre at the start of a zoom-in it will move further and further left as the zoom-in progresses, eventually exiting left of frame. A camera pan can alter this path because the relative position of the subject to the camera centre is altered progressively, i.e. the subject can start left of centre and be made to exit frame right of centre by a right-to-left pan.

If it is desirable to make the subject in front of the screen move across the frame during the Zoptic effect without a visible pan on the background as well, then this can be achieved by panning the entire compound-camera and projector together. This method also allows for the use of the full ratio because the two zooms can be locked in the parallel position. In some cases the entire compound can be suspended on wires for even greater flexibility of movement. The Neilson-Hordell projector is particularly suitable for this purpose.

**Different mixes**

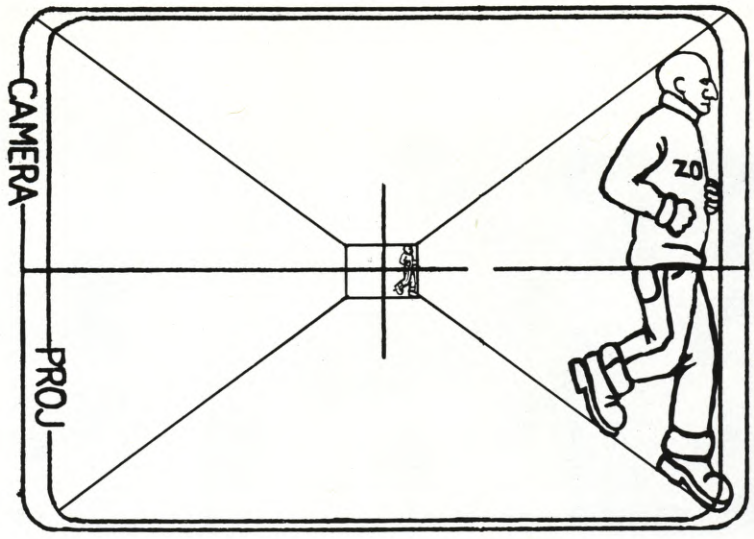
When mixing conventional front-projection and Zoptic effect the two zooms are normally used in a parallel setting, i.e. their focal lengths are matched when they are interlocked. Also they can be used in different relative settings, to enable panning and tilting camera movements.

In addition, the two zooms can be used quite independently for any specific effect that may be required. The operation is so flexible that the two zooms can be used in the interlocked position and independently in the same shot.

For example, the projector zoom can be set at the wide angle and remain static while the camera lens is used to zoom-out from within shot to a full frame in a conventional manner. At the end of the zoom the projector lens can be interlocked with the camera lens and the two are then zoomed in together creating the Zoptic effect on the subject in front of the screen.

Another example would be to use this procedure in reverse. The projector lens is set at its long focal length setting, projecting a small picture on the screen. A man stands by the side of this picture looking at it. The camera lens starts at the wide angle and zooms-in until the projected picture fills the frame. At this point the two zooms are interlocked and as they are zoomed out the background picture remains the same size but the man who was standing by the picture is now inside it!

Alternatively, the projected picture can be made to grow enveloping the man until it fills the camera frame fully; at this point the two zooms are interlocked and the man can be made to 'fly' in towards the camera but still remaining inside the picture.



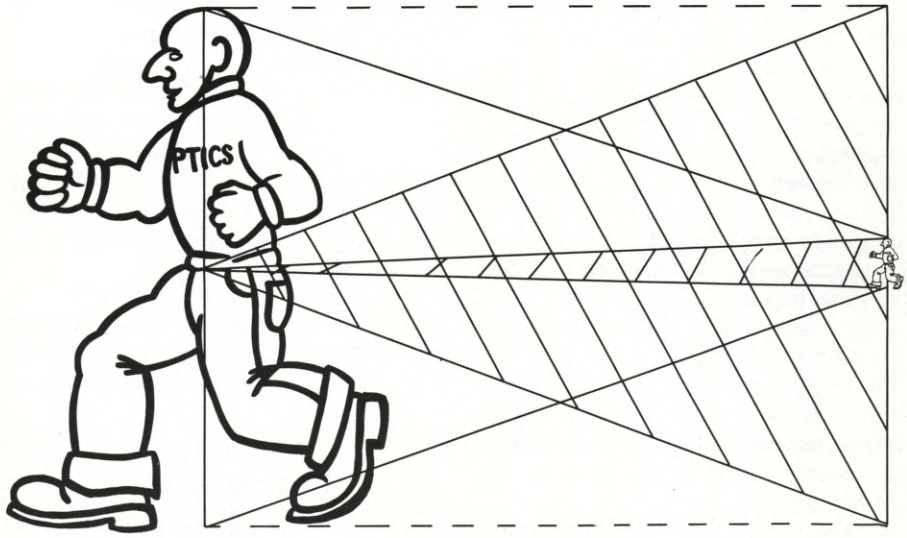



**Fig. 3A (Above) and Fig. 3B (Below). Two ways of calculating and representing a 10 to 1 zoom on a man running**

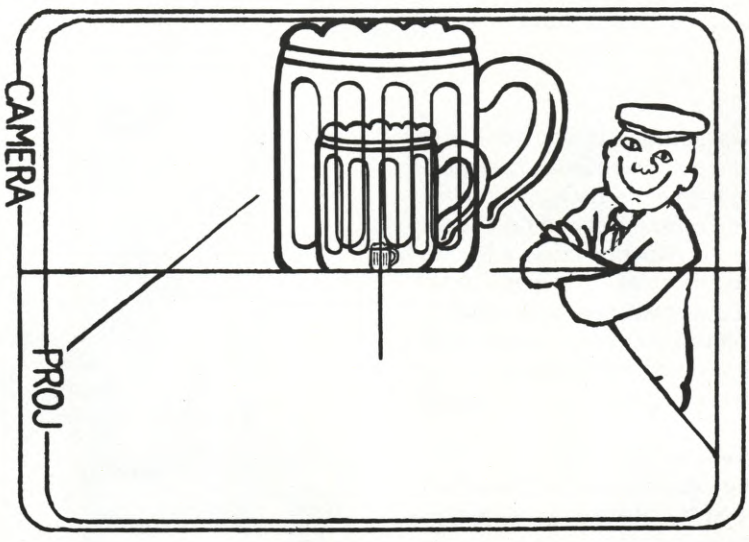
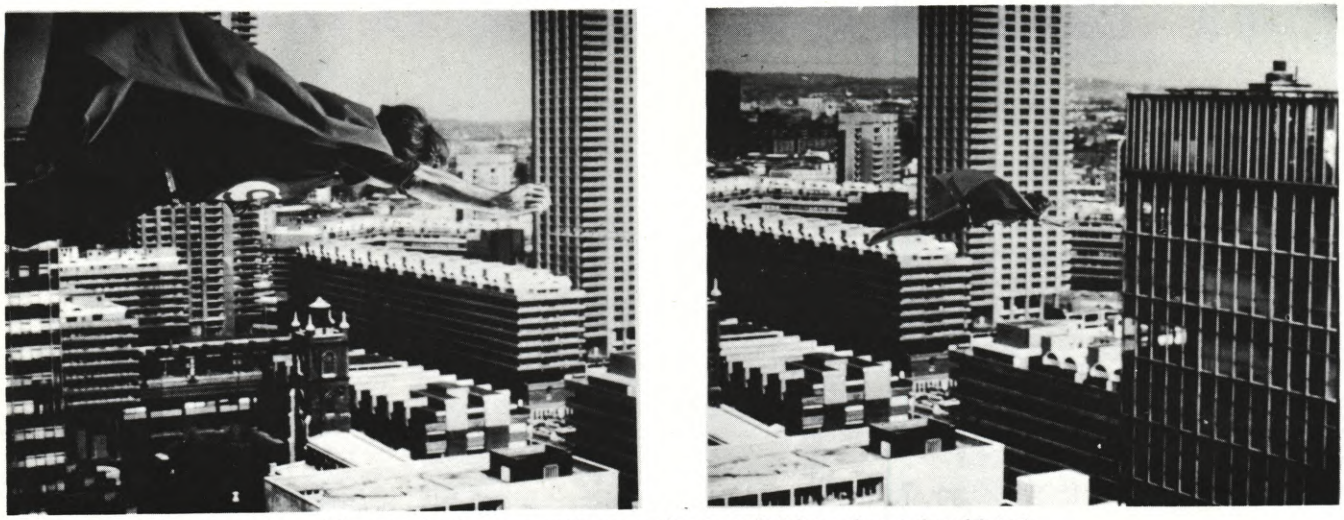



**Fig. 3C. No compensation is needed for a glass to grow when positioned with its base on the horizontal control line with the vertical line cutting down the centre of the glass**



**The Zoptic effect in action with a gradual zoom out from a close-up (left) to a long shot (right)**

### Realistic effects

The obvious applications of Zoptic technique is for making objects or people appear to fly or simply grow and shrink. Apart from this it can be used to add realism to a scene. If an actor is walking on a treadmill with a tracking background projected on the screen behind him the Zoptic system can make him appear to come gradually nearer and nearer the camera (or alternatively, the camera can be made to appear to move away faster and faster in front of him).

This is the sort of flexibility that a director would have if he were shooting the scene on location. Because the Zoptic effect can be seen as it happens and is infinitely variable it enables the creation of very realistic effects as well as those of total fantasy.

A man can walk down a winding path of a painted background towards the camera and the operator can make sure that his feet stay on the ground simply by manipulating the projector/camera compound.

### Shot planning

Naturally a great deal of attention has to be paid to the precise angle and perspective chosen before the background plate is shot. The Zoptic effect can be worked out in detail on paper because it follows strict geometric rules. The path along which the subject will appear to move in depth through the picture is the extension of a line drawn from the centre of frame (lens centre) through the centre of the subject.

Two more lines drawn from the frame centre to the extreme points of the subject and extended to the edge of frame give the wedge shaped path along which the subject will travel.

If an actor is required to run towards the camera at some incredible speed the precise position of the road in the frame is extremely important. It is best to line up the shot with a stand-in in position. If the horizontal centre line of frame is set to cut across his waist as he stands on the road and the camera is positioned at this height, then no further adjustments will be needed during front projection. Both the upper and the lower parts of the body will appear to grow in size in equal proportions as the actor nears the camera and his feet will always remain on the ground (Figs 3A, 3B and 3C).

If, however, the perspective is not matched in this way the actor's feet will appear to move below the road or above it and to compensate for this the camera/projector compound will have to be correspondingly tilted during the shot to overcome this mismatch.


**Neilson-Hordell dual screen front matte projector fitted with Zoptic special effects device**

If a shot is properly planned so that the actor's feet are on the horizontal centre line they will stay on this line throughout the zoom and the apparent increase in size of the actor's body will appear to be away from this line towards the edge of frame.

This is particularly useful when people or objects are required to shrink or grow while standing in a specific spot. If, on the other hand, the actor is fully in frame at the start of the shot with his feet near the bottom frame line and is required to shrink to a very small size on the same spot then the camera/projector compound has to be tilted upwards during the shot in order to keep his feet in the same position in the scene.

The position of the object relative to the vertical centre line is also of equal importance. A man standing on the horizontal line and on the vertical centre line will grow or shrink on the spot without the need for any compensation. However, if he is a certain distance to the right of the vertical centre line with his feet still on the horizontal centre line he will "drift" towards the right edge of frame as he grows and his feet will appear to slide along the horizontal centre line. In this case a left-to-right pan of the camera/projector compound will be required to keep him on the same spot.

This type of compensation is not difficult to achieve because the actual effect can be seen as it is being created and appropriate correction can be made as it is required.

Actors can be suspended on wires or by specially constructed girdles attached to a long pole which is placed through the front projection screen so that the rigging supporting it is not visible. This way the actor can be manipulated to achieve the de-

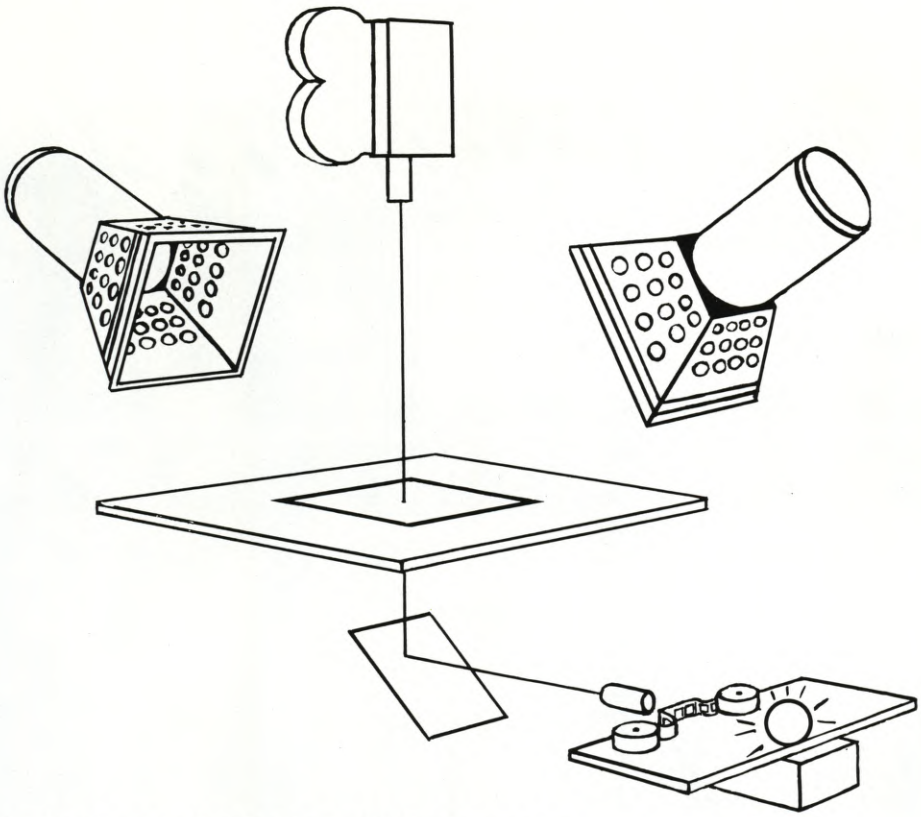


Fig. 4. Flat artwork animation with Zoptic system

sired action or change in perspective. For walking shots, slanted strips coated with f-p material are placed on the rostrum area below their feet. The extra reflectivity which results this way, because this section is nearer to the camera/projection, can be eliminated with the use of graduated ND filters in front of either the projector or the camera lens.

This is another case where the dual screen projector has a great advantage over others since only a small area of the scene is reflected back from the secondary screen. The actor can therefore appear to be high up in the shot when he is in reality only a couple of feet off the ground.

Models are best suspended by means of a pole pushed through the f-p screen. This way they can be manipulated with the greatest degree of accuracy. As the Zoptic system can operate at slow continuous speed or stop-motion the models can be animated to accomplish extremely intricate manoeuvres.

### Several objects

Normally, if more than one object is placed in front of the screen then they will all fly or change size at the same rate. For those occasions when two or more objects are required to appear in the same scene at the same time but travelling at different speeds, possibly in opposite directions, it is necessary to shoot each object separately on a separate run through the camera, ensuring that the camera and projector are in perfect frame-to-frame interlock for each pass.

This is done by masking off different areas as required for each pass in front of the camera lens or in the camera itself.

Certain cameras with built-in masking facilities are particularly useful for this purpose. The masking in front of the camera lens can only be done successfully along the vertical and horizontal lines running through the centre of frame (lens control) because their relative positions remain unaltered throughout the zoom.

Alternatively, one object can be married up first and then the plate of the composite scene can be used for marrying up with another object. This requires extra duplication but it is extremely useful when the two objects are required to cross over each other or execute extremely elaborate manoeuvres which are not restricted to one specific area of the frame.

### Zoptic without zooms

It is possible to achieve the Zoptic effect by tracking the camera and projector compound towards the f-p screen. The problem of the increase in the level of luminosity of the projected image at smaller field sizes can be solved in much the same way as in the case of the zoom lenses by an automatically operated iris which progressively cuts down the amount of light reaching the screen.

The camera/projector compound can be tracked along rails set on the floor or

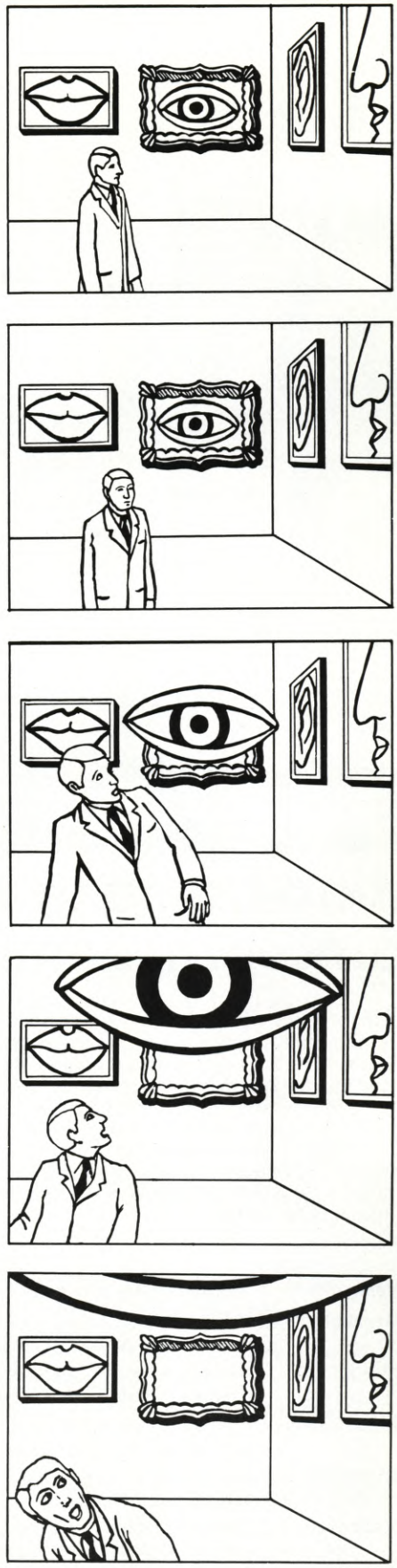


Fig. 5. The effect of using the Zoptic screen in conjunction with the front projection screen.

else it can be suspended from the ceiling and tracked along that way. In addition, this method requires some form of automatic follow focus mechanism on both lenses.

**Continued on Page 966**

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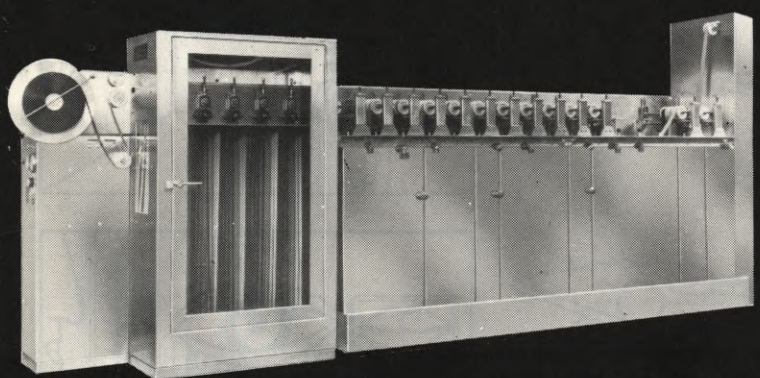

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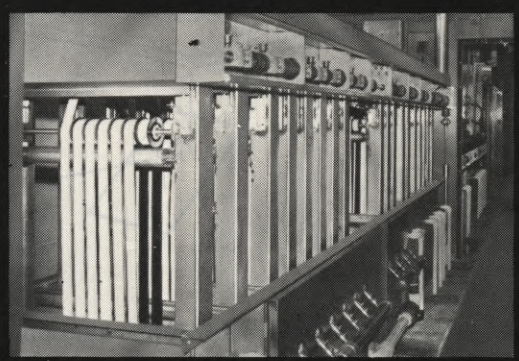

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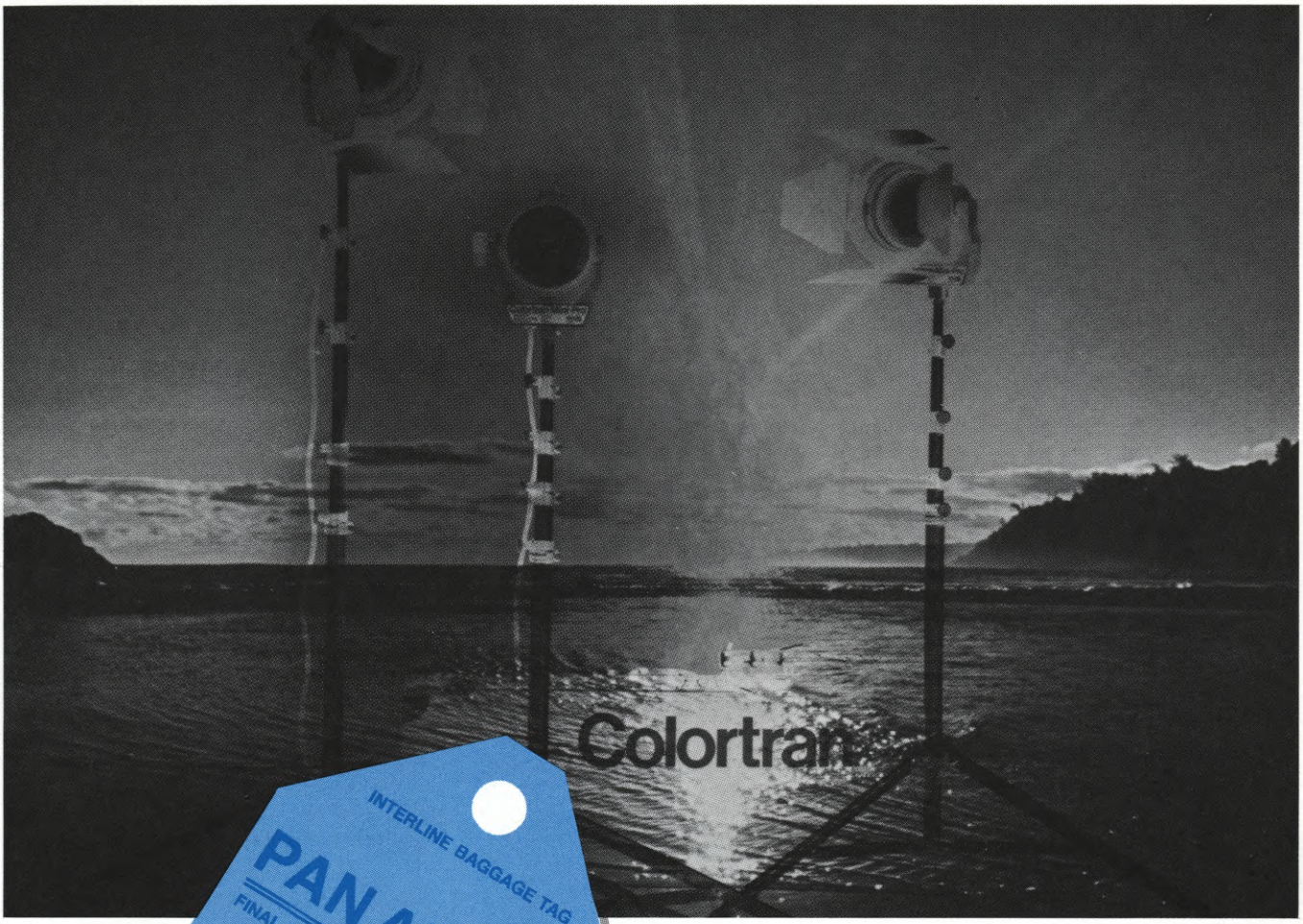



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# THE new MOVIECAM 3 35mm camera

film 77

**Previewed at FILM '77: a new self-blimped, compact and lightweight 35mm mirror-reflex film camera, suitable for studio or shoulder operation, with several highly sophisticated features built into it**

Gabriel Bauer is a film producer and director of commercial films in Vienna. He runs MOVIE GROUP—one of the largest companies in Austria producing animated films—using Neilson-Hordell equipment.

For some time Mr Bauer had been dissatisfied with the 35mm movie cameras which were available in Austria. Therefore, he bought a Mitchell Standard Hi-speed Camera and built an attractive rotating mirror conversion with built-in video tube around the famous Mitchell movement. The camera was named MOVIECAM 1.

One year later he designed a prototype camera with his own claw reciprocating movement, built-in video tube and duralumin housing. The magazines were easy to change, but the camera was still noisy for location and studio shooting. In the beginning of 1976, Mr Bauer started to develop and design MOVIECAM 3 which was shown in its prototype version at FILM 77. With this design some steps into the future were taken. Modern technology was used in its construction of Poly-Carbonite. The Digiclapper system was designed and the movie-speed system (which permits alteration to camera speeds whilst shooting, but still maintaining the correct exposure) was brought up to a high standard.

The following is a description of the camera provided by Neilson-Hordell Ltd., world-wide exclusive agent for the MOVIECAM 3:

The Moviecam 3 is a self-blimped, compact and lightweight 35mm mirror reflex film camera suitable for studio and shoulder operation. It is constructed of the most modern materials and uses "state-of-the-art" technology throughout. It is truly a camera of the future.

**As previewed at FILM '77, the handsome new MOVIECAM 3 35mm film camera, shown here with portable 12-30-volt DC battery power supply unit and video monitor. The camera incorporates a high-contrast television pick-up tube which can feed TV monitors and a video tape recorder. It can be powered by batteries or mains electric current. The movement is dual-pin registered, with a 4-pin film transport system.**

The movement is dual-pin registered with a 4-pin film transport system providing continuously variable speeds from 3 to 140 pictures per second and stop-motion, in addition to synchronous 24 and 25 pictures per second.

The Moviespeed-System: by use of an unique interlock coupled to the lens iris, it is possible to alter the camera speeds whilst shooting and automatically maintain correct exposure of the film. This feature will particularly appeal to producers of television commercials and special effects. Drive is achieved by a built-in controlled printed-circuit motor that can be powered by batteries or mains electric.

The viewfinder is orientable throughout 360° providing a brilliant erect-upright image. The mirror always stops in the viewing position.

The camera incorporates a high-contrast television pick-up tube which can feed T.V. monitors and a video tape recorder. A built-in safety circuit prevents damage to the pick-up tube if left pointed at a strong light source.

Another unique feature of the camera is the built-in "Digiclapper" which prints in a dialled scene number on to the first frames. This also provides start, stop and synchronisation pulse marks. This feature achieves considerable savings in time and film stock. The camera body and magazines are made of a high-strength, low-weight Poly-Carbonite foam plastic. Attention has been paid to providing easy access and threading. The magazines have take-up and brake motors incorporated which provide forward and reverse running.

**Frame Format:**
35mm.

**Dimensions:**
Camera + 120m. (400 ft.)
Magazine:
length: 530mm. (21 inches)
width: 310mm. (12¼ inches)
height: 360mm. (14¼ inches)

**Weight:** (excluding lens or film):
14 kg. (30.8 lbs.) including magazine.

**Body:**
High-impact Poly-Carbonite Foam Plastic with antivibration absorbers. Carrying

handle. Grey matt-velvet finish.

**Speeds:**
Variable from 3—140 forward or reserve, in single frame increments. All speeds crystal controlled, also single-frame stop-motion (with exterior shutter). By using the Movie-speed-System frame speed variations can be preset and operated during running with automatic control of exposure. Timing of the speed changes can be pre-set over 1 to 99 seconds. Minimum change-time over complete range: 3 seconds.

**Power:**
12—30 V.D.C. battery supply. 110 V./240 V.A.C. 50/60 H.Z. power supply.

**Film Transport:**
Newly designed reciprocating movement with double transport claws each side and twin registration pins providing a high degree of frame-to-frame registration. Interchangeable frame aperture plates.

**Viewfinder:**
Optical image via rotating mirror to ground-glass. The viewfinder is rotatable throughout 360° presenting an upright erect image at all times. An optional long viewfinder can be supplied with an adjustable lens for increasing magnification of the image as an aid to more accurate focusing. The viewfinder is adaptable for anamorphic viewing. The built-in TV pick-up tube provides a high-contrast display of the ground glass image. This can be fed to TV monitors and a video tape recorder.

**Shutter:**
180° reflex mirror shutter. Stops automatically in the viewing position.

**Lens Mount:**
Bayonet or BNCR.

**Magazine:**
120 m. (400 ft.) quick-change magazine for forward and reserve running, complete with take-up and braking motors and an integrated footage counter. A looping feature aids quick and precise threading. 300 m. (1,000 ft.) magazines also available.

**Digiclapper:**
Prints optical a dialled scene number at beginning of each shot (25 frames). Also prints start and stop marks and a synchronised pulse marke on film.

**The MOVIECAM 3 incorporates several highly sophisticated features. One of these is the Moviespeed System, which, through the use of an unique interlock coupled to the lens iris, makes it possible to alter the camera speed while shooting and automatically maintain correct exposure of the film. Another unique feature is the "Digiclapper", which prints a dialled scene number onto the first frames of a take. This also provides START, STOP and synchronization pulse marks.**

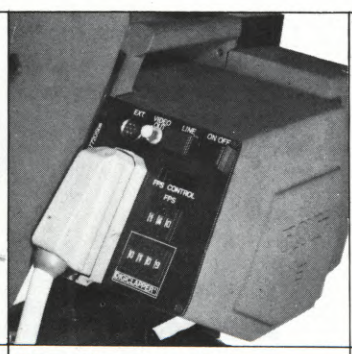
**Operational Controls:**
1. Illuminated on/off switch
2. Alarm light against incorrect operation or buckle trips
3. Pre-set framing-speed dial buttons
4. Digital frame-speed check display
5. Phase-shifter for synchronising film with T.V. monitor
6. Digiclapper pre-set controls
7. Sync. pulse outlet

**Handle** (removable):
Anatomically shaped and positioned for correct centre of gravity when shoulder mounted. The handle contains an on/off switch.

**Carrying Case:**
Shockproof case with foam inserts and snap latches. Contains camera and 2 magazines, cable and hand-grip.

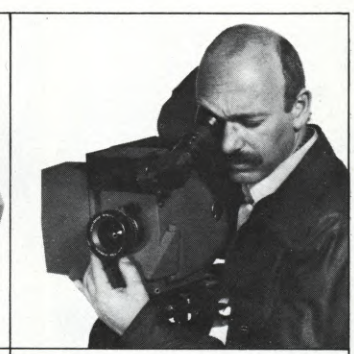
For further particulars please write to: Neilson Hordell Ltd.; Central Trading Estate, Staines, Middx. TW 18 4 UU, England. ■

Side View



Operational controls

Power unit



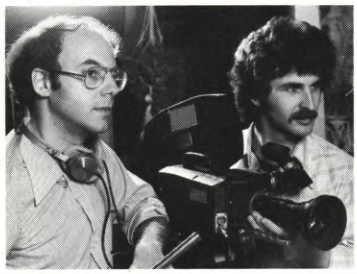
360° rotatable viewfinder

***"I am most impressed with Cinema Products' approach to the design and manufacture of film equipment, as well as the diversity and dependability of their products. CP-16R and STEADICAM are the prime examples!"***

*Timothy Wolfe*
*Chief, Film Production*
*Maryland Center for Public Broadcasting*

"The Maryland Center for Public Broadcasting is the production facility for a network of PBS affiliated stations throughout the state," says Timothy Wolfe, Chief, Film Production.

"Most of our programs are specifically tailored to meet local needs, while others are produced for a national audience. The film production unit provides a wide range of materials for broadcasting, from film inserts which are rolled into live or taped broadcasts, to hour-long dramas and documentaries."



*Cameraman Kevin Weber (right) and Timothy Wolfe, Chief, Film Production, Maryland Center for Public Broadcasting.*

***"The CP-16R is the finest production camera of its kind..."***

"We are well equipped for all phases of 16mm production. Included in our inventory is a CP-16/A, a CP-16R/A reflex with orientable viewfinder, a Model 6C mixer, and we have just ordered a J-4 zoom control system for several of our lenses.

"The cameras are extremely quiet, well built, and simple to service. Certainly the CP-16R is the finest production camera of its kind, and we use its single/double system sound capability extensively."

Motion picture cameraman Kevin Weber concurs. "I have been using the CP-16R on a daily basis for the past year or so — filming community theatre, dance, and music presentations in the Baltimore-Washington area," says Weber. "After hundreds of location productions, the CP-16R continues to function perfectly. The camera is very professional, yet it retains a simplicity that makes it extremely functional.

"I enjoy shooting from the shoulder, so I often utilize a 10mm lens, and jump right into the action on stage. From this vantage point, my camera can become another character who is in close touch with the performers. The CP-16R is one of the finest handheld cameras I have encountered: silent and reliable, capable of handling almost any filming situation."

***"Working with STEADICAM means developing a new technique of moving and shooting."***

Says Wolfe: "A recent assignment to produce a short film about the sport of Siberian Husky dog racing presented us with an excellent opportunity to explore the unique capabilities of Cinema Products' new STEADICAM camera stabilizing system. Especially since director Marian Siegel wanted to include both tracking and point-of-view shots of the race itself.

"From Brenner Cine-Sound (Washington, D.C.) we rented a Universal Model STEADICAM and Cinevid system for use with our own CP-16R, allowing cameraman Steve Dubin sufficient lead time to familiarize himself with the unit under the guidance and supervision of Brenner technicians.

"The evening before the shoot, Steve took a feed from the Cinevid and recorded his moves on a video cassette machine. Time well spent, since working with STEADICAM means developing a new technique of moving and shooting.

"Using 7247 color negative for maximum depth of field, Steve shot with an 85N6 on the Angenieux 12-120mm zoom lens at f/16, keeping the focal length between 12-25mm."

*Cameraman Steve Dubin with CP-16R and STEADICAM. STEADICAM converts virtually any vehicle into an "instant" camera platform.*

***"STEADICAM replaces costly and time-consuming methods of shooting."***

"Steve moved easily with his STEADICAM, in and around dogs and trainers as the teams were being prepared for a run. He was then strapped to the tailgate of the truck for some tracking shots, leading the teams along little used trails, and ended the day riding in the dog sled on a run through the woods.

"With STEADICAM, Steve was free to make complicated shots on short notice with relative ease — shots which would have been impossible to make had he been limited to a dolly, tracks, and hours of crew rehearsals! And the finished piece has a remarkably fluid and refined quality.

"STEADICAM replaces costly and time-consuming methods of shooting," concludes Wolfe. "The Universal Model is especially attractive, since it can be used interchangeably with 16mm and 35mm motion picture cameras, as well as with video cameras.

"I am most impressed with Cinema Products' approach to the design and manufacture of film equipment, as well as the diversity and dependability of their products. CP-16R and STEADICAM are the prime examples! With products like these, filmmaking remains a viable operation for a television production facility such as ours."

For further information, please write to:


cinema products CORPORATION
*Technology In The Service Of Creativity*
2037 Granville Avenue, Los Angeles, California 90025
Telephone: (213) 478-0711 ■ Telex: 69-1339 ■ Cable: Cinedevco

# SURVIVAL OF THE FITTEST.


You could still smell the smoke when this Sennheiser shotgun condenser microphone came in for repairs. The studio where it had been in daily use for years was devastated.

Heat so intense, it melted the shock-mount fittings. Thick smoke, corrosive chemical fumes and water all contributed to the studio's misery.

The studio had no idea how badly the mike was damaged. They couldn't test it. Their equipment had been all but totalled. So they returned the mike to us.

Dubiously, we put the unit on a test bench to see what needed to be done.

We had to replace the shock mount fittings. And clean up the mike cosmetically. That was easy. And that was *all*.

After all it went through, this Sennheiser shotgun microphone still met all our original factory specifications. With the same wide, flat response. Ultra-tight directionality. High sensitivity. And freedom from overload.

Of course, there's no need for such extremes to prove how much you can depend on Sennheiser. Rugged design, precision craftsmanship and the fact that Sennheiser RF condenser microphones don't use high-voltage DC bias (which can cause arcing) have all contributed to our reputation for unsurpassed reliability. And helped make Sennheiser the industry standard over the years.

For more information about our remarkable condenser microphones, see your Sennheiser dealer or contact us. Either way, you'll get a warm reception.

**SENNHEISER**

ELECTRONIC CORPORATION
10 West 37th Street, New York 10018 (212) 239-0190
Manufacturing Plant: Bissendorf/Hannover, West Germany

# THE KEESCAN ELECTRONIC FILM EDITING SYSTEM

film 77

**For those who feel that electronic editing of tape is somewhat faster than conventional film editing, there is now a compact "tabletop" system for editing film, after it has been transferred to 3/4-inch videocassettes**

In the past few years, proponents of videotape over film have made much of the fact that, from the ideal standpoint, the electronic editing of tape can be accomplished at a much faster pace than conventional film editing.

Accepting that assertion, some filmmakers have experimented with methods of transferring film to tape, editing the tape electronically and then ultimately matching the film original to the edited tape "workprint".

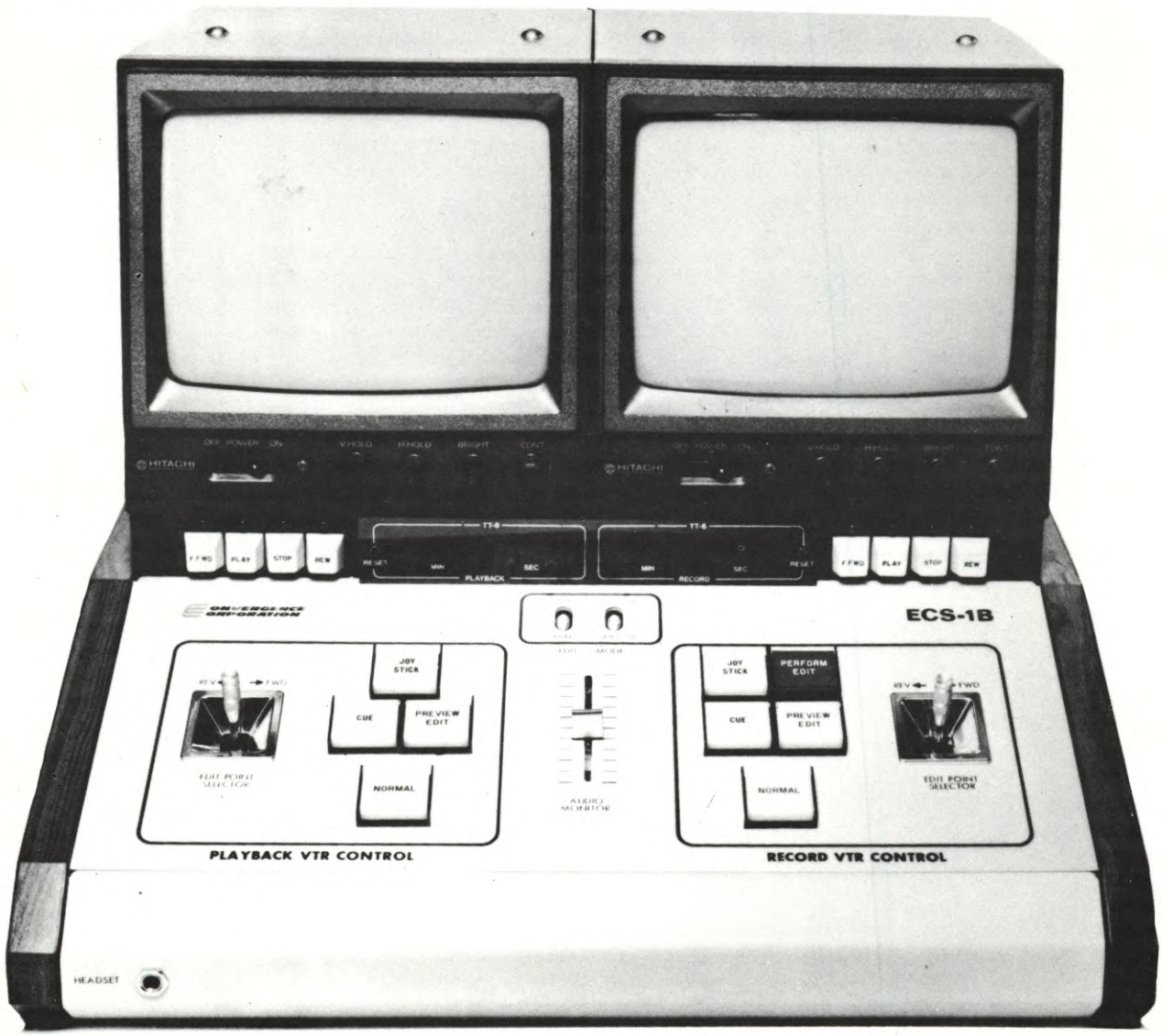
So far, so good—but what has mitigated against this method is the fact that, in cases where the film images are transferred to standard broadcast 2-inch tape for editing purposes, the costs of renting the cumbersome and highly sophisticated editing equipment (such as the CMX) are so prohibitively high, that at best the editor can afford only enough time to do a "quick and dirty" editing job—a procedure that is contrary to all tenets of quality filmmaking.

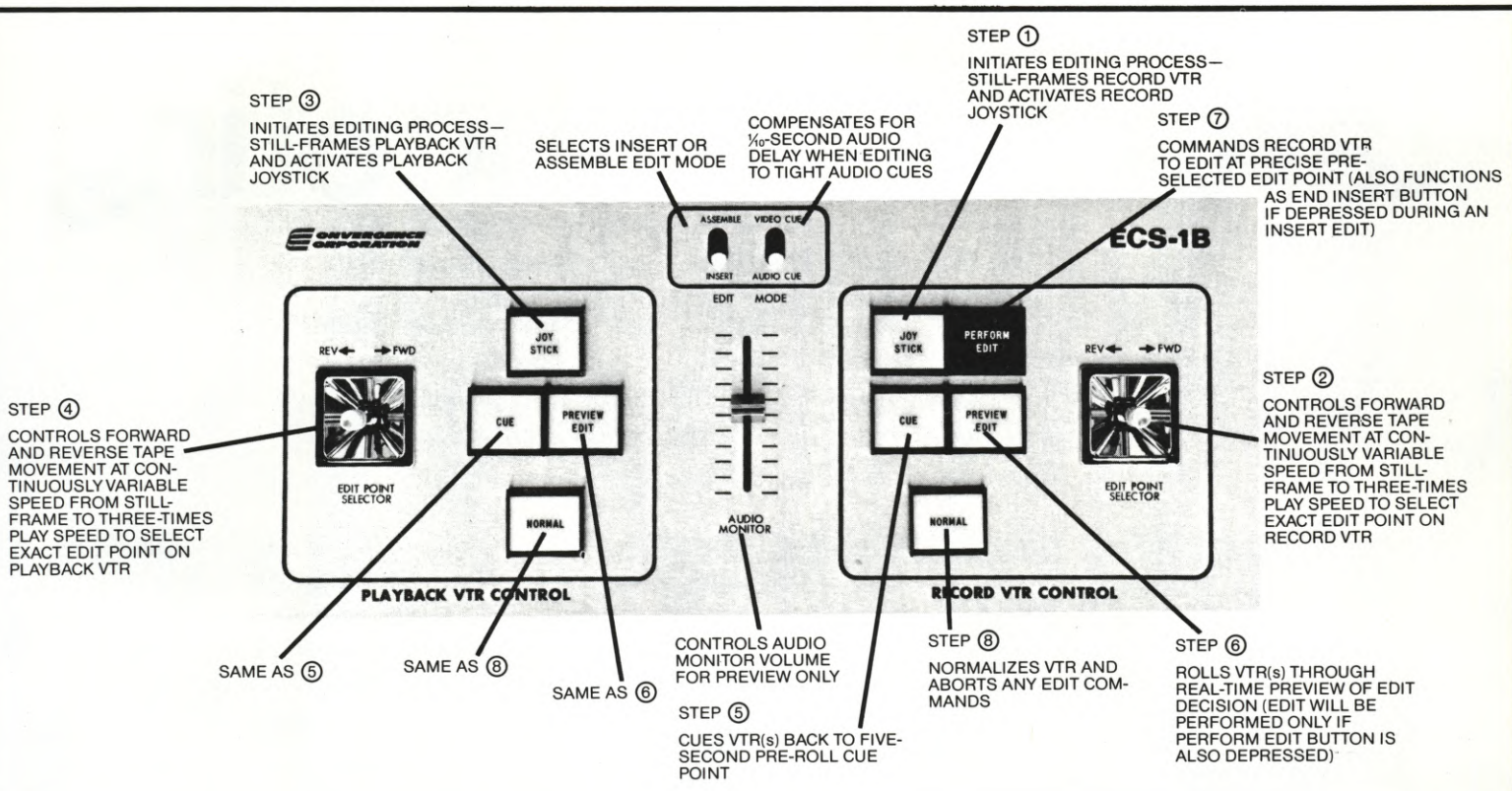
To overcome this considerable obstacle, the Keescan Electronic Film Editing System, on display at FILM '77, was developed. Utilizing very compact ("tabletop") electronic components that are relatively inexpensive to purchase, the Keescan System theoretically speeds up the editing process, while still allowing the editor to mull over cuts (in the way traditionally associated with film editing) and try out various alternatives without actually cutting and splicing a film workprint.

In practice, the film images are transferred to 3/4-inch videocassettes, complete with edge numbers. These edge numbers are electronically recorded along with the picture information. When the creative editing decisions have all been made, and the resultant electronic "cuts" have been executed, the okayed edited tape is then retransferred back to film in the form of a workprint to be used for matching the original in the conventional manner.

What follows is information provided by the KEESCAN people to further explain the system:

**The heart of the Keescan Electronic Film Editing System, as demonstrated at FILM '77, is this Convergence Corporation ECS-1B unit, a rugged, low-cost, frame-accurate editing control system that interfaces to helical scan videocassettes for precise tape-to-tape and camera-to tape editing. Basis of the Keescan system is the transference of film material (complete with the edge numbers) onto video tape via a special telecine unit. The tape is then edited on the ECS-1B unit.**






**CLOSEUP DIAGRAM OF THE ECS-1B KEYBOARD, WITH ITS VARIOUS FUNCTIONS EXPLAINED**

### *USING FILM . . .*

Traditionally, film-making techniques have been based upon a system which makes use of rush prints—so that the director can see whether a particular take is right, etc.—and involves considerable to-ing and fro-ing between studio or location, the film laboratory and, eventually, the editing table. Editing is the key to the process.

Film editing still depends on edge numbers which indicate the frame at which the cut is to be made and, perhaps illogically, on the physical handling, cutting and splicing of the valuable material on which expensive and often irreplaceable images are recorded.

Without the edge number, the film editor's job would be totally impossible. Even with it, there are an infinite number of stages at which something can go wrong. Prints have to be processed, cutting decisions made, insert and assembly sections mechanically joined. Even then the result might not be quite right. The process starts again.

### *. . . AND TAPE*

"Post production" work has long been the bane of programme makers. Videotape has only too often been seen as the panacea which will cure all production ills. Editing on videotape operates on the same principal as film editing, by a standard time code which is magnetically recorded onto the tape—either during shooting, or at a later stage.

Time codes are simply electronic edge numbers imposed on the material in a digital form and logical progression. Edits are still made at numerical reference points.

The right videotape format can score heavily over film at the editing stage. Original material remains physically uncut. "instant" previews of edits (including the sound track) are normal. Videotape equipment can run backwards and forwards at high speed to pre-set points so that rough cuts—or entire videotape programmes—can be put together in a tiny proportion of time it would take to edit a similar footage of film.

### *THE BEST OF BOTH WORLDS*

Proponents of both film and video have been muttering phrases such as "oil and water won't mix" into their respective beards ever since photographic emulsion and magnetic tape first made each other's acquaintance.

But there is in fact no good reason why the two technologies should not complement each other. Film, for example, may give a better image or may be easier to shoot in a given situation. Videotape can help the overall project by keeping post-production time (which equals cost) down and can, if anything, allow greater creative freedom by allowing the director or editor to preview and choose between a much greater number of alternative edits.

Rather than fighting each other, the two "camps" should seek to derive maximum benefit from each other's technique. Which is where Keescan comes in.

Many companies have already realised the benefits of combining both technologies (in editing terms, edge number versus time code) for post-production purposes. Keeline is now offering a system which can be operated to the highest standard of technical accuracy, at high speed and without any compromise on quality.

Basis of the Keescan system is the transference of film material (complete with the edge numbers) onto videotape via a special telecine unit. The videotape can then be edited—giving the user all the flexibility of tape editing and taking advantage of its speed. A unique feature of the system is THE EDIMARK, a device which shows a visual identification at every edit point.

The edited videotape is quick and inexpensive to produce and a permanent record of the creative decisions. It can readily be used to win client or producer approval.

All that being done, the edited tape is telerecorded and can be passed to the negative cutter. The edits normally "felt for" by the negative cutter are indicated by THE EDIMARK display—and the edge numbers are always available for him to work by.

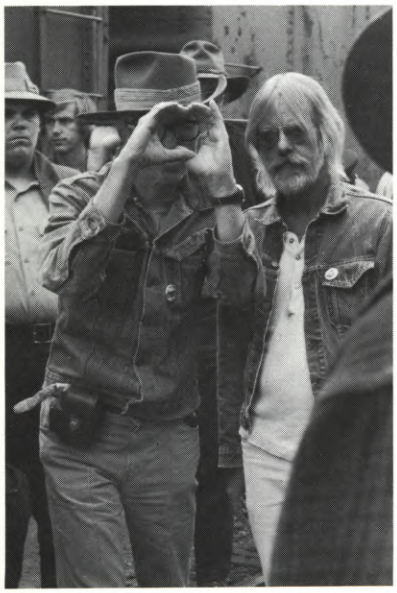
Although its individual elements can be varied, the Keescan system operates around four basic stages. Start point is the film rushes (which can be either normal

**Continued on Page 975**

# Haskell Wexler talks about shooting with his 35BL.

Mr. Wexler has won two Academy Awards for his cinematography—this year, for shooting *Bound For Glory*. He owns an Arri 35BL.

Haskell Wexler shooting *Bound For Glory* scene with 35BL. "For hand-holding," says Mr. Wexler, "This is the best balanced silent-running 35mm camera available."



Wexler with *Bound For Glory* director Hal Ashby.

"The extras were waiting around between setups, one day," says Haskell Wexler. "We were at Stockton, shooting *Bound For Glory*. The extras were dressed as migratory workers and their families."

### Natural

"They looked great—kids playing around—behaving naturally, because they *weren't* being photographed. So we set up secretly inside a tent, and picked things out with the long end of the zoom."

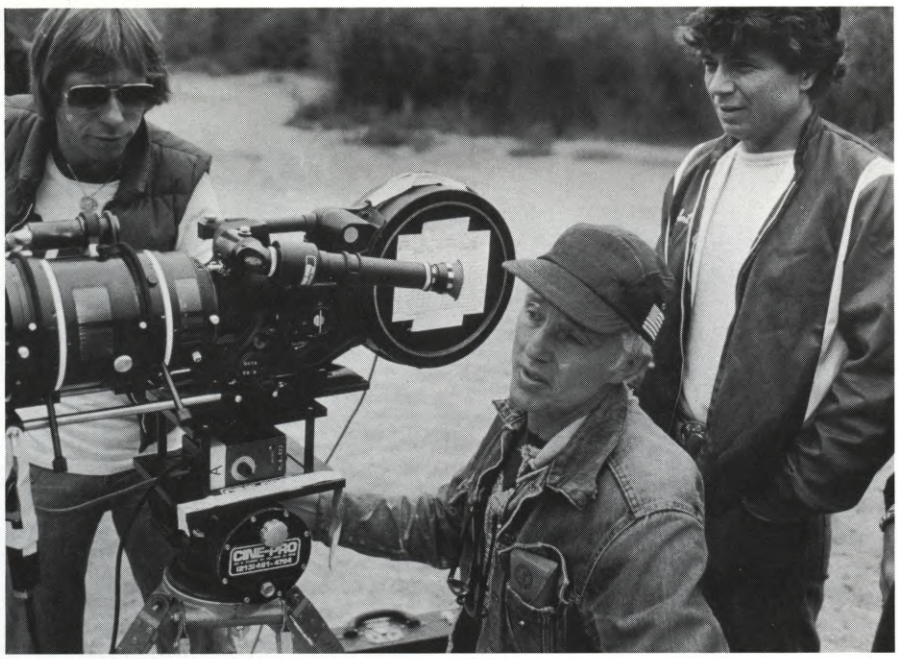
### Suitcase

"Then we hid my 35BL in a cardboard suitcase, with holes cut for the lens and eyepiece. The second operator dressed up like the extras, and he sat down among them with the case on his lap."

### Sideways

"Even when they realized what was going on, they still acted more naturally, because he was sitting down and facing *this* way, with the suitcase pointing *that* way, off to one side."

Above: Operator, dressed as migrant worker, checks fit of hole cut in suitcase for 35BL viewfinder. Below: The 35BL being positioned inside the suitcase.



Working on STP commercial with actor Robert Blake. "I much prefer to light looking through a 35BL – the image is brighter and clearer," says Mr. Wexler. "Hand-held, with the short eyepiece, the 35BL lets you see the edges of the frame more easily than any other portable 35mm camera."

Wexler and 35BL in swimming pool, shooting sync sound scene for *One Flew Over The Cuckoo's Nest*. Note relatively simple plank and stepladder rig supporting small camera.

Shooting STP TV commercial, Wexler gives instructions to cameraman perched on sidecar chassis with 35BL. Raincoat is for puddles in dirt road.

### Unobtrusive

"That's one big advantage of an unobtrusive camera like this. Even with professional actors, there's one less thing to distract them. I can often *ease* quietly into a scene – using the camera's internal slate system and my radio bloop, and waving a finger to indicate *Rolling*."

### CLIO

Mr. Wexler used a 35BL to shoot Robert Blake in the STP commercial that won a CLIO award this year. For the sync-sound footage, the camera was equipped with a 1,000 foot magazine and a 20-120mm zoom lens.

### Motorcycle

But they also needed some closeup footage of Robert Blake's face as he gunned his motorcycle down a dirt road.

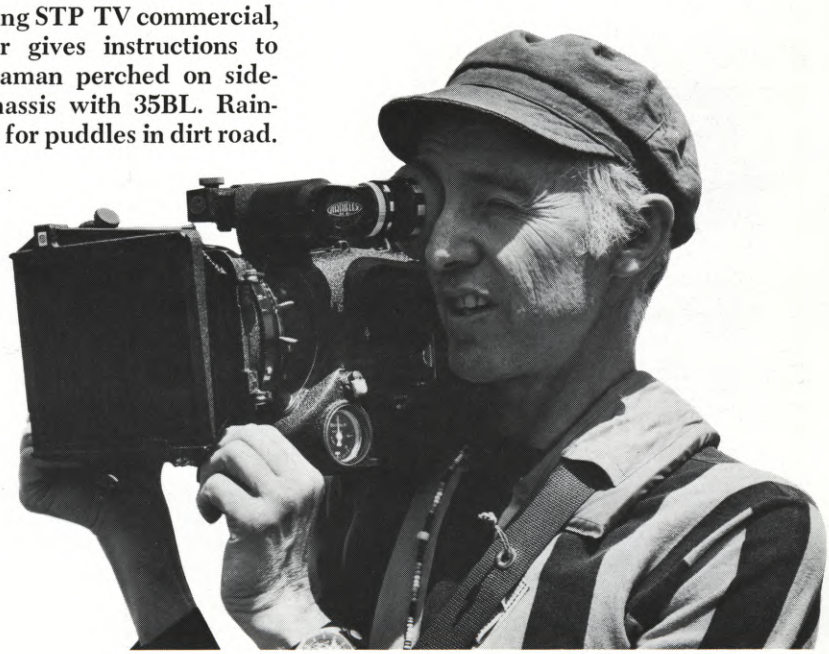
### Unsteadicam

"There was no room for an insert car," says Mr. Wexler, "So we mounted a sidecar chassis on the bike—and the operator rode on that with the 35BL. 400 foot magazine and a 24mm hard lens."

### Lightweight

"In the bad old days, we'd have needed a separate, lightweight wild camera for that shot. But the 35BL took care of it nicely."





# AN AUTOMATIC EDITING SYSTEM FOR COLOR FILM

film 77

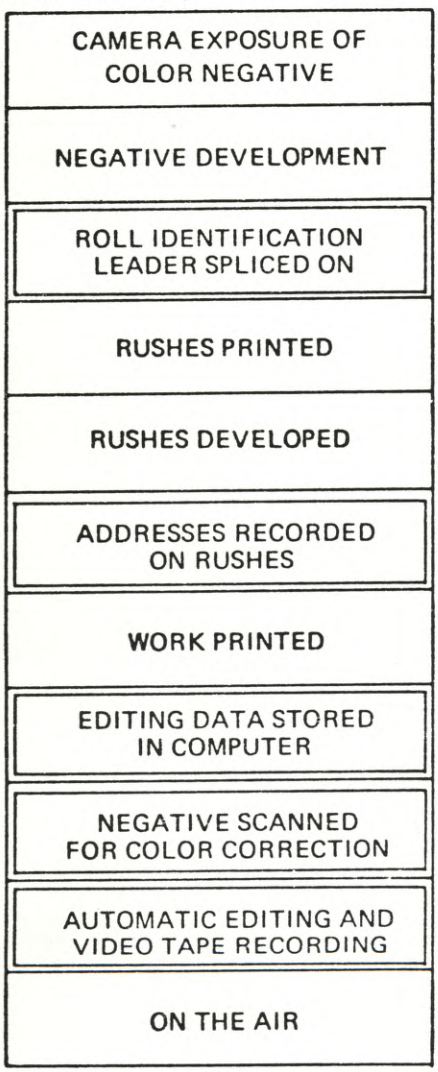
**The method used in Japan for improving the picture quality in color television, when using film as a source, involves scanning the color negative directly and broadcasting a videotape edited from the negative**

**By KYUJIRO TAKAHASHI, SHIN ICHIYANAGI and HIROSHI TANIMURA**
*(Japan Broadcasting Corporation, NHK)*

***Summary***

Among the many efforts now being made to improve the picture quality in colour television using film as a source, one of the most promising approaches is scanning directly the colour negative and broadcasting an edited videotape from the negative, instead of the usual positive print on film. This approach results in improved gradation, colour fidelity, steadiness and resolution. In addition to these advantages, this method makes unnecessary the time-consuming task of negative matching or conformation. A sophisticated system has been developed which simplifies the editing process and can reduce to at least 25% of the time and manpower customarily required for production of a finished program. The work is automated by using self-threading random-access film-to-tape transfer equipment, a remote-controlled quadruplex VTR and a minicomputer. Other features of the system include a unique electronic colour-timing system and a newly developed scanning-projector which can be loaded with ten 1,200-ft (366-m) reels of 16mm film in simultaneous storage.

**FIGURE 1 — Operational flow diagram for the new NHK system of TV program production from a color negative film. (Special newly introduced work steps are shown in double borders.)**




***Introduction***

This system has been designed to improve the production process of colour television programs having film as the original source. The basic idea of the new system is to scan the original camera negative directly, without any cutting or splicing of this negative. High quality positive pictures are obtained by electronic editing and direct transfer from the negative to videotape.

Until now, there have been two areas which required improvement when producing a television program from film: (1) the process of "matching" or conforming the original negative to the workprint; (2) overall working time necessary to go from the original negative to the final print, ready for broadcasting.

In particular, in the workstep of conforming the negative to the workprint, one incurs the following problems:

(1) too much time and labour is involved;
(2) an expert operator is needed to achieve perfect conformation;
(3) the negative matcher is subject to a great deal of mental and physical fatigue;
(4) there is a continual risk of missplicing or scratching the original negative during the matching (also called negative editing) process; and
(5) ample working space is needed, especially when a great many "takes" or cuts must be held for splicing and many rolls of film must be worked on.

On the other hand, this new broadcasting system, which derives the final program videotape directly and uniquely from the original colour negative has the following advantages when compared with the customary telecine system telecasting from a positive print:

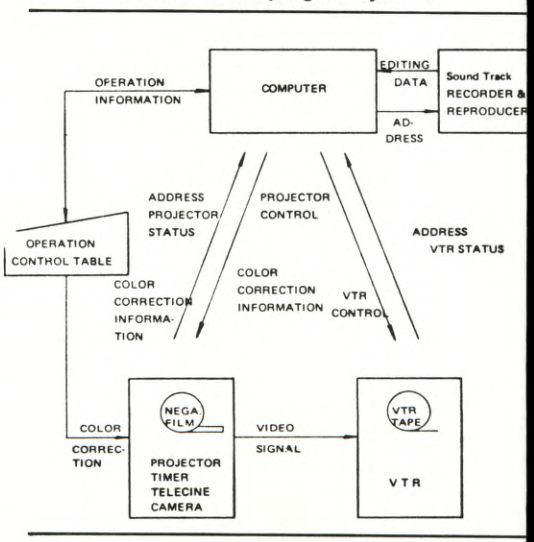
(1) picture resolution is considerably improved;
(2) reproducibility of colour characteristics improves remarkably; and
(3) picture quality can easily be adjusted at any time.

The basic components of the system are an address generator, a decoder, a minicomputer, a three-vidicon telecine camera and a quadruplex videotape recorder (VTR). By direct scanning of the original negative, improved picture quality is assured and many problems are resolved during program production from film.

***Operations Flow***

Figure 1 shows schematically the general operational flow of the system. Five special operations, marked in the figure by double borders, characterize the new system of television-program production from film. First, a special identification leader is spliced to the head of each roll of camera negative after developing. Second, film address data are recorded on the rush prints for later reproduction and

**FIGURE 2 — Basic block diagram of the new NHK film television program system.**



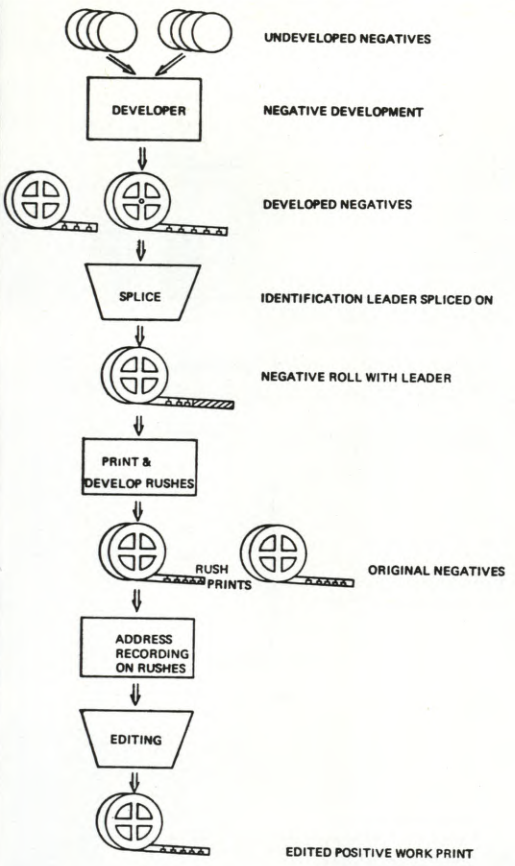



**FIGURE 3 — Flow diagram of film-handling steps up to the edited workprint.**

scene identification.

Third, editing data are calculated by computer. Fourth, colour-correction means are incorporated into the film-to-tape transfer system, with colour-correction information being stored in the minicomputer. And finally, an automatic editing system is incorporated between film pick-up and final videotape recording. A basic block diagram of the whole process is given in Figure 2.

Figure 3 explains the film handling up to the final edited positive rushprint. It should be noted that negative exposure and processing are done in the customary way. The next step is the splicing on of a special identification leader at the head of each negative roll. A positive rush print (or daily) is then printed and developed in the normal way. Frame-identification addresses are next recorded on the positive prints while the negative is stored for its later end use. The final step in manual film handling is the editing of the rushprint, which is achieved in the conventional way.

Two important differences distinguish the new system from the customary film-editing process. One is the already mentioned special identification leader which must be attached to each roll of negative after its development. This leader carries a printed roll number in code. The other difference is that magnetically striped material is used for the workprint (the rushes) and address-code numbers are recorded on the magnetic strip instead of a soundtrack.

### *Negative Roll-Identification Leader*

The roll-identification number contained in code on the leader is the link between the original negative and the workprint, because this code number is also recorded on the magnetic track of the workprint together with the frame address-code numbers. Negative roll identification is preferably transferred in an automatic mode to the workprint. Head identification leader of the negative is printed on the dailies and appears thus automatically (after development) at the head of each roll of rushprint material.

Simultaneously with the recording of address data on the magnetic stripe of the rushprint, the negative roll-identification number is decoded by a special optical reader and added to the address code of each frame. The negative roll-identification leader also serves the purpose of storing an "automatic roll record" in the minicomputer's memory for later readout at the time of automatic negative editing and transfer to videotape. During this transfer, the negative roll-identification number on the negative leader is decoded from the video signal generated by the film-pickup three vidicon camera.

### *Positive Address Code*

When deciding what type of code to use, three important points must be taken into consideration: (1) the code should be easy to record and reproduce on the magnetic stripe, with high reliability and at great speed; (2) editorial procedures for the cutting of the workprint must not be changed; and (3) the code must be able to distinguish any single frame of the edited workprint.

The address code is recorded on the magnetic striping of the workprint by a four-phased frequency-shift-keyed (fsk) modulation system with a carrier frequency of 1.7 kHz and at 2,400 bits per second. The address code and the roll-identification code are recorded on the rush print at a speed of 60 frames/s, prior to delivery to the editor. (See Fig. 3.)

### *Determination of Cutting Points or "Edits"*

As previously mentioned, the rushprint is delivered to the editor with the address already recorded on the magnetic striping. After editing of the workprint the editor will return the workprint's final version for further processing.

The edited workprint is next passed through a magnetic sound reader which

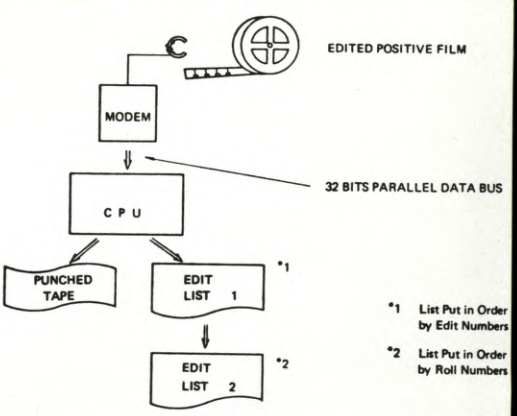



**FIGURE 4 — Memory stacks for storing editing data which have been taken from perforation-generated pulses.**

picks up the recorded digital information. The signals obtained are fed into an audio amplifier and decoded by a demodulator. The output of the demodulator is a series pulse train with the same time relation as the magnetic pattern recorded on the magnetic striping of the film. These series pulses are converted by a device similar to a shift register into a train of parallel pulse signals. There is thus only one single output line or wire coming out of the demodulator but a significant number of lines or wires input the information to the computer. The computer can distinguish each individual frame address number and also the roll to which any particular frame belongs. It can also distinguish the number of the first frame succeeding the end of the roll-identification leader.

When the address readout progresses in continuous fashion the computer recognizes all counted frames as belonging to one and the same scene. A discontinuity during readout is recognized by the computer as a scene-change.

The information sequence stored in the computer is used to establish scene sequence and length during image transfer from the colour negative to the final videotape. Loading of negative rolls on the projector is done manually by the operator in the required order. But the sequence in which the scenes contained in a roll are transferred to the videotape is determined by the initial address of each "edit".

During decoding of address by the sound reader, there exists the possibility of incomplete or missing address, due to magnetic dropouts or gaps caused while splicing the workprint. Also often a piece of blank leader or "dummy" may have been spliced in to compensate for editing errors or other reasons, such as a missing scene. In this case, no magnetic recorded information is available and no decoding is possible for a given length of film. Thus the software program must overcome two

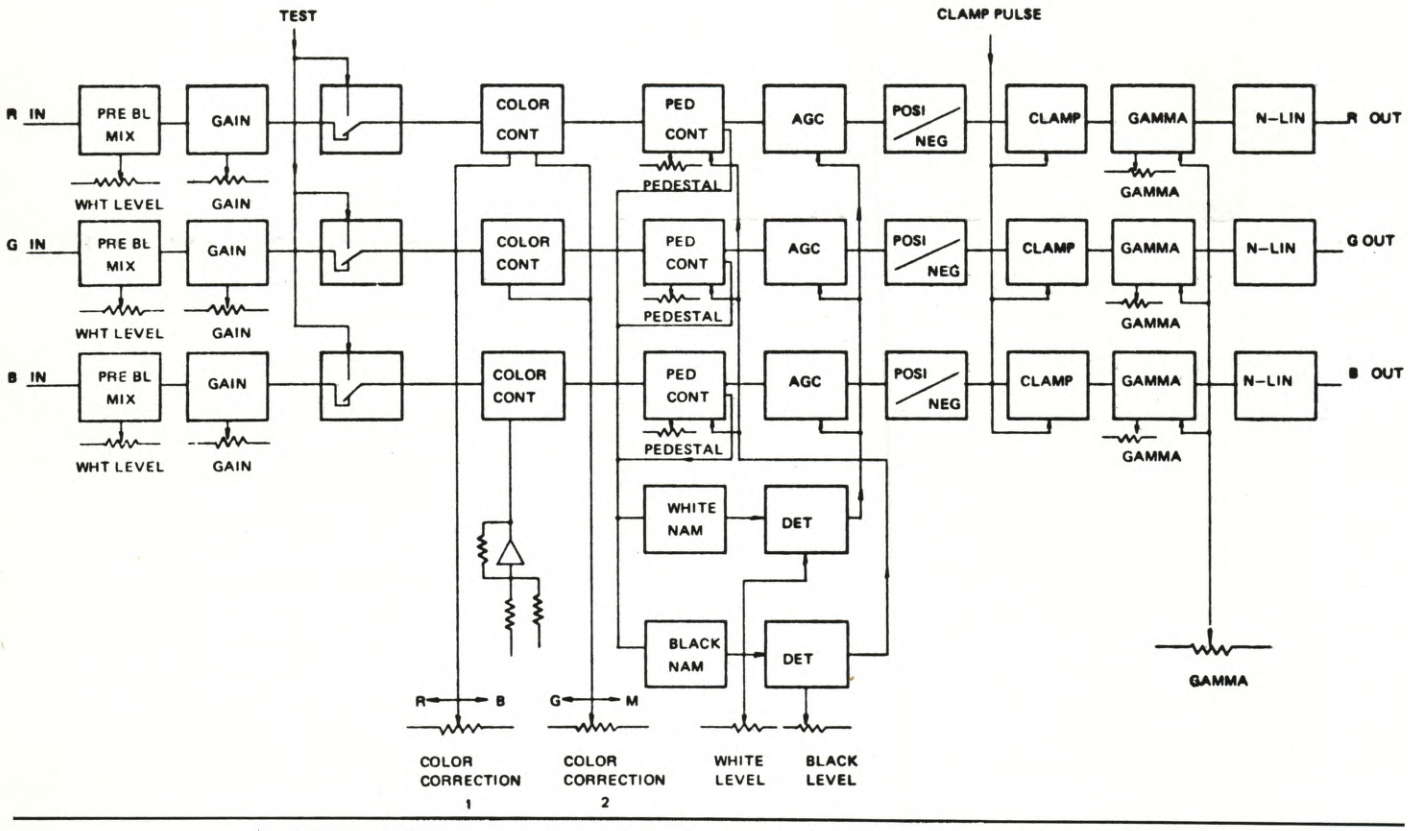



**FIGURE 5 — Block diagram of color, brightness, contrast and facetone processing amplifier.**

difficulties: first, how to handle invalid data sent to the computer due to an error in demodulation and showing an abnormal carrier frequency on the magnetic track and second, what to do when no address information is available at all.

Errors of the first category are of comparatively short duration. Splicing usually affects only a fraction of a frame, as do also most magnetic dropouts.

In our experience, scenes less than ten frames long do not normally appear in the edited version of a film. Hence, the computer, by correlation of the 10-frame information, replaces the invalid data with valid data, or decides that the discontinuity is due to a scene change.

The error caused by the second difficulty (blank leader) is of longer duration. It may continue for several feet. The absence of any address information must be compensated for by other information derived from the edited workprint. For this, one-bit pulses, originated by a perforation-pulse generator, are fed into the computer. These pulses permit counting the exact length of dummy film that has no address information recorded on it. This will take care not only of blank leader inserted but also of long-length magnetic dropouts.

Another function of the one-bit perforation count is to indicate scene start and stop cues, read out by measuring the time interval between these two pulses. If no further pulses are detected after a predetermined time delay (1 second) the computer assumes that the corresponding scene has been read out in its total length up to its end. The information so obtained, which compensates for the information missing on long-length dummy cuts, is inserted manually by keyboard operation into the computer memory before proceeding to the next step.

Figure 4 shows examples of how this information is sequentially listed by "edit" numbers (list 1) and roll numbers (list 2).

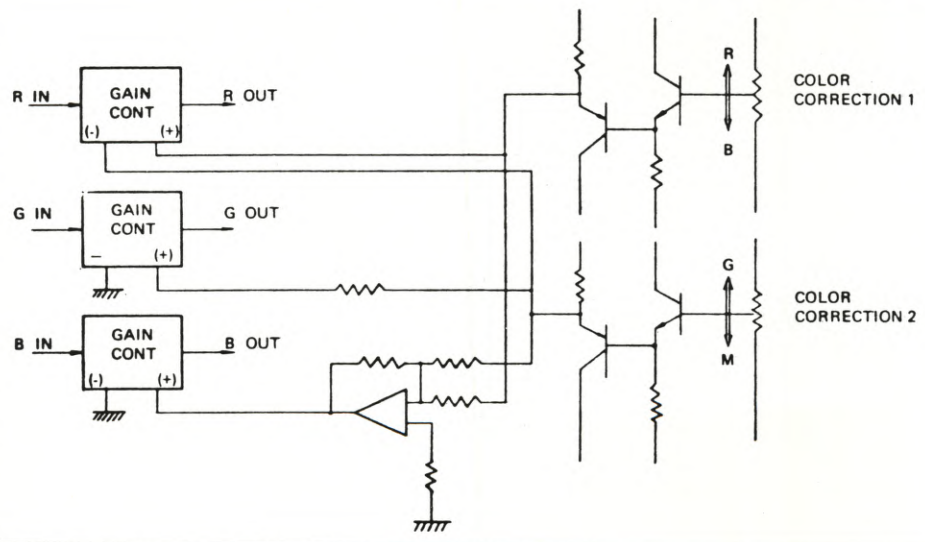
### *Colour Correction*

Colour correction is achieved exclusively by electronic means, in contrast to the timing by optical means of the customary film print. Colour information, picked up from the colour negative by the vidicon camera, is processed by means of a colour-control console provided with five main control knobs. As will be shown, the electronic colour-timing procedure does not take place simultaneously with the film-to-tape transfer, but is the basis for automatic colour correction during the transfer stage.

Figure 5 shows a block diagram of the

**Continued on Page 952**

**FIGURE 6 — Block diagram of color-balance circuit.**



# CP-16
# the camera for all seasons

**Summer** can be pretty tough for a newsman. He deserves a comfortable, lightweight camera


*Tom Baer, KBTV Denver*

which can be hand-held for long periods of time . . . the CP-16. Unexcelled for the cameraman who must go it alone.

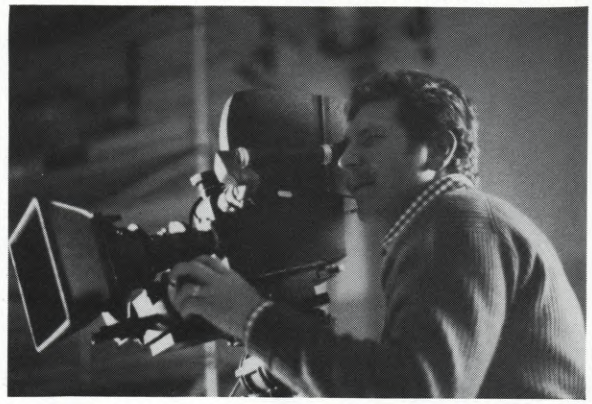
**Fall** Football season and sports. Ever notice that practically everybody has adopted the CP-16? A rugged, reliable, light weight camera (under 17 lbs. fully equipped). Grab it and run with it, for single system sound or crystal-sync double system work.

*WTMJ-TV Milwaukee*

**CP-16** is the most versatile and reliable camera for the year-around professional filmmaker. See us today for a demonstration of the 'camera for all seasons'.

cinema products CORPORATION

**Winter** It's industrial and commercial time again, with budgets approved and the end of the year approaching, so everyone is in a hurry. The CP-16 Studio Rig is a fast-moving, compact 16mm outfit, but with the same precision controls found on most

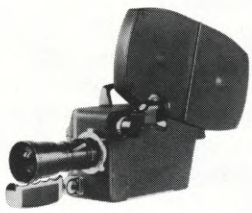


*Marty Collins Director/Cinematographer, Hewlett-Packard Co.*

35mm studio cameras. In fact, with the Studio Rig you'll almost think you're shooting 35.

**Spring** Brings the flood of documentary and feature work. The CP-16, coupled with Cinevid video assist and the amazing new Steadicam provides a system for new dimensions in film.

*Director of Photography Steve Golden, "The Streets of Chicago"*



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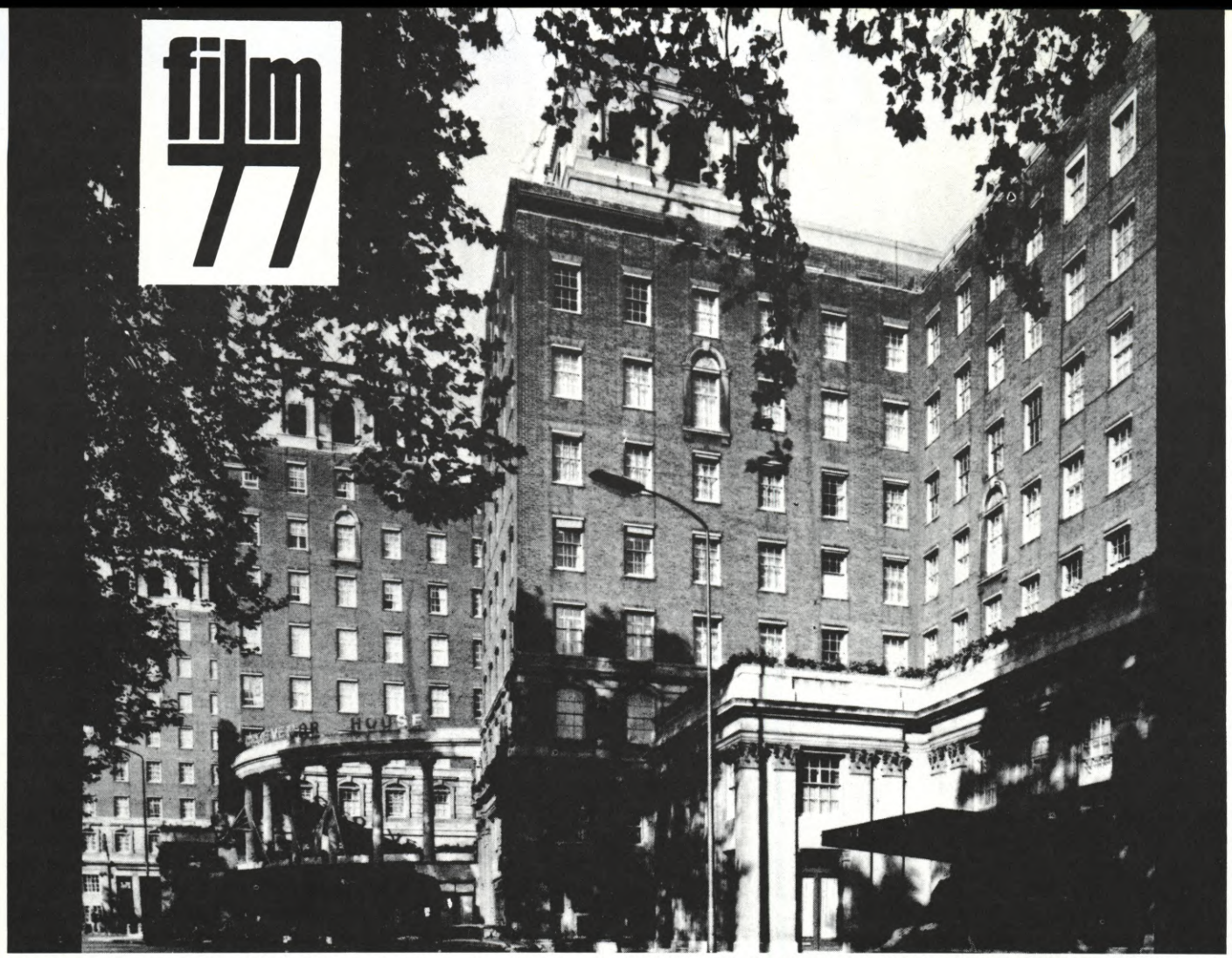



**The Grosvenor House Hotel in Park Lane, London — headquarters for FILM '77. The Conference, in its four previous editions, had been held at the Royal Lancaster Hotel, but the equipment exhibition had outgrown that hostelry's facilities, prompting the move to the Grosvenor House. Primarily because of the Silver Jubilee of Queen Elizabeth II, London was extraordinarily crowded during the time of the Conference.**

**REPORT FROM FILM '77**
**Continued from Page 914**

are synchronized and kept that way. Seconds, minutes, hours, days, months, the last two figures of the year, and finally a three-digit camera number, are recorded successively, using a BCD code with four bits per frame. Such an information block is repeated once per second.

This paper is followed, logically enough, by one by K.H. Trissl and N. Lungren entitled *"A FILM EDITING TABLE WITH EBU TIME-CODE CONTROL"*. Description is furnished of a device incorporating the requisite control circuitry for the practical application of the EBU time code for 16mm picture film and magnetic tape to an editing table, and the substantial saving of time which this offers.

So far, so good—nothing really new or startling in either of the aforementioned papers.

Then a veritable technological bombshell is thrown into the session.

Appearing on the program schedule as the next paper to be read is one by Jean Pierre Beauviala, talented inventor of the Aaton camera. It is innocently entitled *"THE STATE OF TIME MARKING SYSTEMS IN THE FILM INDUSTRY,"* and it purports to be a comparative evaluation of the major systems currently under study in a search for standardization of Time Base Coding for universal practical application—the SMPTE, EBU/TDF, EBU/IRT and Kudelski S.A. systems. However, when the paper is actually read, it quickly disposes of all of these suggested systems as having serious shortcomings for the film-maker, in that they will encourage a greater reliance on additional expensive machinery—namely, a decoder to unravel the cryptic coding symbols used for synchronizing picture with track.

In place of these systems, he proposes a revolutionary one of his own devising which he calls "Aaton Numerals", and which is calculated to eliminate the one monumental disadvantage of the other systems—namely, that if you happen *not* to have the expensive decoding device handy whenever the processed footage is handled, there is no possible way to establish sync between picture and track. Beauviala's system, by way of contrast, employs Arabic numerals on both picture and track, which are clearly readable *without the need for any additional equipment whatsoever.*

The Aaton Numeral system provides exactly the same identifying time information as do the other proposed systems, but instead of displaying it in terms of dots representing binary code, it does so in numbers clearly recognizable to the unaided eye. Syncing and cutting are done on conventional editing equipment, *without the necessity of a decoder.* When French Atlas editing tables are used, the Aaton numerals appear on the screen with no modification whatsoever. With Steenbeck editing tables and others, a slight modification must be made to widen the space, allowing the numerals to appear on the screen. To reduce the modification to a minimum, and at the request of the BBC, the Aaton people have centered the figures as closely as possible to the frame edge.

I can tell from the audience reaction that I am not alone in registering excitement at this development, which is clearly a revolutionary breakthrough in the heretofore convoluted Time Base Code sweepstakes. Here is a system that can free the film-maker forever from the bondage of

clapperboards and bloop lights, just as crystal sync severed the umbilical cord between camera and recorder. Its elegance lies in the stunning simplicity and logic with which it gets the job done — cutting through all the esoteric, academic mumbo-jumbo which has surrounded the subject to date and made standardization appear to be hopeless. Beauviala and his colleagues are to be congratulated upon getting right to the core of the problem and solving it with one clean stroke. (For full details of the Aaton Numeral Time Base Coding System, see Page 962.)

As the next speaker of the session, Ed DiGiulio, President of Cinema Products Corporation, has a hard act to follow, but follow it he does — and with his own little bombshell. His paper, entitled *"THE NEW CINEMA PRODUCTS 'GSMO' CAMERA"*, constitutes the first public disclosure of the new space-age 16mm mini-camera which the company has had under development for the past four years. This little gem of a camera, extremely compact in silhouette, manages at the same time to be highly sophisticated (in terms of its electronic capabilities), yet very simple to operate (an absolute minimum of operating controls). Sync-sound quiet and featuring quick-change coaxial 100-foot, 200-foot and 400-foot magazines, it quickly becomes the "hit of the show" during the run of the FILM '77 Equipment Exhibition.

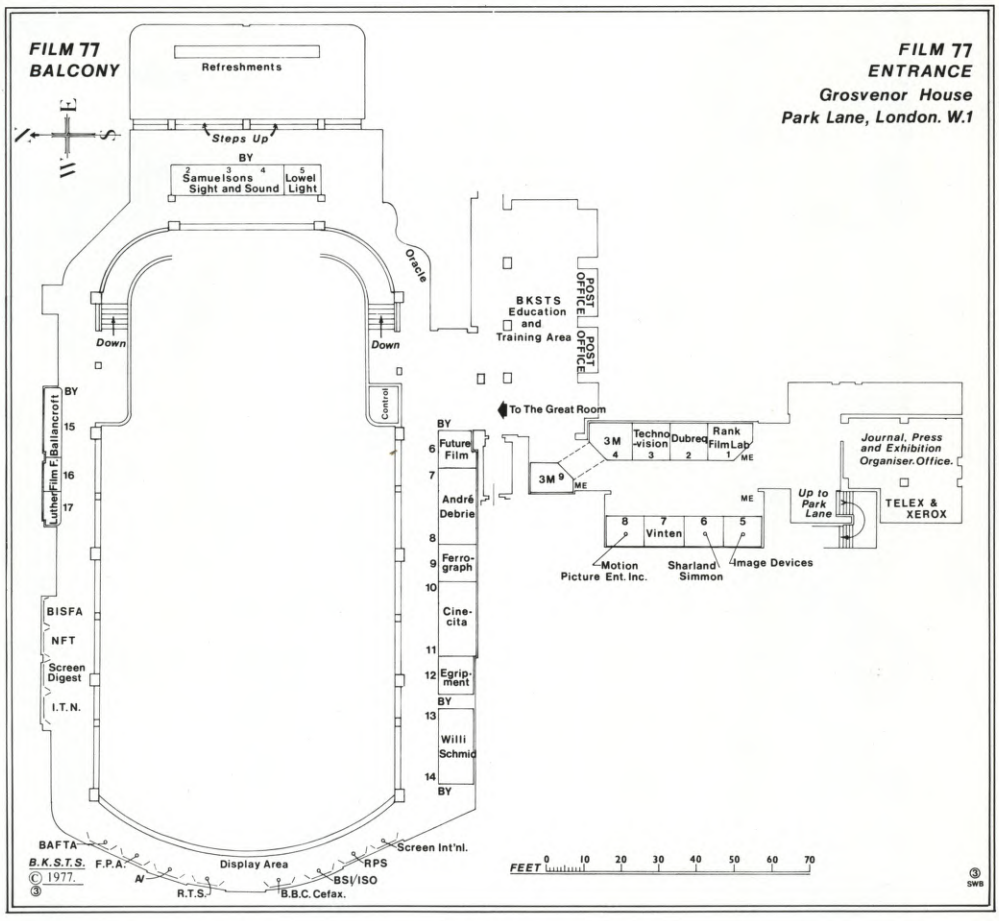
The papers program of FILM '77 is very comprehensive, embracing such major categories as: Production Techniques, Sound, Laboratory Techniques, Color, Film Technology and Television Technology. With few exceptions, the papers are on a very high technical — or more aptly, *academic* — level, and are clearly slanted toward engineers, rather than toward working technicians of the film and television industries. While such a slant is perfectly appropriate to an SMPTE Conference, I, for one, would like to see a return to the less formal, more practical atmosphere that prevailed at this event in years past. I have fond memories of some of the top cinematographers and other technicians of the British film industry joining in very informative, marvelously witty and often loudly spirited panel discussions having to do with the very real problems they face in production. It is this sort of essential spice that I feel is lacking at FILM '77, however fine the papers program.

On to the Equipment Exhibition.

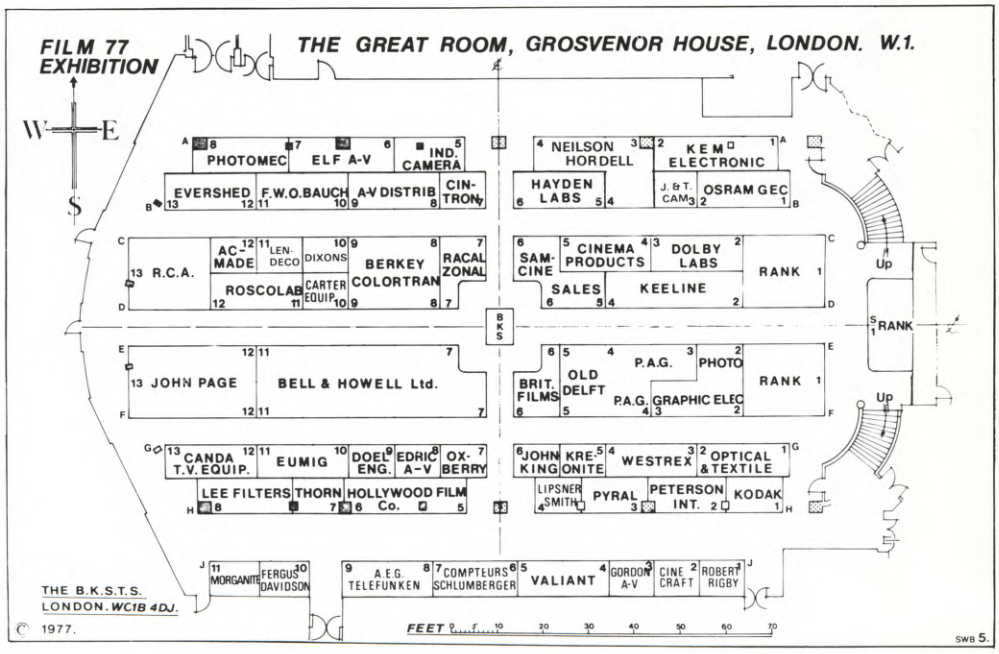
It is held in The Great Room (main ballroom) of Grosvenor House and spills over into the foyer and balcony above. There is considerably more exhibit space available here than at the Royal Lancaster, but even so, I'm told, many would-be exhibitors had to be turned away, due to lack of space. If the popularity of the event continues to grow at this rate, where will it all end?

At the Rank Audio Visual booth, where Arriflex products, among others, are being displayed, I encounter three old friends: Robert "Bobby" Arnold and Horst Bergmann of Arnold & Richter (Munich), and Volker Bahnemann, President of Arriflex Company of America. Among the new Arriflex developments on display are the video viewfinder tube for the 16SR camera, a remote control accessory (FSZ) for the same camera, a new lens in the 16mm range (the Angenieux 10-150mm f/2 -T/2.3, with automatic lens iris and bayonet steel mount), a dry cell battery set for the 16SR (with five 12-volt batteries, sufficient to expose between 35 and 40 400-

**Continued on Page 956**




**(ABOVE) Diagram of the Foyer and Balcony Exhibition Area at Grosvenor House. (BELOW) The Main Exhibition Area in the Great Room.**



# Datsun Presents FOCUS '78

## Films of College & University Students

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**In cooperation with**
**Playboy Magazine, Rollei of America, Inc. and**
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The second annual **FOCUS** Competition will award Datsun vehicles, scholarships and film equipment to students exhibiting exceptional talent in the areas of filmmaking and film study.
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AWARDS IN BOTH CATEGORIES:

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- Honorable Mention: $250 Scholarship Rollei RM6 Movie Camera

All winners will be flown to the west coast premiere and award ceremony via **Continental Airlines** and stay at **The Los Angeles Marriott Hotel**

***Awards of Datsun vehicles will also be made to corresponding schools of first place winners.***

# AAU HONORS LOYAL GRIGGS, ASC

**(LEFT) Loyal Griggs, ASC, is shown with annual Look Award for the best photography of 1953 for "SHANE". (RIGHT) Lana Turner presents Griggs with Oscar after he won best color photography, again for "SHANE" at the 1954 Academy Awards Ceremonies.**

At a recent AAU event in the Hofheinz Pavilion in Houston, Texas, Loyal Griggs, ASC, was presented with an Award of Achievement. Ten individuals or organizations that obtained "greatness" in their chosen fields were thus honored. Awards of Achievement were presented to Dr. Richard P. Condie, Salt Lake City, Utah, for Religious Music; Dr. Frederick Fennell, Miami University, Miami University, for Educational Music; Dr. Denton A. Cooley, MD for medicine; the Phillips Petroleum Company, Bartlesville, Oklahoma, for the Oil Industry; Roscoe G. Haynie, Pittsburgh, Pennsylvania, for Industry and Commerce; Avery Brundage, Chicago, Illinois, for Athletics and Sports; Loyal Griggs, ASC, Laguna Hills, California for the Motion Picture and Television Industries; the late General of the Armies, Douglas MacArthur, for Military Science; the late Ralph Alexander (Andy) Anderson, Scripps-Howard Newspapers, for Journalism; and N.A.S.A., The Johnson Space Center, for Science and the Achievement of the Century.

In presenting the award to Loyal Griggs, it was noted that "everything that is viewed from the film or television screen must pass through a camera." It was pointed out that Griggs had filmed such notable pictures as "THE GREATEST STORY EVER TOLD", "SHANE" and "THE TEN COMMANDMENTS".

Griggs was born in Michigan in 1906. He came to Los Angeles, California and went to work in the process department at Paramount in 1924.

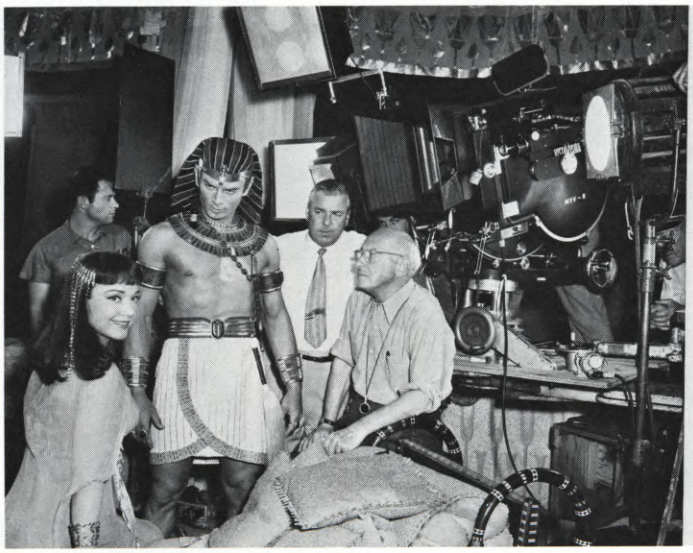
After 30 years as a cameraman in the transparency or process department at Paramount Studios, he was singled out by Paramount to photograph "SHANE". For this film, his first major feature production assignment, he won the coveted Academy Award. This same year, 1954, he also won the annual Look Award for the best photography of 1953, again for "SHANE".

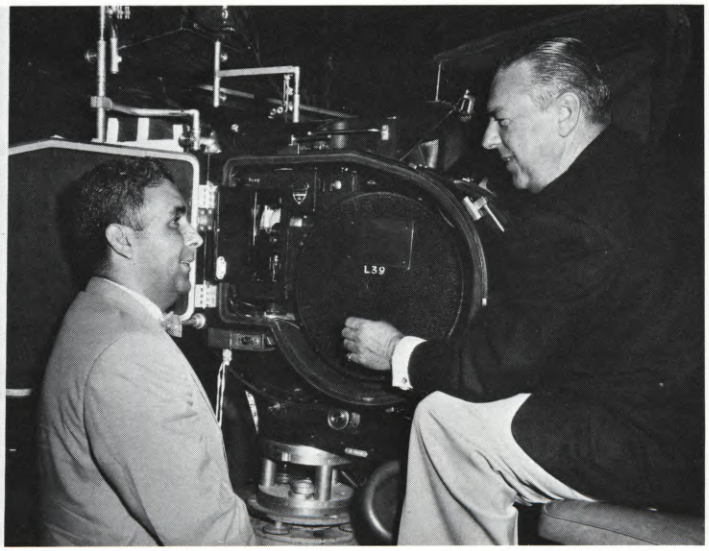
Since photographing "SHANE", Loyal Griggs has received nominations for the Academy Award for "THE TEN COMMANDMENTS" photographed in Technicolor and VistaVision at Paramount in 1956 and for "IN HARM'S WAY" and "THE GREATEST STORY EVER TOLD".

When Griggs was selected to shoot "THE TEN COMMANDMENTS", he was the logical candidate for the assignment. After having photographed "SHANE" he went on to direct the photography of "WHITE CHRISTMAS" which was Paramount's first VistaVision production. Subsequently, he did two more, "WE'RE NO ANGELS" and "THAT CERTAIN FEELING", thus, when it came time to choose a cameraman for "THE TEN COMMANDMENTS" Griggs was the

**Continued on Page 990**

**(LEFT) Anne Baxter and Yul Brynner rehearse for a close-up as Director Cecil B. DeMille and Director of Photography Loyal Griggs look on. (RIGHT) Newsreel V. Parkash, en route to New Delhi, India after a year on loan to the United Nations in New York, visits Griggs on set of "THE TEN COMMANDMENTS".**





# THE NEW IMPROVED ELEMACK "MANTIS" CAMERA DOLLY

film 77

**Since its last showing, this ingenious "mini-boom" dolly which can track through the narrowest of doorways has undergone constructive changes that make it an even more versatile tool for the film-maker**

When shown at *Photokina* in Cologne last fall, the Elemack MANTIS dolly, successor to the company's Academy Award-winning SPYDER dolly, created quite a stir, even in its more or less prototype form.

The production model shown at FILM '77 was even more impressive, since it incorporated several significant improvements over the original design.

In extolling the basic features of its new dolly, the Elemack company described it as follows:

*"The sleek, compact overall dimension of the MANTIS dolly translates a studied, fresh approach to help you shoot effortlessly, even in confined spaces—such as passing through a 23" door.*

*"Its quiet-action hydroelectric telescopic boom system produces five full boom elevations, without altering the focus setting.*

*"The stainless steel core of this machine provides ruggedness and light weight. Its compensated steering mechanism allows 360° circles of 34" radius (without change of vertical axle), tight turns and any crab movement desired. The MANTIS moves on tracks also."*

The original important feature of the MANTIS is the telescopic hoisting mechanism of the boom, which moves up vertically within a maximum axis shift of about two inches. The vertical axis pivots on the steering circle of the dolly, so that any cinematic blurring effect on the scene being shot is avoided.

The advantages of the famous SPYDER adjustable legs and wheel system have been retained in the MANTIS but with a plus: a clever and rather simple cinematic device has been added to the compensating mechanism of the steering wheels. This allows the steering wheels to swivel and move varyingly, while always coinciding with the instant revolving points of the dolly's axis. To shift from steering to crabbing, one simply moves the left control lever under the handle bar and the build-in preselector will deliver the desired steering direction.

The flexibility of its adjusting legs permits the MANTIS to be used with its boom in longitudinal and crosswise positions in respect to the axis of the tracks.

The MANTIS has been designed to work equally well on tracks or on the floor. The combined wheels which are supplied allow for instant straight track operation.

The improvements incorporated into the production model of the MANTIS dolly, as shown at FILM '77, include the following:

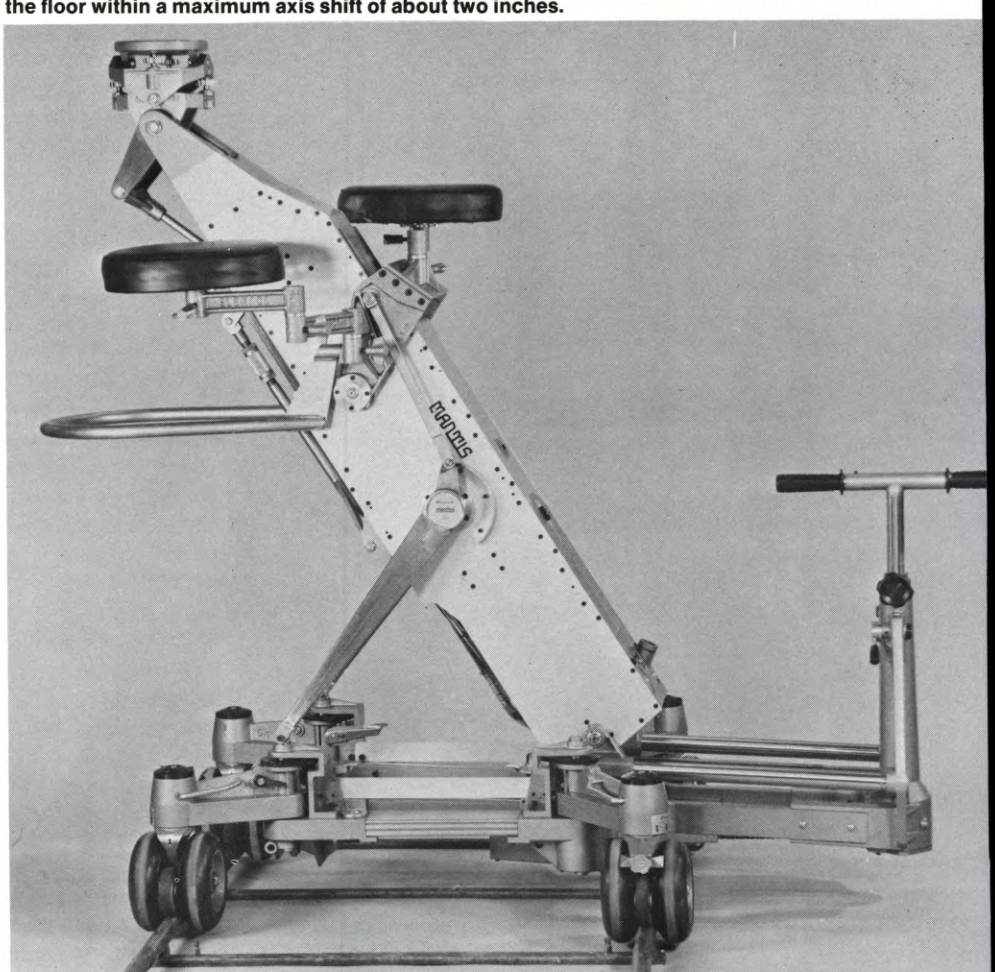
1. Reinforcement of the entire dolly frame to increase its stability.
2. A new system of extendable parallellogram which assures the steady angular position of the camera support.
3. Legs pivoted on the same axles as the folding front arms in order to increase the stability of the hoist boom.
4. A demountable round bar on which the operator can place his feet when sitting, or when the arm is being lifted. The same round bar can be fitted into the back holes of the chromium plate bars, so that it can be used as a handle for loading and unloading the dolly.
5. Crosswise levelling of the camera support, allowing a 10-degree correction in the ortogonal axis.
6. Only one power supply receptable for 115 volts AC-DC.
7. Straight and crank extensions to make the height of the seats adjustable.
8. A remote control for the boom mounted on the handle of the fluid head. This was specially designed for television purposes and is an optional extra supplied on request.

**SPECIFICATIONS OF THE MANTIS:**

| | |
|---|---|
| Weight | 380 lbs. |
| Min. height from ground to camera base | 13" |
| Max. height from ground to camera base | 65" |
| Max. boom movement | 52" |
| Min. width | 23" |
| Max. width | 31" |
| Overall length | 54" |
| Loads on camera base | 180 lbs. |
| Loads on operator seat | 180 lbs. |

For further information about the MANTIS camera dolly, contact: ELEMACK, Via Poggibonsi 15, ROME, ITALY. Tel: 52 31 9 94—52 36 1 63. Cable: ELEMACK—ROMA. ■

**The handsome Elemack "MANTIS" dolly features a unique hydroelectric telescopic hoisting mechanism of the boom that allows it to raise the camera from 13 inches to 65 inches above the floor within a maximum axis shift of about two inches.**



# THE NEW STELLAVOX TAPERECORDER SP 8

film 77

**This compact recorder, tried and proven over several years in professional motion picture production, now appears in an updated model that includes several fundamental and significant changes**

Shown at the John Page Limited stand at FILM '77 was the new Stellavox Taperecorder SP 8, which incorporates several advances over previous models. The manufacturer has provided the following "provisional description" of the new SP 8 Model:

The self-contained professional taperecorder STELLAVOX SP 8 succeeds the model SP 7, from which it retains the essentials: the same low weight, the same flat format, compact, and the same appearance.

In addition to these already outstanding characteristics, it has also been possible to include, on public demand, the following advantages, thanks to most recent technology:

1. *Universality*

The unique STELLAVOX system allows the interchangeability of the head assemblies of various norms, using, however, two different basic types (A or B). The unique SP 8 includes a switch "mono/stereo", which offers the choice between the two instantly, according to the chosen head assembly.

2. *Increased possibilities*

The two symmetrical microphone inputs (sockets upon request: Cannon male or female, Binder = Tuchel) can be switched over individually to accept three types of microphones: dynamic, phantom 12 V (or 48 V) and parallel 12 V. These two inputs, individually controlled by two potentiometers and two modulometers (or VU-meters, upon request), are supplemented by two line inputs, individually adjustable: a preamplifier accessory, type ALP, can easily convert them into two supplementary microphone inputs.

3. *Structure of the improved sockets*

In response to the request of the major-

**Continued on Page 978**

**The new STELLAVOX SP 8 recorder succeeds the manufacturer's previous Model SP 7 and, far from incorporating only minor changes, includes several very significant improvements — among them: interchangeability of head assemblies, structure of improved sockets, universal synchronization (for sync film, television, etc.), and a doubling of the battery life. With all of these changes, the recorder retains the same appearance, the same light weight and the same compact form as before.**

## AUTOMATIC EDITING SYSTEM FOR COLOR NEGATIVE FILM

**Continued from Page 942**

colour-correction processing amplifier. The following five control functions can be carried out:

(1) control of "white level";
(2) control of "black level";
(3) control of "gamma";
(4) control of "colour correction along the R-B axis"; and
(5) control of "colour correction along the G-M axis."

Until now, in conventional telecine broadcasting, the picture of the telecast positive film print has been compensated for by individual gain adjustments of each of the R, G, B channels and by adjustment of each pedestal gain. But, in our new colour correction system, the function of each of the five controls is kept separate according to the type of correction desired. These fall into three categories: (1) establishing an overall brightness level and contrast range during reproduction; (2) determination of face tone; and (3) achievement of the desired colour bal-

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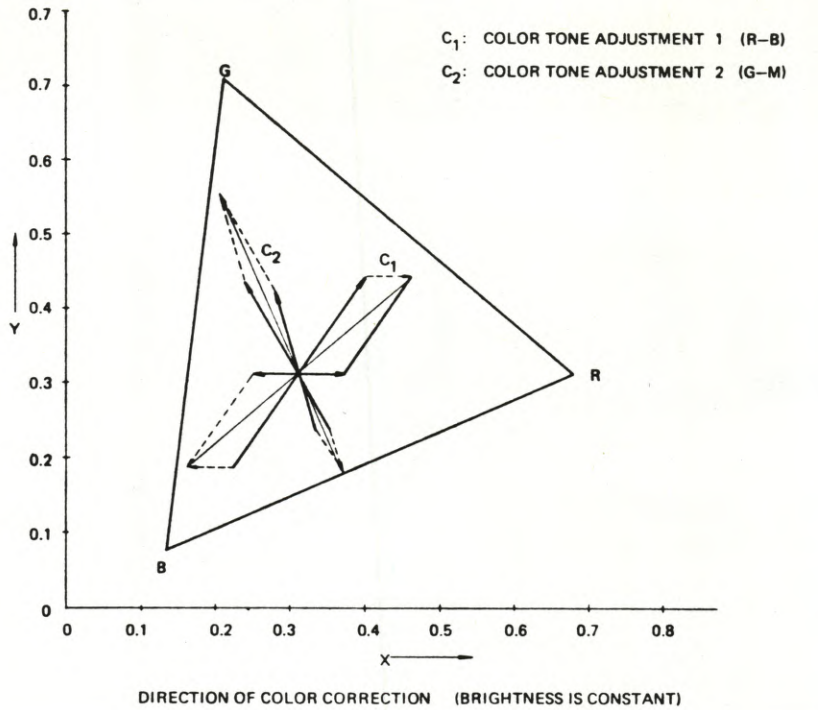
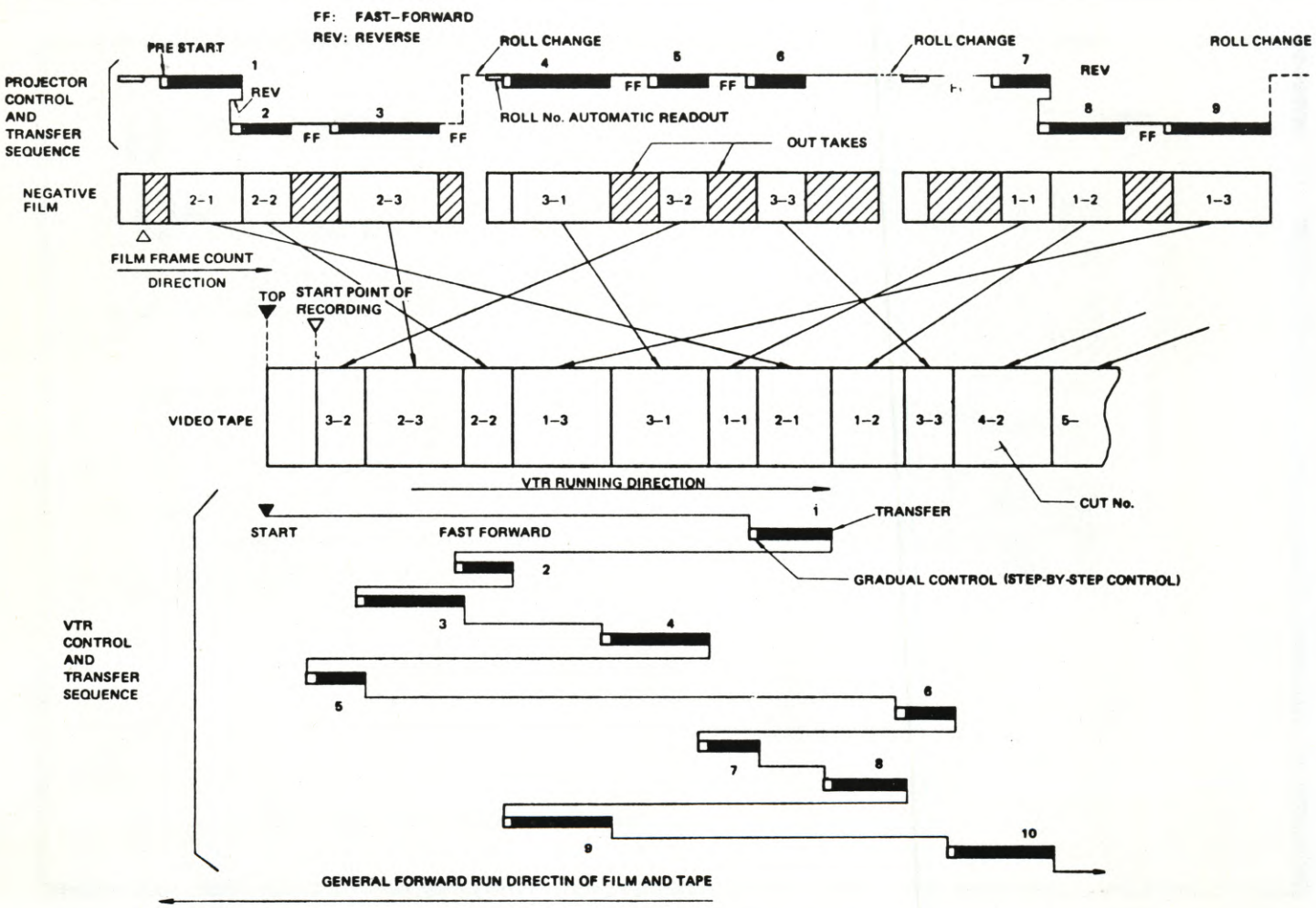



**FIGURE 7 — Color-correction vectors for constant brightness on the chromaticity diagram.**

**FIGURE 8 — Schematic representation of automated edited film-to-tape transfer operations.**



## AUTOMATIC EDITING SYSTEM FOR COLOR NEGATIVE FILM

**Continued from Page 952**

ance without a change in luminance level.

The first of these objectives is attained through a combination of "white level" and "black level" adjustments in conjunction with the "nonlinear circuit" shown in Fig. 5. The "white level" limit and the "black level" limit are adjusted by visual monitoring until the desired luminance range is obtained. The "nonlinear circuit," connected to the gamma circuit, has suitable inflection points at both the white (knee) level and the black (toe) level which can be adjusted so as to control brightness and contrast range.

Face tones are adjusted by fine tuning the "gamma" control. This adjustment is carried out only when needed and only within the contrast range adjustment described.

The third adjustment, colour balance, is carried out by means of the two "colour correction" knobs, which have the following relation. With the NTSC colour television standard, if the gains of the R, G, B channels have changed by R, G, and B respectively the luminance change Y is calculated as follows:

$$\Delta Y = 0.3\,\Delta R + 0.59\,\Delta G + 0.11\,\Delta B$$

To hold luminance at a constant level, it is essential that changes of Y must be equal to zero.

From this it becomes apparent that when any two of these variables are assigned any given values, the value of the remaining variable is automatically determined. Hence, only two control functions are needed for colour balance adjustment.

In this system described, it was decided that the first colour-correction knob acts as G=0. The second colour correction knob acts as R=B. As a result, the differential amplifier circuits have been designed to satisfy the following proportions:

First colour-correction function:

$$\Delta R: \Delta G: \Delta B = 1 : 0 : \frac{30}{11}$$

Second colour-correction function:

$$\Delta R: \Delta G: \Delta B = -1 : \frac{41}{59} : -1$$

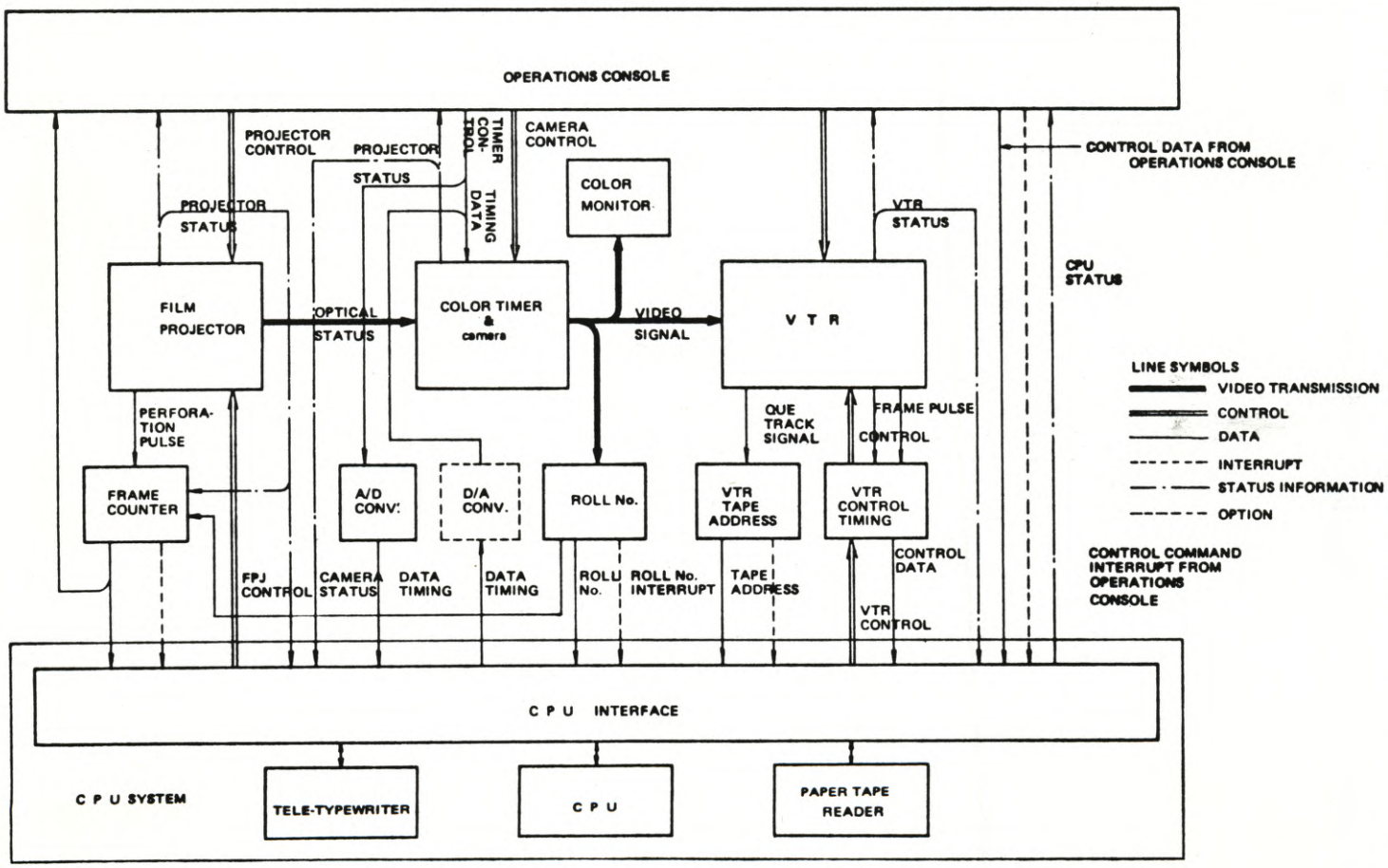
Figure 6 shows a block diagram for the two colour-correction circuits. Figure 7 shows the two axes of the colour-correction vectors on the chromaticity diagram. Each of the two colour-correction potentiometers is divided into 31 taps. Output of each tap is converted through a diode matrix into five bits of a BCD code. The pulses so obtained are fed into the computer and stored as information for final automatic colour correction during film-to-tape transfer. Besides storing this information, the minicomputer outputs also a punched paper tape containing the same information, as a permanent record to be read into computer if needed.

### *Automatic Edited Film-to-Tape Transfer*

Figure 8 shows the relation between the colour negative and the videotape, as well as scene location on the original negative, rolls and on the edited videotape. It is apparent from Fig. 8 that each negative roll is run through the projector in the same sequence in which it was originally exposed on the film, while the VTR is run back and forth in random fashion, as required for correct scene sequencing. Negative projection is stopped at a "pre-start" position, as soon as the beginning of a desired scene is reached. Next the VTR is run, in the fast mode, forward or backward until the required starting point for the scene on the tape is approached. From that point, film and tape are run synchronously in the transfer mode until the end of the scene is reached. A new operations cycle is now initiated by stopping the VTR and running the negative to the next

**Continued on Page 979**

**FIGURE 9 — Overall layout of automated color-corrected negative editing and transfer system.**



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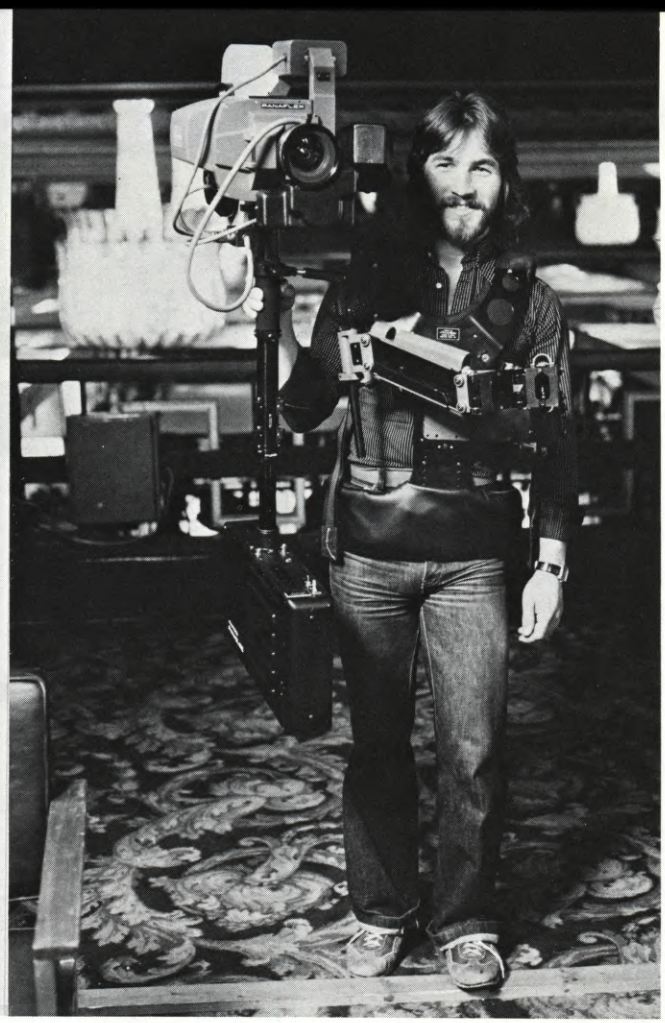
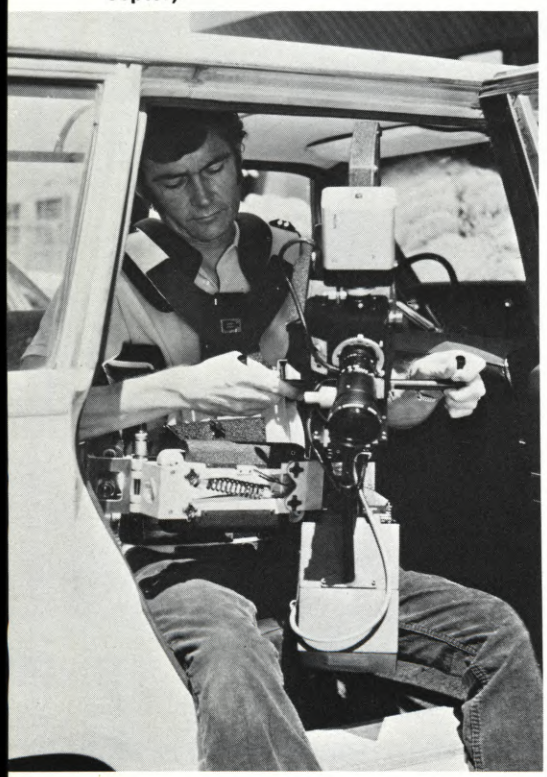


**(LEFT) In the Cinema Products Corporation booth, Garrett Brown, inventor of the STEADICAM "floating" camera stabilization mount, demonstrates the latest modification to the equipment (in kit form) which permits its use with the silent Arriflex 35BL camera. (RIGHT) Upstairs in the Samuelsons Sight and Sound booth, cameraman George Binnersley demonstrates Panavision's "floating" camera stabilization mount, the PANAGLIDE. Meeting head-on in mid-corridor with their respective mounts, the two friendly rivals exchanged gear for a comparison try-on.**

**Another kit modification of the STEADICAM, premiered at FILM '77, permits the mount to be quickly converted to a shorter configuration for use inside any normal-sized vehicle (such as car, plane or helicopter).**



## REPORT FROM FILM '77
**Continued from Page 945**

foot magazines), and a new compact amplifier (VST 7) for single-system sound recording with the Arriflex 16BL.

At the Optical & Textiles Ltd. booth I meet up with another old friend: Ron Collins, a cameraman cohort of three Olympic Games shoots and a handy lad with a 2000mm lens. Ron gives me a conducted tour of his company's multiple goodies. Among the new items are: the Canon Fluorite 300mm f/2.8 lens (with matching X2 range extender), the unique Cronus electronic stopwatches, the Universal Remote Control Radio Unit (to switch any movie camera on or off up to a distance of one mile from base), the Dufort Combination Head (a ball-type fluid head with a flat base that allows the head to stand vertically when not mounted in the tripod bowl), and Ken Richter's currently-in-production super-miniaturized "MPE" (Minimum Possible Envelope) 16mm camera (see *American Cinematographer,* December, 1976).

Another exhibit which stirs "kid-in-the-candy-store" impulses in me is the John Page Limited booth, which features such new items as: the latest Eclair ACL single-system model (with 400-foot magazine), the Stellavox Model SP 8 tape recorder, the LTM 4000-watt HMI lamp, a British-made battery charger that enables two camera batteries to be trickle charged while driving — or even when parked, the P 500 Parabolic microphone (specially designed for wild-life film-making), a range of R.D. time-lapse devices, a new digital counter (giving instant readout of minutes/seconds into feet/frames in the 35mm, 16mm, Super-8 or 8mm formats), and the intriguing "D-to-D" (Dawn-to-Dusk) Solar Camera Battery Charger (see Page 961).

The Cinema Products Corporation booth is predictably stacked up with people eager to "try on" the diminutive new "GSMO" 16mm camera (see Page 958), but there are a couple of new adaptations of the STEADICAM, the company's "floating" camera stabilization mount, that are also attracting attention.

The "Steadicam Modification Kit for the Arriflex 35BL Camera" consists of a pair of rods that are three inches longer than the standard ones for spacing the camera mounting platform from the lower assembly that contains the viewing monitor and battery pack. In addition a new spring arm capable of supporting the additional weight of an Arri 35BL camera is required, as well as a Cinevid unit for picking off the

reflex image from the viewfinder with a video camera so that it can be seen on the Steadicam viewing monitor.

Because of a lighter-weight arm construction, the overall total system weight is increased by only six pounds for the Arri 35BL on the Universal Steadicam, as compared with the Arri IIC package. The 35BL/Steadicam Universal package permits sync-sound filming, even on a sound stage, with the complete freedom of movement typical of previous Steadicam systems. Production units will be available later this month.

The "Steadicam Modification Kit for Operation Inside a Vehicle" consists of two shorter arm units to permit the Universal Model Steadicam to be easily converted for more convenient use inside of any vehicle. With shortened arms, the overall Universal Model is seven inches shorter than with the standard extension rods. Easily removable side handles permit the operator to work with the unit while seated in a vehicle (car, plane, helicopter, etc.) with a great degree of freedom and utility.

The Steadicam can be converted to a shorter mode for vehicle operation (or back to normal configuration) in a matter of 10 minutes or less. This new shortened vehicle version of the device is made possible by the unique pivot assembly employed and now permits Steadicam operation inside any normal-sized vehicle.

While the affable Garrett Brown, inventor of the STEADICAM, is running around the Cinema Products booth demonstrating these new adaptations of his "baby", upstairs on the balcony, in the Samuelsons Sight and Sound booth, another cameraman is running around demonstrating Panavision's "floating" camera stabilization mount, the PANAGLIDE. It gets pretty funny when the two blokes almost collide in mid-corridor, camera stabilization mounts dangling. The two are very "Noel Coward" about it all, however — trying on each other's mounts and voicing discreet comparisons.

It's refreshing to see a full line of Panavision equipment on display at Samuelsons. At most previous shows such as this, Panavision has declined to exhibit, supposedly on the grounds that "everybody knows about Panavision, so why advertise?" Actually, there's plenty to advertise — if that's the correct term. In addition to the aforementioned Panaglide, there is the superb Panaflex camera in its latest manifestation, the Panahead, the Panalite and the Panaglow (see *American Cinematographer,* April, 1977).

There are several interesting new items on display at the Hayden Laboratories Ltd. booth. For the first time, Nagra Kudelski tape recorders, operating in conjunction with both the TDF (French) time base coding system and the IRT (German) system are being shown.

**Former British Prime Minister, Sir Harold Wilson, was Guest of Honor and speaker at the culminating social event of FILM '77, the black-tie Banquet held in the Main Ballroom of the London Hilton Hotel. A truly gala affair, it drew a near-capacity crowd.**

The revolutionary new SN miniature portable mixer, Model SNF-3, is also on premiere display, along with the new Sennheiser "closed ear" headphone, Model HD224.

On the Lowel-Light Mfg. Inc. stand, the company is marking the UK introduction of its new Lowel Omni-Light and Lowel Omni-System, which were shown in prototype form at *Photokina.* Fine-tuned for production, the units boast several refinements over the prototype, most notably, a special series of double-parabolic reflectors designed especially to suit the filament configuration of the 30-volt bulb required when the Omni-Light is to be battery-operated.

Among the new products which KEM Electronic Mechanisms is showing are: the KEM Master Sound 5 + 1 channel mixer, SFAT Super-8 editing/sound transfer unit, EWA's range of aqua-housings, rain covers, blimps, matte box and ASTU portable protection stand.

ACMADE, a manufacturer of unique editing equipment, is introducing two new synchronizers at FILM '77: the Compeditor and the Twin-Pic models. The Compeditor is available in 16mm and 35mm and is a 5-way, new concept in film editing, whereby all editing and tracklaying is now carried out on the same machine. The unit has an independent fourth sound track, enabling both searching and syncing to be carried out without involving two machines.

The Twin-Pic is a two picture/three sound track machine for two-camera set-ups.

On the Elf Audio Visual stand, visitors to FILM '77 have the chance to see what has been described as a new concept in audio-visual multimedia presentation and by its executive producer, Walter D Huskonen of Penton/IPC Ohio, as "the most extensive, demanding, and exciting audio visual I've ever been associated with. It's a blockbuster".

"It" is Borg Warner's Chemical Division's presentation of "The Magic of Cycolac", featuring a modern universal plastic, and starring a "salesperson of mystical

**Continued on Page 983**

**The excellent cabaret presented at the Banquet featured the spirited singing and dancing of the effervescent New Edition Dance Group, shown here in one of their routines. But the show was "stolen" by the smartly coordinated Band of the Royal Artillery, which brought the audience to its feet in a rousing ovation.**

# CINEMA PRODUCTS' NEW "GSMO" CAMERA

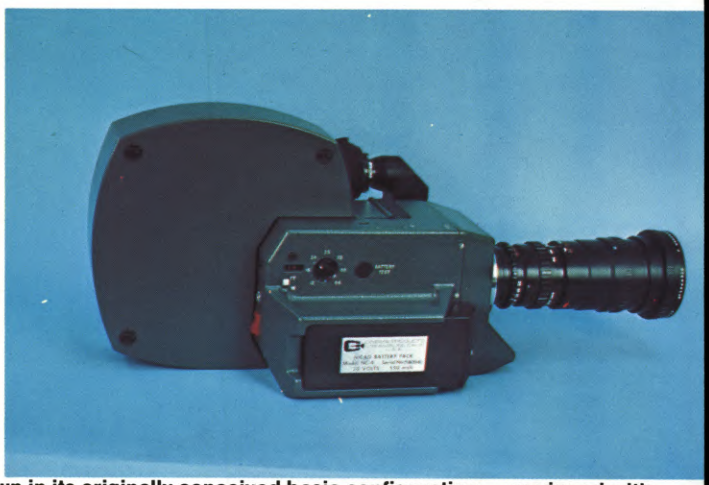
**After four years of development, a brand new miniaturized, lightweight, self-blimped 16mm camera — simple to operate, but highly sophisticated — is unveiled at FILM '77 . . . and quickly becomes the "hit of the show"**

**By ED DiGIULIO**
*President, Cinema Products Corporation*

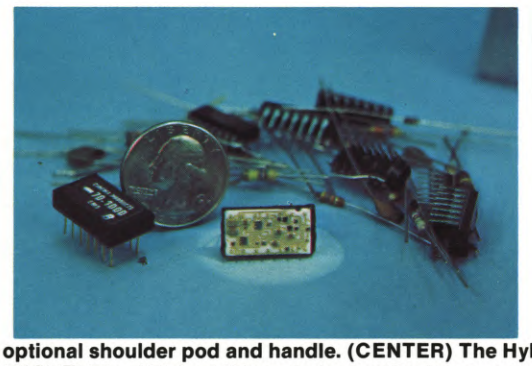
Cinema Products has been involved in the development of the GSMO camera for over four years now. And, as is the case with any successful development program, there has been a dynamic evolution in the design of this camera from its original conception to the form it has today.

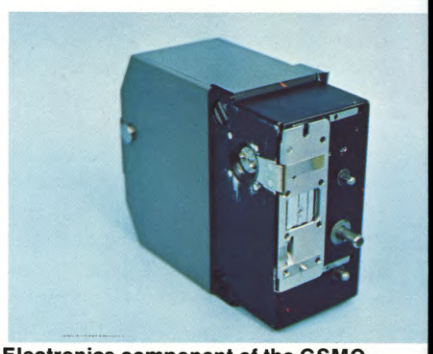
We first conceived of the GSMO as a space-age replacement for the famous Bell & Howell D-70 "Filmo" camera. The original concept was to have 100-foot coaxial quick-change cassette-type magazines, and in this regard the design would be similar to the famous gun sight camera used by the U.S. Armed Forces during and after World War II called the GSAP (Gun Sight Aiming Point) camera. From this combination of historical backgrounds derives the name GSMO (for Gun Sight Man-Operated).

As with all our previous product design efforts, we attempt to define a "hole" in the market, and then set about to develop a product that will fill that vacuum. In this case, we felt there was a significant gap between the lower-priced 16mm cameras—such as the Beaulieu, Canon, and Bolex cameras—and the fully professional 16mm cameras at the high-priced end—such as the Arri 16SR, the Eclair ACL, the Aaton-7, and including our own CP-16R. (In the United States, the CP-16R is, of course, considerably lower in price than its Common Market competitors in the higher-priced category.) We felt there was a need for a camera having

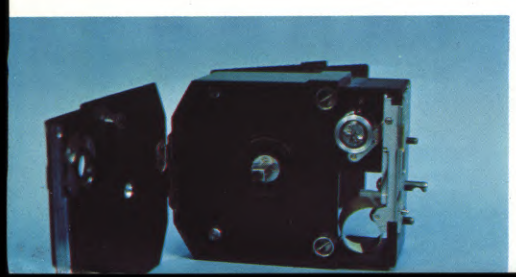


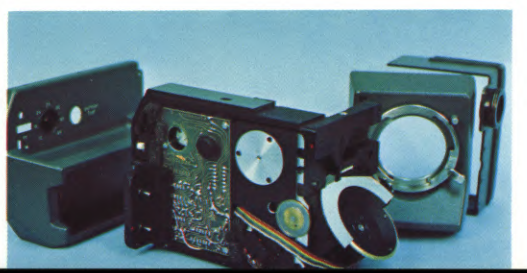
**(LEFT) Cinema Products' handsome new "space-age" GSMO camera, shown in its originally conceived basic configuration — equipped with 100-foot (30-meter) cassette-type coaxial magazine. This extremely compact configuration adds up to a very unobtrusive, low-profile silhouette. (RIGHT) The GSMO with 400-foot (120-meter) cassette magazine. The NC-4 nicad battery (plug-in) is shown mounted on the side.**

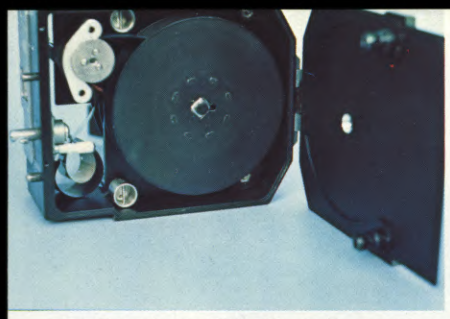


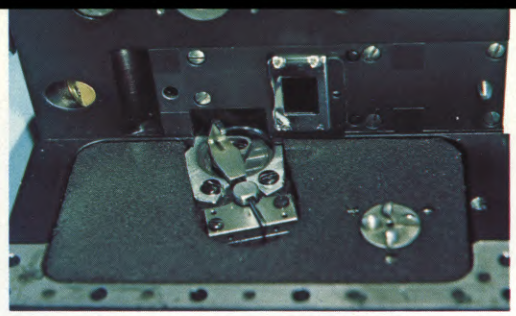


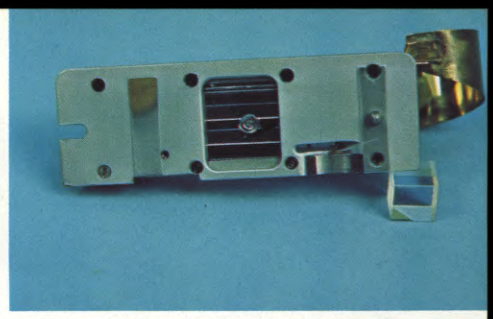
**(LEFT) The GSMO (100-foot magazine), with optional shoulder pod and handle. (CENTER) The Hybrid Electronics component of the GSMO, shown with quarter coin for size comparison. (RIGHT) The 100-foot (30-meter) cassette-type coaxial magazine. (BELOW LEFT) The 100-foot magazine with the loading side door open. (CENTER) Housing removed to show electronic components of the GSMO. (RIGHT) Front view of the GSMO, with 100-foot magazine mounted.**



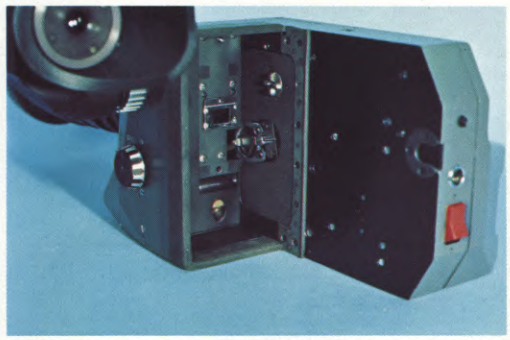


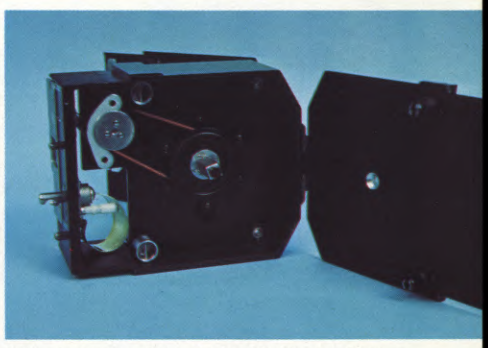






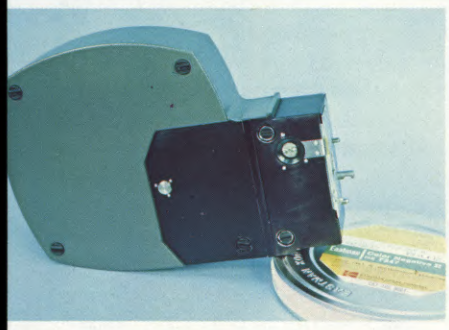
**(LEFT) The GSMO 100-foot magazine, with daylight-loading spool in place. (CENTER) The GSMO camera body, showing the film transport mechanism. (RIGHT) The GSMO aperture plate. The rotating mirror shutter of the camera is of the single-blade, full-speed type that provides a 180° shutter opening. The mirror clearance is such that the camera will accept any reflex-type lens that fits onto any of the existing Arriflex or Eclair cameras.**



**(LEFT) Closeup of the GSMO controls. There are a minimum of controls, making the camera very simple to operate, despite its highly sophisticated electronics. (CENTER) The GSMO camera body, showing the film transport mechanism. (RIGHT) The GSMO 100-foot (30-meter) cassette magazine, with cover removed to show take-up side of the coaxial mechanism.**

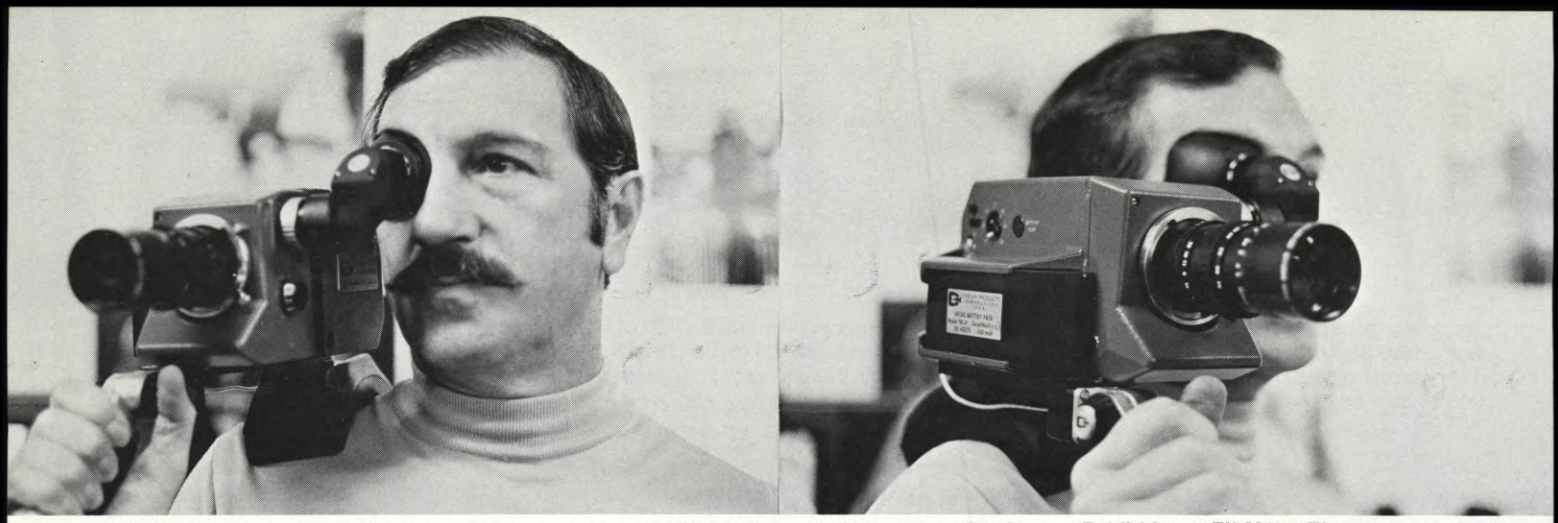
**(LEFT) The GSMO camera with 400-foot (120-meter) magazine mounted. (CENTER) and (RIGHT) The GSMO in use, with the 100-foot magazine mounted. In this configuration, the camera is little larger than an amateur Super-8 model, rendering it very unobtrusive for news filming situations where a low-profile is a must. (BELOW RIGHT) Cinema Products President Ed DiGiulio introduces the new GSMO camera during the papers program of FILM '77 in London.**



the full professional capabilities of the more expensive cameras, but selling for a price somewhere between the high and low end of the market. We are confident that by the use of large volume production techniques, such as die castings, injection moldings, etc., and by the use of the most advanced miniaturization techniques for electronic circuitry, we could hold the cost of the GSMO down without sacrificing any of the quality features that a professional cameraman would expect from Cinema Products.

Like the English, we Americans have finally come to the reluctant decision to join the rest of humanity and eventually convert to the metric system. Accordingly, we have decided to make the GSMO the first professional camera manufactured in the United States that will conform to metric standards.

The camera is designed to be extremely compact. Its overall dimensions with the 30-meter (100-ft.) magazine are 12.4cm (4.88") wide by 11.1cm (4.37") high by 19.4cm (7.63") long. The 60-meter (200-ft.) magazine is 13.7cm (5.39") high, and increases the overall length of the camera to 24.2cm (9.5"), while the 120 meter (400-ft.) magazine is



**Ed DiGiulio demonstrates the new GSMO camera at the Cinema Products booth of the Equipment Exhibition at FILM '77. The camera quickly attracted crowds which remained undiminished during the course of the show. Originally conceived as a space-age replacement for the famous rugged "workhorse" Bell & Howell 70D "Filmo" camera, the GSMO took on much more sophisticated characteristics during the course of development. It now ranks with the most advanced professional 16mm cameras in the field.**

18.3cm (7.2") high, and increases the overall length of the camera to 28.8cm (11.34"). Camera weight with NC-4 plug-in battery pack and fully loaded with 30 meters of film (less lens) is 3.2kg (7 lbs); fully loaded with 120 meters of film (less lens) it weighs 4.3kg (9 lbs 7 oz).

The optical system has been patterned after that of the CP-16R with two important differences. The rotating mirror shutter is of the single-blade, full-speed type that provides a 180° shutter opening. The mirror clearance is such that the camera will accept any reflex type lens that fits on any of the existing Arri or Eclair cameras. We originally designed the mirror so that C-mount lenses with an appropriate adapter could be used, but we have decided against this because we could construct a stronger, and hence more stable, mirror by ignoring C-mount lenses (which would have required a thinner mirror construction to avoid interference with the C-mount threads) and concentrating instead on adapting Arri and Eclair mount lenses. The basic lens mount of the camera is the standard CP mount, which was patterned after the rugged and reliable BNC mount with its positive rotating locking ring.

The viewfinder arrangement is identical to that of the CP-16R, so that the camera will accept either our standard viewfinder or the optional orientable viewfinder that we manufacture, which folds forward for better shoulder balance. An eyepiece extender is also available when using the orientable viewfinder for tripod operation. Both viewfinders provide 12-times magnification and greater than full-field viewing through a fiber optics viewing screen.

The camera drive system is of unique construction. A small 22mm diameter highly efficient motor that utilizes samarium cobalt magnets drives a gear train, all of which is embedded in a solid aluminum block to achieve maximum noise attenuation. The movement consists of a single-claw sinusoidal registration movement with a curved film gate for minimum pull-down time. This system provides frame line accuracy of ± .05mm, and a picture steadiness of ± .0076mm.

All of the electronics are located on an extremely compact circuit board. For maximum packing density, liberal use was made of hybrid circuits. These hybrids are a cross between conventional integrated circuits and the highly sophisticated LSI's (large scale integrated circuits). As a consequence of their use, we are able to include in this camera crystal-controlled speeds of 24 and 25 fps, as well as step-variable speeds ranging from 12-64 fps. Accuracy for *all* speeds is ± 30 ppm over a temperature range of -18° to +60° C (0-140° F).

In addition, the circuit board also includes slating and pilotone outputs, as well as an electronic counter which is switchable to read meters or feet. While we will very definitely make provisions for the inclusion of time code in the GSMO, we feel it extremely advisable to wait until EBU and others have sorted things all out, and we can proceed ahead on an internationally agreed upon standard.

The camera will provide indicators visible through the viewfinding system and a semi-automatic exposure control system similar to that used in the CP-16R as optional accessories. The camera is powered by the standard CP-16 NC-4 nicad battery pack. One battery which weighs .45 kg (1 lb) has the capacity to run approximately 400 to 500 meters of film through the camera.

Because of the previously mentioned dynamics of our design program, although we started out intending to build only a 30-meter coaxial quick-change cassette-type magazine for the camera, where the magazine profile was consistent with that of the rest of the camera, we have become convinced, as a result of extensive field evaluation, that we should abandon this concept and proceed with the development of 60-meter and 120-meter coaxial quick-change cassette-type magazines. The 60-meter magazine has the capability of handling daylight load spools only, while the 120-meter cassette can accommodate either daylight spools or darkroom cores. In designing the GSMO magazines we have tried to avoid the pitfall of making the "quick-change" magazine a monster to load. To this end, the magazines include a loop-forming device so that the magazine is relatively simple to load.

One of the major design criteria in this program has been to achieve a sound level low enough to permit sync sound recording under the most demanding conditions. While the GSMO is still only in the pilot production phase, we feel we have had enough experience with the production prototype units already built to assure ourselves that we can guarantee that production cameras will not exceed 30 dB measured on the weighted "A" scale at 1 meter from the film plane. This puts the GSMO in a class with the CP-16R as the quietest 16mm professional cameras ever built.

In conclusion, it can be fairly stated that we set ourselves some very difficult design criteria with regard to size, weight, sound level, and cost, and we have met or exceeded each one. With the expanding use of 16mm film in all phases of cinematography, such as films for television, military combat camera applications, industrial films and student filmmaking, the GSMO will uniquely satisfy the need for a fully professional silent camera for these applications at a reasonable price. We feel it is a significant step forward in the design of film cameras which, when coupled with the new faster emulsion films that are now becoming available, represents a formidable challenge to the designers of electronic cameras in terms of cost-effective quality performance, portability, reliability, and almost any other comparative parameter one might wish to consider. ■

# THE "D-TO-D" (DAWN TO DUSK) SOLAR CAMERA BATTERY CHARGER

film 77

**Inevitably, someone would harness the energy of the sun to power the machines of cinematography, and this lightweight solar charger should prove valuable in remote locations where generators are impractical**

In these days of growing awareness of "the energy problem" and the resultant search for viable alternatives to the burning of fossil fuels for energy, it would perhaps seem logical that someone should seek to apply such alternatives to the charging of motion picture batteries—a solar charger, for example.

Obviously rising to the challenge, the John Page Limited group displayed on their stand at FILM '77 just such a device—the "D-to-D" (Dawn-to-Dusk) Battery Charger, a compact, lightweight, easily portable panel faced with 42 solar cells.

There are those who would argue that such a device should be regarded only as a gimmick—like a fur-lined bottle opener. They might argue that the amount of current needed to charge camera batteries from the mains supply is infinitesimal indeed, and that on location a small generator would neatly do the trick. But what do you do when you're part of a camera crew climbing Mt. Everest, where even a "small" generator (to say nothing of its fuel) becomes a cumbersome and weighty proposition? At times like that, one would think, a lightweight charger with an inexhaustible supply of weightless solar "fuel" might come in very handy.

At any rate, the John Page Limited people have one that they say works, and they have provided what they call "advance information", as follows:

*Over recent months we have been investigating the possibility of utilising solar energy for the purpose of charging and re-charging camera batteries.*

*In considering the design philosophy of a Solar Energy Camera Battery Charger, we took into account the following main points:*

1. *The relatively low power output of existing solar panels, together with the changeable nature of the sunlight received.*
2. *The variable demand on a day-to-day basis of the filming schedule.*
3. *The considerable size and cost of the solar panels themselves.*
4. *The necessity of excluding sand, snow and water from the unit.*

*With the "D to D" unit, we have tried to obtain maximum coverage of these points in our design.*

*We have based our unit on the latest type of high-output silicon solar panel, which will give up to 8 watts per hour in good sunlight. Instead of using this to directly charge the camera battery, we have coupled it to a pair of fully sealed lead-acid battery reservoirs. The use of such reservoirs brings many advantages in our attempt to maximise the available energy.*

a) *Being capable of charging at a constant potential, the cells are able to absorb all the available energy during periods of intense sunlight. Using cadmium batteries would require a form of current limiting, which would of course result in the loss of some of the energy received.*
b) *As they have a larger capacity (two x 3 Ah) than the camera batteries, they act as a reservoir to smooth over the variations of the day-to-day sunlight received and the different daily demands of the production unit.*
c) *The use of storage reservoirs means that the camera batteries themselves may be charged at night when they are not required for filming. This eliminates the need for a duplicate set of batteries to be carried in order to be charged during the hours of sunlight.*
d) *Now in an electrical form, the solar energy may be controlled for optimum efficiency. This is achieved by the incorporation of timers in the charging circuits so that only the energy used from the camera battery during the day will be drawn from the reservoir.*

***DESCRIPTION***

*The unit is housed in an aluminium case and consists of a solar panel; two storage batteries and their associated charging electronics; a mains charger, to ensure that the reservoirs are fully charged at the start of the duty cycle; adjustable, collapsible legs; four guy lines; two canvas sheets.*

***OPERATION—Solar Charging of Reservoirs***

*The unit is set up facing South (North in the Southern Hemisphere) and, by means of the adjustable legs, the angle of declination of the panel is set in accordance with the data supplied.*

***OPERATION—Camera Battery Charging***

*This may be undertaken while the reservoirs are charging or not. The unit has the facility to charge TWO 1.2 Ah batteries; or TWO 1.8 Ah batteries; or ONE 4 Ah battery by using the linking switch. The capacity of the battery to be charged is selected and the charging time is set in accordance with the expended footage chart supplied. The "start charger" button is pressed and the charging L.E.D. indicates that charging has commenced. End of charge is indicated by the extinction of this light.*

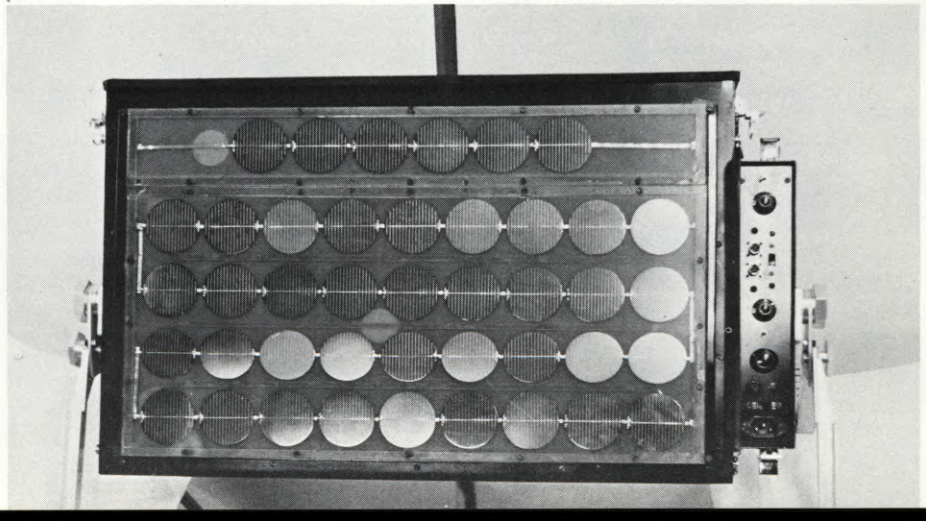
*Should the linking switch be used (for charging a 4 Ah battery), the same charging duration should be set on both timers.*

***OPERATION—Mains Charging***

*The unit has an automatic sensing relay which will always take the output of the mains charger in preference to the solar panel whenever mains is applied to the unit. To ensure long life of the reservoirs, these should always be charged once every two weeks when the unit is not in use.*

For further information on the "D-to-D" (Dawn-to-Dusk) Solar Camera Battery Charger, contact: JOHN PAGE LIMITED, 169 Oldfield Lane, Greenford, Middlesex, ENGLAND. Tel: 01-578 0372. ■

**The compact, lightweight "D-TO-D" Battery Charger consists of an easily portable panel faced with 42 solar cells. The unit produces up to 8 watts per hour in good sunlight. This current does not directly charge the camera batteries, but is coupled to a pair of fully-sealed lead-acid battery reservoirs. The unit has collapsible legs and is housed in an aluminum case.**



# A REVOLUTIONARY NEW APPROACH TO TIME MARKING ON FILM, SOUND AND VIDEO TAPE

film 77

**"Aaton Numerals" that can be easily read with the unaided eye provide, at last, a Time Base Coding system that makes sense and involves the absolute minimum of modification to existing equipment**

**By JEAN PIERRE BEAUVIALA**

We should take it for granted that some system providing time-based information on film and sound at time of shooting will greatly enhance the creative and economic performance of film-based production. This information would usefully be incorporated into any video system used in film production.

So the question is no longer *whether,* but *which* system should be used. We at Aaton feel that the EBU/TDF/IRT systems have serious shortcomings for the film-maker in general in that they will encourage a greater reliance on further expensive machinery. The fact is that these systems have, in effect, not gone far enough. We would like to propose the next step, which will not only transform the shooting stages, but also, through simplification, many aspects of the editing procedures.

Aaton, in search for this system, has come up with what we will call "Aaton Numerals", which, as it says, enable clear numbers to be used where previously only coded information was provided. And this with the absolute minimum of modification to existing equipment. We will provide clear numbers printed directly onto the original film on the perforated side, coded information incorporated into the standard pilotone signal on the ¼" tape, subsequently retrieved and printed onto the 16mm magnetic stock, and clear numbers incorporated into the video signal and appearing on the video picture outside the useful frame area. This latter proposal enables us to transmit and record this information on ordinary lightweight video recorders.

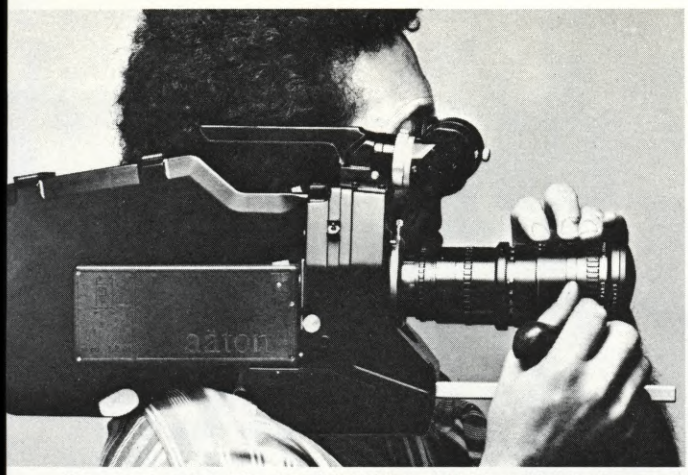
We will now look in more detail at the practical application of these proposals.

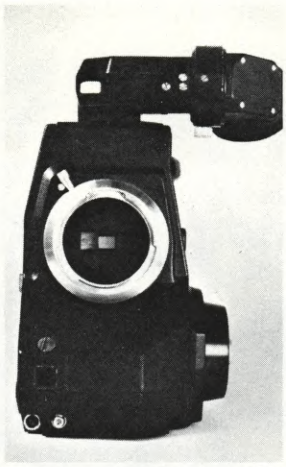
**View of the Aaton 7 camera, with magazine removed to show all five diodes lighted behind the cutouts in the aperture plate. To adapt the camera to the "Aaton Numeral" system, the standard aperture plate is removed simply by releasing four screws and the new plate is inserted in its place. It is possible to have light-emitting diodes for both coded marking (EBU/IRT, for example) and clear numerals in the same plate, deriving their signals from the same micro-processor.**

***SHOOTING:***

One of the first changes brought about by the use of a chronometric marking system is an economy of from 10% to 15% obtained through the elimination of the clapper. The economy is not only one of

**Video screen with ASC II figures appearing at the top of the frame, well outside of the useful screen area.**



**The new and vastly simplified "Aaton Numeral" time base coding system was developed by Jean Pierre Beauviala, designer of the sleek Aaton 7 camera (shown here), who states: "We at Aaton are very concerned with providing the main advantages of time-marking to all film-makers." His new system may well serve as the basis for long-sought standardization in this area.**

film, but also of nerves, time, and logically, money. Further economies and creative flexibility may be found by viewing video rushes recorded simultaneously to eliminate rolls of film which, for any number of reasons, may not merit printing. Little new equipment is needed, be it for camera, tape recorder, or VTR; the compact plug-in Aaton coders do the work. One or several sound recordists can work synchronously with one or several film cameras. By using the Aaton wireless link for the video, the cameraman and sound recordist may maintain the freedom provided by the advent of crystal-based technology. At last the film-makers may attend fully to the creative act in front of them—no longer having to provide the editing room with any sync information.

### *EDITING*

But only a fraction of the benefit of Aaton numerals is enjoyed during the actual shooting stages. It is during editing, when the editor wants to *read* his film and sound tape, that Aaton-numerals have a most striking influence on the film-making process; the editor can rely on his eyes alone to establish sync. His dependence upon the machine to record the information is eliminated. According to studies made by TDF, composite dailies are synchronised five to ten times faster with chronometrically marked material than without. So the editor with "Aaton-numeral" film and 16mm tape in hand is totally self-reliant with minimally modified editing equipment. The editing rack (and a "rack" it often is) becomes no more than a half-remembered, often unsynchronisable tangle of the past, even the smallest sequence may now be brought into sync with no trouble. And here we have the main difference between the TDF-IRT coded systems and the clear Aaton-numerals. With the former systems the editor needs as many decoders as there are tracks or pictures, for each time the material needs to be read it has to be passed through the recorder. This must represent a sizable investment in what we will show to be unnecessary equipment.

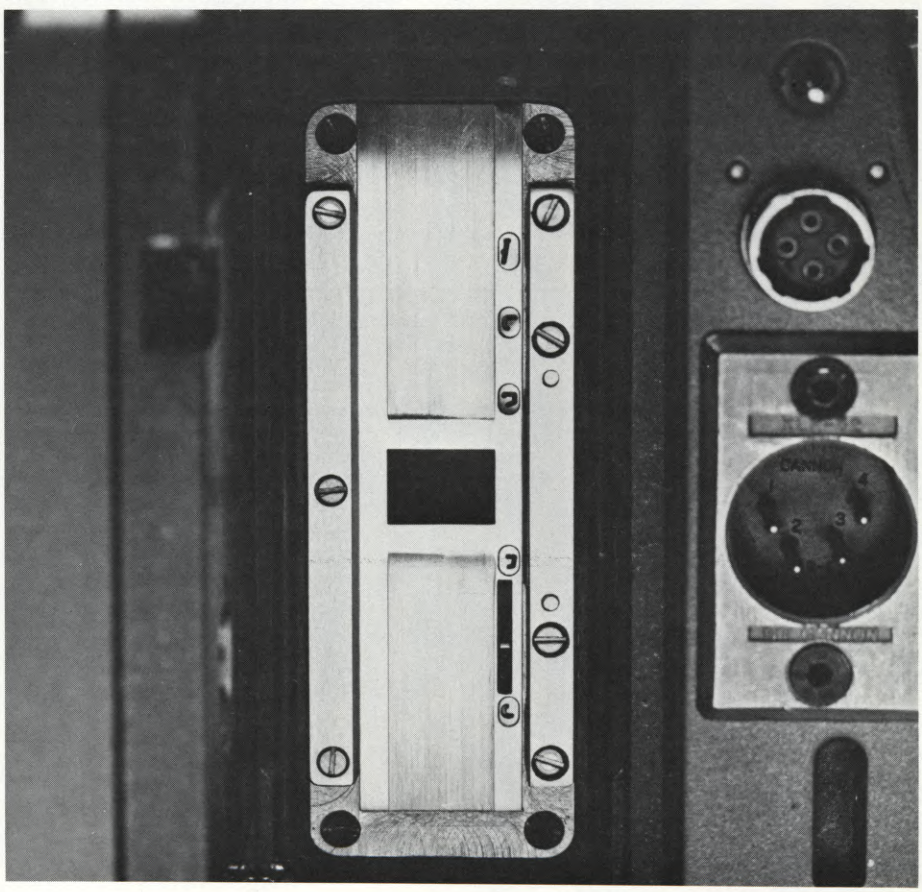
By using the Aaton-numeral system, no such additional equipment is required. I repeat, no additional equipment is required at the editing stage, the same work being carried out by the editor's own eyes, a facility, we gather, willingly provided.

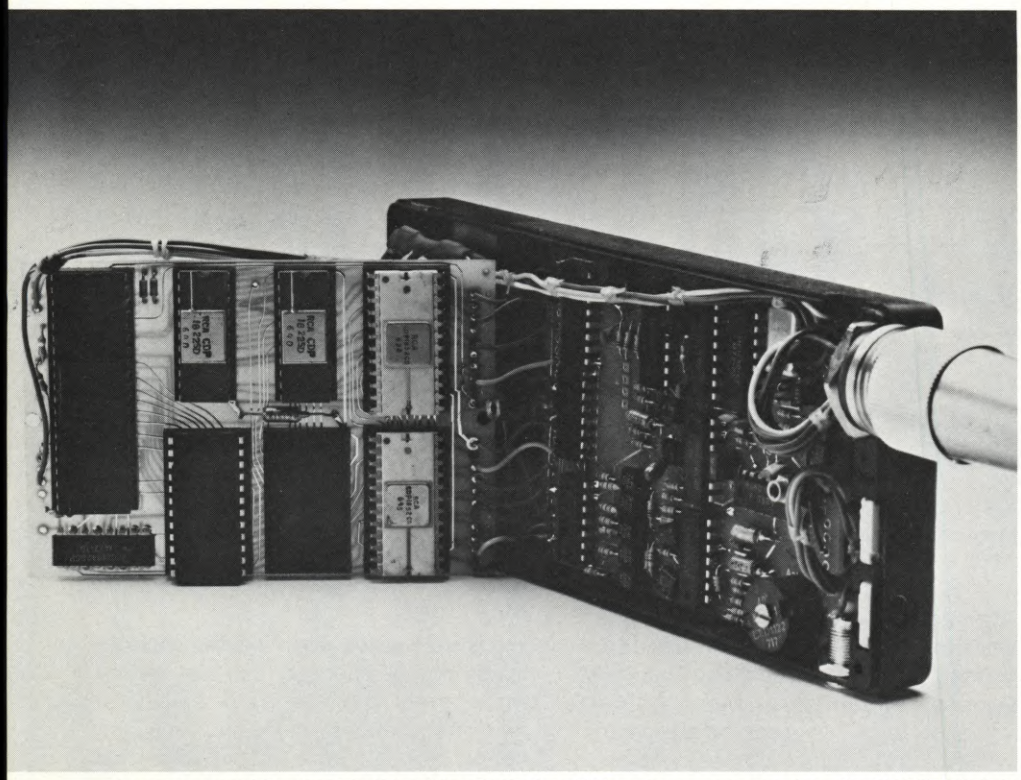
It is intended that the "Aaton-numeral" system will also be compatible with the automatic syncing and editing facilities as proposed by IRT and TDF. This will be achieved in two ways. Firstly, in the camera we can install on the same aperture plate the EBU binary code slots to provide coded print-out, as well as the Aaton-numerals, both being run from the same code generator. Secondly it will be possible to "read back" the numerals into signal form with characteristics identical to those of the IRT-TDF signals. However, we anticipate that this facility will only find favour in the larger companies who may well be inclined to form central syncing-up rooms. We at Aaton are very concerned with providing the main advantages of time-marking to all film-makers.

### *SO NOTHING IS CHANGED, YET NOTHING IS THE SAME*

We have insisted upon the fact that nothing need be changed, and that, on the whole, everything remains the same. Yet an entirely new way of making films cannot be brought about without some real change. To reiterate, we feel it is very important not to oblige the user to purchase any more new equipment than absolutely necessary. By carefully considering the requirements, it proves possible to

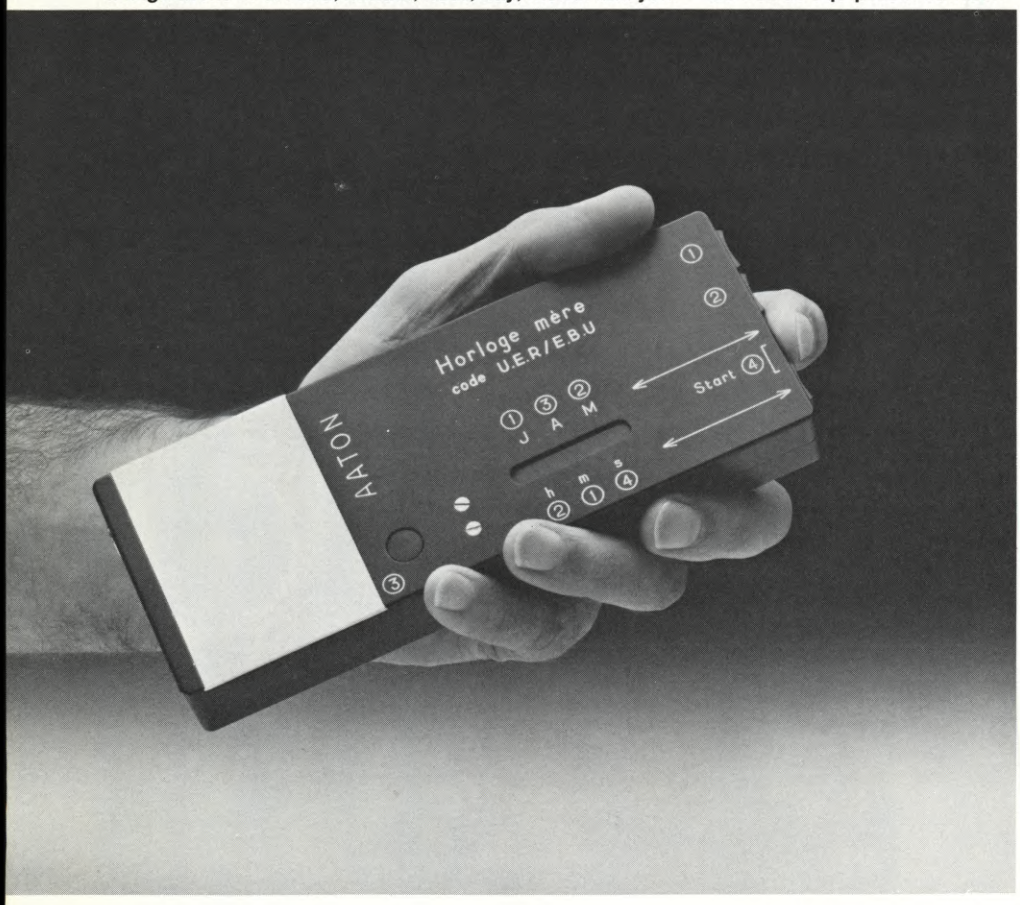
**Closeup of prototype aperture plate, showing cutout areas with light-emitting diodes installed behind. The five components which these cutouts expose combine to make up all ten basic Arabic numerals. Coded information incorporated into the standard Pilotone signal on the 1/4-inch sound tape is subsequently retrieved and printed onto the 16mm magnetic stock in the form of numeral groups identical to those on the picture.**





**Cover removed to show inside of the C Coder. This micro-processor has the EBU/TDF dots system, Aaton Numerals and video numerals in memory. When built into the base of the camera, it will control not only time marking facilities, but also the camera motor, single-system and exposure metering functions. The S Coder will be slotted into the sound recorder to provide Aaton-Piloton compatible 1/4-inch modulation. This will maintain compatability with the IRT/TDF systems.**

**The Aaton "mother clock", which generates EBU/TDF setting signals for both C and S, as well as V Coders. The mother clock is used to "set" one or several cameras in perfect synchronization with one or several tape recorders, annotating both picture and track with designations of second, minute, hour, day, month and year — as well as equipment number.**




adapt the various systems and to simplify the operations by applying them to existing equipment. This can be shown on four levels: the 16mm Aaton camera, the sound recorder, the VTR and the editing table.

(1) *Camera*

To adapt the Aaton 7 16mm camera for Aaton-numerals, the aperture plate is removed simply by releasing four screws, and a new plate put in its place. This engraved aperture plate contains five diodes and figures, wires, and a connector. It is possible to have light-emitting diodes for both coded marking and clear numbers in the same plate deriving their signals from the same micro-processor. The system functions without relay optics or fiber optics, thus avoiding the complexity and poor reliability associated with micro-optics. The C coder, having received the time setting signals from the master clock, is then hooked up to the camera. The C coder is now entirely independent, with its own power supply and internal clock to run the diodes. In the future, this will be incorporated inside the camera base with its microprocessor handling all the electronic functions of the camera motor, photometer, and the Aaton single-system digital sound recording facility.

(2) *Sound Recorder*

For the sound recorder, the S coder is added inside the recorder itself, in the form of a plug-in circuit board. A special kind of modulation using the neopilot or synchrotone itself allows complete compatibility: no head to change, no resolver or other equipment to replace. The great advantage of this system, is, again, that no profound modification to the equipment is required; either neopilotone or synchrotone can still be used, and they are not mutually exclusive, as in EBU modulation systems on ¼-inch tape. This again is a micro-processor-based facility.

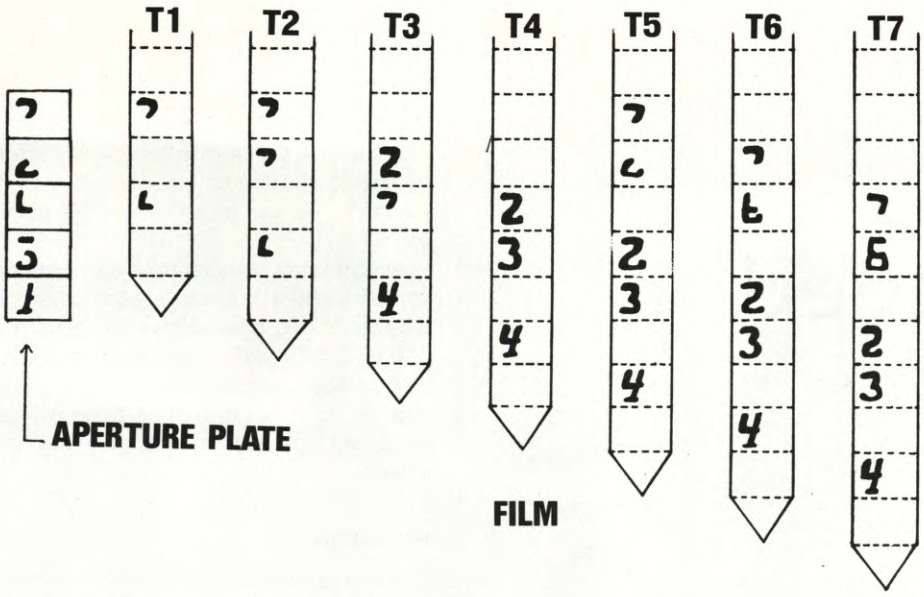
(3) *Video*

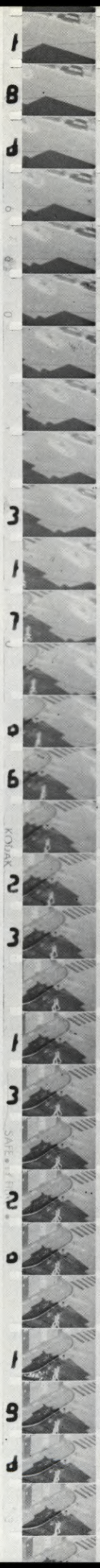
The adaptation for VTR recording is also minimal. The coder (a small box about the size of a pack of cigarettes) fits onto the outside of the Aaton camera video control unit. This allows the addition of the time figures to the standard video signal; any existing VTRS can then record them without any modification.

(4) *Editing*

With the French Atlas editing tables, the Aaton-numerals appear on the screen with no modification whatsoever. With Steenbeck editing tables, and others, a slight modification must be made to widen the space, allowing the numerals to appear on the screen. To reduce the modification to a minimum, and at the requests of the BBC, we have centered the figures as closely as possible to the frame edge.

The Aaton-numeral clear marking sys-



**(ABOVE) Diagramatic construction of numbers, showing step-by-step generation of Aaton numerals from five basic components. (RIGHT) A strip of 16mm black and white negative film, showing the Aaton numerals exposed in the left perforation area. Each actual second is delimited by the sign "d", which immediately follows the last digit of the second indication.**

tem was presented to both the ORTF and the BBC and discussed with them during the design and development stages. Early this year, TFI (ORTF Channel 1) gave a go-ahead with an order for cameras equipped with this system, and now the accepted Aaton-numerals standard is as follows:

### *THE ORGANISATION OF AATON-NUMERALS*

The following points are characteristic of the Aaton-numerals, and can be identified as the standard of this system.

1. *They are on the perforation side of the film,* allowing compatibility with single-system, and Super-16, as well as EBU coding, all of which take up the other side.

2. *The figures are in groups of two,* separated by a blank space, making it easy for the eye to separate the number sets; with coded systems this is very difficult with the naked eye.

3. *The figures run in the same direction as the images;* i.e., when the image is right side up, the numeral is too. Thus, a cut taken from the editing rack is immediately identifiable. The order of the indications contained in the message (equipment number, year, month, day, hours, minutes, seconds, sync sign) is such that the essential information is at the end, allowing the editor time to stop on the sync mark once he has chosen to.

4. *The equipment number and final digit of the year are grouped together,* giving 3 figures. Thus the 7 in 77 disappears, for example, and with equipment number, say 31, would appear as 317. With these three figures together, the blank space before is increased, making it easier to identify the beginning and end of the message.

5. *The actual second is delimited by the sign d,* which immediately follows the last digit of the second indication; e.g., 41 d. This sign, therefore, serves as a sync mark, giving certainty, even on a tiny cut, of the precise point at which one second succeeds another. The sync sign and the message preceding it compose the entirety of a given second.

### *THE FORM OF THE NUMERALS*

To obtain the most legible figures possible, Aaton sought a system whereby left/right and up/down confusion would be impossible, to avoid the problems met with 6 and 9 or 5 and 2 on the seven segment displays universally used in electronics. Aaton designed and patented a special display providing rounded and non-symmetrical figures, based on five segments only.

### *PROPOSED STANDARD FOR VIDEO NUMERALS*

1. Clear marking on the image outside the "useful" frame.

2. Figures recorded by the video signal itself, thereby eliminating the necessity of a special track which does not exist on lightweight VTRS. The time message then appears on the successive editing generations.

3. With a video signal for this information, a high-frequency transmitter can be used, leaving the VTR at a distance, and the film camera light and autonomous.

4. The images within the second are also numbered, making it possible to match the film and tape image-to-image.

5. ASCII figures and letters are used; readily available integrated circuits do the job. ■

## ZOPTIC SPECIAL EFFECTS

**Continued from Page 929**

### Back-projection

Zoptic can be used with back projector by fitting matching interlocked zoom lenses to the rear projector and the camera.

Alternatively, the projector and camera can be tracked in towards each other by an interlocking drive. However, because of the physical difficulties involved in this type of operation, it can only be recommended for use on a small scale where small set ups and model work are involved.

### Animation

Three dimensional models and live subjects can be made to fly and move in depth inside a picture with the use of the Zoptic system, but what about flat artwork?

With the normal Zoptic system using front-projection a cutout or flat artwork could be mounted on a piece of glass at a distance placed in front of the f-p screen. The hot spot that occurs because of the glass, is best eliminated by angling the glass in relation to the screen so that the solid area of the artwork covers it.

A very large piece of glass is normally necessary to give an appreciable zoom ratio and this is not too difficult when dealing with cutouts. However, animation cell artwork would have to be on such extremely large cells as to make it impractical.

The use of the Neilson-Hordell dual screen projector can help to overcome this problem to a certain extent. Because the greater part of the frame area at wide angle setting is seen reflected from the secondary screen, the artwork needs to have only a small amount of clear area around it to enable it to be matted in. This also means that a much smaller piece of glass is necessary when using dual screen because it does not have to cover the entire area.

But for the Zoptic system to work in flat artwork animation it is essential for it to work at conventional field sizes which do not normally exceed 15" and are often less.

In addition, it should also be able to utilise the existing equipment such as the underneath aeriel image projector.

If a cycle of cels representing a bird in flight were shot with a Zoptic effect the bird would appear to fly over any kind of background whether real or painted and the artist would not need to draw any more cells except those 5 or 6 comprising the cycle.

Many projectors are already fitted with a zooming capability but because the camera must remain in a fixed position relative

to the aeriel image condensors, tracking with the camera is not possible when it is used this way.

It was necessary to develop a back-projection screen that would have all the properties of aeriel image projection (i.e. that the artwork can be lit from above at the same time as the background is being projected without it being washed out by the top lights.) and none of the disadvantages such as the inability to track the camera. This has now been achieved with the Zoptic screen. (Fig. 4).

**Zoptic screen**

When the Zoptic screen is placed in the cutout of the rostrum table the image projected on it from underneath does not get washed out by the top lights providing illumination for the artwork placed over it. The camera can track in or out without any restrictions taking the composite image in one single pass.

If the projector has a zooming capacity then the camera can track in to keep the projected image the same size in the frame. The Zoptic effect has now been achieved and the animated bird, a title etc. does really fly.

A cut-out photograph of a spaceship or some other object can be mounted on glass as described earlier. The window areas can be cut out and a Zoptic screen placed behind the cut-out area in contact with the photograph.

A prefilmed live-action shot of the pilots is then projected through the hole in the f-p screen in the window area. The cut-out is lit from the front and the background image is also projected from the front. The effect of live-action pilots inside the cockpit of a spacecraft as it flies across a live action background is thus achieved *all in one pass.* Alternatively, a commercial product can be shot flying through any kind of background with another live image projected inside it.

The Zoptic screen can be mounted at the same level and in contact with the f-p screen, so that the screen material can be stuck over it. A desired shape is then cut out with a scalpel and the f-p material peeled off to reveal the Zoptic screen underneath. An image projected onto the Zoptic screen from behind will appear as part of the scene which is projected from the front. When the Zoptic effect is brought into operation the back projected object appears to separate from the background and fly through the scene. Again the entire operation is done in one single pass.

This sort of effect is only suitable for objects with a fixed shape whose outline does not change or where a mask of a particular shape can be used to give a shape to the subject (e.g. the eye in the illustration). (Fig. 5). ■

# INDUSTRY ACTIVITIES

### COMMITTEE NAMED FOR 3rd ANNUAL ASC COLLEGE FILM AWARDS

Event chairman Stanley Cortez has named the supervising committee for the third annual College Film Awards of the American Society of Cinematographers, to be held in October.

Cinematographer Lee Garmes will be committee vice-chairman. Committee members are: Charles Clarke, George Folsey, Ernest Laszlo, Winton Hoch, Harry Wolf, Sam Leavitt, Joseph Biroc, William Fraker, Lester Shorr, Leonard South, Ted Voigtlander and Haskell Wexler.

Also: L. B. Abbott, Burnett Guffey, Milton Krasner, Daniel Fapp, William Margulies, Ralph Woolsey, Lloyd Ahern, Loyal Griggs, Howard Anderson, Owen Roizman, William Butler and Conrad Hall.

Specially-created trophies will be presented by the ASC for the best student-photographed film of 1976-77, and to its student cinematographer.

Last year, actress Greer Garson presented the winning trophy to Philip Earl Jr. for the USC film, "The Preparatory". Actor Gregory Peck presented the first year's trophy to student Denis Mayer for the San Diego State film, "Negative Image".

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### SMPTE SET FOR RECORD-BREAKING OCTOBER CONFERENCE AND EXHIBITION IN LOS ANGELES' CENTURY PLAZA HOTEL

The 119th Technical Conference and Equipment Exhibit of the Society of Motion Picture and Television Engineers (SMPTE) is set for the Century Plaza Hotel in Los Angeles October 16-21, 1977. According to early indications the meeting will be the largest the SMPTE has ever had. The equipment exhibit is already a record breaker with more booths than ever having been taken by the major manufacturers and suppliers of professional motion-picture and television equipment.

The Conference will feature, in addition to the equipment exhibit, a full five-day technical program of sessions dealing with the subjects of current concern to the motion-picture and television industries. The Conference will also have a schedule of social events, a

full week of activities for spouses, and a coffee club. The SMPTE Conference will be the focal point of the motion-picture and television industries. More than 5,000 film and television engineers, executives and production people are expected to attend.

The subjects that will be covered on the SMPTE technical sessions and their schedule of presentation during Conference week are: Monday morning: Film-TV Interfaces; Monday afternoon: New Products in Television; New Equipment and Processes in Film; Tuesday morning and afternoon: Laboratory Practices; Television Post Production; Wednesday morning: Television Sound; Film Production; Wednesday afternoon: Television Production; Film Sound; Thursday morning and afternoon: Corporate Uses of Motion Picture and Television; Thursday morning: Unconventional Imaging Systems; Thursday afternoon: Panel Discussion on the Corporate Uses of Motion Picture and Television Production; Friday morning: New Television Technology; Friday afternoon: General Television Subjects.

As a special added attraction, there will be a "Hands-On" motion-picture equipment demonstration with well-known filmmakers showing how movies are made. Film clips of famous movies will be screened after which demonstrations will be given on how the scenes were filmed. The session, tentatively scheduled for Sunday morning October 16 at the Fox Studios behind the hotel, is sponsored by the Professional Motion Picture Equipment Association (PMPEA).

The SMPTE Equipment Exhibit will feature a wide variety of professional television and motion picture equipment. Almost every imaginable type of film and video equipment will be on display from film and video cameras, editing equipment for film and tape, laboratory equipment, equipment for lighting, sound, and projection, lenses, VTRs and TBCs, microwave equipment for ENG, telecine projectors, tripods, to mention only a few of the many types of film and video equipment that will be shown. With more than 200 booths and over 110 exhibitors this will be the largest equipment show where a substantial amount of both film and television equipment will be shown together under one roof. The increased participation of filmmaking and television equipment manufacturers and suppliers proves that the SMPTE Exhibit is now the major show for motion-picture equipment, and also one of the most important shows for video equip-

ment as well. All who register for the Conference will be admitted to the exhibit free; passes for non-registrants will be available gratis from SMPTE before the Conference, and at the door during Conference week for $2.50.

In addition to the exhibit and technical sessions, there will be a full week of social events throughout Conference week. Beginning Sunday, Oct. 16, there will be an evening Social sponsored by Eastman Kodak Co. On Monday, the Conference will feature the Get-Together Luncheon with Guest Speakers George Stevens, Jr., Director of the American Film Institute, and famed film director William Friedkin. Monday and weekly registrants will receive free lunch tickets, courtesy of Agfa-Gevaert. The luncheon will be highlighted by the presentation of SMPTE awards which recognize outstanding achievements in motion pictures and television and service to the SMPTE. Other social activities scheduled are a Tuesday evening open house at the plant of Cinema Products Corp. and the Wednesday evening SMPTE Banquet. A complete program of activities for spouses is also scheduled.

For persons wishing to register for the technical sessions, the rates are as follows: for SMPTE members, weekly, $85; daily, $30; for nonmembers, weekly, $100; daily $35. Student SMPTE members are admitted free; for nonmember students the charge is $10. Registration for the spouses program is $20 for the week. Tickets for the luncheon are $12 each; for the banquet $25 each.

Additional information on the Conference and Exhibit is available from SMPTE Conference Dept., 862 Scarsdale Ave., Scarsdale, NY 10582.

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### 1977 ACADEMY AWARD WINNERS SCHEDULED TO LEAD PMPEA'S "MOTION PICTURE PRODUCTION & HANDS-ON EQUIPMENT SEMINAR" ON OCTOBER 16

The PMPEA's Motion Picture Production & Hands-On Equipment Seminar, now scheduled for Sunday, October 16, 1977, will be the opening event of this year's upcoming SMPTE Conference in Los Angeles, it is announced by Chad O'Connor, president of the Professional Motion Picture Equipment Association (PMPEA). According to O'Connor, this year's program promises to be most exciting for filmmakers, with some of Hollywood's best talent on hand to lead the sessions exploring various aspects of

cinematography, lighting, sound and post-production techniques.

Academy-award winner Haskell Wexler, ASC, ("Bound For Glory"), and John Alonzo, ASC, ("Black Sunday"), will each demonstrate and discuss studio cinematography techniques. Verna Fields, production executive for Universal Studios and winner of an Academy award for best editing ("Jaws"), is tentatively scheduled to lead a discussion on post-production techniques. Jim Webb, co-winner of the 1977 Academy award for sound ("All The President's Men"), will demonstrate production recording.

Roy Isaia, Vice President of the PMPEA and chairman of the committee organizing the Hands-On Seminar, expects this year's program to be even more successful than the 1975 Hands-On event which drew more than 500 people. "This seminar," says Isaia, "is a unique opportunity for filmmakers to see top professionals demonstrate their craft, with the latest equipment, on a Hollywood soundstage."

Planned and organized by the PMPEA under the sponsorship of the Society of Motion Picture & Television Engineers, the Hands-On Seminar will be held on the 20th Century-Fox lot, Sunday, October 16, 1977, from 10 AM to 2 PM. For further information, please contact the SMPTE or a PMPEA member company.

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**EXPANDED "CP MAINTENANCE TRAINING SEMINAR" TO FEATURE CURRENT DEVELOPMENTS IN PROFESSIONAL MOTION PICTURE EQUIPMENT FIELD.**

Cinema Products' forthcoming expanded two-day "CP Maintenance Training Seminar" (to be held at the factory in Los Angeles) will feature special sessions conducted by representatives from other equipment manufacturers who will report on current practices and the latest developments in their field, according to Ed Clare, Seminar Coordinator.

John Norris, of Eastman Kodak Co., will present Kodak's new, fast film stock, VNF 7250 (with an ASA rating of 400). Bern Levy, of the Angenieux Corporation of America, will demonstrate the proper use and care of both zoom and fixed focal length lenses. Nat Tiffen, of Tiffen Optical Corporation, will discuss special filter applications. The expanded program will also include a special session on STEADICAM™ — Cinema Products' new and revolutionary film/video camera stabilizing system.

The two-day event is scheduled for

Friday and Saturday, October 14-15, just prior to the opening of the SMPTE 119th Conference & Equipment Exhibit.

For complete information and registration forms, please contact Wilbur Russell at Cinema Products Corporation, 2037 Granville Ave., Los Angeles, CA 90025. Tel. (213) 478-0711.

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### TTFL '77 SYMPOSIUM SET FOR MIAMI IN NOVEMBER

The Theatre Television Film Lighting Committee othe Illuminating Engineering Society has rescheduled "MAKE IT LIGHT", the TTFL '77 Symposium in Miami. The new dates are November 6 through 9th.

Focus of the symposium will be on developments in luminaires, light sources, and control. As usual, the program material will be integrated with tours to various sites of interest, including television studios, theatres and other lighting facilities. Those interested in attendance should write: Mr. George Gill, TTFL '77; P.O. Box 610124; Miami, FL 33161.

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### VIRGIN ISLANDS FESTE HONORS WOMEN IN FILM

"We have established a separate new category of competition especially recognizing the outstanding efforts of women in the motion picture and television industry," Festival of The Americas President & Founder J. Hunter Todd has announced. Todd added, "It is the festival's continuing desire to honor excellence in every area, and to encourage, assist and develop filmmakers in their careers, so we felt this award would go a long way to spotlight the creativity of the distaff side."

The 10th ANNUAL FESTIVAL OF THE AMERICAS will award Gold, Silver and Bronze Venus Medallions in this new women's category. Entries should be totally created or largely controlled by women, groups or individuals.

For its 10th annual celebration, The Festival of The Americas is expanding its Great Director seminars and retrospects, and adding a major new emphasis on Shorts, Documentaries, and Experimental films with the addition of a third new theater that will be in action 18 hours a day to screen and market 35mm and 16mm films.

For the really delightful new 10th Annual celebration poster for The Festival of The Americas, plus the complete VI Festival & Film Market entry kit, and a copy of the past festival's 250 page program, all for free, air mail your

name and address to: J. Hunter Todd, President & Founder, Festival of The Americas, PO Box VIFF 7789, St. Thomas, U.S. Virgin Islands 00801. Telephone (809) 774 7708, Cable: PARADISE USVI.

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### SECOND CISCO INTERNATIONAL FAIR TO BE HELD IN PARIS

The 2nd CISCO—International Fair for Cinema, Theater, Convention Hall Equipment, Production Equipment and Related Materials—will take place at the Porte de Versailles Exhibition Hall in Paris, France October 3-7. Attendance is expected to hit 10,000 from 90 countries, and exhibit space will cover approximately 250,000 square feet. Among countries sending official delegations are Japan, Canada, Norway, Morocco, Algeria, Rumania, and Turkey.

The 1st CISCO held in 1975, drew over 6,000 visitors from 66 countries. 380 companies exhibited over an area of 100,000 square feet.

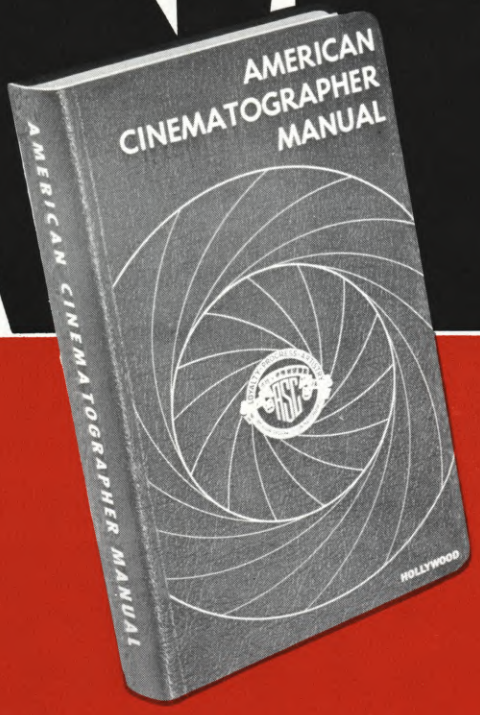
Among manufacturers represented on exhibitor stands at the upcoming CISCO are: Agfa Gevaert, American Seating, Arriflex, Bauer, Bell & Howell, Berkey Colortran, Bolex, Eumig, Canrad Hanovia, Christie, Cinemeccanica, Electro Voice, Kinoton, Mole Richardson, 3M, Philips, Steenbeck, Thomson CSF. For additional information contact: CISCO, 30 Rockefeller Plaza, Suite 4535, NYC 10020, 489-1360.

### ASC CINEMATOGRAPHERS AVAILABLE FOR SEMINARS, LECTURES, INFORMAL DISCUSSIONS AND QUESTIONS & ANSWERS SESSIONS

The following members of the American Society of Cinematographers have indicated their availability to appear for seminars, lectures, informal discussions and questions and answers pertaining to motion picture and television photography, lighting, special photographic effects and production in general: L. B. "Bud" Abbott, Lloyd Ahern, Taylor Byars, Stanley Cortez, Victor Duncan, Linwood Dunn, Daniel Fapp, George Folsey, Lee Garmes, Richard Glouner, Burnett Guffey, John L. Hermann, Gerald Hirschfeld, Winton Hoch, Michel Hugo, Richard Kelley, Milton Krasner, Vilis Lapenieks, Andrew Laszlo, Jacques Marquette, Richard Moore, Sol Negrin, Frank Phillips, Owen Roizman, Joseph Ruttenberg, Howard Schwartz, Richard Shore, Frank Stanley, Alan Stensvold, Mario Tosi, Ted Voigtlander, Harry Wolf, and Vilmos Zsigmond.

Arrangements as to availability and other details are to be made directly with the individual A.S.C. member. For further information, contact: American Society of Cinematographers, P.O. Box 2230, Hollywood, California 90028. Telephone: (213) 876-5080.

# NEW!




# FOURTH EDITION

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prints or in negative form). The film material is then transferred, via a special open gate telecine (which allows the edge numbers to be seen), onto videotape. A special visual edit marker is used, and recorded when the video cassette is being edited (using a machine such as the Convergence Corporation ECS-1B). Having been approved by all concerned, the edited tape is again transferred to a film copy from which the negative cutter can work. Telecine and projection is done using crystal-controlled equipment to ensure perfect synchronisation and full-frame pictures. The cutting copy shows both edge numbers and edit points flashed onto the picture area.

### *GENERAL DESCRIPTION OF THE ECS-1B*

The Convergence Corporation ECS-1B was designed specifically to meet ever-growing videotape editing needs across a broad spectrum of the television industry. The versatile ECS-1B is a rugged, low-cost, frame-accurate editing control system that interfaces to helical scan videocassettes for precise tape-to-tape and camera-to-tape editing. The system derives its precision accuracy from counting control track pulses on normal unmodified tapes—without the addition of expensive and elaborate time codes. The unit features dual joysticks on the control panel for controlling forward and reverse tape motion to select and adjust exact edit points on both playback and record VCRs. The joysticks provide extremely tight, responsive control of bi-directional tape speed which ranges from still-frame up to 3 times normal play speed. The speed and flexibility of the joystick approach to edit point selection outperforms even the "hands-on" open reel technique, and makes true "movieola style" editing a reality.

### *OPERATION OF THE ECS-1B*

The ECS-1B has been human engineered to require only a few minutes of training before the controls are mastered. After using the normal tape motion controls on the VCR or the optional PC-3 to select the general area of the tape to be edited, the operator begins the editing process by depressing the "JOYSTICK" pushbutton on the control panel. This activates the joysticks, and provides a simple, effective method of controlling both tape direction and speed—with instantaneous visual feedback on the large 9-inch high resolution video monitors. When the operator moves the joystick slightly to the left, the tape will crawl backward, with the frame bar just inching

up the monitor screen. With a slight movement of the joystick to the right, the tape will crawl forward. The farther over in either direction the joystick is moved, the faster the tape will move—up to 3 times normal speed for rapid scanning of program material. By moving the joystick back and forth, it is possible to rock the tape reels back and forth to select a precise audio cue. The time required to select an exact audio or video edit point has now been reduced to an absolute minimum by the Convergence Corporation ECS-1B.

Once the edit points have been selected, flashing illuminated pushbuttons guide the operators sequentially through the editing process. The operator now presses the flashing "CUE" pushbutton, and both VCRs simultaneously cue backwards to a 5-second preroll cue position.

Next in sequence, the flashing "PREVIEW EDIT" pushbutton is pressed and both VCRs roll simultaneously through a preview of the edit which is viewed on the monitor. The preview mode is programmed to go three seconds past the edit point for the purpose of checking aesthetic continuity. After three seconds, both VCRs will stop and automatically recue back to the original 5-second preroll position. If more time is needed, the 3 second postroll time can be extended using the optional PC-3 keyboard. Following a preview, the operator can adjust the edit point any amount in either direction, and repeat the preview process. If, however, the preview was acceptable, the actual edit can be made simply by pressing the "PERFORM EDIT" button and the flashing "PREVIEW EDIT" button. Both VCRs will roll, and the edit will be automatically performed at the points selected by the joysticks. Operational mistakes are virtually eliminated by a designed-in feature called "Digital Interlock Logic," which disarms any incorrect function.

During an edit, the perform edit pushbutton is illuminated solid red and must be depressed to manually end either an insert or an assemble edit. To automatically program, preview and trim the end of an insert edit, it is necessary to use the optional PC-3 program computer.

The ECS-1B incorporates a new half-time edit cycle which can cut editing time up to 50%. A two position toggle switch on the right rear corner of the ECS-1B can be switched from normal to half-time, thereby reducing the cue preroll, postroll and recue times in half.

### *FEATURES OF THE ECS-1B*

- Dual joystick control of forward and reverse tape motion for edit point selection.
- Continuously variable tape speed, from still-frame to 3 times play speed, in forward and reverse.

- Switchable half-time edit cycle cuts editing time up to 50%.
- Repeatable preview capability in both still-frame and real time.
- Liplock™ pitch control for precise audio editing.
- Simultaneous or sequential cueing with automatic recue.
- Precision editing accuracy to within one frame.
- Digital interlock logic for error-proof operation.
- Interfaces with several models of low cost videocassette recorders.

For further information about the Keescan Electronic Film Editing System, contact: KEELINE PRODUCTIONS, 1 Spring Villas, Broomfield Place, LONDON W13 9LH, ENGLAND. Tel: 01-579 3447. TELEX: 21120 Ref. 1768. ■

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### ANGENIEUX/O.H. HIRT SPONSOR CLINIC

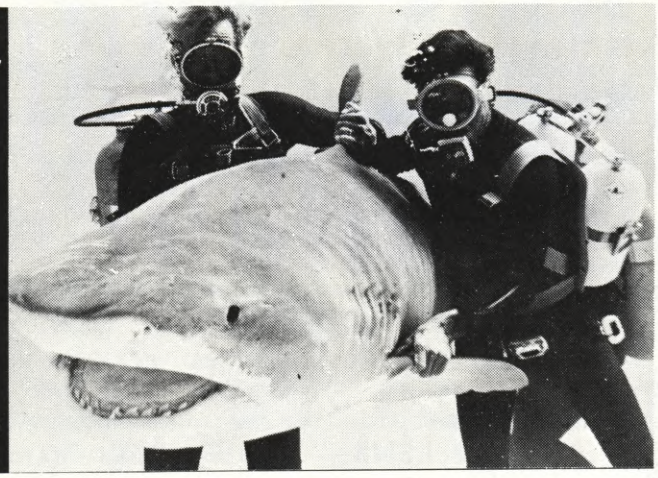
Angenieux Corp. of America, in conjunction with Oscar H.Hirt, Inc., has scheduled a lens clinic for the professional motion picture industry in the Greater Philadelphia area. The clinic will be held at the facilities of Oscar H. Hirt, Inc., 35 N. Eleventh Street, Philadelphia, Pa., on Thursday, September 8th. Continuous sessions will be held from 9 AM to 8 PM.

Professional cine and video cameramen from the Greater Philadelphia area are invited to bring their Angenieux lenses for a free analytical inspection and consultation by Angenieux and O.H. Hirt technical personnel equipped with Angenieux factory test equipment.

The special Angenieux test equipment will be used to enable the cameramen to view the complete characteristics of their lenses; beyond what their cameras or film can see. The highly trained Angenieux factory technicians will verify that the lenses are retaining their best professional performance and suggest any service that they may find necessary. Individual optical problems will also be discussed.

The Angenieux/O.H. Hirt clinic marks the initiation of the first dealer service facility capable of Angenieux cine lens repairs in the Delaware Valley area. O.H. Hirt, Inc. is now equipped with Angenieux test instruments and tools to better handle the servicing of Angenieux motion picture optics for Philadelphia and surrounding areas.

For further information call Angenieux Corporation of America at (516) 567-2424 or O.H. Hirt at (215) 629-8560.









## STELLAVOX SP 8 RECORDER

Continued from Page 950

ity of users, we have:

—equipped the auxiliary sockets of the left panel of the SP 8 with Binder = Tuchel, and the socket "SYNCHRO" 4 poles are compatible with NAGRA.

—included, on the right panel, a standard socket "mono/stereo", called "JACK" for headphones: the level can be adjusted by a double potentiometer.

—foreseen (optional) a double module of two symmetrical outputs 1,5 and 4,4 V (+6 dBm and +15 dBm); banana sockets outputs.

4. *Universal synchronization (for sync. film, television, etc.)*

Assured, up to now, by the pluggable module, type SXQ 123, and the external synchronizer, type ARU or ATU, the synchronization is completed, with the SP 8:

—by the pluggable synchronizer in the place of the SXQ 123 (50/60 c/s).

—by the very flat base, fixed under the SP 8, including the circuits for "real time coding", according to French or German standards.

5. *Double battery life*

The autonomy of recording of the SP 7, by one set of batteries, is from 2 to 7 hours, depending on the type and quality of the batteries, according to the equipment in supplementary modules (SXQ, etc.) of the taperecorder, and, of course, according to intermittent or continuous use.

By increasing the efficiency of the motor we have been able to reduce its consumption by approximately 40%. On the quick rewind it has even been possible to reduce the average current to 70 mA.

By increasing the number of batteries from 12 to 15, contained in the built-in compartment, which is even better than the preceeding one, it has been possible to well reduce the current of the audio modules, at the same time gaining a modulation reserve of 7,5 dB beyond 0 dB = 1,55 V.

Also, the consumption of additional quartz module is only 1,5 mA (against 15 mA previously).

In this way, the standard taperecorder SP 8, even equipped for synchronization, does not consume more than 100 to 110 mA when recording, and 85 to 95 mA when playing-back, the average current for rewinding being only 70 mA.

The battery life is, therefore, approximately doubled.

For further information about the new Stellavox Taperecorder SP 8, contact: John Page Limited, 169 Oldfield Lane, Greenford, Middx., UB6 8PW, ENGLAND. ■

## AUTOMATIC EDITING SYSTEM FOR COLOR NEGATIVE FILM

**Continued from Page 954**

desired scene start. Of course, only the wanted scenes are transferred by the system to the tape, all operations being controlled in automatic fashion by the computer.

Among the scenes loaded in the projector in their original shooting sequence, there are many unwanted shots. The edited workprint shows only the wanted scenes in their wanted sequence and length. The scene sequence of the edited program has thus no relation whatsoever with the scene sequence of the camera negative.

If one were to thread up in the projector the individual scenes wanted of the negative in the random mode necessary to establish the desired scene sequence, as required by the workprint, for their sequential transfer to the videotape, transfer time would be more than five times that required by our new system. Such a method would also subject the negative to a great deal of unnecessary handling during the transfer process. Furthermore, a projector cannot be run as fast either in forward or in reverse, as a VTR can be, and, of course, there is an increased risk of negative scratching with frequent running of the projector in both directions.

For all these reasons, the system selected is the one where the VTR is run in random fashion, to profit from its capability for fast forward and reverse running. Another reason for this is that the total relative length of the videotape is much shorter than the total relative length of the negative. Thus the back-and-forth scene-search movements of the VTR equipment take much less time than negative-search movements of the projector would take.

For the fully automatic film-to-tape transfer operation, the address-code signals must be previously recorded on the videotape cue track. These address-code signals are then used for finding the exact location into which any desired scene of the negative is to be transferred.

### *Videotape Recording System*

A quadruplex VTR is used for film-to-tape transfer. Figure 9 shows, as a block diagram, how the VTR, the negative-scanning projector and the minicomputer are related to each other.

It is necessary for the functioning of the VTR that there be several subsystems, including (1) an address decoder for decoding of the address-signal modulation recorded on the cue track of the videotape, (2) interface units which feed information concerning the operational status of the VTR and address signals into

the computer, and (3) control logic units which send control signals from the computer to the VTR.

As already mentioned, the VTR is run in a controlled random mode, and the running direction depends on the location of the wanted negative scene on the tape. The VTR must stop shortly before the point from which transfer of the desired scene takes place. This is necessary to prepare the exact placing of the scene on the tape. To achieve this successfully, the VTR is controlled by a gradual-control method. We shall explain this method in some detail.

The computer reads first the address at which the tape has stopped at any given time during transfer operations. Next this address is compared with the "edit list" stored in the computer's memory. From this, the exact particular frame address difference is calculated. This establishes the length of tape which must be run in the fast-forward or reverse mode, or in the playback mode if desired, until the scene transfer starting point is approached. The logic circuits of the VTR, on command from the computer, will stop the VTR ten seconds before the scene transfer starting point is reached. This helps in reducing the VTR's operating time.

The film-scanning projector we use is of the conventional intermittent-type. It was evident from the start of the project that more than one roll of negative would have to be handled by the system. Thus, facilities for storing and fully automatically threading ten rolls of negative have been provided.

Figure 9 shows in which way the projector is connected to the computer. A special feature of the projector is a frame counter that detects perforation pulses, incorporated with the film-transport movement.

The projector advances the negative toward the desired scene starting point by the same gradual control method that is used for the VTR. Frames are counted starting with the first frame of each negative roll. One pulse is generated for each frame.

Frame-count information for any given frame is thus continuously available to the computer. The frame count is compared with the "edit list" in the computer's memory, and the computer will stop the projector exactly two seconds before the scene transfer starting point is reached.

The "run up" procedure is as follows. With both the VTR and the projector stopped ahead of the scene-transfer starting point, as explained, the VTR is the first one to be started in the "play" mode. Frame count information from the moving tape is now fed into the computer. The computer compares this frame count with the frame number at which the projector is

stopped until a predetermined time interval is reached. At this point the projector is started by the computer. Both the VTR and the projector are now running synchronously, and as soon as the tape frame count arrives at 20 frames before the scene transfer starting point, the computer sends a "record" control signal to the VTR. Following this order the VTR changes from the "play" to the "record" mode and initiates transfer of the desired portion of the negative exactly from the preestablished cutting point on, the negative being recorded directly as a positive by electronic inversion. When the end point of the scene is reached, the computer sends an "end record" signal to the VTR. The VTR and the projector will then stop both thereafter.

The system is designed in such a way that the colour-correction operation and the automatic film-to-tape transfer operation are carried out separately from each other. Colour correction is carried out during a previous "timing" run with an operator checking the results on a monitor while making adjustments on the colour-control console. Colour-correction data are stored simultaneously in coordination with the "edit list". During the transfer stage, colour-correction information is conveyed to the colour-correction circuits of the telecine camera, when the VTR is at stand-still during scene search in the negative.

The film-to-tape transfer operations are usually carried out in the evening hours, at a time of low demand for our VTRs. The approximately 40 VTRs NHK has in operation, have usually a peak production demand during daytime hours, although some of them are usually available for the reduced time span the automatic transfer operation requires.

### *Soundtrack Operations*

Once the film-to-tape image-transfer operations have been completed, the final soundtrack is added by direct recording on the videotape. This is done by the sound department in the customary way. Also captions may be added. Once all these operations have been completed the program is ready to be telecast. ■

**WHAT'S NEW**
**Continued from Page 892**

Continuous Optical Reduction Printers. This new probe enables users of the Peterson "COR" and "COR Jr." printers to measure the light level and uniformity for all four Super-8mm tracks.

Known as the "PCOR" probe, it is available as a separate attachment for current owners of the Spectra Film Gate Photometer, or may be ordered along with the Spectra Film Gate Photometer from Pioneer Marketing Corporation, the exclusive world wide distributor for Photo Research of the Spectra Photometer and accessories.

The "PCOR" probe allows the printer operator to scan any one of the Super-8mm tracks, or all four in sequence to determine the track-to-track light uniformity and make required adjustments. The absolute value of the readings helps in setting the overall exposure level of the "COR" and "COR Jr." printers.

Further information and prices are available from Pioneer Marketing Corporation, 1021 N. Lake St., Burbank, Ca., 91502.

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**BYRON MOTION PICTURES DEVELOPS NEW BI-LINGUAL SOF SYSTEM**

Byron Motion Pictures, Inc., Washington, D.C.-based film and video tape laboratory, has developed a new 16mm sound-on-film processing system which will enable two different language tracks to be played simultaneously through one 16mm projector while one single sound film is displayed.

The advantages of this bi-lingual sound-on-film in terms of teaching, training, information dissemination and entertainment to audiences of more than one language are astounding. Dual-language films are also ideal for in-flight movies on European and trans-oceanic airlines. Many film libraries are also interested in bi-lingual prints. Film distributors appreciate the savings that would be incurred from warehousing one-half the number of prints normally stocked—particularly in light of cost efficiency and convenience. Byron reports that dual-language prints can be produced for about the same cost as single-language prints.

For more information, contact: Mr. Byron Roudabush; Byron Motion Pictures; 65 K Street, NE; Washington, D.C. 20002; (202) 783-2700. ■

**REPORT FROM FILM '77**
**Continued from Page 957**

persuasion". The presentation is now on a national tour of the United States in a custom-built travelling theatre. The creative approach employed was made possible by the technical projection facility offered by the unique Elf Digital Interlock Technique, known as Edit.

On their stand Elf Audio Visual have duplicated the technical staging, using four 16mm film projectors, three front-projection, one back-projection, in conjunction with the digital interlock system, which ensures perfect synchronization of sound and frames, achieving frame-to-frame registration on all screens simultaneously. 16mm live action, animation and still photography provide the visuals. A single four-track tape supplies voice-over, music and effects, as well as the vital continuous tone pulses, which operate and co-ordinate the step drive motors of the projectors.

Commentator "star" of the presentation is a medieval wizard, who appears as a cartoon character on the front-projection units, and as a filmed puppet, rear-projected into a separate "mystery box" to create the illusion of three dimensions. His creator is Rich Reinhart, who trained and worked with Disney and over his thirty years experience in the business claims to have worked on everything from Disney features to "TOM AND JERRY" cartoons.

FILM '77 reaches its social peak at the traditional black-tie Banquet, held this year in the Grand Ballroom of the London Hilton Hotel.

Guests of Honor at the gala affair are Sir Harold and Lady Wilson. The Former British Prime Minister, astute politician though he may be, seems somewhat ill-at-ease in this company of mad film and television types and, in my opinion, was perhaps not the happiest choice of speaker for this particular occasion.

The cabaret, however, proves to be, as our British hosts say, "bloody marvelous". We are treated first to a spirited medley of songs and dances by an energetic ensemble known as The New Edition Dance Group. But the real show-stopper is the Band of the Royal Artillery, made up of smart military types who march and play with meticulous precision and style. They are given a rousing standing ovation by the appreciative audience.

And so FILM '77 draws to a close. Once more it has been a stimulating and, I would say, highly successful bringing together of film and television people from all over the world. The hard-working behind-the-scenes officers and members of the BKSTS are to be congratulated on having done it again — and done it exceptionally well. ■

**Continued from Page 923**


then we'll see it on the next. And if we miss it altogether, then it joins a long list of other hot news items which are easily forgotten tomorrow.

There is no doubt that these devices do add an important dimension to live sports coverage. That is for sure. The problem for the TV stations is that having spent a young fortune buying this gear, and having crews of cameramen, back pack carriers, cablemen, links men, video mixers, sound mixers, maintenance engineers, truck drivers and so on, permanently on the payroll, to replace a couple of guys with an Arriflex who drive around in their own car, they have to find excuses, or "reasons" to use it more often.

For sending a unit to the Upper Volta, or somewhere else equally inaccessible, film is still the most economical, most versatile, most reliable, system giving the best image quality and best colour rendition.

The unreliability of ENG compared to film, especially where there is a radio link involved, has sometimes to be seen to be believed. Colours can go berserk, especially when the cameraman must walk from say a daylight lit situation to one lit by tungsten lighting, while interference caused by the transmitter or other local features causes the picture to break up irretrievably. The laws of chance being what they are, it will always happen at the most unfortunate moment, as all videocrats know. If such a deviation of colour fidelity or image cohesion happened on film, howls of anguish would reverberate around every film laboratory in the country.

As I understand it, compact battery-powered portable colour TV cameras and recorders which produce pictures indistinguishable from those produced by studio TV cameras, or film, at their normal best, are still a long way off.

Film men must not get paranoiac over ENG. Even at its best, it is still only newsreel quality and, as an old newsreel cameraman myself, I can say this. If there is any sort of an image on the screen it is usable.

Do we go to smaller formats, like Super-16, for instance? For the big screen—and what film producer doesn't dream of having a sleeping "JAWS" or "ROCKY" in his take-up spools—the answer is no. Again, it's a matter of arithmetic. The magnification of the 35mm, 1.85:1 image to a screen 11 metres by 6 is 290,000 times. To the same screen from Super-16, it is 920,000 times. Furthermore, unless the filmstock shooting ratio is greater than 5:1, Super-16 may even cost the producer more.

Of interest, during the past year, is the fact that there has been the return to favour of the anamorphic format. Film producers have realised that all the cinema has to offer is quality—better scripts, better production values, better images on the screen—to offset the need for a patron to leave the warmth of his home and his free television, to travel in the cold to pay money to sit in all-too-often uncomfortable seats to see our product.

I should like to take this opportunity to deprecate the way film is sometimes shown in transcontinental aircraft, bearing in mind that many of the captive audience there may be out of touch with current cinema standards. I recently saw a film projected in a Boeing 747 where 25% of the screen area had been arbitrarily shorn off from either side of the anamorphic format, without selective pan and scan printing, as is so often done for television presentation. How would the airlines react if they were forced to fly with only 50% of their wing area and with only two engines instead of four? The definition was so bad that the titles and credits were unreadable. I later learned that it was a Super-8 projection system. It looked just that, amateurish.

Since the earliest days of cinema, even in the silent era, the demand has always been for cinema entertainment to bring excitement to people who might otherwise do nothing more enterprising than sit in an arm chair.

Indeed, in 1925 the Society of Motion Picture Engineers recommended standardisation at 60 feet per minute in the theatre projector. It was said that this rate was close to the average and denoted the public desire to have its picture drama injected under greater pressure with an increasing dose, bigger than life and a third faster.

The message is still the same and if we film-makers are to remain competitive with television our images and their presentation had better be good.

Where do we go in the future? Have scientists something in store for us? Can we look to Holography?

The Holographic state of the art is in its early stages as yet, but already advertisers are looking at White Light or Multiplex Holograms derived from motion picture film as a possible new means of attraction in communication. I believe that in the next two years we will see more of these displays. ■

Continued from Page 917

proved productivity and reduced shooting ratios by bringing film techniques more in line with existing television practices.

As television cameras—and more particularly videotape recorders—improve, it will be necessary for film stock manufacturers to continue making improvements in sensitivity and granularity. It is to be expected that lenses for film cameras or television cameras will continue to keep in step, while the introduction of time-codes for editing and synchronising sound, improved lighting and automation of many controls will be applicable to either medium. The techniques here don't seem to be the main problem—more a question of human attitudes.

At present, however, it seems that film technology in general is sufficiently well established and universally understood for those who use film to be able to concentrate on the business of making information, education and entertainment programmes, without being unduly preoccupied with technicalities. When one considers the difficulty of operating in remote places, film is likely to be the prime choice for a long time to come. The delays of bringing the picture to the screen weigh little against the convenience and flexibility of operation in difficult environments.

An important factor in the *news field* is the developing use of the satellite for the communication of pictures. In this, the decision to originate on film or tape could have become unimportant once the story has been delivered to the earth satellite station. Thinking primarily of news operations, when speed of distribution is of the greatest importance, the spread of the number of earth stations and the multiplication of intercontinental and international satellite channels will have an important bearing on future operations—more important, almost certainly, than the method of picture-making used at the source.

Satellite distribution is not as simple as it might seem. When you get down to practicalities, you find that ground stations are not always in the right places to suit your purpose. If you find yourself in a queue for standards conversion before your programme can be sent, and that it will be necessary to transport a videotape a few tens or hundreds of kilometres, you may find that the overall journey takes as long as sending the film by more conventional transportation. Time differences around the world can take the edge off urgency. At the moment, the balance between distribution by flown film and by satellite is not universally critical, and considerations of capital expenditure on originating equipment are often likely to be a bigger consideration than the technicalities of dis-

tribution. But these are undoubtedly situations where differences in time of availability are clearly vital, outweighing cost factors.

The choice of film or tape origination might well turn on the quality of standards conversion available at earth stations. There must be standard practices for conversion and the broadcasters cannot continue to accept the quality variations which occur at present from station to station. Competition between satellite and earth station routes will develop, and the picture originator might well find that his broadcast is delivered to the other side of the world in better shape if he starts with one medium or the other and sends it by one route or another. There may soon come a time when too many earth stations are chasing too little business. They are becoming national status symbols—rather like having a national airline—and if the utilisation is poor, then it is the user who pays—unless he kicks. The route which offers the best service at the best price will obviously do well in a competitive world and the balance could very easily be tipped by the quality of conversion facilities or transfers from one medium to the other. At major international events like the Montreal Olympics where much of the outward distribution was by satellite, standards conversion produced many problems. There will be an increasing number of international events when a high concentration of the world's television broadcasters will all be wishing to send their pictures through local earth stations at the same time. The peak demand can be high—very high indeed—and there must be ways of economically increasing temporary capacity in any one part of the world to deal with special events.

Whenever a satellite circuit is part of the path from the original scene to the viewer there is a strong likelihood that special processes will be required; standards conversion, if the picture is electronic throughout, and certainly film scanning, if the pictures are originated on film. In many parts of the world it would be convenient to be able to return to film as a medium at the receiving end of the satellite link. Television must move towards being able to switch from one medium to the other at any time when the requirements of pickup, distribution or display make it expedient to do so.

A major stumbling block remains: tape-to-film transfer. With the greatest respect to those in this business, the process is not simple enough, inexpensive enough, or of sufficiently good quality for it to be said that there is no problem. It is a constraint upon the flexibility of distributing the programmes on film and, if the latter is to remain a major medium for the carriage

of programmes, the problem must be solved. In any case, the need to transfer to film to satisfy the vast needs of rural audiences in developing countries will not only survive—the demand grows endlessly.

There is no technical reason why programme productivity in one medium should be different from that of the other. In using either, the main function of the programme producer should be to exercise his artistic judgment, rather than worry about the technicalities. The purpose of making any picture must not get lost in the machinery. Programme-makers need to know which picture is being recorded—and why—but not to know *how*.

As a consumer, my plea, therefore, is for the technology to take a back seat in programme-making, and to be so developed that its presence is not apparent. There must be complete interchangeability between the two media at any stage of the process. Whether it is by optical projection or by television and whether the audience is a large group in a cinema or a single television viewer in his home, it is the picture and the story that matter. Of course, the technology must be there but when it is completely on top of its job, it should not be apparent.

I return then to the general balance between film and videotape, and what it will be in the eighties. The basic question is whether electronic picture-making will take over. Eventually it may do so, but, I now think, not for a very long time. It is not only a question of how programmes are recorded; there has to be an operator to show the pictures to the audience. The simplicity of film compared with the present stage of electronic picture presentation gives it an important advantage. The great flexibility of film for *showing* by different means and without standards conversion is important. The ease of making multiple copies is an advantage. But electronic picture-*making* offers a more direct communication between the originator and the user. The influence lingers of the fact that, at one time, all television, other than filmed sequences, had to be broadcast live. Programme production by television is quicker, although perhaps less polished, than film and the delay between the action and seeing the picture seems to create something of a barrier. Often the time lag does not matter from the programme point of view, but free interchangeability between the two recording media would eliminate most of the difficulties associated with either.

In the end, I suspect, it will not be a question of whether electronic origination takes over from film. The two processes will merge imperceptibly until they lose their separate identities to become a single versatile tool of the programme-maker. ■

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## LOYAL GRIGGS

**Continued from Page 947**

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Although Griggs is now retired, he continues to take an active interest in Cinematography as a Member of the Board of Governors of the American Society of Cinematographers. ■

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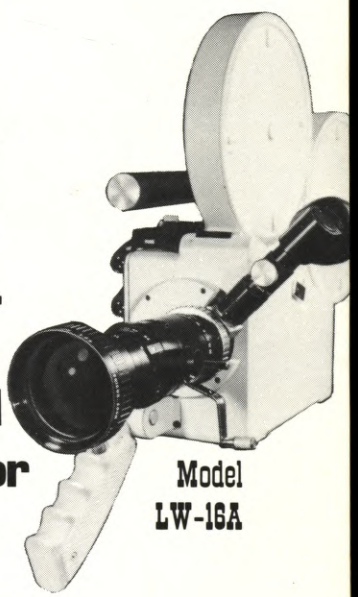

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