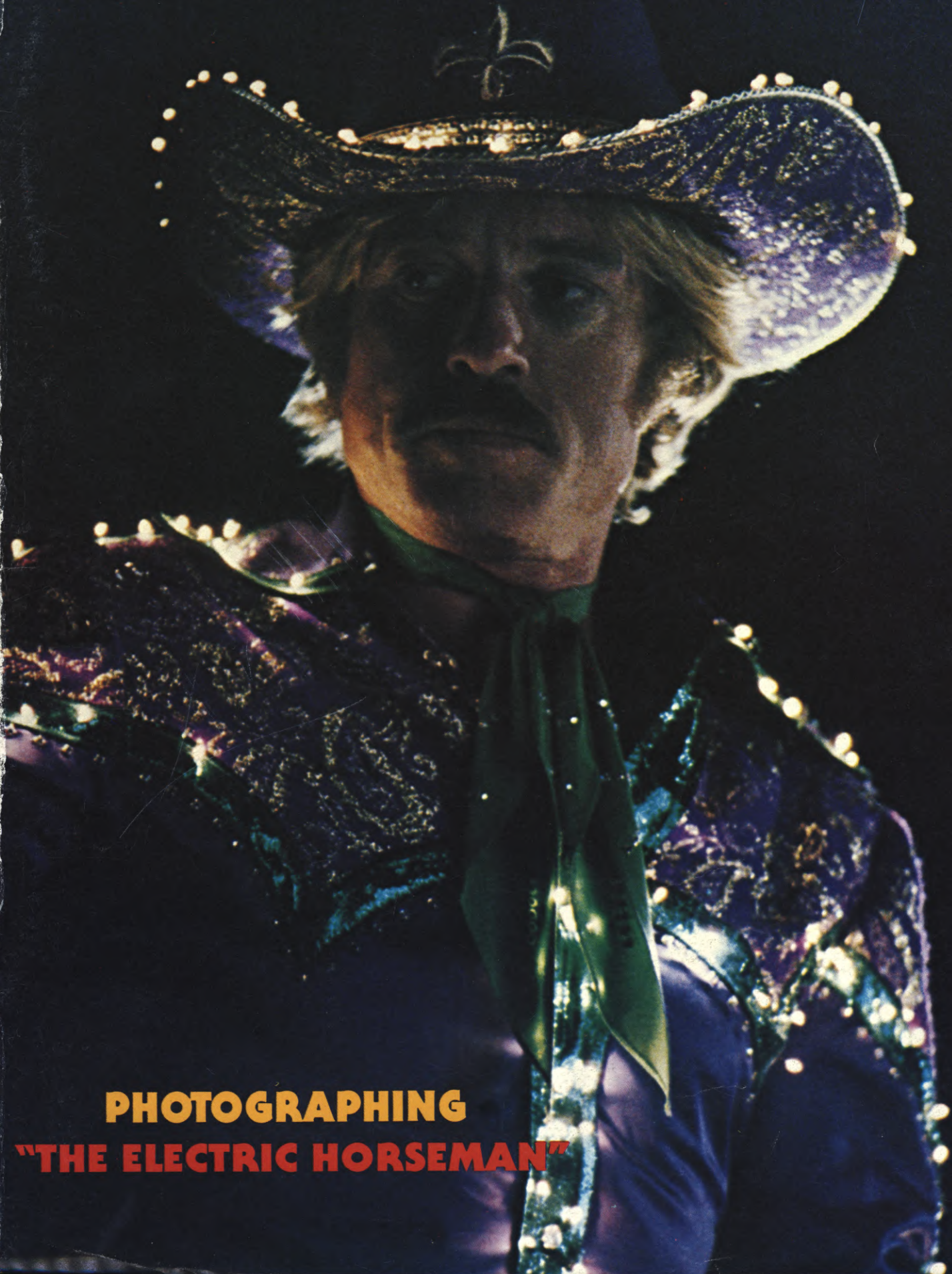


American Cinematographer

International Journal of Motion Picture Photography and Production Techniques

OCTOBER 1979/\$1.50



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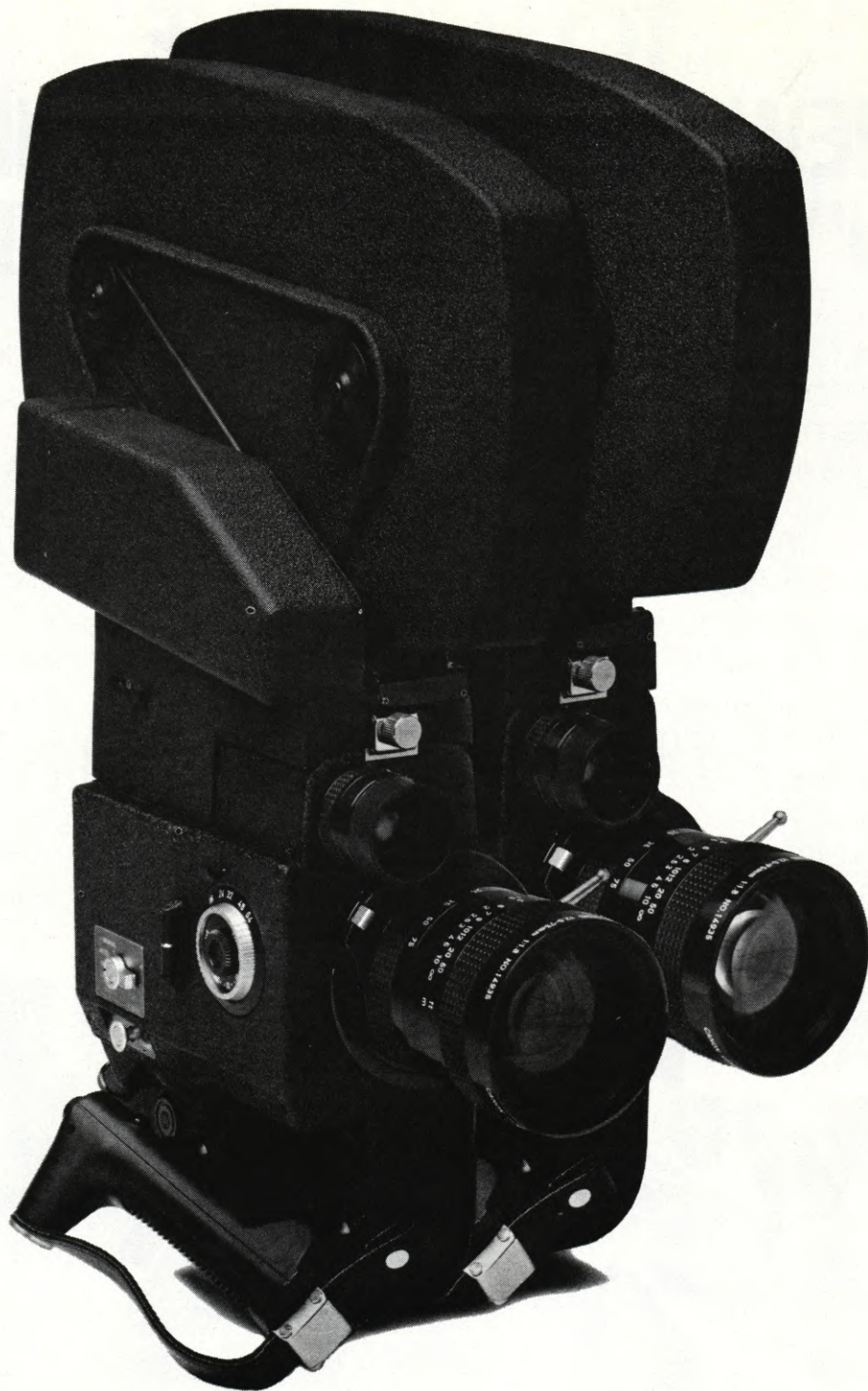
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OCTOBER 1979

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ON THE COVER: Robert Redford rimmed in hundreds of tiny lights, as he appears in the title role of THE ELECTRIC HORSEMAN, the Ray Stark-S. Pollack Productions-Wildwood Enterprises Production for release by Columbia Pictures and Universal Pictures. THE ELECTRIC HORSEMAN was directed by Sydney Pollack, with Owen Roizman, ASC, as Director of Photography.

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BOOTH



"You have to know when not to cut."

Margaret Booth, Vice-President of post-production for Rastar Films, has been editing film for 62 years and is still at it. Many famous directors have relied gratefully on her skills. Young editors might take a moment to read Miss Booth's wise counsel and, along with Kodak, rejoice that they are a part of the same industry as this warm and gracious woman.

"I become involved from the start of a script. I read the scripts and make suggestions on cutting. Sometimes, I go to the director and say, 'If you would give me a pan shot from here to there, it'll make it smoother and nicer.' Most directors appreciate this help.

"The really good directors do their homework. They plan ahead. Ford knew what he wanted. He wouldn't even come near the cutting room. I showed him the picture when I finished making the cut. It's different with every director, but all the really great directors have one thing in common—they know what they want. And that's a wonderful thing because there isn't any confusion on the set.

"Rhythm is everything. If you don't have rhythm, you don't have a very good editing job. When I was cutting silent pic-

tures, I used to count—one, two, three, four, cut—because it helped carry the rhythm. Of course, now that there's sound, the sound carries you along, and it carries the audience along. So you must cut on the beat each time. It's like the Rockettes. If they get out of step, they're not the Rockettes. It's that way in film.

"Tempo means so much. If you have a picture that has tempo, and then you slow down, the film seems to dip, and the audience is left anticipating. You must always keep the tempo going because the audience is really a thousand feet ahead of you. You have to be ahead of them if you can.

"When I first started, we used to splice by hand. We'd have to match the sprocket holes and splice by hand. We had to match the action. Sometimes we just had to look for a little dot or something on the negative. Now, of course, we have this little splicing machine. And when we cut negatives, all we do is get the right key number and cut it. But in the early days there were no edge numbers.

"You have to like editing to be a fine editor. You have to have a feel for it. And you have to learn to use just the long shots for planning and then learn to punctuate where it's necessary for the story. I think the biggest mistake novice editors make is getting all the dailies in and thinking it's necessary to use every piece, every angle. The

mistake is saying, 'Well, the director shot it; he must want to see all of it.' They get completely confused. But you also have to know when not to cut. That is what editing is about—knowing when *not* to cut.

"I recommend a film-editing career to younger people because I think it's wonderful. You meet everyone, and you work on something for six or eight months and then go to something else that's entirely different. You're working with an entirely different crew and entirely different personalities. It's a challenge. Every day is a challenge."

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CINEMA WORKSHOP



By ANTON WILSON

THE VIDEO CAMERA

The professional motion picture camera represents the ultimate in mechanical precision. Yet, in the realm of modern technology, the film camera is a relatively straightforward and simple device. Despite the recent plethora of digital tachometers, TTL metering, and other electronic accoutrements, the film camera is still the basic intermittent movement with its rollers and sprocket wheels.

I am not attempting to impugn the dignity of the motion picture camera. Its precision and simplicity make it an accurate, reliable and dependable instrument. However, the cameraman who is accustomed to opening a camera and seeing a couple of rollers and guides may experience cardiac arrest upon viewing the inside of a modern video camera for the first time.

FIGURE 1 is a view of the left side of an Hitachi SK-90, a modern EFP camera, with its cover removed. For anyone interested in counting, there are more than 70 adjustment pots and switches in the picture. This is just the surface. Removing individual boards (FIGURE 2) reveals even more pots and switches mounted internally on the face of the circuit boards. And if this is not enough, removing the right camera side panel exposes even more of the same. The final score? Most ENG/EFP cameras will employ well in excess of 200 individual adjustments and switches. In addition, there are usually at least 50 designated "test points" on the circuit boards with corresponding waveform and voltage specifications.

Before you run out and enroll at M.I.T., or jump under the blankets and assume the prenatal position, it must be said that very rarely, if ever, is the cameraman required to come into contact with most of the aforementioned adjustments. Quite the contrary. With few exceptions the cameraman should *not* mess with the pots inside the camera. I have seen a video engineer spend two days attempting to realign a camera that was suffering from the results of a cameraman who had "just turned a couple of watchamacallits slightly". In most cases one adjustment affects another, and the unskilled tinkerer can easily start a chain reaction of

misalignment that is most difficult to define and correct.

The point here should be clear. The video camera is a different breed of animal altogether. Its electronic complexity is light years apart from a film camera and requires highly skilled electronic engineers or technicians and sophisticated test equipment to facilitate proper adjustment. Many EFP productions and almost all studio productions employ a video engineer as a standard member of the crew. Under circumstances where a video engineer is not present during production, the camera should be thoroughly checked-out and calibrated prior to departure. Just because the picture

"looks good" on the monitor does not mean that the camera is optimally adjusted. There are many aspects of the video signal that can deviate from optimum specification and only built-in or external test procedures can reveal these anomalies.

Every video camera should be treated like the sophisticated electronic instrument that it is. Every video camera should have an "electronic Godfather" somewhere who can tweak the camera to optimum performance on a regular basis. Lastly, for those cameramen who do not have the luxury of a resident engineer, there are fairly simple built-in test procedures. **Continued on Page 1044**

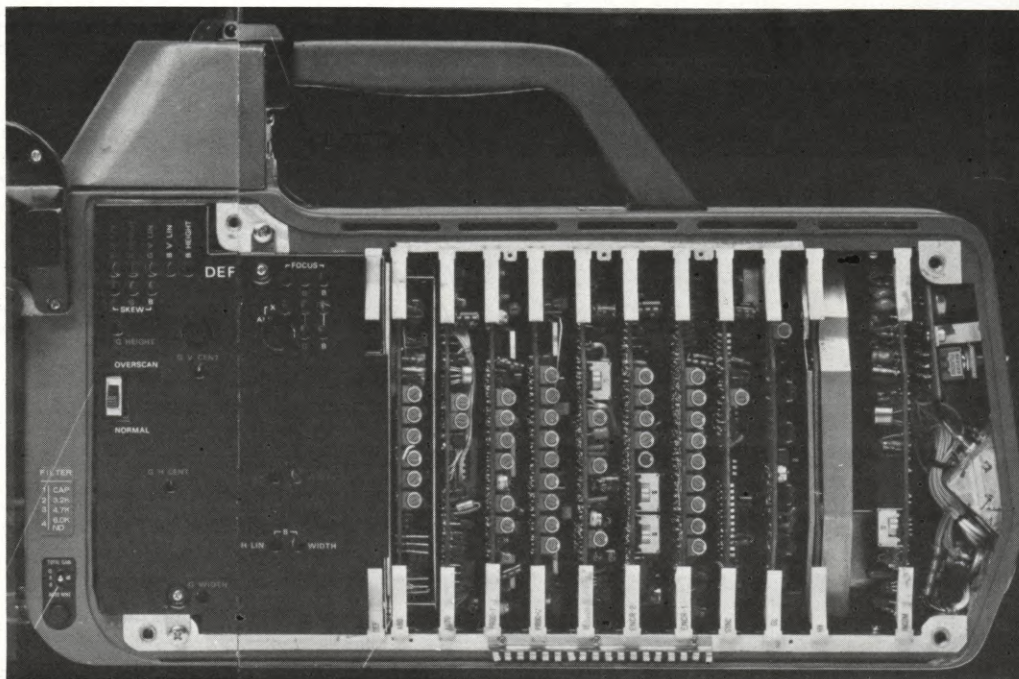
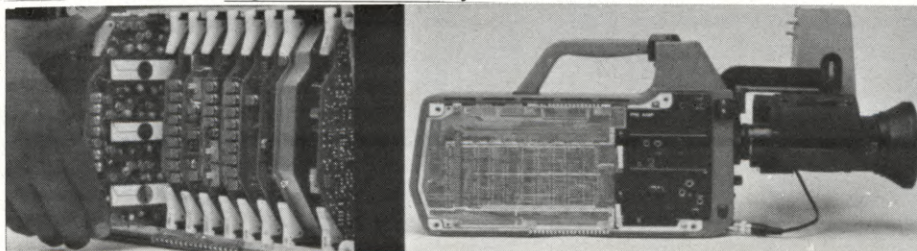


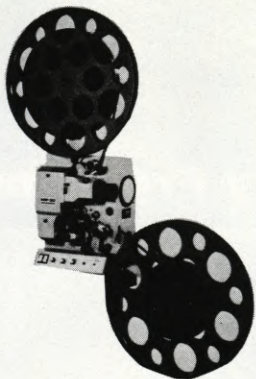
FIGURE 1—Removing the side cover of a modern ENG/EFP camera reveals more than 70 adjustments.

(LEFT) FIGURE 2a—Removal of a printed circuit board reveals even more adjustment pots. (RIGHT) FIGURE 2b—A peek behind the right side cover show the remaining adjustment pots and switches. The grand total is usually in excess of 200.



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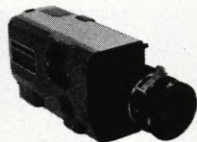
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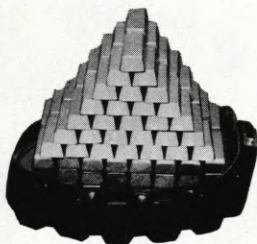
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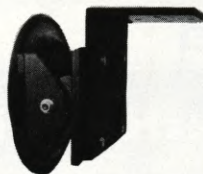
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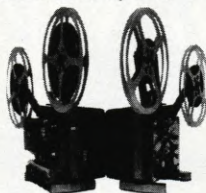
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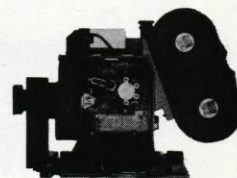


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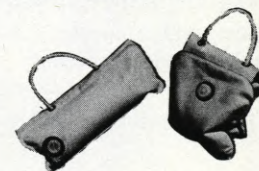
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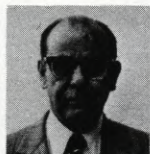
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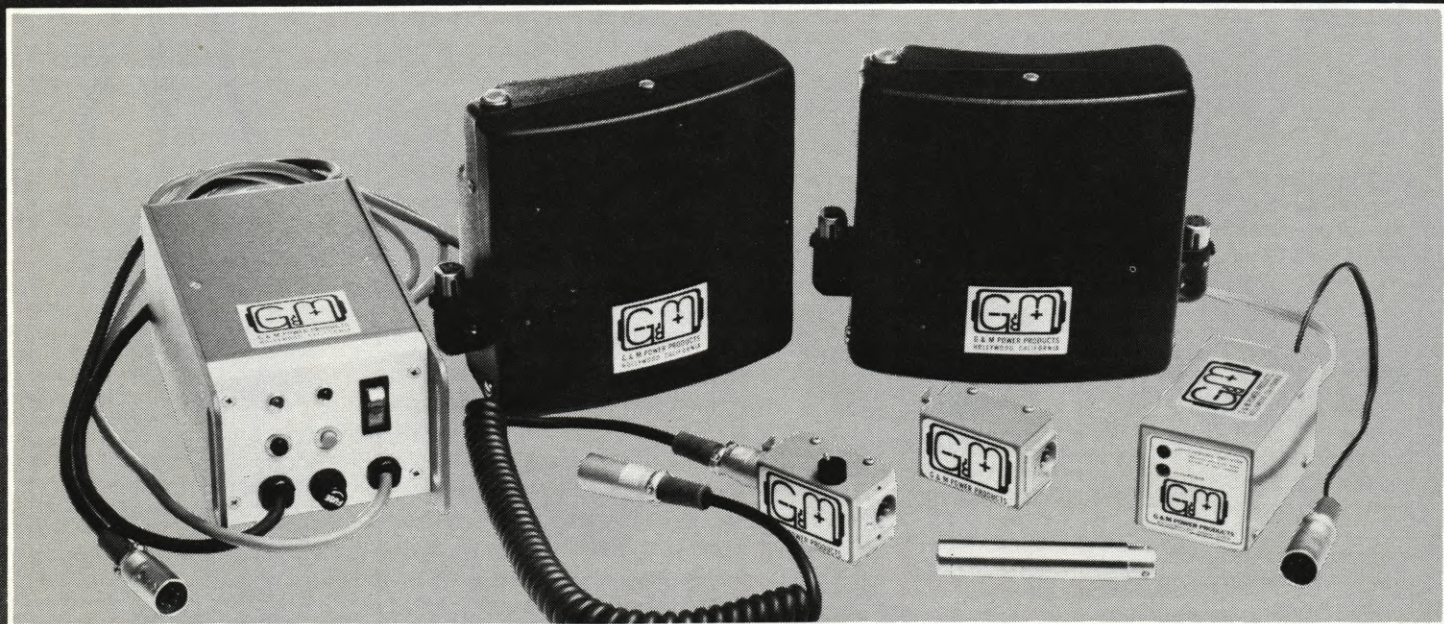
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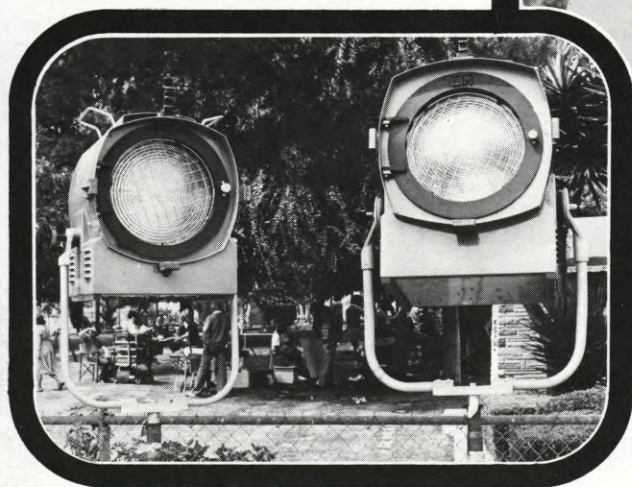
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THE BOOKSHELF

By GEORGE L. GEORGE

ASPECTS OF CINEMA

Little known outside Europe, film production in Holland is largely identified with directors Joris Ivens, Fons Rademakers and Bert Haanstra. In *DUTCH CINEMA*, Peter Cowie draws a full picture of the country's film activities, analyzes trends and prospects, and discusses specific films (Barnes \$12).

In *SWEDISH FILMS*, editor Gun Hylten-Cavallius surveys an expanding production whose diversified approach encompasses historic retrospectives, contemporary drama, comedy, social comment, documentaries and children's films. Distribution statistics are included, and also profiles of director Jörn Donner and performers Lena Nyman and Gösta Ekman (Swedish Film Institute, Stockholm).

Italian cinema during most of the Fascist era is analyzed in *THE FABULOUS THIRTIES*, an attractive, abundantly illustrated volume edited by Adriana Apra and Patrizia Pistagnesi. Covering the 1929-1944 period, it views with benevolence the precursors of the neorealist school and films with a light approach known as "commedia all'italiana" (Rizzoli \$12.95).

A broad survey of film's current status, *CINEMA '79* examines the trend in sci-fi, animation, women as people, action pictures, scripts that were not filmed, and exploitation movies. Aply edited by David Castell, this is a well illustrated book with popular appeal (Two Continents \$7.95).

Production of low-budget sci-fi movies is described by Don Dohler in *FILM MAGIC*, an anthology of technically explicit articles from *Cinemagic* magazine dealing with stop motion animation, optical and mechanical effects, sets and make-up (Cinema Enterprises, 12 Moray Court, Baltimore, MD 21236; \$12.80 postpaid).

Assorted giant monsters roaming the screen for popular enjoyment are evoked in *SCIENCE FICTION GOLD: FILM CLASSICS OF THE FIFTIES*. Edited by Dennis Saleh, it commemorates a particularly successful era of this perennial genre (McGraw-Hill \$7.95).

A complete guide to animated filmmaking, *THE ANIMATION BOOK* by Kit Laybourne explores knowledgeably vari-

ous cartoon techniques and materials, with detailed data on basic movement, timing, synchronization, and other professional requirements of the craft (Crown \$14.95/9.95).

Bud Sagendorf, in *POPEYE, THE FIRST FIFTY YEARS* tells in a highly entertaining account how the popular cartoon character created by E. C. Segar fared over the years in more than 400 shorts that Sagendorf now draws (Workman \$14.95/8.95).

Bugs Bunny, Porky Pig and their friends are featured in *LOONEY TUNES POSTER BOOK*, a bright collection of ads and placards introduced by Mel Blanc, their ubiquitous screen voice (Harmony/Crown \$7.95).

Edited by Ralph Newman Schoolcraft, *ANNOTATED BIBLIOGRAPHY OF NEW PUBLICATIONS IN THE PERFORMING ARTS* (No. 35) lists in comprehensive detail all such books issued between 10/1/78 and 12/31/78 (Drama Book Specialists \$2.50/yr., \$1 per quarterly issue).

CULT OF PERSONALITY

An attractive large format volume with excellent color portraits, Ken Wlasehin's *THE ILLUSTRATED ENCYCLOPEDIA OF THE WORLD'S GREAT MOVIE STARS* covers the lives and careers of some 400 top performers (Harmony/Crown \$19.95/9.95).

A lavish collection assembled by Larry Carr, *MORE FABULOUS FACES* offers over 800 superb portraits of five superstars (Hepburn, Davis, Del Rio, Loy and Lombard) with an informative commentary detailing their careers (Doubleday \$19.95).

In *SEESAW*, a dual biography of Anne Bancroft and Mel Brooks, William Hotzman presents with affection and insight a married couple, whose dissimilar origins and environments found common ground in show business and life (Doubleday \$10.95).

Tom Dardis brings a fresh biographical outlook in *KEATON: THE MAN WHO WOULDN'T LIE DOWN*. This reassessment of a life nearly ruined by bad luck, marital problems and alcohol offers new data on Keaton's sound films (Scribners \$12.50).

Vera Caspary, an eminent author and scenarist with such credits as the classical "Laura," writes honestly and compellingly in *THE SECRETS OF GROWN-UPS* about her life. Now 80, she reviews

with optimism and objectivity the high points of her career marked by stubborn fights against the prejudices and inhibitions of her times, her unflinching spirit of self-improvement and the eventual recognition of her literary talent (McGraw-Hill \$12.95).

Actor Raymond Massey continues in a *HUNDRED DIFFERENT LIVES* the autobiography he began in "When I Was Young." Covering over 50 years of highly polished and versatile performing, the book offers a penetrating and often humorous look at a distinguished career (Little Brown \$13.95).

Howard Koch, the screenwriter of *Mission to Moscow* and *Casablanca* who panicked the population with his script for Orson Welles' "War of the Worlds," reminisces engagingly in his memoirs, *AS TIME GOES BY*. Working in Hollywood and abroad (courtesy of Senator McCarthy), he scans people and events with indulgent warmth, keen intelligence and steadfast humor (Harcourt Brace Jovanovich \$10.95).

A British actress who spent more than 30 years in Hollywood (often in Hitchcock films) and garnered 3 Oscar nominations is vividly profiled by Sheridan Morley in *GLADYS COOPER*. From an inauspicious London debut, she parlayed her thespian talent, looks and personality into a long and rewarding career (McGraw-Hill \$10.95).

A well researched and deservedly admiring biography by Forsyth Hardy, *JOHN GRIERSON* follows the career of a clever Scotsman who pioneered the documentary film genre, and was at once civil servant, political thinker, tough journalist. His creation of the National Film Board of Canada established that country as the top governmental film producer and Grierson himself as the inspiring leader of the documentary approach to reality (Faber & Faber \$18.95).

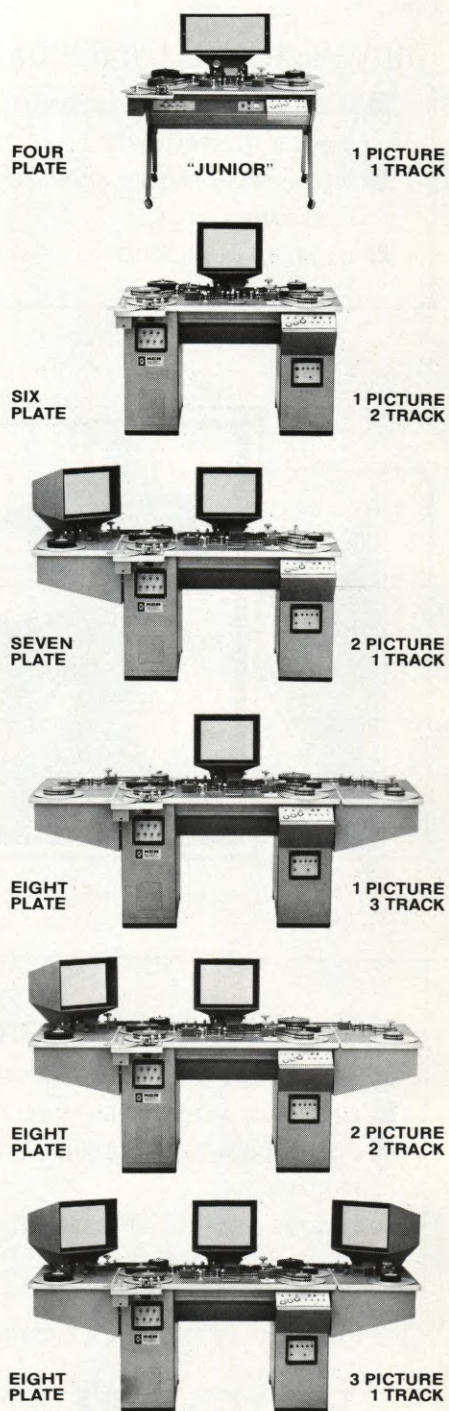
In *ROBERT ALDRICH*, Alain Silver and Elizabeth Ward draw an extensive portrait of the director. A volume in G. K. Hall's "Guide to References and Resources" series, it includes a penetrating critical survey of Aldrich's work, a detailed biography, an annotated list of his films and film-related activities, and a revealing interview (G. K. Hall \$15).

The French film critic André Bazin who died in 1958 describes in *ORSON WELLES* the director's life and career. He appraises with keen perceptiveness Welles' talent which had already produced its most innovative major works (Harper & Row \$10).

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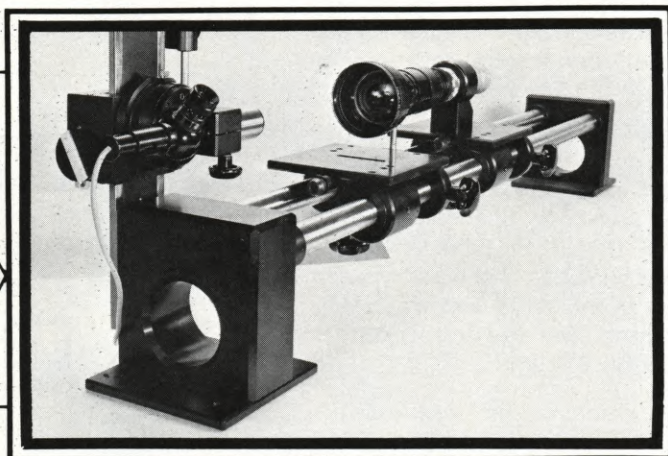
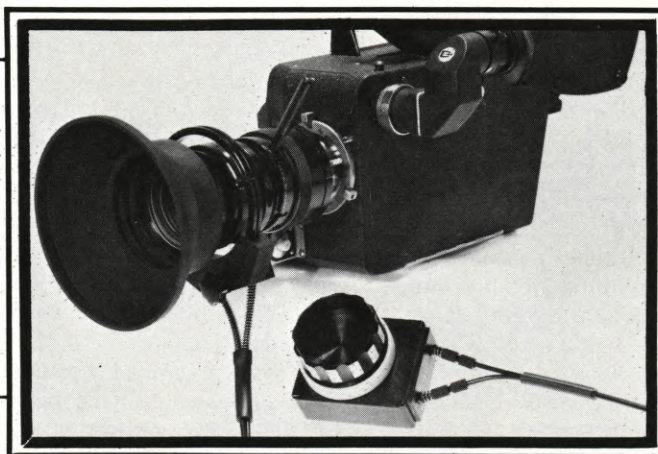
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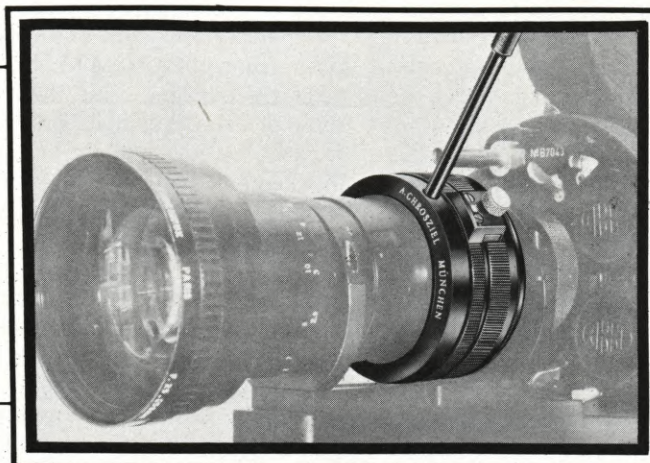
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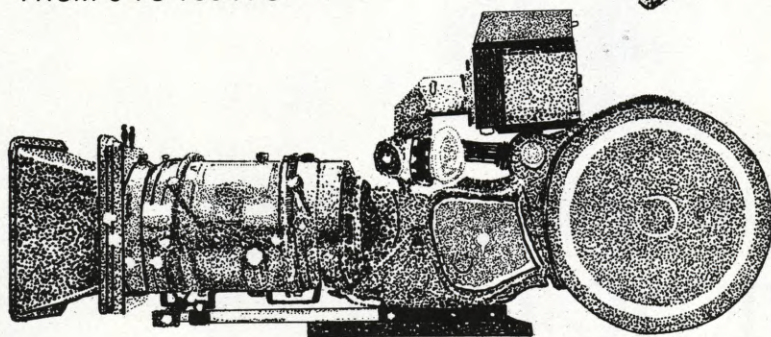
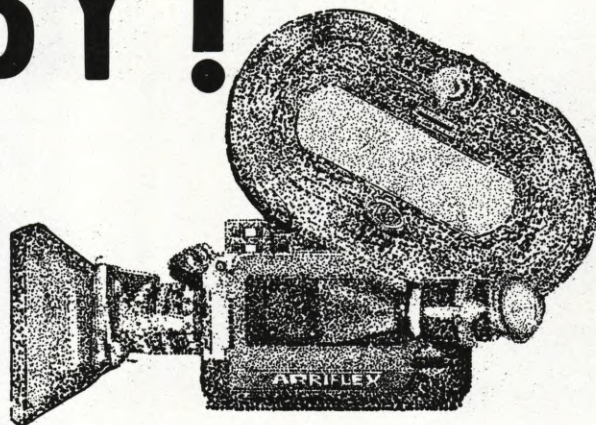
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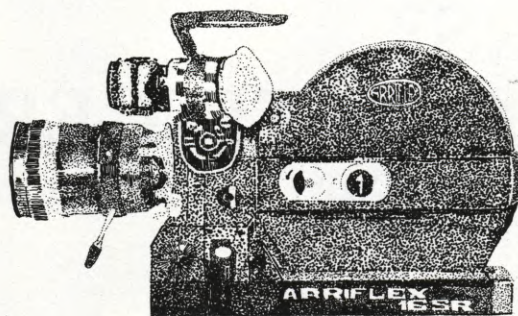
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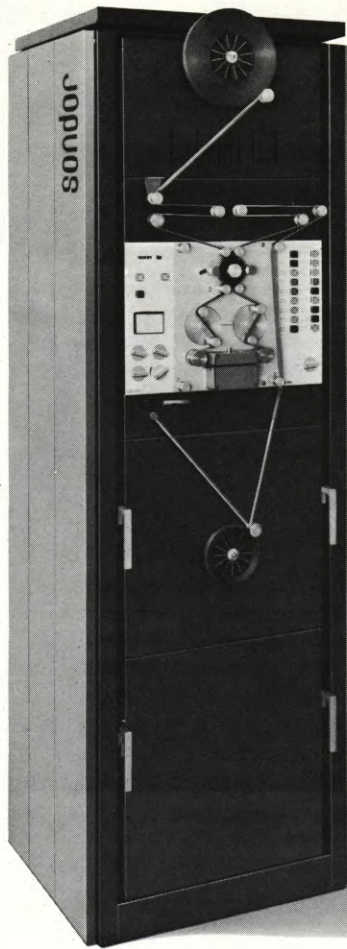
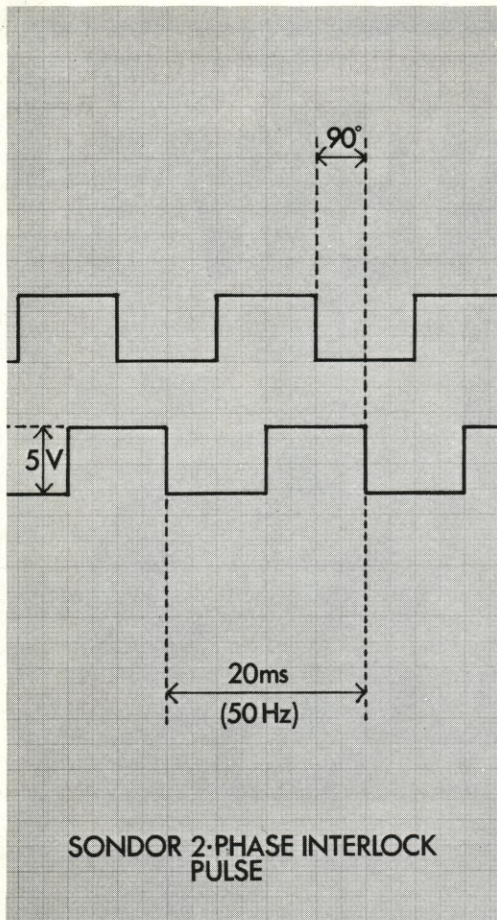
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“As the dailies appeared, my D.P. was impressed—he couldn’t believe his eyes. Amazed and happy, he turned to me and said, ‘Dios mio, que he hecho?’ (‘My God, what have I done?’).

“Nonchalantly, I replied, ‘Thank Chem-Tone.’

“Trying to imitate my English, he said, ‘San Chem-Tone?’ (‘Saint Chem-Tone?’).

“Suddenly, he realized what he had said. ‘That’s right,’ I said, ‘Saint Chem-Tone did a miracle.’ We all laughed.

“The Spanish people, as you probably know, are very religious; so, now, my cameraman is very devoted to a new ‘saint.’

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Alan Gordon Enterprises

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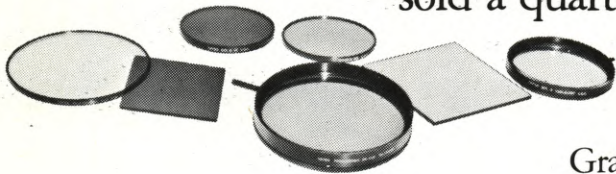
“Here at AGE Motion Picture Rental Department, we put Tiffen Filters to this test on a regular basis, as a means of assuring consistent quality.

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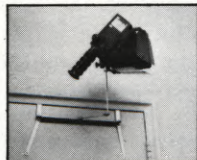
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AÄTON 35 mm



Aäton 35 mm

A.M. Mieville

Aäton makes J.-L. Godard a 35 mm camera. Ultimate steadiness

Two years ago, the well known film director, J.-L. Godard, commissioned Aäton to make a 35 mm camera. He wanted to combine the advantages of the quantity of information contained in a 35 mm film image, and the ease of handling and unobtrusiveness of super 8 cameras. The first prototype has been in use since April 1979, and the results are more than encouraging.

The Aäton 8-35 is **handheld**, and has **instant magazines**; until now, the only 35 mm camera with instantmags has been the Cameflex (1946), which is extremely noisy.

The noise level of the 8-35 is **33 dB**. Without any sound absorbing material, the prototype runs at 35 dB; two decibels less is realistic with damping. 33 dB appears quite acceptable in light of the fact that a non-optimum self-blipped 16 mm camera can run in that area.

The **steadiness is excellent**; it is ensured by the same **claw movement system** (U.S. patent 3806016) that has made a name for the Aäton 16 mm LTR. The pulldown of the stroke is absolutely linear, with the dead point in the film plane. Willy Lubtchansky, J.-L. Godard's cameraman, contends that the 8-35's steadiness is comparable to that of a Mitchell. On double exposure tests, no visible sign of any movement whatsoever can be observed.

An original feature: a second electric motor in the camera body drives the

60 m and 120 m magazines through an independent drive clutch.

The 8-35 is **small**, and **light**; it weighs in at around 5 kg, with 60 m mag — slightly less than the Aäton LTR 16 mm camera.

This camera is meant to be a companion to the Panavision or Arri 35 BL: it is easy to handle, unobtrusive, mobile. For certain films, it may even be the only camera; with a soft blimp, the sound level could be made acceptable for indoor work.

The first pre-series of some twenty cameras will be launched early in 1980. Many well-known cameramen and directors have already spoken for theirs' by putting down 50 % payment (in the order of \$ 10,000 to 15,000); delivery will be early 1981.

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The exciting future developments of Aäton's innovations in 35 mm should not, however, overshadow its proven achievements in the 16 mm field. The Aäton LTR has now shown itself to be a reliable instrument, with over 400 sold in Europe in the last few years.

Below, Dedo Weigert, « shooting » a lion on location in Java Indonesia, with camera number 84. One of the early cameras to come out of Aäton, Dedo also took it with him for extensive filming in the jungles of the Amazon ; with up to 100 % humidity, and condensation dripping in the lens, he shot 60,000

feet without so much as a single scratch, or any other problem.

Neither the very low noise level of the LTR (average : 26 dB) nor its excellent image steadiness and sharpness are compromised to make it a rugged and reliable tool for work in expedition type settings. The Aäton LTR is at home in the icy chill of Lapland* ; it has proven itself problem free in the muggy humidity of the African jungle (see A.C. Aug. '79). And in the torrid dust storms of the Iranian desert too, the Aäton 16 mm camera has been shown to be robust and

dependable (A.C. June '77). It is established as a camera that can brave the wilds with ease, and bring it all back on film.

The LTR magazine is simple to load : with gloves in cold climes, or with hot and sticky hands in the tropics. And the aperture gate can be checked and cleaned effortlessly with the magazine off the camera.

The Aäton LTR is now available in the U.S.. Rapid maintenance and turn-around are ensured through Aäton's New York operation.

*Remember, when working in sub-zero temperatures, it is a must to *leave both raw stock and camera in the cold at all times*, and to lace up in the cold as well.

Aäton 16 LTR





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"GLOBAL VILLAGE"-WALL-TO-WALL MONTAGE

By ROGER FLINT

A highly stylized, fast-paced combination of live action, animation, speeded-up time-lapse and a trip through the guts of a giant computer

I was called by Byron McKinney, Executive Producer of Francis Thompson Productions in New York, and asked if I would be interested in working on a most complicated and unusual project. The project was to write, produce and direct an around-the-world look at General Electric's Information Services (a computer time-sharing service). This industrial was to be used as a sales film, shown to the heads of the largest corpo-

rations in the world. My answer was "yes" and months of research meetings began. Francis Thompson, Sasha Hamid and Bryon McKinney and myself met with General Electric executives, computer time-sharing experts, designers and scientists in General Electric Information Services and outside time-sharing users involved in research projects. The capabilities of the General Electric Time-Sharing Program are truly incred-

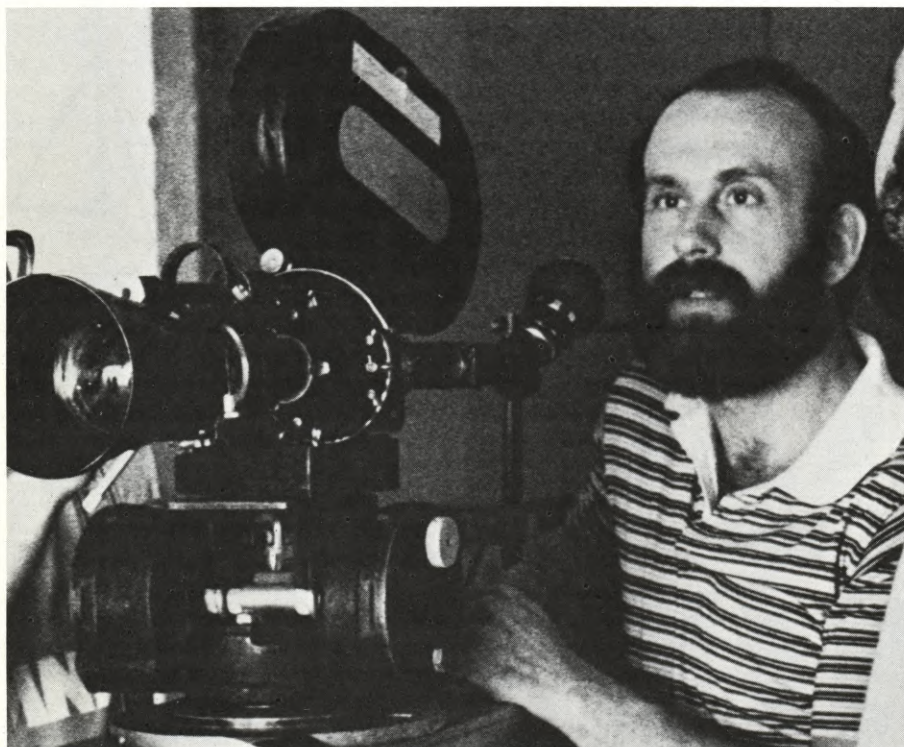
ible; however how the system worked and what it did was so complex and intricate that relating it to an audience in dramatic, human, and interesting terms seemed questionable.

The film was to include many of General Electric's worldwide and national clients, including McDonald's, Coca-Cola, Nomura Securities, American Airlines, Booth Fisheries and Disney World. Actually, General Electric expected more of a documentary when they first commissioned Francis Thompson's company to produce this 16mm epic than what they finally received. My feeling was that no matter how incredible the General Electric Information Services program was, if it were not exciting to the most sophisticated as well as the most unsophisticated (people who really could care less about a computer system), that it wouldn't work. I fell in the second category. I really had no emotional feeling for computers or computer systems whatsoever. I felt that if it entertained me, and kept me visually fascinated while informing me, that it would interest most people as well. So, I set out to create not a documentary, but a piece of informative entertainment.

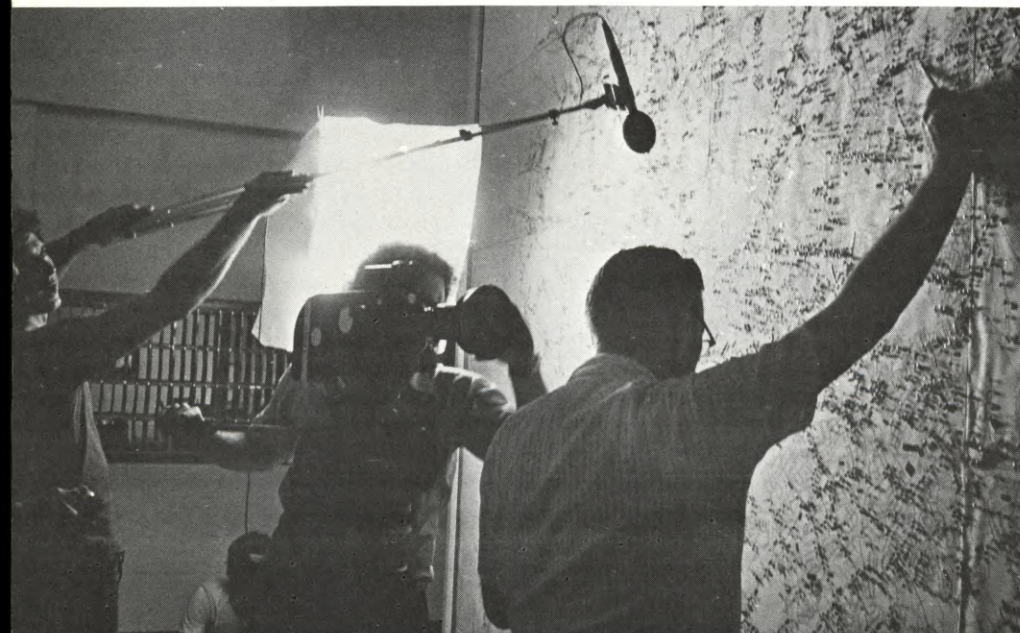
This is what happened. We focused on people around the world (London, Paris, San Francisco, Tokyo and New York), sharing the common human problems that all people encounter in the day-to-day battles of business. For example: Traveling executives in Los Angeles whose plane will be delayed one more time complain, "This could ruin the deal!"; the stock broker in London who, though instructed to buy two hundred thousand shares of a certain commodity, only purchased twenty thousand, and is being asked, "Why?"; Aldo, the fresh fish merchant refuses to accept two thousand pounds of mackerel because he ordered sole, and when he is asked by the delivery truck man, "What am I supposed to do with it?", Aldo answers, "What do you want me to do, tell ya?"

Through quick editorial pacing of these opening scenes, we made it clear that the problems of bad communication and human error multiply, affecting people worldwide, creating a misinformation domino effect. The solution that we presented was, of course, General Electric's Information Services' global network of computer time-sharing, communicating internationally to facilitate business everywhere.

Continued on Page 1011

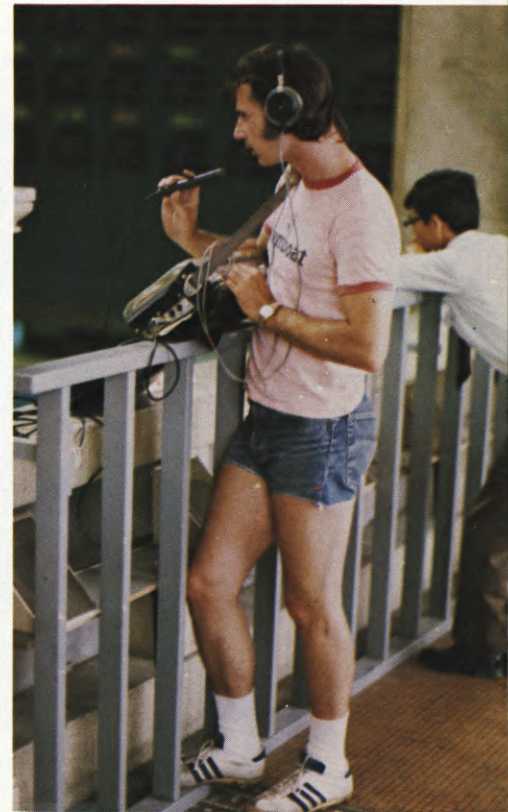


Roger Flint, writer-producer-director of the stunning GLOBAL VILLAGE for Francis Thompson Productions and the client, General Electric. The film is an exciting round-the-world visual adventure that moves so fast it is like a continuous montage. (BELOW) Flint directs Duke Power sequence, while Cinematographer Tim Housel shoots and Mike Fitzwater works mike.





A Coca-Cola sequence, shot in Japan, took elaborate planning and multiple set-ups, even though it goes by at a rapid clip on the screen. (ABOVE) Getting ready to shoot, Flint directs Japanese girls in traditional costume, with aid of interpreter at far left. (BELOW) Flint and House! shooting Coca-Cola scenes in the crowded streets of Tokyo, while Production Manager Mike Fitzwater records sound in Tokyo stock market.



PHOTOGRAPHING "THE ELECTRIC HORSEMAN"

Robert Redford "electrifies" Las Vegas during the shooting of a film that presented some tricky technical challenges to the crew

Ending a two-year absence from motion picture sets, Robert Redford is back in the cinematic saddle as THE ELECTRIC HORSEMAN, urging his handsome thoroughbred stallion against the heavy evening traffic down the blazing-neon Las Vegas Strip, with Jane Fonda in hot pursuit . . . along with a small army of assorted police on motorcycles, in black-and-whites, and in helicopters swooshing overhead.

Written for the screen by Paul Gaer and Robert Garland from a story by Shelly Burton, the romantic comedy has been five years in gestation. The logistics are staggering. The cost may conservatively be deemed "considerable". But so strong has been the faith in this property

by Redford, producer Ray Stark and director Sydney Pollack since it was first presented to them in 1973 that no problem was considered unsolvable.

Now, finally, with Ray Stark-S. Pollack Productions-Wildwood Enterprises Production all set to be presented by Columbia Pictures and Universal Pictures, THE ELECTRIC HORSEMAN has started his sprint to the screen.

Joining Redford and Fonda in the stellar cast are Willie Nelson, widely hailed "King of Country Music", in his motion picture debut, a non-musical role; Valerie Perrine as Redford's estranged wife; and a blood bay five-year-old stallion of aristocratic ancestry and benevolent disposition.

About the Story . . .

Robert Redford plays Sonny Steele, five times World Champion Cowboy, in his early thirties, slightly over the hill, battered by both bulls and booze. In his professional dotage, Sonny now finds himself more famous and solvent than ever, his leathery face decorating thousands of billboards and millions of cereal boxes. AMPCO, a conglomerate with products ranging from giant earth-movers to ladies' dresses, has engaged him to promote its line of breakfast foods. Moreover, for several million dollars AMPCO has purchased a Triple Crown-winning stallion, Rising Star, in whose electrified saddle—decorated with hundreds of tiny, flashing lights—Sonny, also



(LEFT) Robert Redford, playing a tired ex-rodeo champion, fed-up with the establishment in THE ELECTRIC HORSEMAN, rides his horse through the casino of Caesars Palace in Las Vegas. (RIGHT) He has to stoop to make it through Caesars front door on horseback. (BELOW LEFT) All lit up, he rides past the fountain outside Caesars Palace (which froze up during shooting). (RIGHT) He rides down the brilliantly lighted Las Vegas "Strip".



suitably lit, appears at football games, rodeos, sales meetings and other events in behalf of the company's junk food.

Corporate image is important to AMPCO because it is attempting to take over Unibank, a prestigious financial enterprise whose management is resisting the move. Should the merger materialize, AMPCO's stock could soar.

Sonny has not been behaving well lately—his rustic, weathered nature not meshing smoothly with corporate manners or mores. But cereal sales are up, largely because of his appeal. Accordingly, AMPCO decides to risk his appearance with Rising Star at its worldwide sales meeting and convention in Las Vegas.

At an introductory press conference with corporate chieftains at Caesar's Palace, the convention site, Sonny has an abrasive encounter with Hallie Martin (Jane Fonda), a network TV reporter, who needles the former rodeo star for selling out to peddle corn flakes. He is further perturbed to find Rising Star suffering from shipping fever. The finely-tuned thoroughbred has been sedated against the shock of the blinding lights, blaring music and dancing girls in the corporate show in whose rousing climax he will appear.

Sonny's resentment builds, justified or not. The man who conquered Brahma bulls and wrestled thousands of steers into swift submission detests having to distribute cereal samples at supermarkets, where he is photographed astride coin-operated mechanical horses. He's embarrassed at having to don a gaudy, electrified costume and sit in a saddle resembling the Milky Way. He's a cowboy, not a clown—regardless of the high fee he receives.

And he is angered by what he considers to be maltreatment and misuse of so noble an animal as Rising Star.

Sonny's turmoil intensifies when his wife (Valerie Perrine) seeks his consent to a divorce—although he's seldom home and frequently bedded down with rodeo groupies. His life support system is snapping, and years of rodeoing have left him battered inside and out. He is exhausted and frustrated.

And so . . . in an outrageous gesture of defiance, as 1,200 delegates, guests and media representatives watch in the hotel's massive showroom, Circus Maximus, Sonny swings aboard Rising Star, horse and rider ablaze in twinkling lights. He rides the horse off the stage, through the audience, into and through the crowded, clattering casino filled with gaping gamblers, across the parking lot and onto the jampacked, spectacularly lit Las Vegas Strip at the height of the evening traffic.



Director Sydney Pollack coaches a slightly embarrassed Redford for a scene in which he rides a coin-operated mechanical horse in a supermarket, just one of the indignities he is required to suffer as the highly-paid huckster for a breakfast cereal. The director and star, old friends from their acting days, have made five features together.

About the Filmmakers . . .

Director Sydney Pollack has made four prior films with Robert Redford: *THIS PROPERTY IS CONDEMNED*, *THREE DAYS OF THE CONDOR*, *THE WAY WE WERE* and *JEREMIAH JOHNSON*, the latter being Redford's choice as his favorite picture. And Pollack directed Jane Fonda in *THEY SHOOT HORSES, DON'T THEY?* *THE ELECTRIC HORSEMAN*, which was submitted separately to Redford and Pollack five years ago, is his first undertaking since making *BOBBY DEERFIELD* in Paris with Al Pacino over two years ago. In the interim he and Redford have worked on several joint ventures they hope to put before the cameras in the future. Their close friendship, personal as well as professional, dates back to their work as fellow actors in Redford's initial feature, *WAR HUNT*, in 1961.

For Director of Photography Owen Roizman, ASC, his assignment to photograph *THE ELECTRIC HORSEMAN* constituted something of a reunion, since he had previously worked with both Robert Redford and Sydney Pollack on *THREE DAYS OF THE CONDOR*.

A two-time Academy Award nominee (*THE FRENCH CONNECTION*, *THE EXORCIST*), Roizman is a meticulous artist of the camera who characteristically welcomes creative and technical challenges. In the following interview with *American Cinematographer* Editor Herb Lightman (who spent several days with the company during filming on

the Las Vegas location), Roizman discusses the techniques he used in photographing *THE ELECTRIC HORSEMAN* and points out why this assignment turned out to be an even greater challenge than he had bargained for:

QUESTION: What would you say were some of your major challenges in photographing *THE ELECTRIC HORSEMAN*?

ROIZMAN: It was an assignment that was full of interesting technical challenges. For example, when we were working in the main casino at Caesars Palace in Las Vegas, we were unable to rig lights, due to the necessity for staying clear of the overhead surveillance system. As a result, almost every bit of shooting we did had to be done with basically available light. We could change bulbs or add lights in other areas of the hotel, but whenever the casino was in the shot—even as background—we had to balance to the existing light in the casino. This made it necessary to shoot everything at a stop of T/1.1 or T/1.4. Having made tests, I also chose not to force-develop the film, because I wanted to go for a very rich look.

QUESTION: You spoke of shooting in other areas of the hotel. Could you tell me what kind of shooting conditions you encountered there?

ROIZMAN: More "interesting chal-



lenges". We shot in the main showroom and in the large convention hall, and in those two areas we could also not rig any lights. In the convention hall the ceiling was too weak to support any large units and in the showroom there was a show going on twice a night every night. Diana Ross was performing and we had to use the existing stage lights that had been set for her show. The most we could do was adjust some of the dimmer moves and pick out some color changes and things like that for our own use. We were free to light the audience, but, of course, we didn't want much light on the audience, so we basically lit with what was there.

QUESTION: The fact that in playing the title role for this film, Robert Redford rides around in a cowboy suit outlined by hundreds of tiny bulbs must have meant that you had some problems in exposing for the consistent brightness of those bulbs, isn't that so?

ROIZMAN: Yes. We made tests for exposing those lights on Robert Redford and his horse and we found that an exposure of T/1.8, or slightly wider open than that, maintained a good brightness for the bulbs, but anything stopped down more than that made the bulbs go too dim. So technically what I had to do was balance everything to T/1.8 or less and I tried to work consistently at that stop from the showroom through the casino and out onto the Strip for his ride. Therefore, in the showroom even though I could have shot easily at T/2.8 or T/3.2 or possibly even T/4—I took all the lights down on dimmers in order to bring them into balance so that they would still look bright at the T/1.8 stop, but not over-exposed.

QUESTION: In other words, for all the scenes in which Redford appeared with his suit lighted up, you had to work back from the T/1.8 that you had found to be the optimum stop for exposing the lights on the suit?

(ABOVE LEFT) For Director of Photography Owen Roizman, ASC, *THE ELECTRIC HORSEMAN* signified a kind of reunion, since he had previously worked with both Redford and Pollack on *THREE DAYS OF THE CONDOR*. (BELOW LEFT) Roizman supervises the setting of a mount for the Panaflex camera on a vehicle hood. (RIGHT) Director Sydney Pollack is a former Broadway actor, acting teacher and television director.



(LEFT) Setting up to shoot a night exterior in Las Vegas. The crew was subjected to freezing temperatures while filming in this desert resort, which also gets unbearably hot in the summertime. (RIGHT) A Chapman crane is moved into a gully on the desert outside of Las Vegas for the shooting of a sequence in which Redford takes off with his million-dollar horse and is pursued by helicopters.





(LEFT) Jane Fonda and Redford huddle around a campfire in this low-key actual night exterior filmed on location. Other night "exteriors" were filmed inside a warehouse pressed into service for cover sets because of weather problems in St. George, Utah. (RIGHT) While filming in the casino of Caesars Palace, practical light sources more often than not provided almost total illumination for the exposure.



(LEFT) Redford and his horse, rimmed with hundreds of tiny lights, get ready backstage at Caesars Palace. Scenes of him in the lighted suit were pegged at an exposure of T/1.8 to get best rendition of the lights. (CENTER) Roizman gets a light reading on Jane Fonda, whom he backlighted whenever possible. (RIGHT) At the "magic hour", helicopters fly over in pursuit of Redford.

ROIZMAN: Yes, I had to back everything up to work at an exposure of T/1.8. For example, we actually started onstage with some of the dancers, then revealed the backstage area and picked up a shot of Redford walking over and looking out onto the stage. We then panned around over his shoulder to the stage. Keeping in mind that we had to work to the T/1.8 exposure and light everything to balance, that meant lighting the backstage area for a nice subdued mood (at T/1.8) and then lighting the stage for a bright look (also at T/1.8), so that I could carry the action from backstage to onstage in one shot—and still maintain consistent exposure for the bulbs on Redford and the horse.

QUESTION: What about shooting in the slot machine areas of the casino where there is almost no illumination, except for that coming from the machines themselves?

ROIZMAN: There, again, we had to work to balance to the background all the time. When there were slot machines in the scene we had to maintain the brightness of those machines, which meant shooting at around T/1.1. In order to get the feeling of light actually coming from

the slot machines, we had to hide "gimmick" bulbs just off the face of the machines and shoot from angles that would show the face of a machine, but not the hidden bulb. The object was to make it look like the light was emanating from those machines. We had to keep the light level down to about seven footcandles in order to get a proper exposure.

QUESTION: You mentioned that you couldn't hang lights in the main casino area of Caesars Palace, where the level of the available light appears to be somewhat lower than T/1.8. That being the case, what did you do for the scenes in which Redford rides his horse through that area?

ROIZMAN: Well, again, theoretically I should have been working at the same T/1.8 exposure, but having made tests in the casino, I found out that the best that I could get away with was T/1.4, so for that sequence I cheated a little bit and shot at T/1.4 and still built up the ambient light a little bit with some extra lights on stands. Again, I had to work with the available light in the casino basically and then just build up the ambient light enough so that you could see detail in the people's faces. It's important to be

able to see their facial reactions when they look up from the blackjack tables to see this insane-looking, mysterious figure on a horse rimmed in lights.

QUESTION: Did you use any bounce light in order to build up the ambient light level for that sequence?

ROIZMAN: Shooting in another part of the hotel for an earlier sequence, I had noticed that there was a big white molding that happened to be around the room, so I just bounced the light off the molding instead of placing a white card on the ceiling, as I would have done normally. In the casino area there was no such molding, nor could I mount any cards on the ceiling, but I did use a lot of bounce light off of vertical cards in order to build up the ambient light level. Also, I was able to drop all the bulbs that were recessed in practical fixtures in the ceiling. By putting extenders in the sockets and bringing the lights down to the bottom of the recesses, they not only lit straight down, but spread slightly to the sides and filled themselves in.

QUESTION: Did you use any appreciable amount of colored light in shoot-
Continued on Page 1038

CONFESSIONS OF A LIGHTING DESIGNER

By ROSS LOWELL

In the past, when asked how I got started designing lights and just what my qualifications were, I tended to concentrate on the how-I-got-started part and avoided the qualifications part. But now, after twenty years, I do have some qualifications. Also, I now have a great design team. My partner, Marvin Seligman, our engineer, Al Calamai, and an entire industry of ingenious, resourceful

professionals eager to share their problems and impressions.

Then, too, I've finally come to realize that I always possessed one "qualification". When working as a cameraman I had an unusually low threshold of frustration for poorly designed, inefficient, cumbersome and unreliable equipment. Not too surprisingly, this is directly connected with how I got started designing lights.

Back in the early 1950s, some of the most antiquated paraphernalia, it seemed to me, was in the area of location lighting equipment. That was long before Sylvania introduced the tungsten-halogen (quartz) lamps. Most of us who shot documentaries and industrials relied, to a great extent, upon reflector flood and reflector spot bulbs. These we generally screwed into fixtures called "gator grips". Gators were, for their day, quite portable and had large, versatile jaws that could hold them onto stands and various objects.

When we worked in rooms that had mouldings, it was standard practice to jam a knife—either the common table variety or the preferred putty knife—between the moulding and the wall; then, the gator grip was clamped onto the knife. It wasn't exactly an elegant solution, but it worked. At least until the steel barndoor was clamped onto the socket, at which point the gator grip swivel had to be tightened to overcome its tendency to do a nose-dive. But to tighten it, the unit first had to be removed. After tightening and reinstalling, more often than not, the swivel was too tight, so the lamp couldn't be aimed. It's amazing how loud the gnashing of several sets of teeth can be on a quiet set. Equally important, a couple dozen units with barndoors (remember film was "slower" then) rep-

resented a formidable obstacle to location travel.

In the late 1950s CBS producer-director Steven Fleischman asked me to shoot a documentary on juvenile delinquency. We needed to light several areas and leave the lights installed for a couple of weeks, but the lights couldn't interfere with the normal uses of the rooms.

Well, this seemed like a good time to

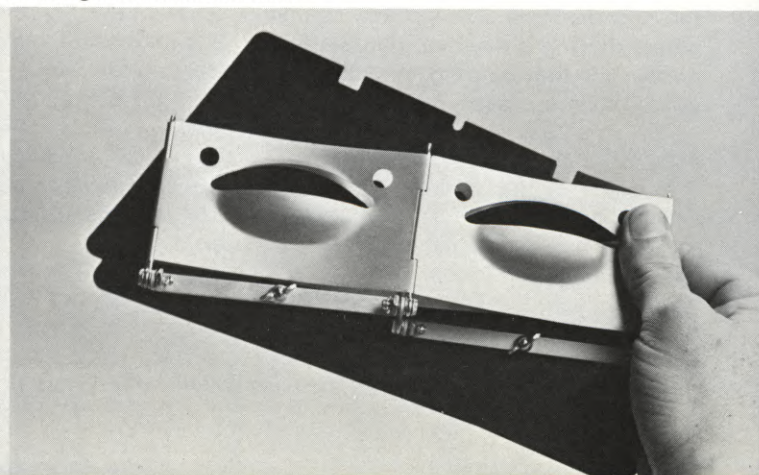


The location lighting revolution began 20 years ago with Lowell's invention of the original Lowel-Light and introduction of Gaffer-tape. Tens of thousands of units have been in use all over the world.



The roll-up variflector, like most of Lowell's inventions, was subjected to extensive field tests. Says he, "In-use reports from professionals help us discover any 'bugs' before tooling up."

(LEFT) Gaffer Harold Lebow attaches a Lowel-Light with Gaffer-tape on the famous "NAKED CITY" television series in 1959. Director of Photography was Ernest Caparos. (RIGHT) Lowell's second U.S. patent was granted for the fold-up barndoor. Along with the original Lowel-Light, it became standard equipment on most location jobs, including countless features.



come up with some small but easily installed and adjusted units that could accept the reflector flood lamps.

My first attempt was a socket and handle on a little ball-swivel with a threaded hole. This, in turn, could be screwed onto various mounting devices, such as a handleless putty knife, a "C" clamp, a spring clamp and a small suction cup.

It worked surprisingly well, but there were too many little parts, and the suction cup was less than a completely reliable mounting device. That might have been the end of it, except that I was intrigued by the challenge of trying to incorporate all of the functions of the accessories into the basic light. Mounting the socket and swivel onto a thin, resilient plate enabled the light to go behind mouldings. End of the putty knife accessory. It also provided a base on which to balance the unit on floors and tables.

Then came the first of two important discoveries. By mounting the swivel on the bottom of the plate, it could be taped to vertical surfaces such as walls and windows. And when the tape was properly applied, it could remain up for months. So that disposed of the suction cup accessory. The only problem was to find a tape that was strong, heat-resistant and that wouldn't leave a residue when peeled off.

I eventually discovered a Permacel tape used in the heating duct industry, and it was suggested I call it Gaffer-Tape. Now, of course, mounting lights is one of its least frequent uses in our industry.

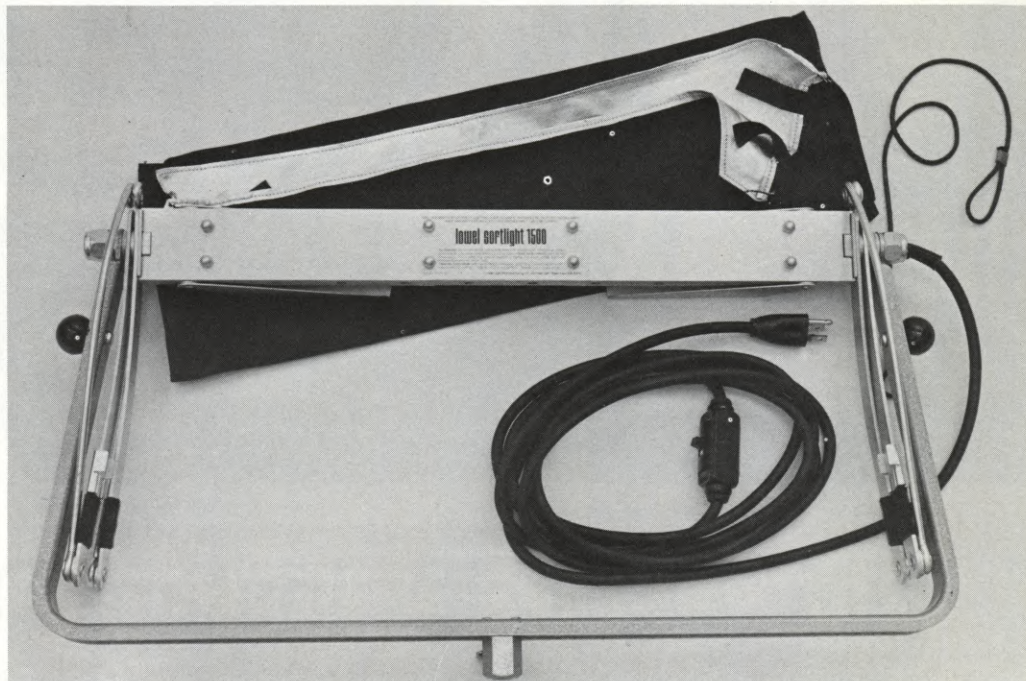
So—all that separated success and failure, from a design point of view, was inventing a versatile clamp for attaching the light to stands, pipes, 2 x 4's, etc., that would be part of the plate but not add to its thickness.

For days I thought about almost nothing else. Morning, noon and night I searched my memory, my imagination, and several hardware stores, but I couldn't get past the mental road block of bulky, conventional clamp devices. At the end of three days I was resigned to the impossibility of ever finding a solution and was prepared to abandon the light. But that night, as I was falling asleep, the answer came to me. The next morning I woke up very excited because I remembered that the answer had revealed itself; however, I couldn't remember what it was! After an agonizing few hours, it came back: a cutout in the flat plate to fit around pipes and stands with a chain and notch to bend and lock the plate.

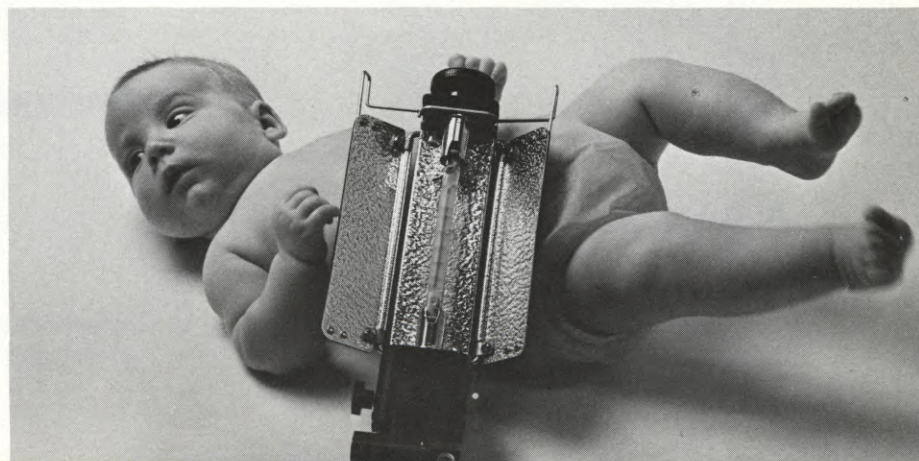
If only a socket could be found with a tireless center contact spring, it would be worth its weight in gold (in those days, gold was only \$35.00 an ounce). Precious shooting time was wasted with flat-



In this photograph Ross Lowell looks more like a leprechaun than the world's foremost designer and inventor of compact location lighting equipment. A much-honored cinematographer/director, Lowell began designing out of frustration with the huge and heavy lighting equipment then available, which was totally unsuitable for the type of location filming he was doing.



(ABOVE) "At the time, large softlights were too unwieldy for most of us to take to distant locations. So I devised a lightweight frame that folded in half, almost flat, and a removable, non-discoloring reflecting shell." (BELOW) Not a "Baby Spot", but the tiny Tota-Light, which seems large next to the inventor's son, Josh. "They were born at the same time," says Lowell, "but I had some help conceiving both."





Color still from "Norma Rae", filmed by John Alonzo, ASC entirely with HMI light.

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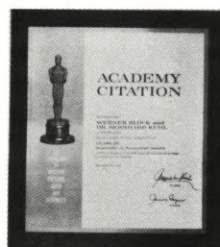
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Mole Richardson
937 N. Sycamore Avenue
Hollywood, CA 90038
(213) 851-0111

Strand Century, Inc.
5432 W. 102nd Street
Los Angeles, CA 90045
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Strand Century, Inc.
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Elmwood Park, N.J. 07407
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Lowell's associates, Al Calamai, Marvin Seligman and Arthur Kramer, worked with him on development of the Omni-Light. Lowell insists that "Good equipment, like good films, is generally the result of a team effort." His aim is to change the way lights look, simplify the way they function, increase their versatility and reduce the space they occupy."

tened center contacts that couldn't be distinguished from defective lamps until after the substitution ritual was performed, witnessed impatiently by the producer, director and cast. I found a socket with a special coil spring under the tab, and decided to use it despite its somewhat vulnerable porcelain exterior. We've seen some chipped sockets but never, in 20 years, any that failed to make electrical contact!

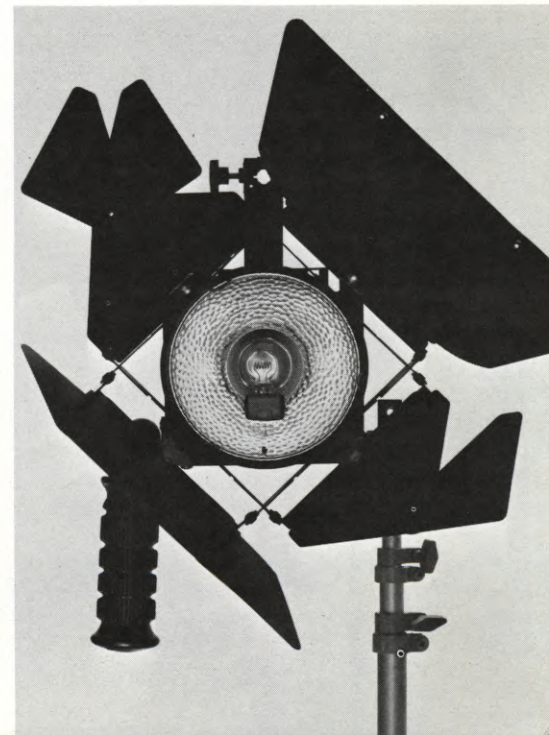
I had hoped to turn the design over to a film equipment company and have them manufacture it. One likely place said it was fine for amateurs but their professionals wouldn't be interested. I went to a distributor of amateur equipment and he felt it was a good professional unit but amateurs wouldn't go for it. In the end, I decided to make a hundred units and perhaps, in the course of a few years, dispose of them. Showing the prototypes to a few farsighted cameramen like David Quaid and gaffers like Norman Lee resulted in selling out the first run before they were even assembled. Perhaps that's because, in those days, they took forever to assemble.

Suddenly, I was a designer, without any engineering knowledge; a manufacturer, without any business acumen. Fortunately, the operation was small—one room and two people—so the mistakes were small.

Still a little amazed by the success of the light, I next tried all the mechanical incantations I could think of, in an attempt to civilize that uncouth, uncooperative "monster"—the reflector barndoor. Installing it usually required removing a hot lamp, clamping it to the socket with a screwdriver and pliers, then screwing the lamp in again. The bottom door couldn't fold back to get it out of the top of the

frame. The black paint eventually chipped off exposing bright metal. It weighed about one pound. It took me over a year and all the wire coat hangers my dry cleaner could supply to devise a totally new one. In those days I worked empirically. Most of my "sketching" was done with pliers and hacksaws. Sometimes, to cut down on blisters, I'd "doodle" with paper clips instead of thick wire, cardboard instead of aluminum. The answer lay in letting the shape of the reflector lamp work to the barndoor's advantage and not try to fight it. The final version was four times lighter than its predecessors—and about ten times more

Despite the elegant and dramatic look of the new Omni-Light, Lowell believes that: "Location equipment should be dependable, efficient, versatile and easy to transport. Appearance is the last consideration."



compact when folded. But most important, it fit directly onto the lamp without tools or fuss.

Since my attitudes, prejudices and working methods as a cameraman, and sometimes director, have influenced the equipment I've designed, I ought to express what they are, particularly in the area of lighting.

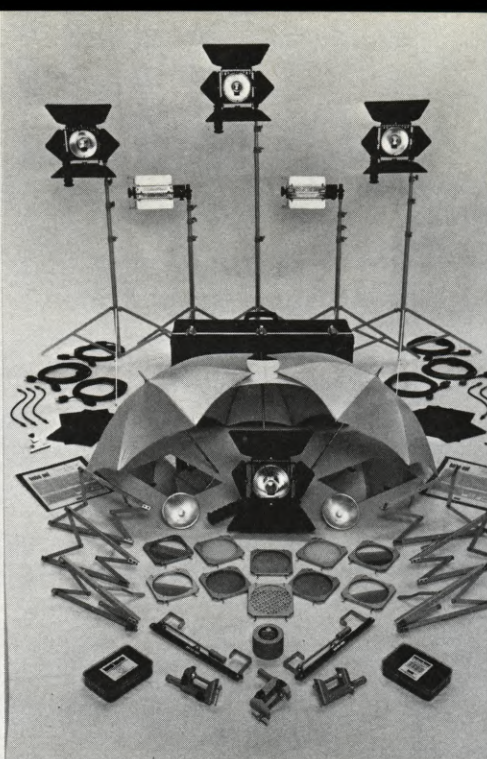
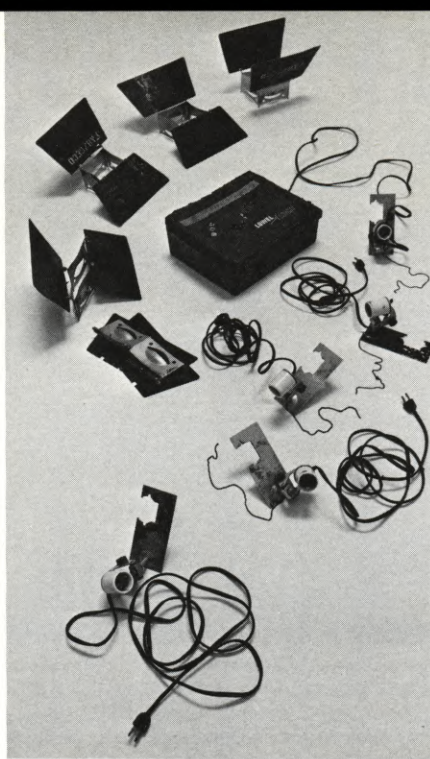
I believe that lighting should look simple, no matter how complicated it is to achieve. I try to make the lighting as natural as possible, regardless of how much artificial light is required. I like available light if there's enough of it, if the mood is right, and if it'll last until we finish. If not, I create my own "available light". Good lighting is not a matter of formula; it's a matter of experience, imagination, resourcefulness and sensitivity. The sensitivity of the cameraman is more important than the sensitivity of the film—up to a point. Lighting's primary purpose is to create an appropriate and effective mood. Its secondary purpose is to separate planes to compensate for the absence of a third dimension.

The controversies over hard light and soft light, or whether backlight looks phony, can't be resolved on a theoretical level. It's a matter of how they are used in relation to mood, composition, wardrobe, set and all the other elements that go into a film. And if you think *that's* too theoretical, you're probably right.

I welcome the challenge of a difficult location because the results are likely to be more unusual—but it helps if I'm prepared with enough useful equipment. However, I hate to be overloaded with

Continued on Page 1056

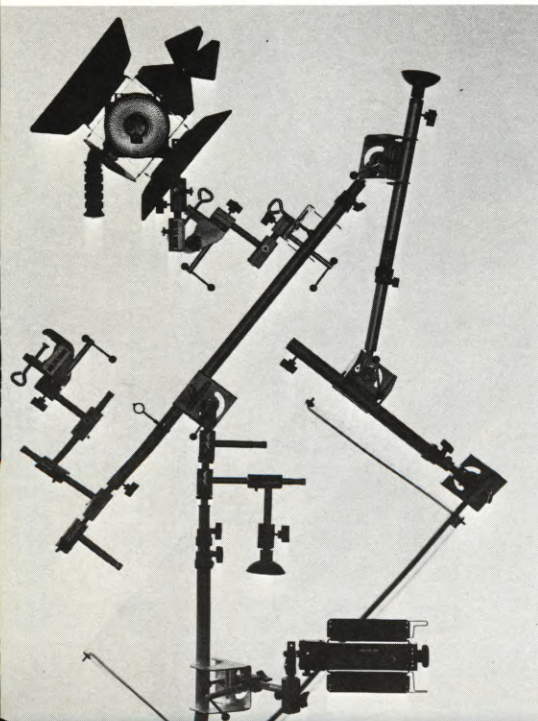
The Lowel Link system, a sort of professional Tinker Toy, can be interlocked to make basic location grip equipment, such as booms, background supports, sun dif-fusers, floor-to-ceiling poles and special rigs.



(LEFT) Almost twenty years separate this old Lowel-Light kit (which has been in continuous use by a rental house) and this new six-light Solo Kit (RIGHT). Both set new standards of compactness and versatility. Each of the Lowel lighting systems covers a wide range of operations, rather than having limited functions. Components are integrated within each of the systems and, when possible, between systems. Compatibility is also maintained with existing industry standards.

SIGNIFICANT INNOVATIONS AND INVENTIONS FROM LOWEL

YEAR	INNOVATION	SIGNIFICANCE	U.S. PATENT #
1959	Tape-up, clamp-on light	First use of tape-mounted lights, smallest, most versatile reflector-flood unit.	3088024 & 3179366
1959	Gaffer-tape	Now a basic industry item, Lowel discovered and named it.	Trademark
1961	Truly compact location kit	5 lights and 5 barndoors in a "lunch box" (without lamps)	
1961	Fold-up barndoor	First compact, quick-to-attach, reflector-flood barndoor. A fraction of the weight of its predecessors.	3140053
1963	Roll-up sun reflector	First portable reflector that could fit on a stand.	3254207
1963	Durable reflecting surface	First industry use of washable, scuff-resistant, aluminized mylar.	
1963	Brightness control	First sun reflector with continuous "flood" and variable beam angle capability.	3254207
1967	Light with interchangeable reflectors	First use of quick-change reflectors (general purpose, super-spot, gold).	D210927
1967	Non-converging, parabolic reflector	Elimination of troublesome crossover beam.	
1967	No-yoke light design	Elimination of bulky yoke on small location units, also increased the tilt angle.	D210927
1967	Constant tension tilt	One-handed, reliable tilting with constant torque.	D210927
1968	Interlocking components	First multi-purpose components for location grip equipment.	
1968	Water weight	First sand bag substitute—21 lbs filled, 7 oz. empty.	
1968	"V" groove in stand fittings	Provided secure locking on undersize stand studs.	
1970	Fold-up softlight	First really portable, lightweight softlight.	3712978
1970	Non-discoloring softlight reflecting surface	Eliminated frequent repainting, increased light output.	3712978
1970	Yoke that can't snarl cable	Cable came out of pivot center, light could tilt 360°.	3712978
1972	Gull-wing reflector design	"Salvaged" light normally wasted by reentering lamp and overheating it.	3852582
1972	Broad with reflecting doors	First use of broad with beam control.	3852582
1972	Device for wall and door mounting	A support for lights that Gaffer-taped to walls and held on top of doors, both open and closed.	3852582
1972	Snap-together flags and reflectors	The first modular, interlocking, light control panels with flexible shafts that attach to lights and clamps.	3852582
1976	Double parabolic reflector	Produced an unprecedented 11-1 spot/flood range	Pat. Pending
1976	Quick release barndoor flaps	First use of ¼ turn locking fasteners to remove expandable doors.	Pat. Pending
1976	Swing-away handle	Large, comfortable, built-in handle folds up for storage.	Pat. Pending
1976	Graduated scrim	Provides light control similar to ½ scrim but with	Pat.





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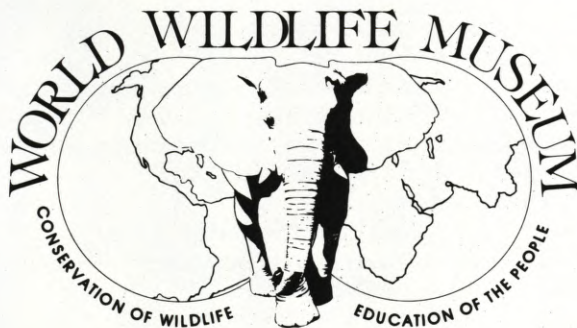
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%The World Wildlife Museum Foundation
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For further information, contact:
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 Film Festival Secretary
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Film Title: _____
 Category: Professional () Amateur () Entry Fee Enclosed ()

Producer: _____

Cinematographer: _____

Director: _____

Return Film to: _____

A representative will be attending the awards presentation ()

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"THE BOAT PEOPLE" AS FILMED FOR CBS

The filming of this desperate human drama, as it unfolded in raging seas and upon hostile shores, tested all of the skills of the crew intent upon documenting it for tens of millions of television viewers

By BOB FISHER

If you saw THE BOAT PEOPLE, chances are you are never going to forget that poignant CBS News documentary that appeared on prime-time last Jan. 16. Among the millions of Americans touched by the film was Governor Robert Ray of Iowa, who immediately contacted President Carter and offered to resettle an additional 1,500 Vietnamese refugees in his home state this year.

That brought to mind a comment made by Greg Cooke, a contributing news photographer for *60 Minutes* and *CBS Reports* documentaries. "There are times when I think about trying to become a news producer," he says. "I had an opportunity to do that and have produced a couple of *60 Minutes* assignments. However, I always come back to the fact that, as a news cameraman, there is always the chance I will touch people's lives and give them a view of something from a perspective no one will see quite the same way as I see it."

THE BOAT PEOPLE illustrates that feeling as much as anything Cooke has ever done. And that's saying a lot. Cooke has piled up some very impressive credentials during his career in news photography. He got his first job at KOOL-TV, in Phoenix, while he was still in school.

Cooke worked as a news photographer at KOOL-TV and KTAR-TV, also in Phoenix, from 1964 to 1969. He spent 1970 at KMGH-TV, in Denver, and soon afterwards signed on for an 18-month stint in the CBS news bureau in South Vietnam.

Cooke has been working as a contributing news photographer for CBS since 1972. Among the recognitions he has received is a first-place award for the documentary category of the 1976 TV News Photography Competition of the National Press Photographers Association (NPPA). It was for THE GUNS OF AUTUMN.

Though his home is in Denver, documentary and *60 Minutes* assignments often take Cooke and his crew to locations around the country and the world. Recalling THE BOAT PEOPLE, Cooke says, "We had just returned from a *60 Minutes* assignment in Nicaragua when we received word from CBS news producer Andrew Lack that we had an immediate opportunity to shoot film for a documentary about the plight of the boat people—the desperate refugees pouring out of Vietnam, seemingly forgotten and unwanted by the rest of the world."

Cooke had just gotten his equipment through customs at the Los Angeles

International Airport. "I checked everything back through again and booked us on the next flight to Malaysia," he says.

The story was red-hot. A few weeks earlier, more than 200 refugees had drowned when a ship carrying them foundered after being turned away from port. Thousands of refugees were known to be languishing in camps in Malaysia, while many others were stuck on all manners of boats. Enormous pressures were building between the persons willing to take desperate measures to escape from Vietnam, and those in neighboring nations dreading the implications of absorbing the tide of refugees.

Press from around the world were clustering in Malaysia, probing for opportunities to visit refugee camps and to speak to officials. "Normally, we would have expected to spend as much as a month on a project like this," Cooke says. As it happened, he and his crew, soundman Jim Camery and assistant Vic Circhirillo, were pressed into action almost immediately after their plane landed. During the following five days, they went through a whirlwind of activity, which included a visit to the island of Pulau Bidong, where some 23,000 refugees were encamped, and the witnessing of hundreds of survivors wading ashore into a hostile crowd after their rickety ship was beached.

There was no time to plan or to reshoot anything. For many of the most important sequences, literally every frame of film had to count. "Out-takes were a luxury we didn't have," Cooke says.

Cooke was carrying two Arri BL cameras with a full set of Angenieux and Zeiss super-speed lenses. These included Angenieux 12mm-to-120mm and 12-240mm zoom lenses, a 300mm telephoto lens, and Zeiss 9.5mm, 12mm, 16mm, and 25mm super-speed lenses. "The most difficult camera work was mainly done with the Zeiss 9.5mm super-speed lens and Eastman color negative II film 7247.

"The combination of a super-fast lens and virtually unlimited film latitude is what allowed us to work rapidly and as unobtrusively as possible under very difficult conditions," Cooke says. "I don't think I could have done this type of documentary using the equipment and film stock of a few years past."

Cooke stresses that every documentary, whether it is a comparatively brief item for *60 Minutes* or an hour-long

Freeze-frame of a poignant moment. A last swimmer reaches the boat far off-shore and, with a strenuous effort, hands one final letter to departing camera crewman. As he does so, a great cheer goes up from those on shore. These frantic refugees from Vietnam were anxious to get the story of their plight to the outside world.



program, is unique. However, he does have some overviews about how this type of news work should be done.

"I like to give viewers the perspective of being like a fly on the wall," he says. That translates into putting the camera and microphone where sights and sounds carry the story naturally. "One thing with television is, the less dialogue, generally the better the feel viewers get for what is actually happening," he says.

Many times that is easier said than done. The first picture opportunity came the morning after Cooke and his crew arrived. Lack and executive producer Howard Stringer were at the airport awaiting the arrival of correspondent Ed Bradley. Cooke and his crew were walking on a nearby beach when they saw a boat offshore being tossed about in giant waves.

"It was obvious the boat was carrying refugees, and it was in trouble trying to land," he recalls. "It was equally obvious a mob of some 200 to 300 villagers were determined they wouldn't land. The villagers were worried and angry. There wasn't enough food or work for themselves, and they saw the arrival of the Vietnamese as a direct threat."

Finally, a spokesman from the boat made his way to shore pleading with Malaysian policemen to let the rest of the people land. Cooke moved in closer. He had the 12-240mm lenses on the Arri BL camera. "People in back of the crowd started tossing driftwood at us," Cooke says. His first instinct was to face down the youngsters doing the throwing, expecting that cooler heads would prevail. He quickly realized the mood of the crowd was uglier than he had perceived and backed off.

By then, the boat was closer, and clearly in trouble. Cooke sent his driver racing back to the hotel to get his tripod while he and his soundman waded 40 to 50 feet in the water. "We were focusing on the boat and the people beginning to come through the water," he says. The waves were breaking around him and Camery, and they often had to hold the camera and Nagra recorder over their heads. Even then, there was no avoiding the spray of salt water.

Bradley had arrived by then and had started to talk to the survivors wading in. "Normally, we work with a wireless mike; however, things happened too fast," Cooke says. "We just stayed within 10 to 15 feet and made do with a shotgun microphone. There were some very moving, emotional scenes. I wanted to reach out and help people, tell them it was going to be okay. But I knew the best thing we could do for them was record things exactly as they were happening, as long as there was no danger of anyone within



Refugees coming ashore at Kuala Trengganu, Malaysia. Andrew Lack and Ed Bradley in the background. Hordes of refugees like these were turned away almost everywhere they went by local officials and inhabitants worried about a lack of food and facilities, plus the social disarrangements they feared might be caused by such an influx of foreigners.

my reach drowning."

The next day, the CBS crew received permission to visit the refugee camp at Pulau Bidong. "Everyone was surprised that came through so fast, and once again, we had to move very quickly," he says. Even then, there were problems getting started as the harbor police spent

most of the morning verifying that Bradley and the film crew could accompany the producer. "Our Malaysian letter of authorization named only Andy Lack," Cooke explains.

They made the trip to the island on a small boat, which was sometimes tossed
Continued on Page 1030

Filming in Kuala Trengganu of refugees who would soon be sent to Pulau Bidong. A major and continuing problem throughout the shoot was the mass of people who clustered around the camera crew whenever filming began, waving and pointing. Various strategems had to be devised to fool the crowds and minimize the problem.



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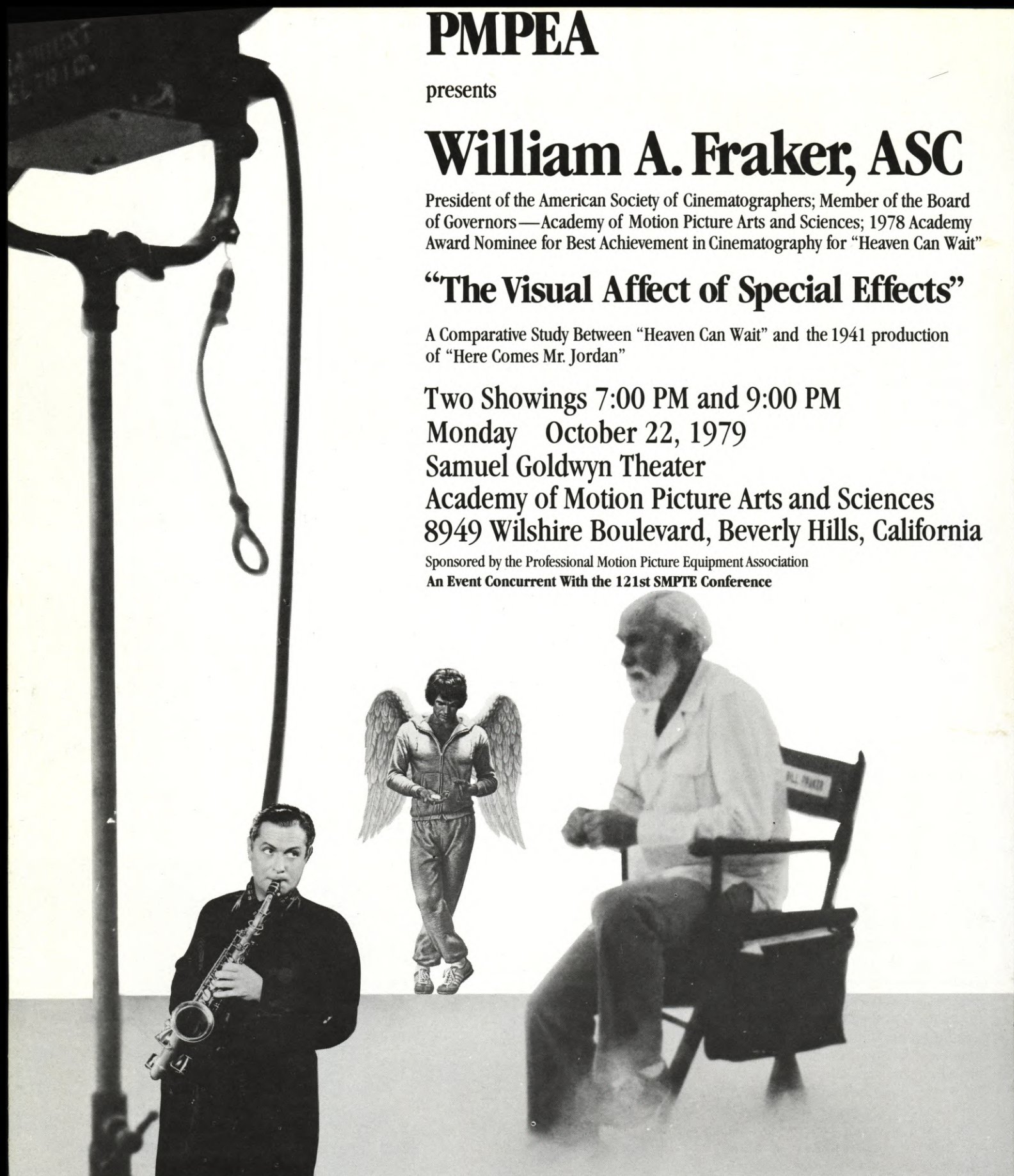
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NEW FRONTIERS IN COMPUTER ANIMATION

How computer-aided animation greatly enhances the productivity of the creative artist while improving the economics of film animation

By EDWIN E. CATMULL, Ph.D.

Computer-aided animation, far from shrinking the role of artists as has sometimes been thought, greatly enhances their productivity and so improves the economics of animation production. As a tool in the hands of animation artists, a dedicated computer system automati-

cally performs many of the non-creative tasks which have had much to do with the high cost and extended production schedules of animated films. Moreover, computer-aided animation can provide artists with special graphic capabilities that are unavailable with conventional

animation.

The Computer-Aided Animation System (CAAS), which has been under development at the New York Institute of Technology for over four years, is now operating as a full production facility at NYIT's Computer Graphics Laboratory (CGL). In support of a staff of more than 35 animation artists and technical people, the CGL's computer hardware, application software and special animation equipment are capable of producing cost-effective educational and commercial films of high quality. Three-dimensional images and unique visual effects are provided with digital techniques developed for CAAS.

The Animation Station

The point of interaction between the artist and the CAAS is the animation station (FIGURE 1a). Here, as shown in the schematic diagram in FIGURE 1(b), the artist can draw lines, paint pictures and control the station's use of CAAS resources. In character animation, the line drawings are outlines of characters, and the painted spaces are both backgrounds and color-filled character figures. There are vast differences in the creativity and skill required in painting backgrounds and filling in characters. Persons who do either job, however, will be referred to here as artists; both are specialists whose functions have not changed in computer-aided animation (even though their tools have).

There are three different types of cathode ray tube (CRT) terminals in an animation station:

- *Color monitor* (center in FIGURE 1a): backgrounds are painted and line characters filled with color under control of the artist.
- *Graphic display processor* (top center in FIGURE 1a): line characters traced or drawn by the artist are displayed on the screen. The processor is also used to present a menu of animation functions for the artist's selection and to display characters in rapid sequence in an electronic "pencil test", as described below.
- *Video display terminal* (right center in FIGURE 1a): the artist's direct link to the Digital PDP-11/34 minicomputer that controls operation of the station. The artist follows instructions and answers questions displayed on the video screen, and inserts commands at the keyboard below.

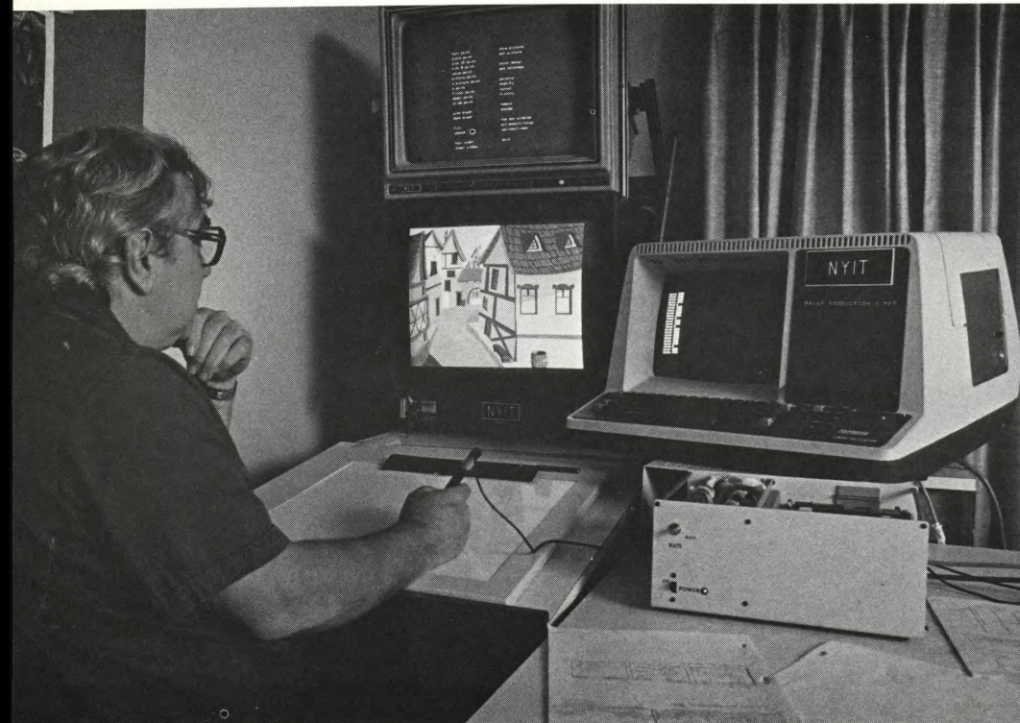
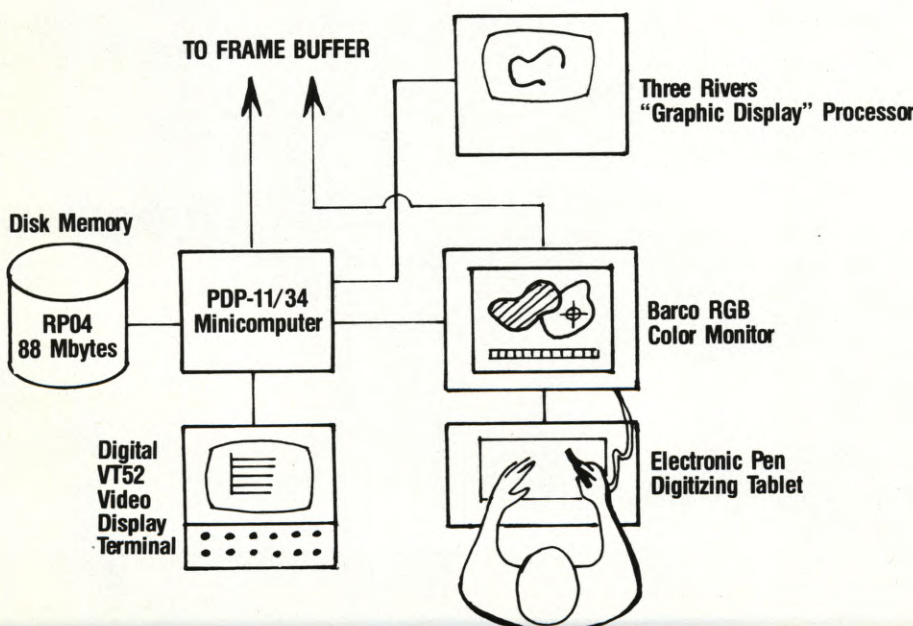


FIGURE 1—Background artist Paul Xander paints a background at an animation station in New York Institute of Technology's Computer Graphics Laboratory, Old Westbury, N.Y. Main elements of the station are the color monitor (center), graphic display processor (top center), video display terminal (right center), and the electric pen and digitizing tablet in front of artist. (BELOW) FIGURE 1b—Schematic diagram of animation station.

FIGURE 1(b)



The application programs that run on the station's dedicated minicomputer have been written so that the artist need not know anything about computers. The artist's control of CAAS functions at the video terminal is accomplished by means of an animation-oriented language that uses a minimum of computer terms.

The artist's means of communication with the images on the color monitor and graphic display processor are an electronic pen and digitizing tablet on the table below the color monitor. As the artist "draws" on the tablet with the pen, a "cursor" follows the pen's motion on the screen of the color monitor or graphic display processor (depending upon what animation task the artist happens to be performing). Spaces in a figure are painted with a selected color simply with a touch of the cursor. In creating backgrounds—usually a much more sophisticated task for both artist and computer system—the cursor on the color monitor actually becomes a "virtual brush" of the artist's own design.

CAAS Hardware

There are six independent animation stations in the CAAS hardware configuration in the Computer Graphics Laboratory (FIGURE 2a). In addition to the six minicomputers at the animation stations, the CAAS includes another PDP-11/34 that controls the Dicomed D48 color film recorder and a PDP-11/70 mini that is used mainly for developing application software. In addition, there is a superminicomputer, a VAX-11/780 (FIGURE 2b), which like the other minis is manufactured by Digital Equipment Corporation, Maynard, Mass. As will be seen, the VAX-11/780 performs the largest computing task in CAAS, assembling the characters and backgrounds into complete animation frames.

Frame buffers—there are 22 of them in the CAAS—are the active storage medium for the very large number of digital bits (a 1 or a 0) that represent a color picture. Each buffer consists of a 512x512-byte memory (8 bits in a byte) with a video port and random-access interface to any of the computers in the CAAS. Pictures stored on one or more frame buffers can be transferred to the IVC 9000 video tape recorder at video speeds or can be displayed on color monitors at any animation station for modification by artists. With this flexibility, the animation stations can be switched from task to task as the workload demands.

At any one time, the CAAS may be called on to hold perhaps hundreds of pictures that are being processed in an ongoing production and thousands more

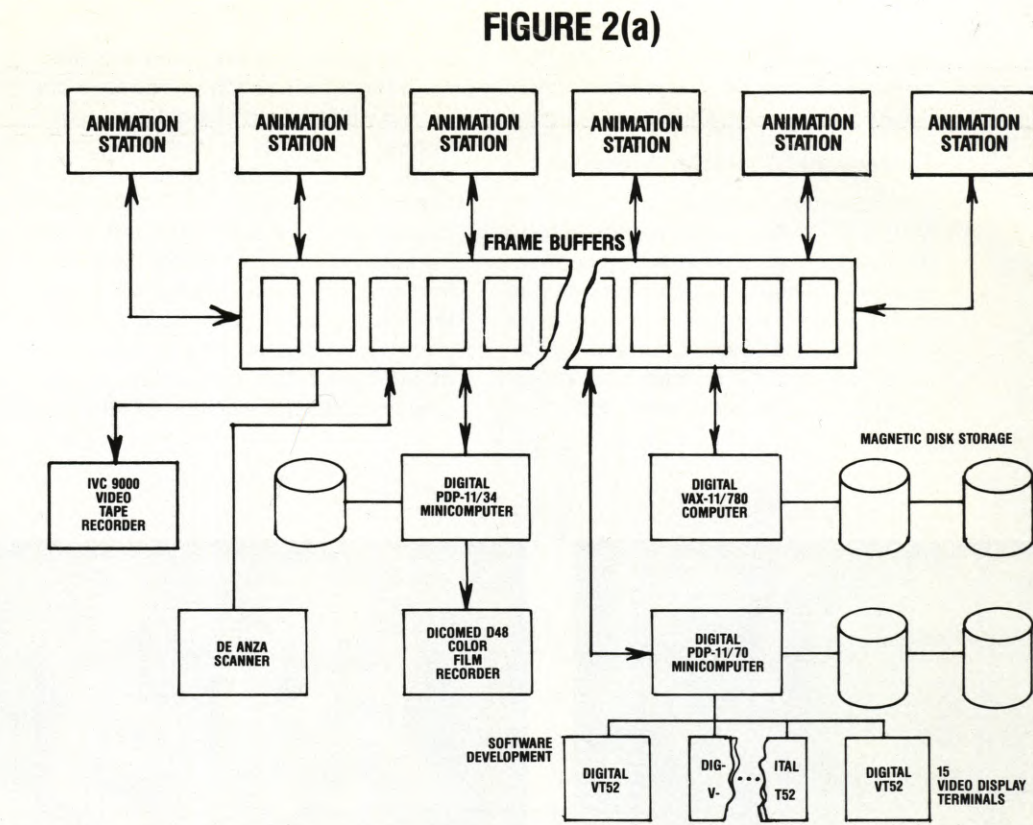


FIGURE 2a—Schematic diagram of the Computer-Assisted Animation System (CAAS). (BELOW) **FIGURE 2b**—The Digital VAX-11/780 computer (left) has the most strenuous data processing task in the CAAS, assembling the background image and one or more levels of character images into a complete frame for recording on video tape or photographic film. One of the PDP-11/34 minicomputers controlling animation stations can be seen at right. (NOTE: The author, Dr. Catmull, formerly Director of the Computer Graphics Lab at New York Institute of Technology, is currently Director of Computer Systems Development, Lucasfilm Ltd., San Anselmo, Calif.)



that are filed in permanent storage. Since there are only 22 frame buffers, temporarily inactive images (those that at a given instant are not being painted at an animation station or assembled for recording) are stored instead on magnetic disk files under control of the computer. The 262 Kbytes of data that represent one color picture on a frame buffer are compressed so as actually to occupy only a small

amount of this space on a magnetic disk (otherwise, the cost of disk space would be prohibitive). When a magnetically stored picture is needed again for processing, the computer simply decompresses it and transfers it to an open frame buffer. There, the picture is available to the appropriate animation station or for assembly by the VAX-11/780 computer. The CAAS computer software

performs the compression in a way that there is no loss of detail or degradation of resolution in the decompressed picture.

Conventional Character Animation

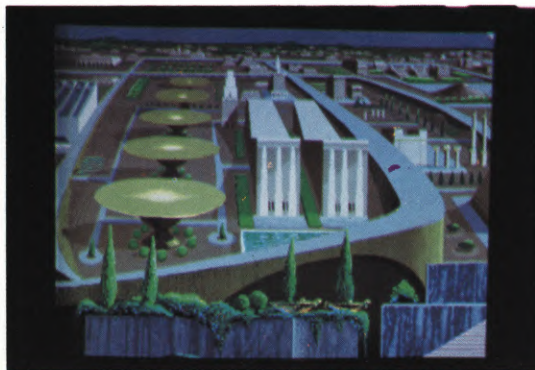
The process of creating animated films with the CAAS is best understood through comparison with the conventional manual procedure for one particular type of animated product. While the CAAS is also used to produce educational films and TV commercials, its application in character animation most

directly parallels conventional practice.

Character animation is basically concerned with cartoon characters in motion through a number of frames against a background. The background image is fixed throughout a given scene (there may be pans and zooms using the same background), which normally consists of from five to perhaps 30 seconds of uninterrupted action by the characters. At 24 frames a second, a scene in a high quality production that is shooting on ones (one film frame per animation frame) then

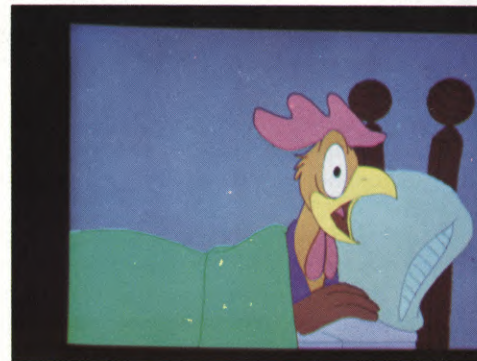
can include anywhere from 100 to 600 sets of character images matched with one background image.

The character images—there may be several of these overlaid in each frame—and background image are created independently, assembled in the proper sequence according to an exposure sheet, and photographed frame-by-frame on film or video tape. This general procedure is the same for manual and computer-assisted animation, as are writing the story, storyboard and detailed



(LEFT) and (CENTER) FIGURE 6—The PAINT software package has been used to create these two backgrounds. (RIGHT) FIGURE 7—An artist is shown using the SCAN-AND-PAINT software package to paint the rooster's head on the color monitor. The SCAN-AND-PAINT coloring of character images is done with a much more simplified version of the PAINT software and consists of filling in enclosed spaces in the character with colors already specified by the background artist.

FIGURE 8—Three steps in CAAS production of a single animated frame: (LEFT) Line drawing of the rooster. (CENTER) The rooster fully painted. (RIGHT) The fully painted rooster has been assembled with the background by the computer.



(LEFT) FIGURE 9—A three-dimensional image produced with the TEXAS 3D software package. (CENTER) FIGURE 10—An image produced by the Computer Graphics Laboratory with the special effects software library and the PAINT software package. (RIGHT) FIGURE 11—Example of the elaborate painting capability of the PAINT software package.



layout, and sound track recording and reading.

In conventional animation, the background image is painted by a background artist, who in the process determines the variety of colors that will be available in painting the characters. An animator draws the line figures in every fifth or seventh character image, and an assistant animator cleans up the drawings and perhaps draws several more images. Finally, an "inbetweener" draws the character positions in intermediate images that will provide the desired smoothness of motion.

Before being painted, the character images that have been drawn on animation paper are filmed and projected in frame sequence for the customary "pencil test" in order to review the action and make any necessary changes. The drawings are then transferred to acetate by Xerox copying or ink tracing and painted. The one or more character images are registered over the background image

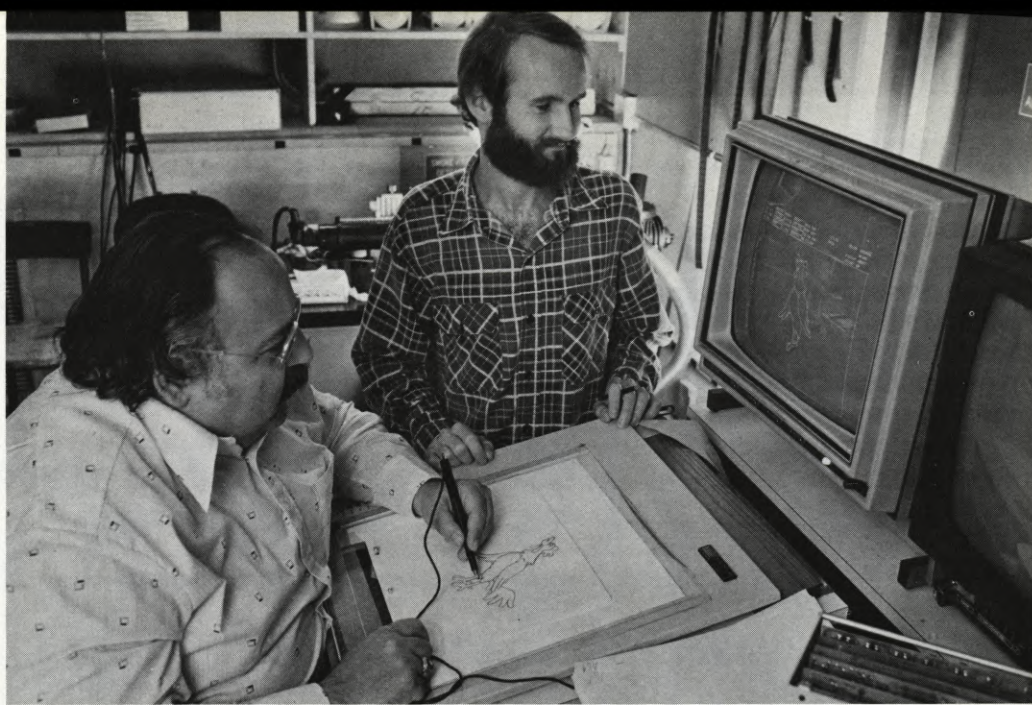


FIGURE 3—An artist is shown drawing a rooster with an electronic pen on the screen of a graphic display processor by tracing a line drawing on the digitizing tablet. The rooster simultaneously appears on the screen and, when completed, is stored in the CAAS at the artist's command.

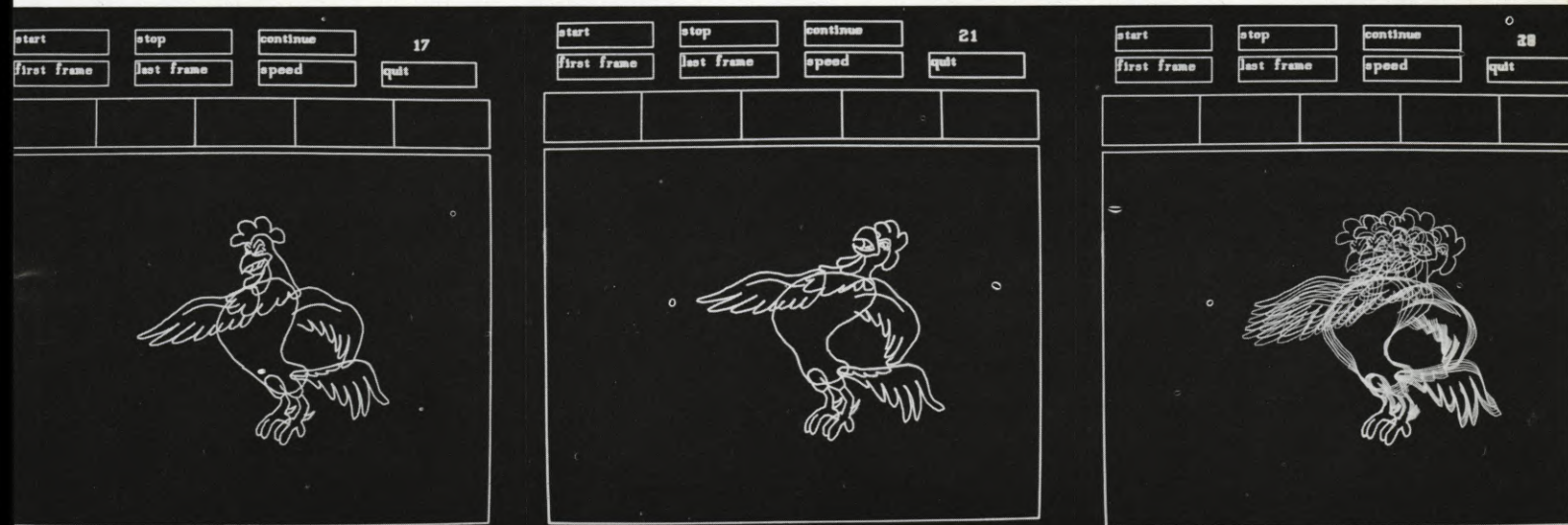


FIGURE 4—The two "extreme" characters (LEFT) and (CENTER) were scanned from artists' drawings into the CAAS. The three "in-between" characters displayed with the extremes (RIGHT) were produced automatically by the CAAS by interpolating motion of the character between the extremes. (BELOW) **FIGURE 5**—An electronic "exposure sheet" is entered by the artist to guide the CAAS in assembling frames of a background image and one or more levels of character images.

and photographed to produce an assembled frame.

CAAS Process

The purpose of computer-assisted animation is to reduce the total touch-time—that is, the time spent in all steps involved in producing an assembled frame. The touch-time is reduced by CAAS at these four major steps: Drawing the line character figures, painting the background, painting the character figures, and assembling the character and background images. In CAAS, these functions are performed by artists with the help of a number of special computer software packages.

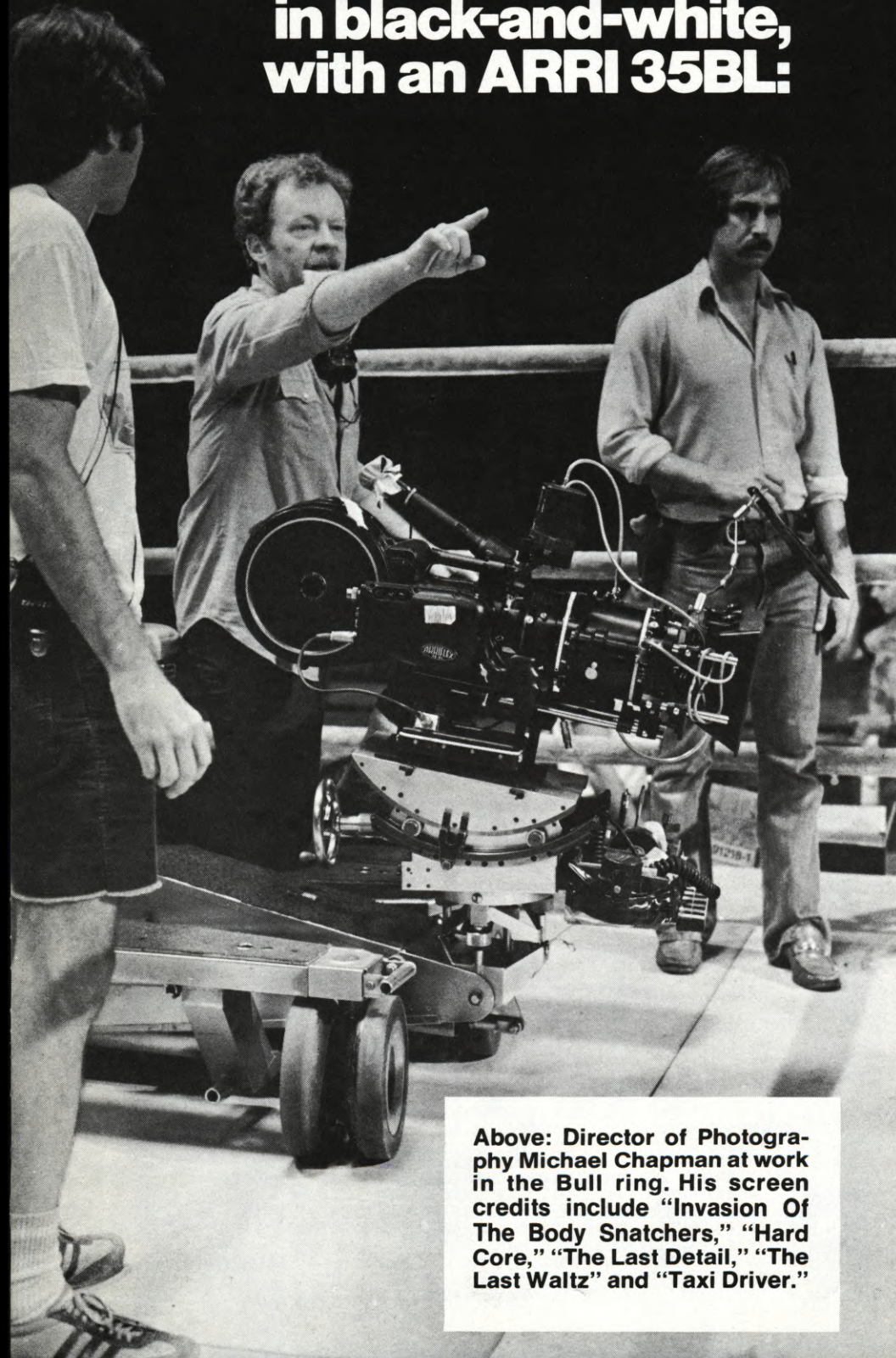
Prototype versions of two software

view	manipulate	scene	interp	size	mag					
match	pencil		interp	table	macro					
track	continues	color	background	grey	lit					
	render				up					
EXPOSURE SHEET Roo3.sqn 4.scn										
frm	ddc	b	c	d	e	f	g	h	i	j
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22										
23		tw12	h12			w12				
24										

Continued on Page 1049

"The fight sequences are choreographed as though it were a musical."

Michael Chapman talks about shooting *The Raging Bull* (directed by Martin Scorsese) in black-and-white, with an ARRI 35BL:



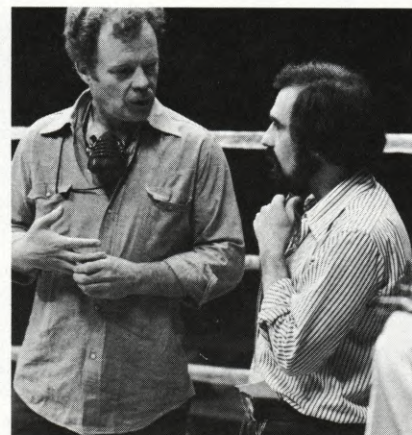
Above: Director of Photography Michael Chapman at work in the Bull ring. His screen credits include "Invasion Of The Body Snatchers," "Hard Core," "The Last Detail," "The Last Waltz" and "Taxi Driver."

It's about Jake LaMotta, a New York boxer who was Middleweight Champion in the Forties. *Raging Bull* is what the papers called him.

He's being played by Robert DeNiro, whose opponents in the film are all real boxers. Mr. LaMotta himself is acting as a technical adviser and has been on the set almost every day during the fight sequences.

Period stock

To add to the authenticity and period atmosphere, the film is being shot with Eastman Double X. "I had never used black-and-white before this job," says Michael Chapman. "I was apprehensive."

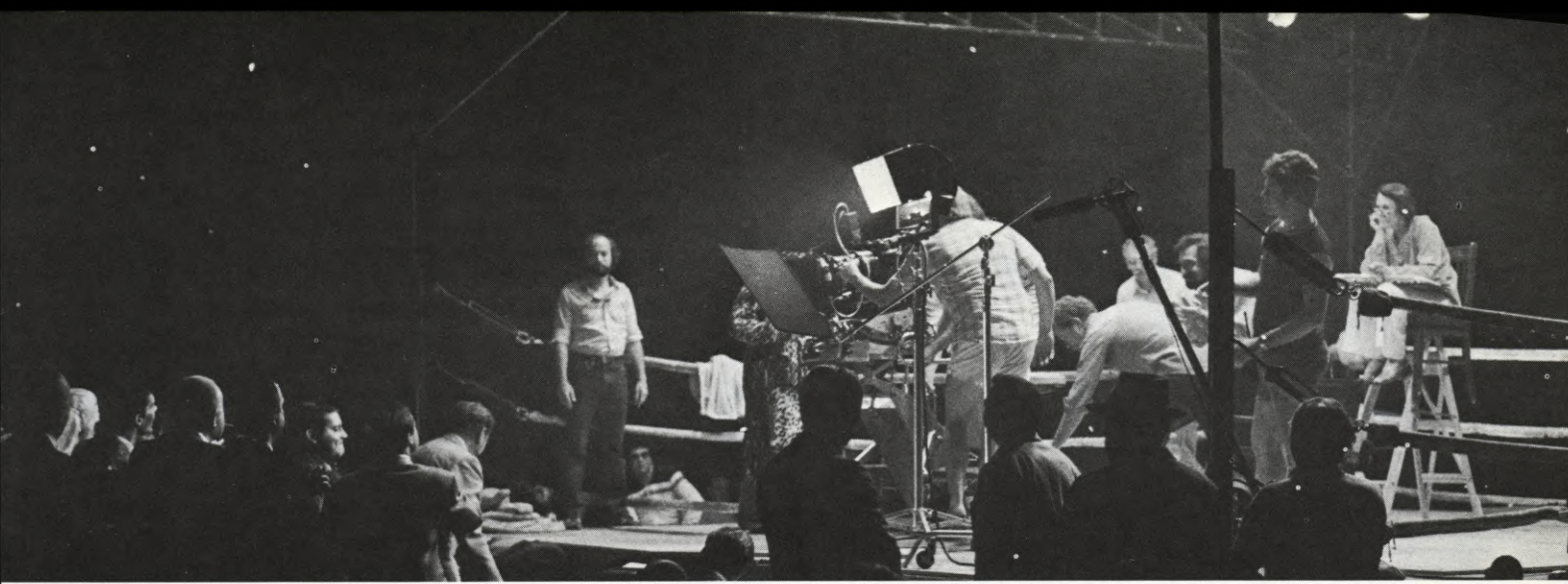


Director Martin Scorsese with DP Michael Chapman

"Before we started, I screened some black-and-white movies at MGM—*Double Indemnity*, *Salvatore Giuliano*. Even some Buster Keaton, because I remembered liking the simplicity. Separation *without* a rimlight."

Low ceilings

"We ran the usual tests; and I took a Polaroid onto the set with me, at first. I *still* think shooting black-and-white is more complicated. On some locations with low ceilings and nowhere to put the backlight, it can be difficult."



Shooting ringside spectators. Most fights are shot in real ring. Extra sets: rings that break apart, dividing ropes, one ring

40ft long (instead of 20ft), another that's not rectangular, for perspective distortion, *subjective* sense of what fighter experien-

ces. 'Tobacco smoke' in the air is mineral oil, sprayed onto set for 8 weeks. Since it's a laxative, some of the crew wore masks.

"The choice of camera was mine," says Mr. Chapman. "I've been using the 35BL since *Taxi Driver*. For a realistic look on New York streets at night, we needed fast lenses."

Accurate lenses

"After testing for *Taxi Driver*, we found the Zeiss set were the only accurate ones. The marked T1.4 was T1.4. Same thing stopped down. If it said T5.6 it was T5.6. They're superb lenses."

Feels good

"Two other things endear me to the 35BL: It's a marvelous camera to hand-hold. Sits right down low on your shoulder, balanced—like part of your body. *It feels good to use.*"

"The other thing I like is the 35BL's simplicity. It does everything I've ever needed—



Operator Joe Marquette and 1st Asst. Dustin Blauvelt run around circle of "press photog." extras for downed boxer's groggy POV of ringside scene. 48 fps, with 16mm lens.

but the system is not intricate. And you can just grab three cases and go."

"The fights will be only about 20% of *Raging Bull*," says Mr. Chapman, "But they're

the high points of the film—so we've spent about eight weeks shooting them."

"Marty (Scorsese) likes a baroque shooting style. Lots of moves, elaborately staged. Different camera speeds. There's a storyboard frame for *every shot in every fight.*"

Baroque style

"Boxers constantly circle one another; and our camera never stops, either. 360° pans, crane shots... And every move—boxers *and* camera—is choreographed. Cut together, the fights all look like dances."

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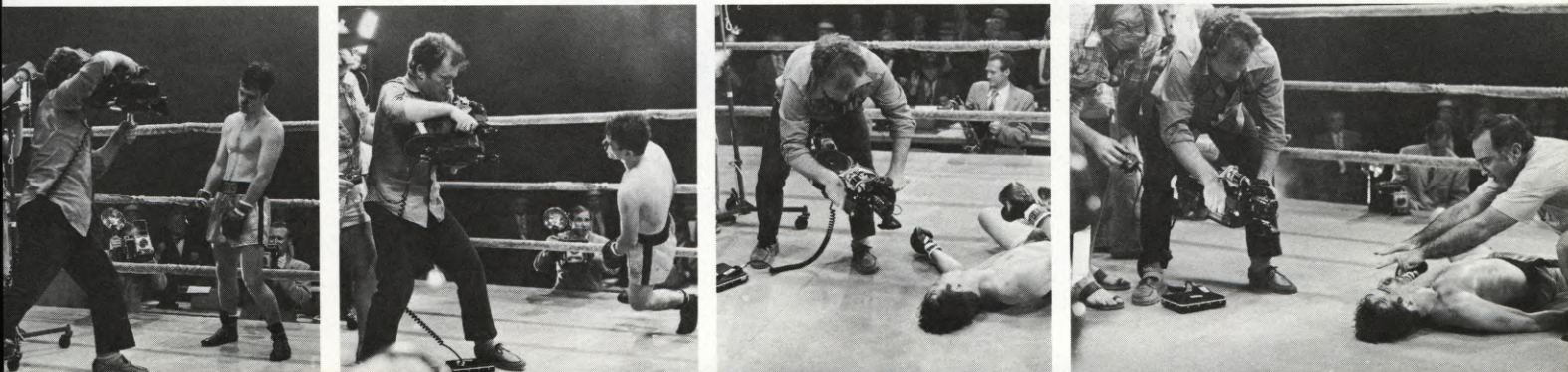
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One of LaMotta's challengers (played by Kevin Mahon) gets knocked out. Michael Chapman

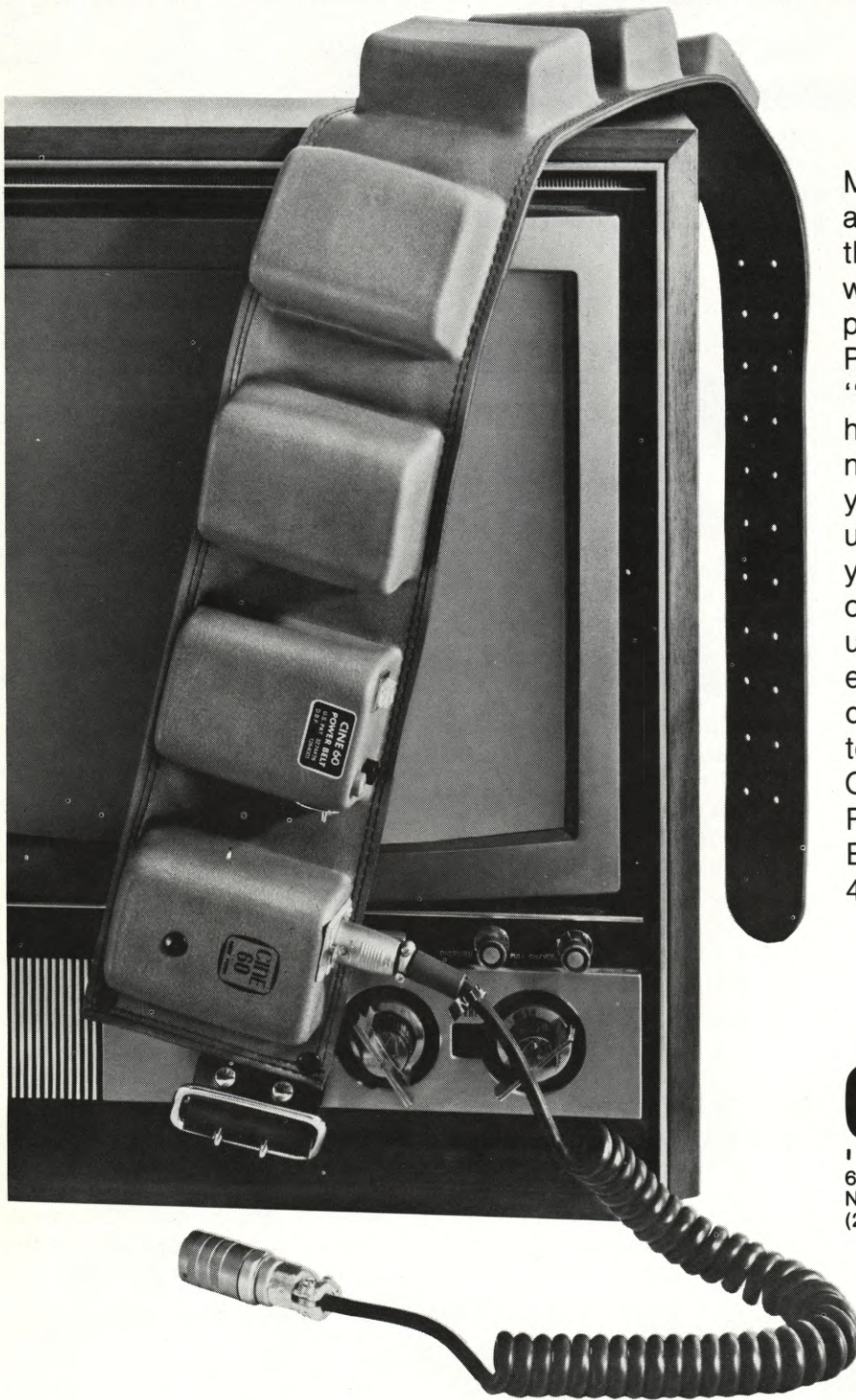
hand-holds a 35BL running at 48 fps, 16mm lens. Closeup shots *inside* ring attempt to convey La-

Motta's emotional POV, as opposed to newsreel or TV shot, spectator's POV outside ring.



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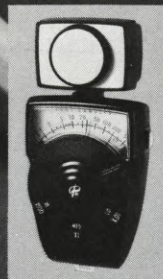
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THE FREEFALL FILMING OF "MOONRAKER"

In an effort to create the most spectacular opening sequence for the latest James Bond film, skydiving daredevils take to the air

By RANDE DeLUCA

They said it couldn't be done. THE SPY WHO LOVED ME touted "the most spectacular opening sequence ever filmed" and many doubted that it could be topped.

In July of 1977, my partner, B.J. Worth, and I began discussing the capabilities of freefalling skydivers; what could be staged, and filmed, which might put MOONRAKER's opening one step better. We weren't fully aware of what was to come. Some of our past work was viewed again and several ideas came to light. Our initial reaction—it might just work! Since we still had reservations, a step-by-step test program was begun to afford us the best possible results.

B.J. started making arrangements for the jumpers (doubles for Bond and Jaws) and the necessary equipment. As my specialty is freefall cinematography, I got to determine and produce the camera system which would be used in freefall and yield the quality expected in a 35mm production with a 2.35:1 format. I started running.

Practically speaking, a freefalling cameraman is limited to a total helmet weight of 12-15 pounds maximum. Multiply that by an opening force of 2-3 G's (higher in the event of using the "reserve" or emergency parachute) and you begin to see the problem (if not stars). A 30mm Panavision lens weighs 6½ pounds—not much left for the camera.

The Eyemo was the only 35mm camera I knew of which came close for size and weight; however, some of our other

requirements might negate its use.

I began calling lens and camera manufacturers, optical engineers, underwater specialists, anyone I could think of. I wanted all the information available on 16mm anamorphic lenses or attachments, lightweight 35mm cameras and 35mm anamorphic lenses which might be an alternative to the heavier, but common, systems. Every answer drew the same conclusion: optimum results required 35mm anamorphic format, and no single system combined the size, weight, frame rate and reliability requirements set forth.

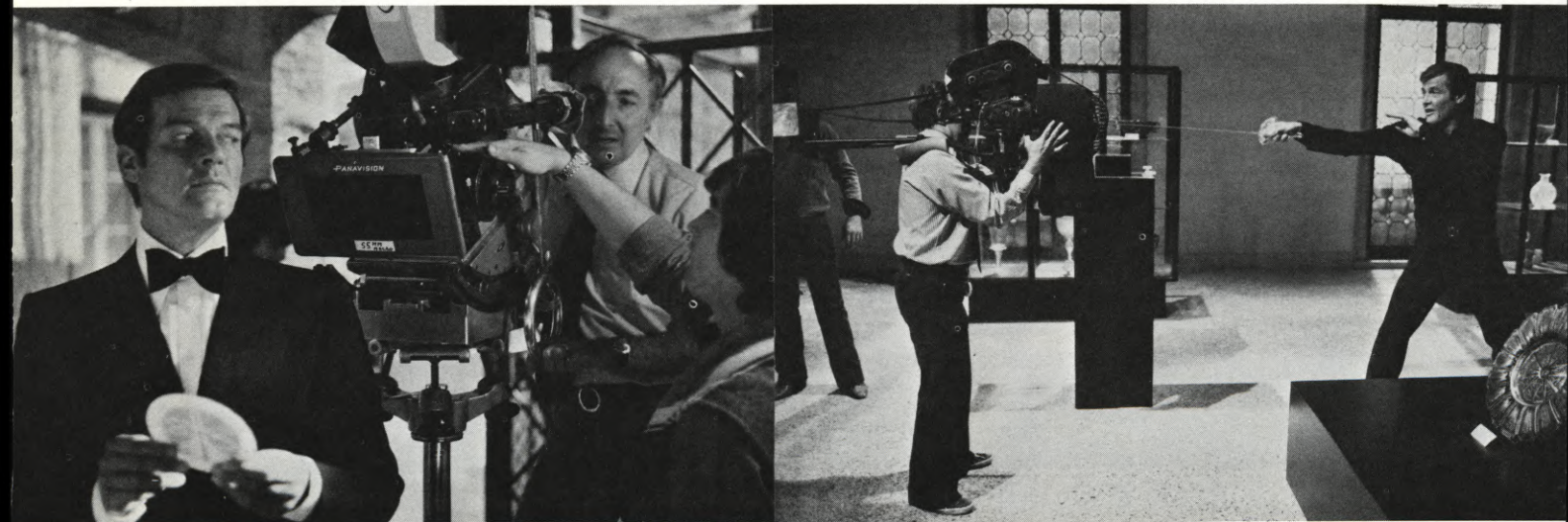
Our first test was filmed using my own Photosonics 1VN—a high-speed, pin-registered 16mm photo-instrumentation camera—the reason being that some of the shots we discussed might require high frame rates, and the 1VN will run up to 200 fps. We knew that enlargement of the film would compromise the quality, but it might have to be done anyway. Also, on the test, the results of the action were more important than the format. We did have this piece of film optically enlarged, with the obvious results—adequate, but we had to find a suitable 35mm system.

The second test evolved around the Eyemo 35mm camera. This unit weighs in at about 6½-7 pounds without lens—which was about the maximum I would care to jump, once film and lenses were added. For the test jumps, I adapted my existing helmet to fit the Eyemo and used a spherical lens, (a) to see if we could live with optically enlarging and cutting off

the frame to 2.35:1, and (b) in the interest of saving weight and keeping the mount simple for the test. Since my preference is for the camera to be mounted on top of, rather than on the side of the helmet, some modification of the existing mount was necessary; I also had to become accustomed to the extra foot I had "grown" over my normal cameras. This became most noticeable when I wanted to move about in the already-cramped Cessna 180 or get out of the four-foot-tall door. I wasn't terribly comfortable with the size and bulk of the Eyemo and didn't look forward to jumping one with an anamorphic lens. If we shot in full screen or academy, we would still suffer an unwanted loss when going to the 2.35:1 format. Too, I wanted the availability of higher frame rates together with a more rugged pressure plate design. What to do?

About that time, I read the article in *American Cinematographer* on the filming of CAPRICORN I and noticed (1) Dave Nowell, the author, was a long-lost college buddy, and (2) Continental Camera of Los Angeles had a 35mm "P.O.V. Camera." After a telephone reunion with Dave, he turned me over to John Carroll, who told me about the camera. Freddie Waugh, a stuntman, and Al Beck of Cine Mechanics had designed and built a 4½ pound (without lens) 35mm camera which had a 100' daylight load capacity and would run a reliable 48 frames-per-second with no floating of film in the gate. It had already been helmet-mounted for

Roger Moore resumes his place before the camera as the urbane British secret service agent "007" in the latest James Bond film caper, "MOONRAKER". The hugely popular Bond films combine sophistication, low-key sex, comic-strip violence, high adventure, droll humor, spectacular set design, incredible vehicles and fascinating gimmicks in an irresistible mix. Nobody seems to notice (or care) that the plot is always the same: Bond confronting a megalomaniac billionaire who wants to take over the world, or, in the case of "MOONRAKER", the Universe.



stunt work. Somehow, it took two months of inquiries to find out that the Panavision lenses could be adapted to the Arrimount P.O.V. camera. After discussing the situation with John Carroll, he agreed to let me test-jump the camera. The conditions: mount the camera and lens so that each were supported totally and independently, as the lens mount would not support an anamorphic lens during a parachute deployment; and: don't break the camera.

To ready the camera for jumping, Dave and I took it back to Al Beck, who modified the lens mount to insure proper alignment. We then designed a very basic mount which would suffice for the test. In a couple of days, Don Taylor of D & E Industries gave us a strong, light-weight alloy mount on a new helmet. The subsequent test was a culmination of everyone's efforts. The specially-built parachute systems, the camera, the personnel—we had come up with the necessary combination for filming the opening to MOONRAKER.

Ten months after we had come up with our first idea, the "skydiving unit" gathered together to film what was to become the "Big Sky Sequence"—a fight in freefall between James Bond and his adversary over a single parachute. Winner takes all. The helmet mount had been replaced by a new, stronger one which would break down easily and support a variety of Panavision lenses for the 90 to 100 jumps we estimated to be necessary. Extra batteries, chargers and wiring systems (leading to a hand-activated switch) were supplied as back-ups, all as requested. The total system weight (helmet included) was 12.5 pounds, which required a parachute with slow, consistent openings. The reefing-line deployment system on Para-Flite, Inc.'s Strato-Star was of major importance in keeping me in the air. On the first day of filming, on our fourth jump, we all became overly involved with the action and opened very close to each other. My attention was diverted, I didn't brace for opening shock, and badly wrenched my neck. Any other parachute opening system would have ended my career. After a weekend of hot-springs and hydrotherapy, we began again. Due to this incident, we felt that a standby cameraman would be a good idea. Peter Boettgenbach, a German parachutist/photographer, was immediately available and filled the position. He also provided some excellent production stills.

The staging and filming of the entire sequence proved to be quite educational . . . and challenging! According to the storyboard which had been drawn up, eighty-four separate scenes would be required; and about 85% of these would



Former Captain of the United States Parachute Team B.J. Worth models the latest in pilot's apparel as he freefalls through the air after 007 has wrestled his parachute from him. The specially designed suits contain both main and reserve parachutes and were reinforced to withstand freefall fights and landings. Photograph by Peter Boettgenbach.

be air-to-air shots.

Freefall is perhaps a cameraman's most limiting environment. Aperture, frame rate and depth-of-field must be pre-set, then left alone during the jump. Sighting must be aligned on the ground; the Newton Ring-Sight provides reference only to the center of the frame. Composition and framing is by experience (trial and error, and luck, in some cases).

In the movie, when James Bond initially leaves the airplane, the scene called for the plane banking away out of control and leaving frame to the side. The speed and angle at which we exited, my distance from "Bond" and the width of the frame called for accurate timing of our exits with respect to each other and to the aircraft. To get the desired effect, the pilot had to start a bank in the direction *opposite* to what we needed. As he reversed direction of roll, momentum picked up, and we let go as the aircraft passed 50° to 60° of bank. The result was just as hoped for—Bond, out of control, without parachute, falling away from a doomed plane.

Film capacity and frame rate limited us as well. Much of the action was occurring so fast that a higher frame rate was necessary to get "normal" motion on the

screen. Therefore, camera running time was limited to about 35 seconds. That was minor, compared to staying with my subjects. Following two jumpers who were "fighting" was quite a task, since their rate of fall was much faster than your average skydiver or group. The problem was compounded by their use of business suits in place of regular jumpsuits, which resulted in exaggerated speed and an overall decrease in control. They tended to move about in a very rapid and erratic manner. Following them, remaining a somewhat stable camera platform and taking into account sun angle, lens size, depth-of-field, composition and background proved even more interesting. The available freefall time in most cases allowed for the set-up, one try at the action and separation from each other for opening; no rehearsals, minimal extra time. At least the weather was in our favor; lighting conditions were fairly constant during the hours we set aside to film—late morning through early afternoon.

As we all adjusted to the situation, the number of jumps increased to an average of five per day. One-by-one the successful takes were set aside and I found myself jumping a different lens and posi-

Continued on Page 1054



Shooting a documentary: quick moves. Camera rests comfortably on Mr. Fauer's shoulder as he hand-holds with tripod attached.

Hand-holding with the tripod on the camera! Jon Fauer talks about working with a Sachtler:

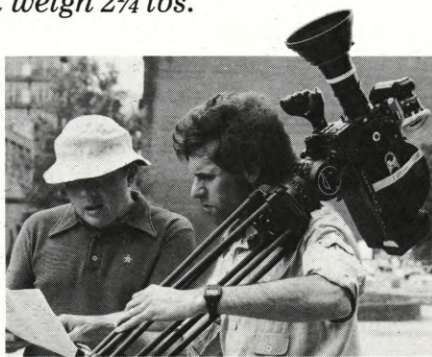
The effect on documentary style of a 6¾ lb. fluid head and carbon-fiber 58 inch legs that weigh 2¼ lbs.

“When the action isn't going to repeat and it's happening fast, you often have to go hand-held,” says documentary cameraman Jon Fauer.

“But you give up a lot, of course. No steady long-lens closeups. No throwing the background out. Even staying wide, the image isn't really rock steady on a big screen. All these things you sacrifice for speed.”

“I bought the Sachtler because of its incredible light weight with the carbon-fiber legs. After I began using it, I found I could make quick moves to a new angle carrying tripod and camera together. The Sachtler was the first tripod that didn't slow me down.”

“The quick-release plate lets me go hand-held fast — and with the ARRI SR on my



“We spend half the time carrying the equipment around,” says Jon Fauer. “Weight is important.”

shoulder, the plate doesn't dig into me. I find I can put the camera back *onto* the Sachtler faster than I could with any other tripod.”

“Using my SR on other fluid heads, I was always fighting the counterbalance spring. Too much or too little. The Sachtler's adjustable spring gives me perfect neutral balance — with my 400mm *and* my Zeiss Superspeeds?”

“The SR's tripod socket is fairly far forward on the base, and the Sachtler's quick-release plate is small. That's why it doesn't dig into my shoulder,” says Mr. Fauer.

“The head is small, too. And this led to something I wouldn't have believed. In the heat of the moment, I found myself needing a hand-held shot *fast*. So I began hand-holding — *with the tripod still attached!* I forgot it was on there.”

Who took the photos on this page — and why is that significant?

On this job, there was a two-man crew: Jon Fauer, cameraman, and his assistant, Jeff Laszlo. Usually, the assistant has his hands full carrying the tripod around two steps behind the cameraman. As you can see, Mr. Fauer carried camera and tripod himself. The pictures were taken by Mr. Laszlo.

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"GLOBAL VILLAGE" Continued from Page 982

But how does one visualize this intellectual concept, of an unseeable worldwide communications network? We considered maps with lines to indicate communication of data. Every idea seemed tired and unexciting. We needed something to symbolize the reach of the system from one part of the world to another that was not cliché. Then, I came up with a difficult-to-explain concept. It was to have a neon bolt of light that would leave the computer system and speed around the world to other locations like Paris and then zap into the window of the Nomura Securities building in Tokyo,

symbolizing the calculating, figuring and instant carrying of complex business data. After many questions and extensive testing, this was the solution! The bolt of light is repeated every time the network is used for numerous locations around the world.

To do this, Tim Housel, our main cameraman and special effects genius, built a large graphic device—a light rig that moved on tracks through a huge blackened-out warehouse in New Jersey. One frame was photographed at a time. Basically, it was shooting live action with an animation approach. The only difference was that it was on a huge scale and
Continued on Page 1024



Roger Flint directs Nomura Securities executive in London scene, as Bill Steele photographs the action. (BELOW) Flint sets up a shot for cameraman Tim Housel in the open market, Paris. The film was shot in many diverse locations throughout the world in order to emphasize the truly global nature of the client's service.



DEVELOPING A SPECIAL "BOND" BETWEEN FALL GUY AND CAMERA

Choreographing a freefall fight that included tumbling, flipping and spinning through the sky called for touchy teamwork, to say the least

By B.J. WORTH

With guarded optimism, Mike Wilson outlined the freefall sequence proposed for this latest James Bond classic. Their novel idea portrayed a conventional confrontation, but was set in freefall as a breathtaking medium. To portray this sequence as absolutely believable required precise synchronization between the freefall cameraman and the aerial stuntmen.

Rande Deluca, my partner, was responsible for assembling all the necessary camera equipment and then operating this system while flying to the proper position in the sky on his "air-bubble" camera platform.

My attention was directed toward achieving the precise action required for this sequence, and then solving the unique technical and practical challenges encountered in coordinating this action with its documentation by freefall photography.

In the sequence, "James Bond" is pushed from an airplane sans parachute and proceeds to fight with the pilot who is already in freefall and who is wearing a

parachute. "Bond" eventually removes the pilot's chute and, after donning it in freefall, evades the steel dentures of "Jaws" and saves himself.

The action had to fill the frame in most shots requiring a minimum distance to be maintained between photographer and subject. For continuity, each consecutive or duplicate shot had to have the same sun angle and background orientation. Also, the aerial stuntmen had to wear business suits, which limited their freefall maneuverability and increased their rate of descent. During the scenes with the pilot and "Bond" in freefall, apparently wearing only business suits, it was necessary to have an actual parachute system concealed within the suit and yet remain totally undetectable, even while tumbling and fighting in freefall.

The skydiving stuntmen not only had to be highly proficient in conventional freefall skills, but were also required to have a good understanding of film. They had to be continually aware of their body position relative to the camera, and remain properly oriented geographically to the

ground and the sun. Due to the lack of helmets and the numerous close points of view in freefall, it was necessary for the skydivers to be close doubles for the actors; Roger Moore and Richard Kiel weren't up for joining our aerial set! This would also minimize the need for the often compromising "studio freefall" scenes.

The first important task was to select the skydivers best qualified for each skill needed. Luckily we were able to gather an extremely talented work force, averaging over 1500 jumps each. Zeke Zahar, the Canadian Parachute Team Captain and world champion, was a parachute equipment designer/manufacturer who agreed to construct some formal skydiving equipment for the project. Ron Luginbill, a 6'5" member of the United States Parachute Team, would be a perfect double for "Jaws." Jake Lombard, two-time world champion with a remarkable resemblance to Roger Moore, was obviously the best choice for "Bond's" double. I was awarded the pilot's role based on my recent experience as Captain of the United States Parachute Team, the current world champions.

Jake "Bond" immediately agreed to start making test jumps attacking me in freefall, while Rande Deluca tested his camera equipment and his freefall chasing skills. These test jumps were most educational. Skydiving motion looks normal on the screen when shot at 32 frames per second in most cases. However, punches at 32 fps seem to be slower than normal. We found the best action effects resulted from tumbling, flipping, and spinning through the sky together. It was most important to know where the camera was at all times. We would usually "fight" for five to ten seconds maximum, and then set up on the sunline again and watch for Rande's signal to start the action for another quick take. We only had sixty seconds of freefall each jump, which seemed to be used very quickly.

Jumping the formal "suit-rig" for the first time was a strange sensation, but it worked very well. On the ground it was slightly bulky, but in freefall it actually looked like a normal suit . . . in a very strange place! Rande filmed the "chuteless diver" from every angle with very successful results. This would give the necessary credibility to the entire se-

Filming the famous freefall fight over a parachute for the opening sequence of "MOONRAKER". (Left to right) Rande DeLuca, Cinematographer; B.J. Worth, pilot double; and Don Caltvedt. "Caltweet" doubled as Bond late in the shoot, after Jake Lombard suffered a knee injury in a hard landing.



quence.

The actual sequence was filmed in Pope Valley, California, with John Glen as second unit director. We started with the easier shots involving just one skydiver with the freefall camera. As we became more comfortable with our strange equipment, we progressed to the more difficult shots. We were continually solving numerous obstacles encountered throughout the shoot.

Our need for extensive ground preparation on each jump resulted in a very slow shooting pace. It would take thirty minutes for two assistants to put the special "suit-rigs" on each skydiver. Since freefall time was so limited on each jump, and verbal communication while falling was impossible, we spent many hours rehearsing the necessary signals and action on the ground. After each 150-mile-per-hour freefall fight, any damages to the suits had to be repaired and reinforced.

Initially, we tried to shoot two or three takes per jump, but soon discovered that we achieved better results by taking longer to set up each particular scene, and only shooting one per jump.

One difficult problem was to get close points of views as we tumbled erratically earthward. In order to do this most effectively, Rande would hold on to us, and would then tumble through the sky with us, resulting in some very dynamic shots. We had to be extremely careful though, not to contact Rande's head or camera equipment.

To capture the effect of the skydivers falling toward *terra firma*, as opposed to "floating in the air," Rande used a 30mm lens, and positioned himself 100 feet below and away from the skydivers, as they tumbled down through the frame. This worked more effectively than using a long lens from the ground as we originally tried.

The most difficult challenge was to film the actual chute exchange in freefall. A dummy chute was put on over the "suit-rig," which had to be taken off before the real parachute could be used. At first, Rande had to shoot the scene in several short takes, but eventually Jake and I were able to do the entire scene with one continuous action, and Rande was able to remain with us for the entire shot.

During the five weeks and 92 jumps it took to film this sequence, we all enjoyed the challenge which we overcame by combining top individual performance with cooperative teamwork from the whole crew. Our greatest pleasure came when we saw the exceptionally fine job of editing that John Glen did in assembling the available footage. This is sure to be one of the most memorable sequences of any movie for a long time to come. ■



Rande DeLuca takes the first step of a 10,000 foot freefall with 35mm P.O.V. camera. Altimeter working time: 50 seconds! (BELOW) Front view demonstrates the relative size of the 30mm lens. Viewing through the ringsight provides reference to the center of the frame. Variable inflation of the jumpsuit arms and wings compensates for camera weight and provides vertical and horizontal maneuverability. Photos by Peter Boettgenbach.



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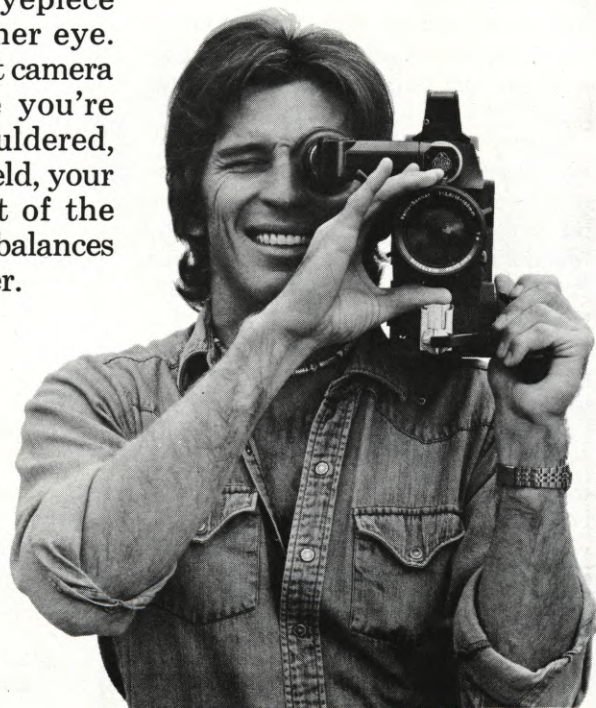
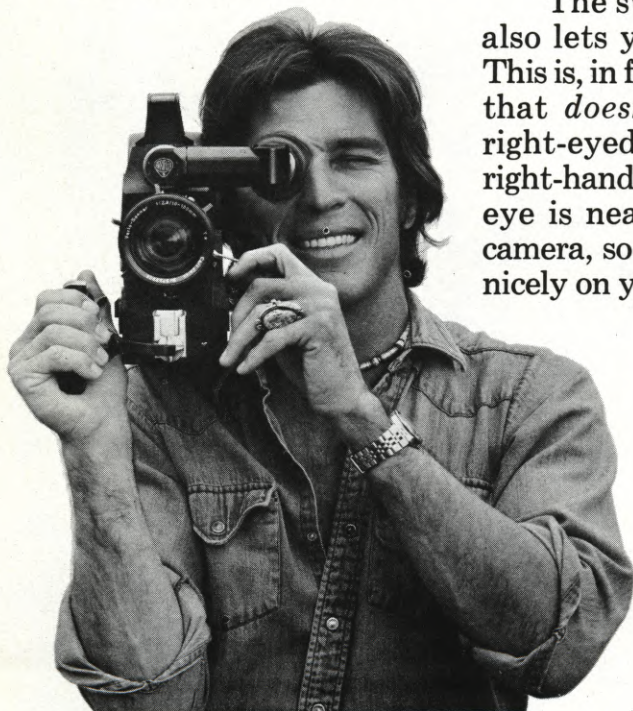
So the primary optical path is vertical, instead of horizontal. It doesn't favor the left side; it doesn't favor the right. And it's equally happy pointing straight up—or any angle in between.

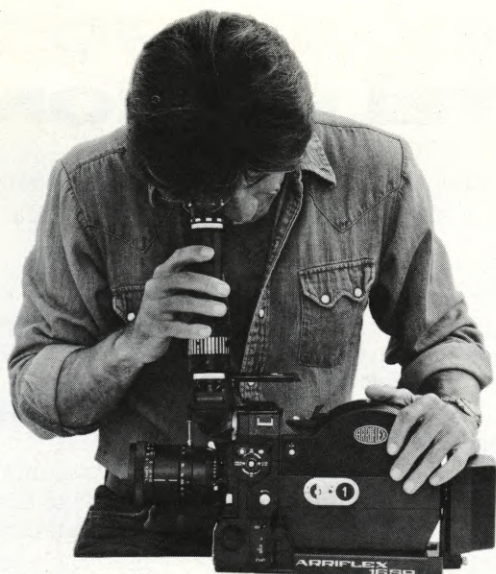
Adaptable

The swivel-out eyepiece also lets you use either eye. This is, in fact, the first camera that *doesn't* assume you're right-eyed, right-shouldered, right-handed. Hand held, your eye is near the front of the camera, so its weight balances nicely on your shoulder.



The seven-inch finder extension makes high angles easier. So does the shutter, which always stops open to the camera's viewfinder.





Steal candid shots by looking the other way.

Fiber focus screen

Compared with a ground-glass, the 16SR's fiber screen transmits more light. Viewing is easier at low light levels. Edge-to-edge brightness is more even, too. And there's much less light scatter, and no groundglass grain. So image contrast is better and it's easier to see when you're stopped down.

Superspeed optics

To match the latest fast emulsions and fast lenses, the entire viewfinder system is a new, large-aperture design. The Zeiss lens transmits T1.3 to the film and the Arriflex finder transmits it to your eye.

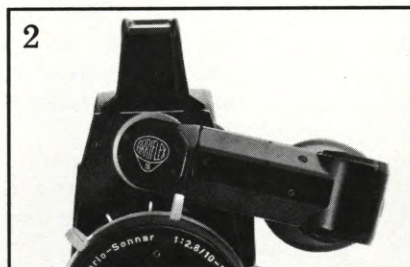
Big, bright image

Moreover, the eyepiece image is magnified twelve times. All in all, the 16SR has the brightest and the sharpest viewfinder image available in 16mm. *Helpful.*

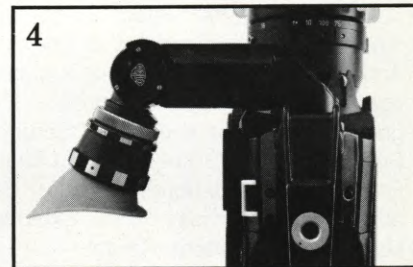
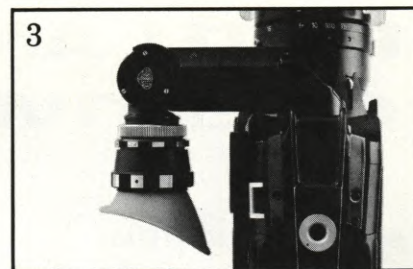
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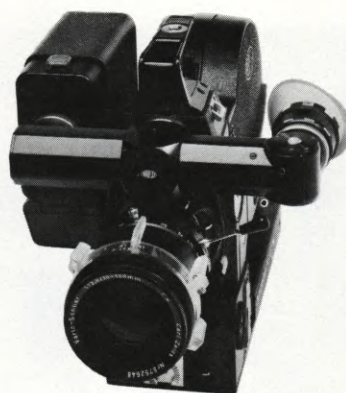
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 In Canada: ARRI/NAGRA Inc., 6467 Northam, Mississauga, Ontario L4V 1J2. (416) 677-4033



Custom Fit
 With the 16SR resting on your shoulder, you can adjust the height of the eyepiece (photos



1 and 2). And you can move it away from the camera's side (either side), to suit either eye (photos 3 and 4). Comfort.

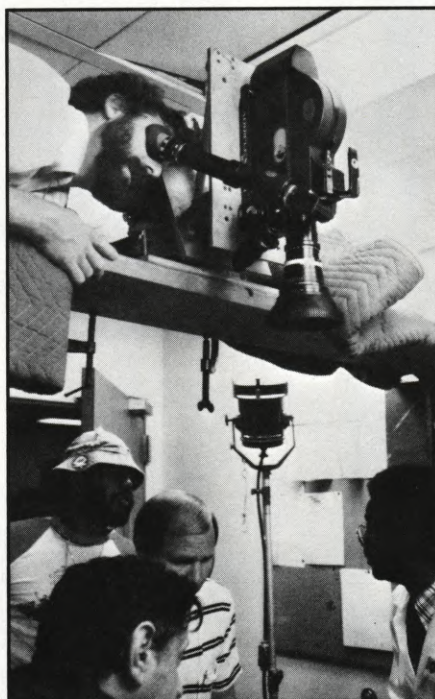


Video monitor

In the photo at left, you can see the Video Adapter mounted on the 16SR's right side. It's easy to attach. On the left side, you view the reflex image normally. The video pickup runs on 12VDC and 110VAC; and it works with most standard remote TV monitors or videotape recorders.

Faster setups
 Wherever you put the camera,

you can quickly see the shot — and so can the director.



16SR at work: left: Jack Cooperman; right: Jack Green. Photographs by Ron Grover.

FIFTH ANNUAL EMMY AWARDS CREATIVE ARTS IN TELEVISION

The Academy of Television Arts & Sciences pays tribute to the creative artists "who utilize their special kind of magic to bring ideas to life"

By HERB A. LIGHTMAN

As has been its custom for the past several years, the Academy of Television Arts & Sciences sponsored a dual celebration of excellence in Nighttime Programming. On the evening of Saturday, September 8, 1979 it held its Fifth Annual Emmy Awards Banquet honoring Creative Arts in Television in the Exhibition Hall of The Pasadena Center.

On the following evening, Sunday, September 9, the Academy telecast on the ABC Television Network its Thirty-First Annual Emmy Awards for Nighttime Programming. The program originated in the Pasadena Civic Auditorium.

For readers of *American Cinematographer*, the Saturday night event was by far the more significant, since it honored the technical artists and craftsmen who work behind the scenes to make those "out-front" register at their best on the television tube. The non-telecast affair, held in the tastefully decorated Exhibition Hall, was characterized by a warmth and intimacy somewhat less evident in the more flamboyant event of Sunday night. It featured radio/television luminary Michael Jackson as host and the presenters included: Beau Bridges, Charlene Tilton, Max Gail, Kristy McNichol, Jamie Farr, Audra Lindley, Olivia Cole, Robert Walden, Loni Anderson, Stan Shaw and Robert Reed. Hank Rieger, President of the TV Academy, presided over the affair.

The awards were widely distributed throughout the two dozen categories, with only three shows ending up with two awards each. The dual winners were "LITTLE HOUSE ON THE PRAIRIE" (cinematography/series and music/

series), "FRIENDLY FIRE" (sound editing and music/special), and "BATTLE-STAR GALACTICA" (costume design/series and individual achievement in creative technical craft).

Winners in the Cinematography categories were two veteran artists of the camera, both of whom had won Emmys previously.

In the category of Outstanding Cinematography/Series, the winner was Ted Voigtlander, ASC, for "LITTLE HOUSE ON THE PRAIRIE" (*The Craftsman*), NBC. This marked the ninth

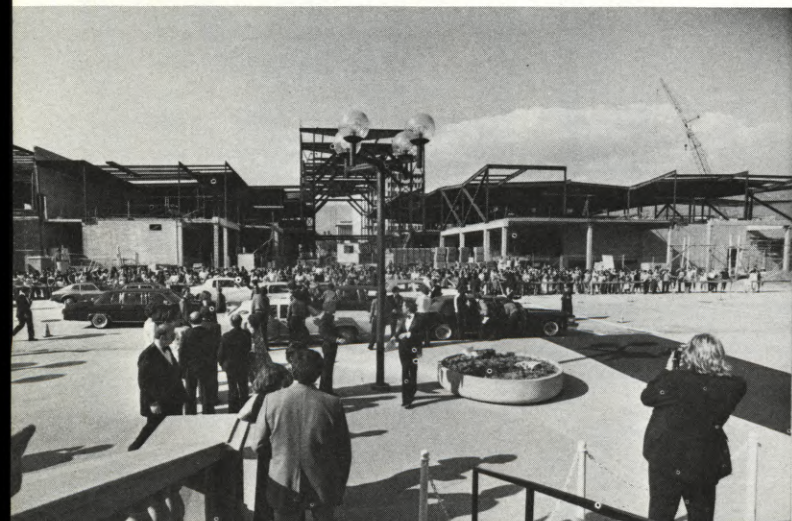
nomination for Mr. Voigtlander and his third Emmy Award. He received his first statuette for "IT'S GOOD TO BE ALIVE" (1974), and his second last year, also for an episode of "LITTLE HOUSE ON THE PRAIRIE".

In the category of Outstanding Cinematography/Limited Series or Special, the winner was Howard Schwartz, ASC. Nominated a total of seven times, he won last year for "THE GHOST OF FLIGHT 401".

NBC led the networks with 10 craft awards. ABC has seven, CBS three, PBS



(ABOVE RIGHT) What it's all about—a table laden with EMMY Award statuettes on the stage of the Exhibition Hall of the Pasadena Center, prior to the awards ceremony. (BELOW LEFT) Fans gathered early across the street from the Pasadena Civic Auditorium to watch television stars emerge from their limousines and to cheer their favorites. (RIGHT) Crowds at the entrance of the Pasadena Civic Auditorium just prior to the start of the nationwide telecast of the Awards Ceremony.





Winning the award for Outstanding Cinematography/Limited Series or Special was Howard Schwartz, ASC, for "RAINBOW", NBC. It was his seventh nomination, second EMMY.

and syndicated shows two each. In addition, an Emmy was awarded to Ampex "for the development of an automatic Scan Tracking System for helical videotape equipment," and a special citation went to Magican "for the development of real-time tracking of independent scenes."

Throughout the evening, host Michael Jackson and the various presenters paid tribute to the honorees as the creative artists "who utilize their special kind of magic to bring ideas to life" . . . from the lighting technicians who create moods from scary and mysterious to romantic, to makeup artists who make the plain beautiful and the beautiful plain, composers who provide dramatic background music, specialists who design logos and titles, others who make doors squeak, brooks babble and birds sing. ■

FIFTH ANNUAL EMMY AWARDS FOR CREATIVE ARTS IN TELEVISION

Art Direction, Series: Howard E. Johnson, art director; Richard B. Goddard, set decorator, "Little Women," part one. NBC.

Art Direction, Limited Series. Jan Scott, production designer; Bill Harp, set decorator, "Studs Lonigan" part three. NBC.

Choreography: Kevin Carlisle, "The 3rd Barry Manilow Special." ABC.

Cinematography, Series: Ted Voigtlander, ASC, "Little House on the Prairie." NBC.

Cinematography, Limited Series or Special: Howard Schwartz, ASC, "Rainbow." NBC.

Costume Design, Series: Jean-Pierre Dorleac, "Battlestar Galactica." ABC.

Costume Design, Limited Series or Special: Ann Hollowood, Sue LeCash, Christine Wilson, "Edward the King." Synd.

Film Editing, Series: M. Pam Blumenthal, "Taxi." ABC.

Film Editing, Limited Series or Special: Arthur R. Schmidt, "The Jericho Mile." ABC.

Film Sound Editing: William H. Wistrom, "Friendly Fire." ABC.

Film Sound Mixing: Bill Teague, George E. Porter, Eddie J. Nelson, Ray West, "The Winds of Kitty Hawk." NBC.

Graphic Design and Title Sequences: Stu Bernstein, Eytan Keller, "Cinderella at the Palace." CBS.

Lighting Direction (Electronic): George Riesenberger, lighting consultant and designer; Roy A. Barnett, director of photography "E," "You Can't Take It With You." CBS.

Makeup: Tommy Cole, Mark Bussan, Ron Walters, "Backstairs at the White House." NBC.

Hairstyling: Janice D. Brandow, "The Triangle Factory Fire Scandal." NBC.

Music Composition, Series: David Rose, "Little House on the Prairie." NBC.

Music Composition, Limited Series or Special: Leonard Rosenman, "Friendly Fire."

Tape Sound Mixing: Ed Greene, Phillip J. Seretti, Dennis S. Sands, Gary Ulmer, "Steve & Eydie Celebrate Irving Berlin." NBC.

Technical Direction and Electronic Camerawork: Jerry Weiss, TD; Don Barker, Peggy Mahoney, Reed Howard, Kurt Tonnessen, Bill Landers, Lou Cywinski, George Loomis, Brian Sherriffe, camerapersons, "Dick Clark's Live Wednesday." NBC.

Video Tape Editing, Series: Andy Zall, "Stockard Channing in Just Friends." CBS.

Video Tape Editing, Limited Series or Special: Ken Denisoff, Tucker Wiard, Janet McFadden, "The Scarlet Letter." PBS.

Individual Achievement—Creative Technical Crafts: John Dykstra, special effects coordinator; Richard Edlund, director of miniature photography; Joseph Goss, mechanical special effects, "Battlestar Galactica." ABC.

Individual Achievement: Tom Ancell, live stereo sound mixing, "Giulini's Beethoven's 9th Live—A Gift From Los Angeles." PBS.

Individual Achievement—Information Program: Robert Niemack, film editor, "Scared Straight." Synd.



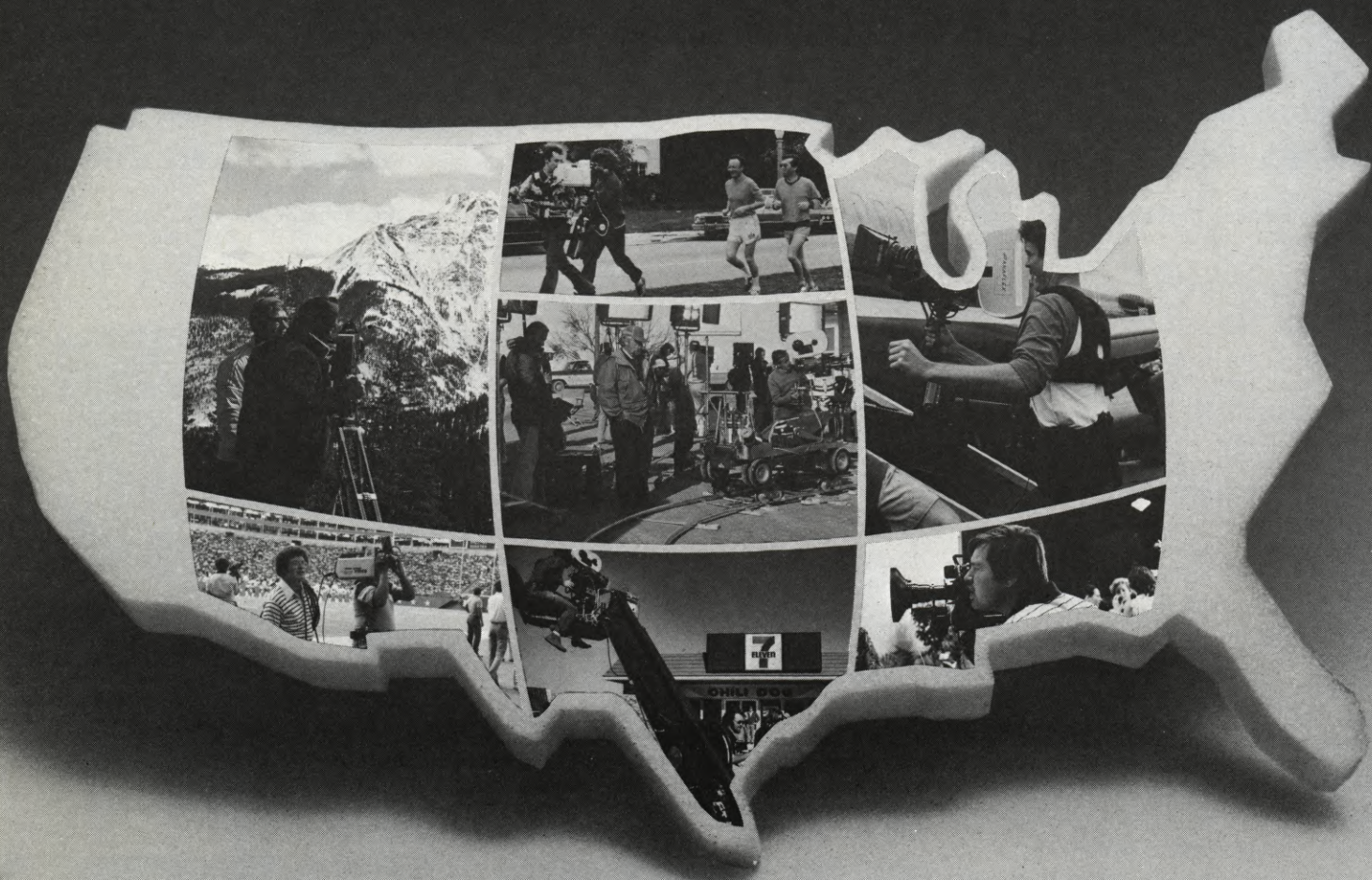
Winning the award for Outstanding Cinematography/Series was Ted Voigtlander, ASC, for "LITTLE HOUSE ON THE PRAIRIE" (*The Craftsman*), NBC. It was his ninth nomination, third EMMY.



(ABOVE RIGHT) Hosting the Fifth Annual Emmy Awards Banquet honoring Creative Arts in Television was popular radio/television personality Michael Jackson. (BELOW) On Sunday evening, Sept. 9, the Thirty-First Annual Emmy Awards telecast kicked off with a spirited dance number featuring "CHARLIE'S ANGELS" star Jaclyn Smith, shown hoisted aloft here in a reasonable facsimile of the prestigious EMMY statuette.



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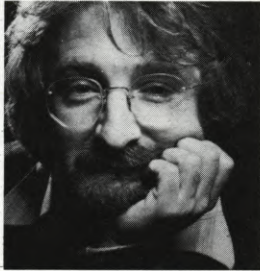
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22nd MPL FILM SEMINAR FOCUSES ON THE FACTUAL FILM

By ELSTON LEONARD

Annual seminar, held on the campus of Memphis State University, emphasizes practical aspects of film-making for the factual subject

The 22nd Annual MPL Film Seminar, held in Memphis, Tenn., July 20 and 21, achieved a good balance between inspiration and information and between theory and practice.

Sy Wolen, of CBS News "60 Minutes" production team, drew on more than 30 years of experience as a professional sound engineer as he related details of methods and equipment used in producing that top-rated program. Bonnie Swenhold, of Eastman Kodak, delved into the theory of "how we see" with her examination of "Depth Perception in Color Photography." Other technically-oriented talks covered creative editing, total immersion printing and 16mm-to-35mm blowups. Food for thought was supplied by producer-author Walter J. Klein's talk on "Good Relations With Your Competition" and Ott Coelln's presentation on the American Archives of the Factual Film.

The Seminar returned to the campus of Memphis State University this year, with MPL President Blaine Baker presiding. He was joined in welcoming the conferees by Dr. Richard Ranta, Dean of the School of Theatre and Communication Arts at Memphis State University, and William M. O'Rork, President, Media Equipment Center, co-sponsors of the Seminar.

"60 MINUTES HAS TOP QUALITY SOUND"

In his introduction of Sy Wolen, of "60 Minutes," Blaine Baker stated that he had always been impressed by the high quality of the location sound the production crew always seemed to achieve.

The 22nd Annual MPL Film Seminar was held in Memphis, Tenn. on July 20 and 21. It achieved its aim of striking a good balance between inspiration and information and between theory and practice. The speakers were top professionals in their fields, representing many disciplines of film-making.

Wolen himself stated that, "In my opinion, our staff of five sound technicians is the best in the profession." He estimated that their collective experience in sound recording totaled nearly 150 years. Wolen credits "60 Minutes" Executive Producer Don Hewitt and his associate, Harmer Williams, for their strong support in providing their crews with first class facilities and equipment.

"For example," Wolen said, "on a typical assignment, we would have the following complement of recording equipment: A Nagra IV recorder, supplemented by a Nagra SN (especially if any hidden camera shots are expected), an eight-foot fishpole and at least two wireless microphones. These are usually used with Sony ECM-50 miniature condenser microphones. We pack six of them, six ElectroVoice RE-15's, two EV 635's, two EV RE-50's and two Sennheiser 415's."

Wolen considers his high-quality Beyer earphones a most important part of his equipment. He suggested that anyone selecting earphones should check them carefully by comparing the sound playback on a good speaker system with the same tape playback through the earphones.

Some CBS News production is still on film but there has been much conversion to original production on videocassette and Wolen is not too happy about some aspects of the change. "This gives me the pleasure," Wolen lamented, "of wearing a 55-pound Sony on my back and carrying the boom in my hand. With videotape, the absence of a playback head means that a problem such as a

clogged record head cannot be detected as it is happening. You can catch this kind of problem only after the tape is re-wound and played back."

Wolen stressed the importance of testing all equipment before it is used, every day. He recommended use of an SMPTE (Society of Motion Picture and Television Engineers) test tape, checking head azimuth and making sure that all sound heads are clean and demagnetized.

In answer to a question on equalizers, Wolen said, "The biggest mistake you can make on location is to use any kind of equalizer. I have a big Cinema Graphic Equalizer that can be powered by a 12 volt battery, but I wouldn't even take it on a music job. There is one exception to that: on my Sennheiser 415, I have a little power supply with two steps of low frequency cutoff. With that and a double windscreen on the microphone, I can handle a 30-mile-per-hour wind with no trouble."

For multiple mike setups, the "60 Minutes" crew uses a Shure mixer, ganged if the number of microphones require it.

He closed by playing two sound tapes. The first was a problem tape and the second was the same recording after it had been cleaned up and equalized at the sound studio. The corrected tape was good enough to provide acceptable sound quality.

"Good results from poor recordings are not always possible," Wolen said, "and, at the best, attempting to correct them is costly in terms of time and money. This time and money could be much better spent before the recording is made."

SEARCHING FOR CONTINUITY

"Creative Editing . . . Searching for Continuity"—was the title of the presentation by Ms. Roxanne Gee. Ms. Gee is presently an Instructor in Film Production at Memphis State University, but her background includes a broad experience in editing industrial films, PBS documentaries and television commercials.

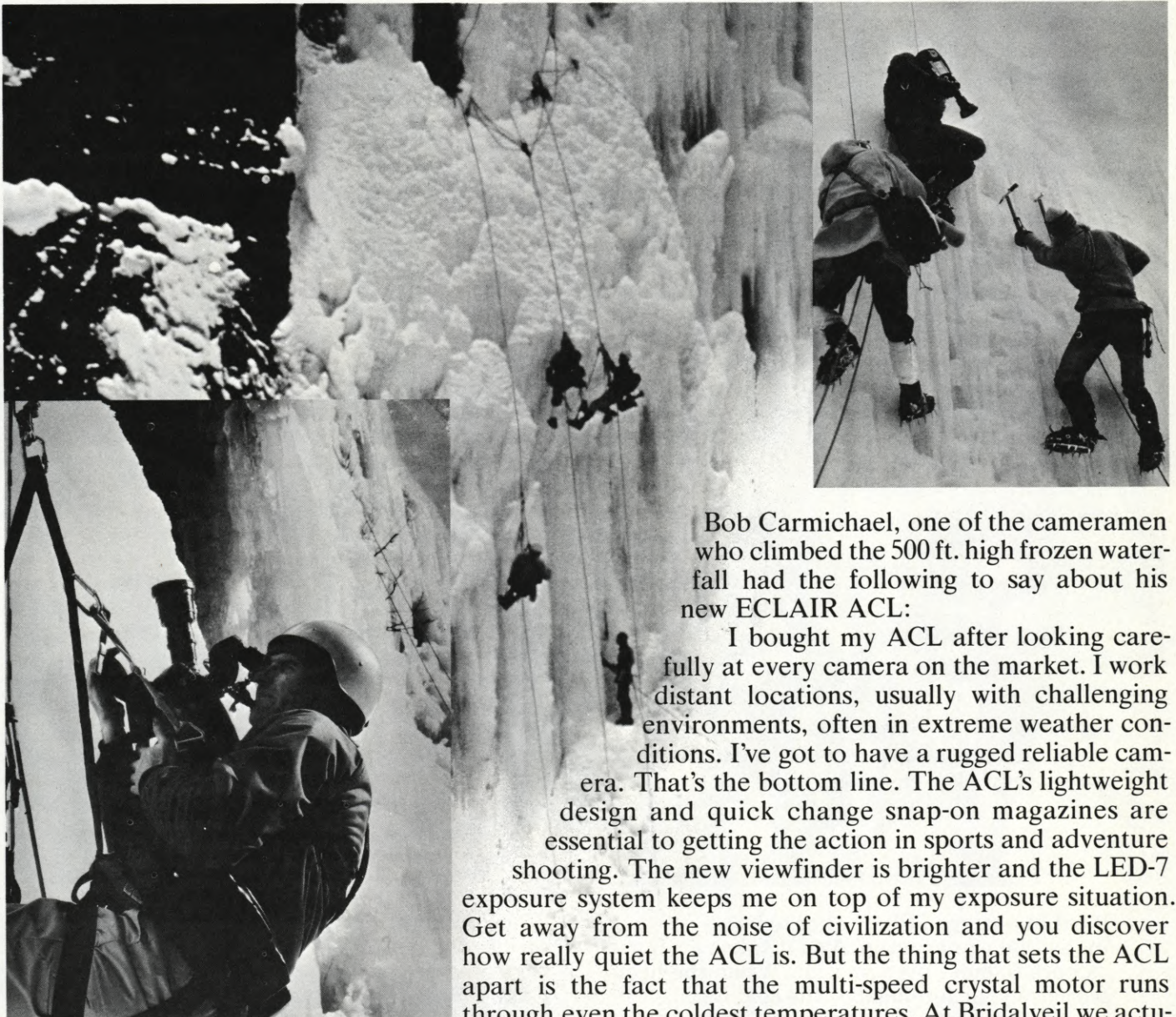
Ms. Gee illustrated her presentation by projecting uncut work print footage first and then her edited version of the same footage. She explained the process of shot selection, transitions and the importance of continuity cut to music. She emphasized the point that "the editor's craft consists of composing in space and in time. The editor must consider secondary elements of the scenes—background and foreground movement, color

Continued on Page 1028



ECLAIR ACL: the rugged reliable quiet camera

ABC Sports selected three cameramen to shoot
Bridalveil Falls: All three owned ECLAIR ACL's.



Bob Carmichael, one of the cameramen who climbed the 500 ft. high frozen waterfall had the following to say about his new ECLAIR ACL:

I bought my ACL after looking carefully at every camera on the market. I work distant locations, usually with challenging environments, often in extreme weather conditions. I've got to have a rugged reliable camera. That's the bottom line. The ACL's lightweight design and quick change snap-on magazines are essential to getting the action in sports and adventure shooting. The new viewfinder is brighter and the LED-7 exposure system keeps me on top of my exposure situation. Get away from the noise of civilization and you discover how really quiet the ACL is. But the thing that sets the ACL apart is the fact that the multi-speed crystal motor runs through even the coldest temperatures. At Bridalveil we actually got ice build-up on the camera body and it continued to function perfectly. ECLAIR ACL is now so well proven that it really is an industry standard.

ABC Sports Bridalveil film crew:
cameraman/director—Scott Ransom
cameramen—Bob Carmichael, Greg Lowe
Soundman—Peter Palafian

ECLAIR ACL: the dependable quiet one

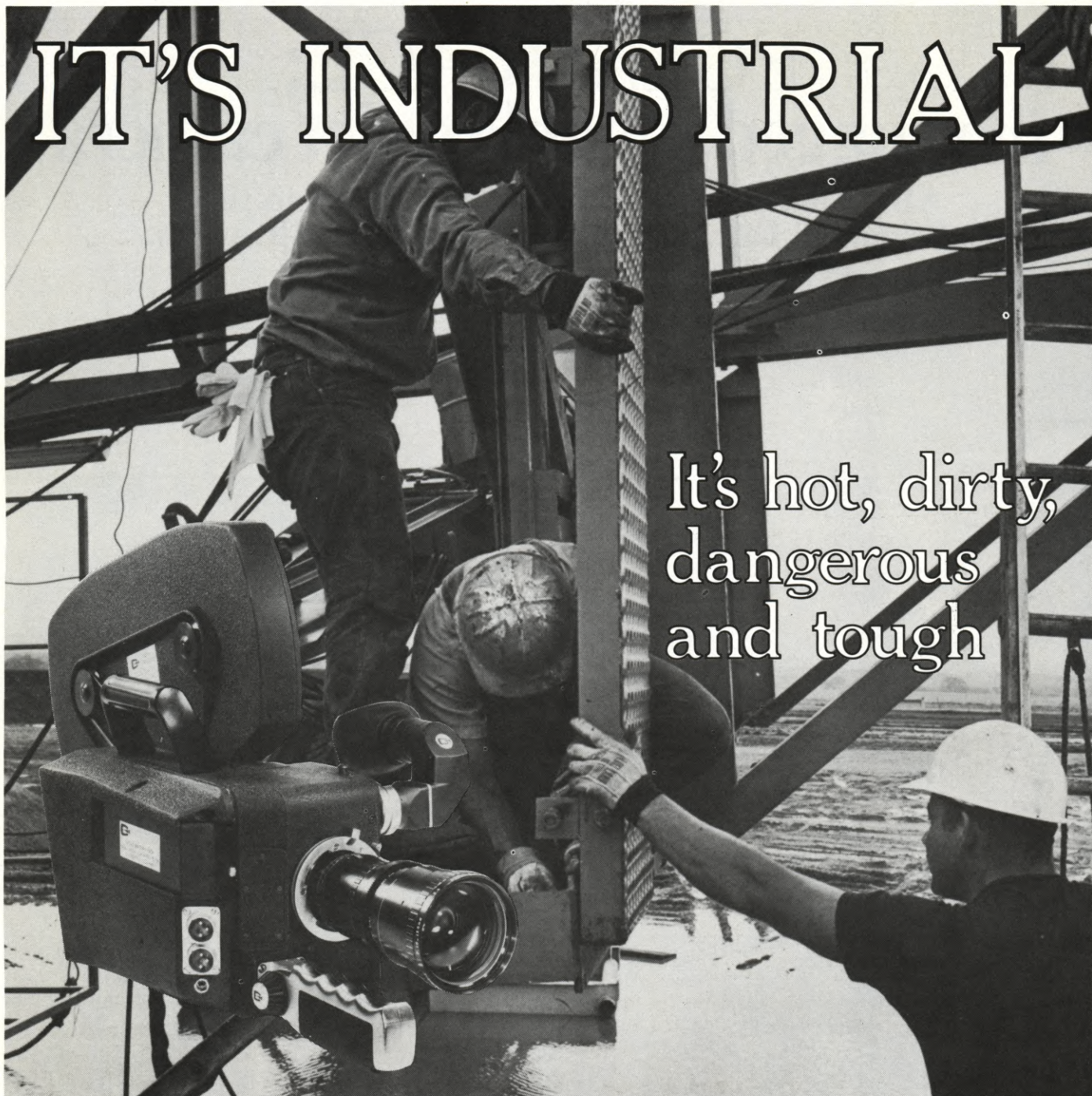
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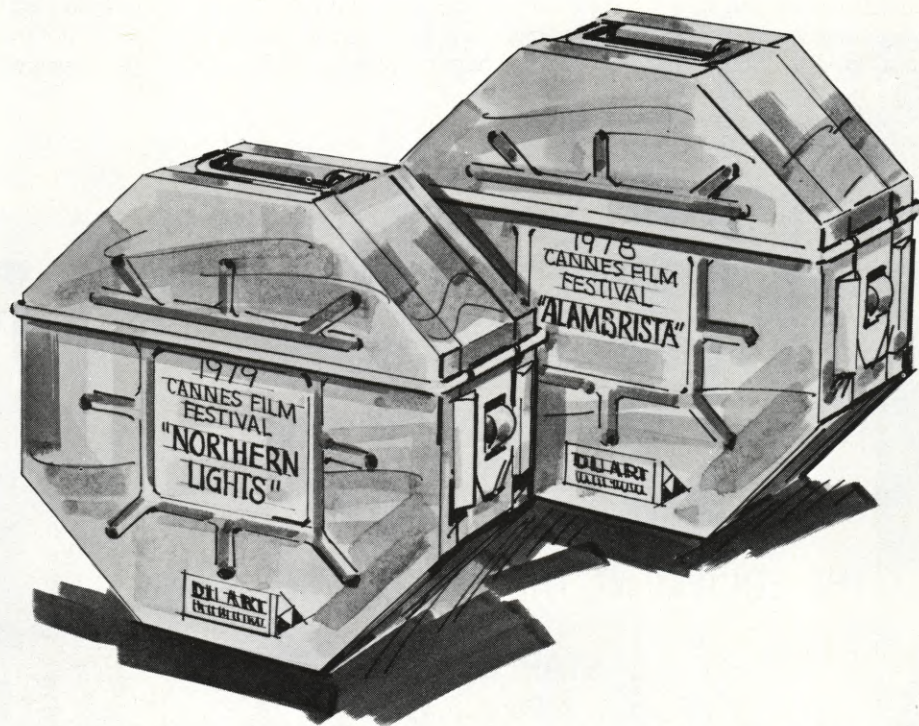
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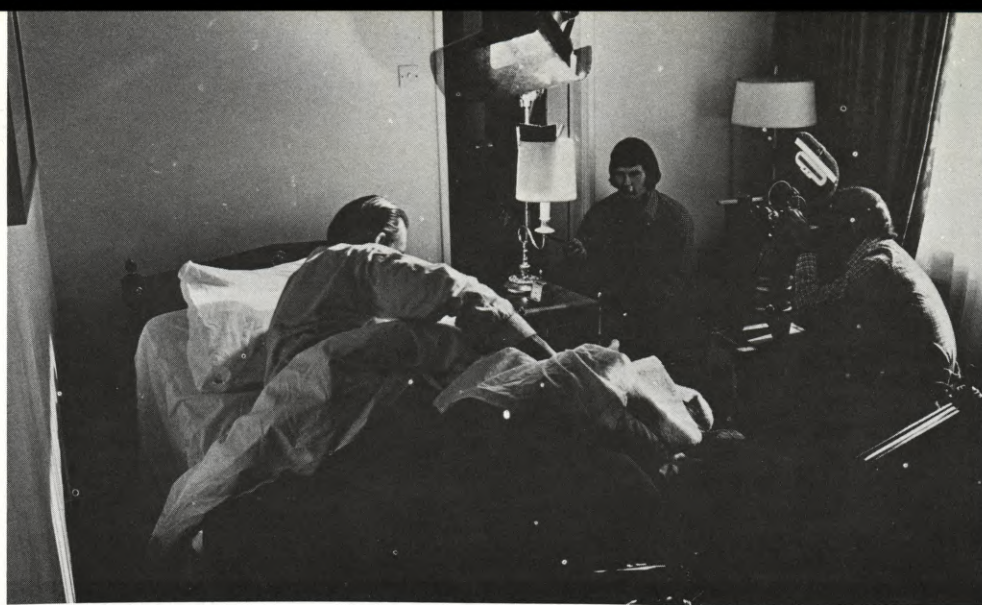
practices of shooting 16mm for blow-up to 35mm. Write or call and we'll gladly send you a copy. If you need assistance in planning your next production, feel free to call Irwin Young or Paul Kaufman.



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"GLOBAL VILLAGE"
Continued from Page 1011

did not incorporate flat art, but rather an elaborate live light rig. The light rig would move forward one or two inches on one frame, then the film would be advanced to the second frame and the light rig would go back to its original position and repeat the movement, adding a couple of more inches distance to the second frame. This was continued on the 3rd, 4th, 5th, and on up to the 30th frame. The process was repeated over and over, hours, days, and weeks of shooting. It was very precise, and tedious work. Each "bolt of light" had to be superimposed onto the background which had already been shot. These "bolts of light" had to be bracketed. Three brackets for each "bolt". The reason for this was that no matter how much testing we did, there were always unforeseen differences. The speed the rig moved (it always varied some), the age of the lights and the distance of the light rig from the lens, constantly changed the result of the film in regard to F-Stop. The tested F-Stop always varied in the actual final result. We wanted flare around the bolt to make it look alive, but if there was too much, it destroyed the background when it was double exposed in a "burn in".

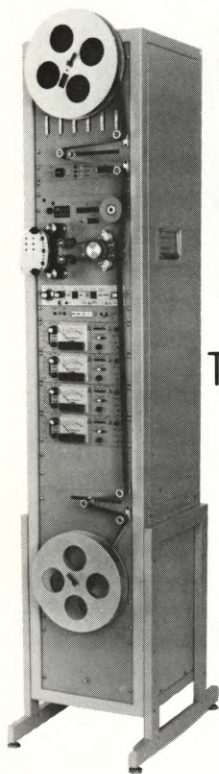


The filming of a "wake-up" sequence in Hollywood. A "lightning bolt" superimposed over certain scenes symbolized the speed of the computer service depicted. Flint succeeded brilliantly in his aim of creating not a documentary, but a piece of informative entertainment.

The background consisted of international cities, buildings, mountains, fields, city skylines, oceans, etc. These backgrounds were put on a Moviola flatbed and the landscape was drawn on a piece of 8 1/2 x 11 typing paper, showing the path and desired direction of the light. It then had to be redrawn on glass, and set up in front of the 16mm Arriflex camera. The tracks were set to guide the rig of lights. They had to follow the drawing on

the glass very accurately. Tim watched through the eye piece, and advanced the rig frame-by-frame until it filled in the drawing completely. This action was then repeated in reverse; so that the bolt of light would go in the opposite direction. We could not just print the action of the light bolt backwards because it would have looked like the light was consuming itself (ultimately disappearing). There

Continued on Page 1044



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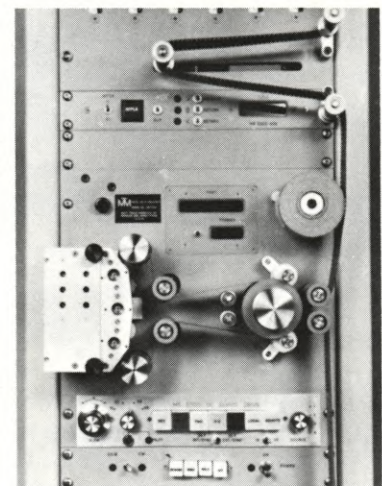
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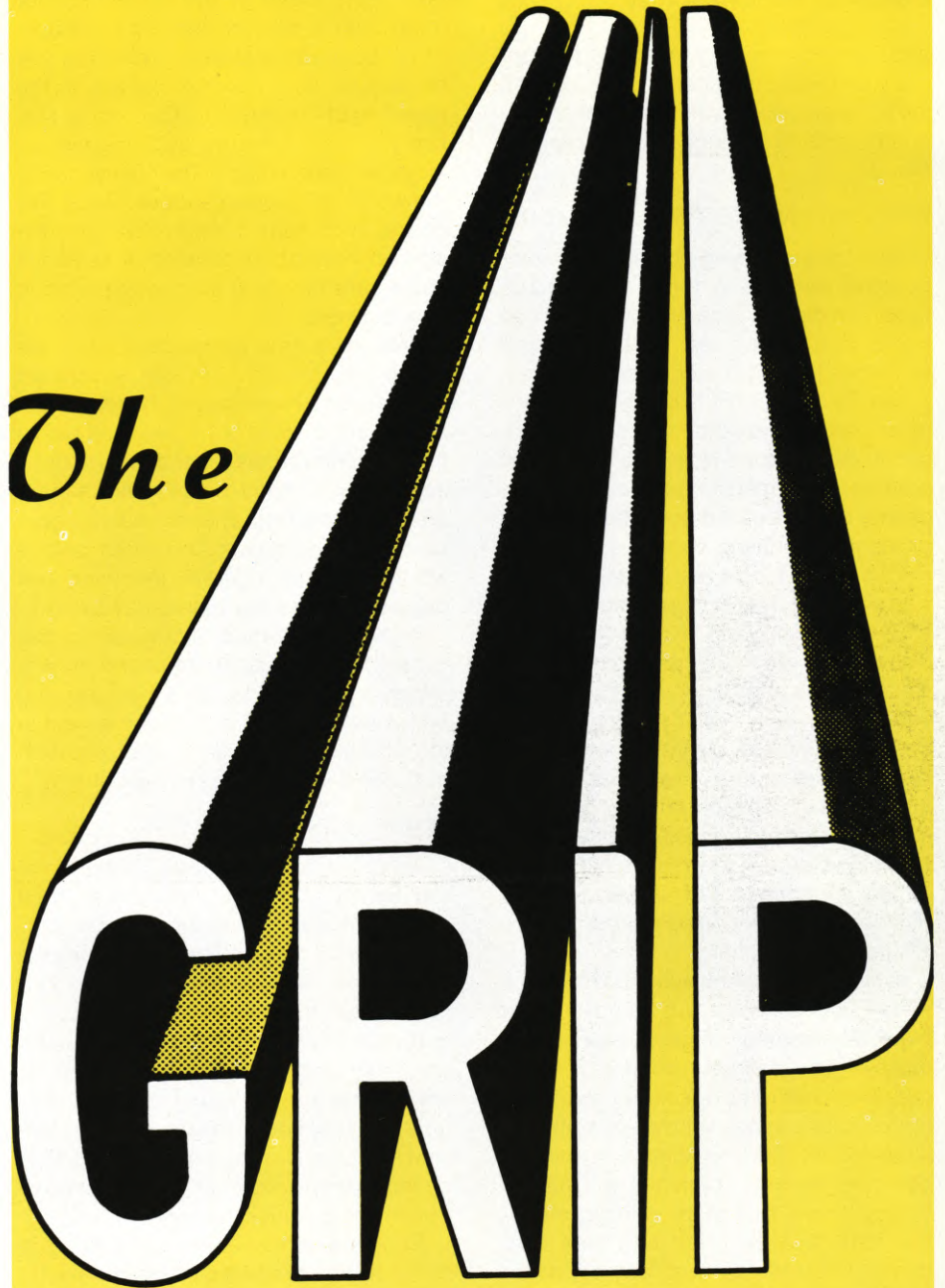
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22nd MPL FILM SEMINAR Continued from Page 1020

and lighting—as they relate to the primary subject of the shot. It is the editor's job to create a logical progression of continuity and to project the appropriate mood."

WET PRINTING HELPS FILMMAKERS

With the increasing popularity of color negative originals in 16mm film production, filmmakers and film laboratories have been plagued with dirt and scratches in prints made from negatives.

Jim Solomon, MPL's Laboratory Manager, used side-by-side screen comparison to demonstrate what one kind of wet printing, *full immersion printing*, can and cannot do to diminish scratches and dirt on negative printing materials.

To prepare for his test prints, Solomon had deliberately scratched some footage shot on 16mm Color Negative #7247. Two prints were made from the negative. The first was printed on a contact printer without any form of wet printing and the second was made on MPL's full immersion contact printer. According to Solomon, "full immersion printing can go a long way toward reducing many problems. Sometimes, the results may seem almost miraculous. But, certain types of film defects cannot be corrected, even by full immersion printing."

In closing, Solomon summarized: "Full immersion printing will remove most black scratches on original reversal and most white scratches on original negative. It will not remove colored scratches on reversal original. With color negative, it can minimize some colored scratches, but most colored scratches will not be helped by any kind of wet printing. Keeping your negative clean and safe from damage is still the best way to insure good quality, clean prints."

COMPETITORS AS FRIENDS?

Walter J. Klein is an award-winning

film producer from North Carolina who has been active in the profession for more than a quarter-century. His book, *"The Sponsored Film"*, validates his credentials as an author. His role in the founding of International Quorum of Motion Picture Producers qualifies him as an organization man in the best sense of the words. In speaking about *"Good Relations With Your Competition,"* he discussed how good competitor relations could save time and money and bring in new business.

"We get a new perspective when we share information with our supposed adversaries," Klein stated. "And, we get an input that could not be evolved within our own enterprises. Best of all, we meet some mighty good people with similar attitudes towards clients, talent, government, equipment, finances and a whole array of matters involving our businesses and our day-to-day living."

Walter Klein urged filmmakers to become more involved in trade and professional organizations, on a national and on a *local, informal basis*, with others in the film industry. "Talk to your competitor," Klein suggested, "not about him."

16MM TO 35MM BLOWUPS

According to Irwin Young, Chairman of the Board, DuArt Laboratories, New York, "the ultimate dream of most filmmakers is to make a feature motion picture." And, since many already own 16mm equipment or have ready access to it, many would-be theatrical producers use 16mm and, sometimes, Super-16, as the original format. Young demonstrated how this goal could be successfully realized by screening examples of films shot on these smaller formats and blown up to 35mm for theatrical release.

To illustrate his point that Super-16 is still a useful production system, Young screened footage from a theatrical film called *CLOUD DANCERS*. *CLOUD DANCERS* is a film about flying, aerial acrobatics and the airplanes made espe-

cially for aerial acrobatics. The film was budgeted at around 3 million dollars, produced and directed by Barry Brown, with a cast that includes David Carradine and Jennifer O'Neal. Much of the film was shot on Super-16, blown up to 35mm and then intercut successfully with other footage shot on 35mm.

FACT FILMS ARE IMPORTANT

Ott Coelln founded Business Screen Magazine in 1938 so he has a long view of the film business and the business film. Now retired from the day-to-day concerns of editing a magazine, he is still actively interested in the audiovisual industry. He was instrumental in the establishment of the American Archives of the Factual Film at Iowa State University, Ames, Iowa.

The computer index at the Archives has already logged more than 3500 titles of factual films, including a historic reel produced 65 years ago for International Harvester. This is thought to be the first use of film by industry. It was an effective sales tool demonstrating mechanization on the farm. (International Harvester is, of course, still active in the sponsorship and use of films on a regular basis.)

One of the experts on the reel Coelln projected was from one of the 457 films produced by professional, business-based filmmakers and coordinated by the federal government as our nation geared up for World War II. Designed for the most part to train and direct our citizens for the unfamiliar tasks that the war effort required, each of the motion pictures was supplemented with a filmstrip and a 16-page booklet. "President Roosevelt and his advisors," Coelln commented, "had discovered the greatest tool for putting ideas into peoples' heads."

"As we enter a new, energy conscious era, we must find ways to reach a generation conditioned by thousands of hours as passive observers," Coelln continued. "It is frightening to realize that even
Continued on Page 1055

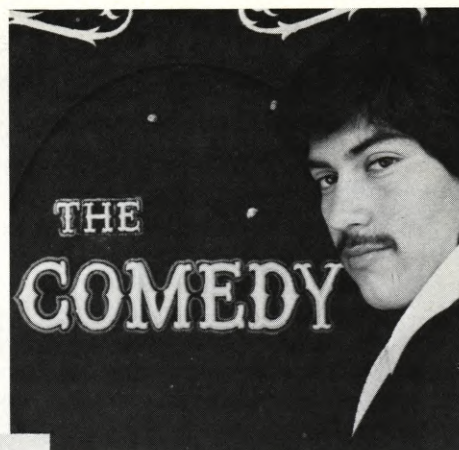
The Seminar also featured clinics on editing, lens testing and camera maintenance. An important aspect was the opportunity those attending had for hands-on perusal of equipment displayed. Media Equipment Center's annual two-day flea market and swap shop drew a large variety of basic production equipment and gadgets brought by the conferees. Equipment exhibits included many nationally known manufacturers and the film-makers were given the opportunity to talk to the exhibitors on a one-to-one basis.



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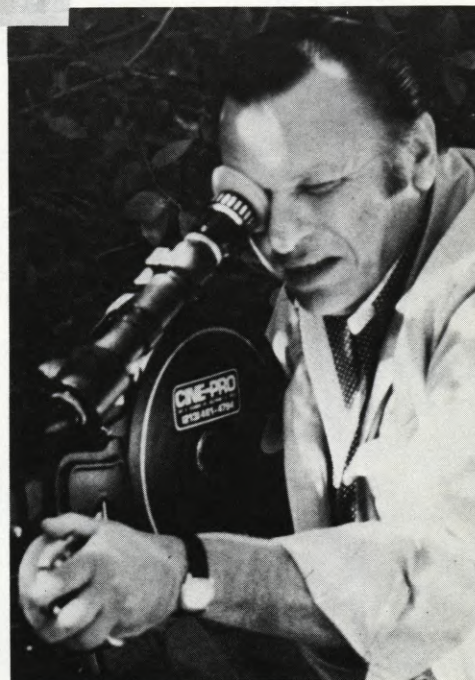
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After six solid years as a U.S. Marine Corps combat cameraman in Korea, the motion picture camera became to Bob Caramico as the six-gun was to Wyatt Earp; practically a part of him. Caramico joined the Hollywood motion picture industry in 1964, and in the ensuing fifteen years has shot theater and TV films just about everywhere in the U.S. and in the Middle East, Europe, the Orient and South America. In the process, he has earned a reputation throughout the industry for delivering consistently outstanding cinematography, whether shooting in studio or under the worst of location filming conditions.

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"THE BOAT PEOPLE"
Continued from Page 997

up and down 15 to 20 feet by the pounding waves. Finally, they caught sight of the cone-shaped, tree-covered island. "I don't think any of us were prepared," he remembers. "As we got closer, it became obvious every habitable and level square foot was covered with makeshift shelters and people. There was no room for farming or anything else. The people were squeezed onto the small island, and thousands of others were arriving every week."

The news crew was quickly absorbed by the mass of people who pressed upon them at every turn. Correspondent Bradley accepted a letter from one person addressed to someone in the United States. The word spread like wildfire. Pretty soon, there was a pillowcase full of letters.

"That constant crowd limited our options," Cooke says. "We followed Bradley wherever he went filming interviews with people who spoke English and with others through translators. Most of the interviews were necessarily very brief, because every time we stopped, a mob trying to get our attention closed in."

Cooke relied on the fast lens and film. "One minute we would be in bright sunlight, and around the next corner, there would be an interview in a darkened tent," he says. "In the old days, I would have worried about filters and light meters, so I could tell the lab how much to push the film. However, my experience with the color negative is that the latitude far exceeded my best expectations. I have long since learned to trust the lab to make end-tests for low level light exposure and print accordingly."

The dimmest lit situation was in a tent at night where Cooke filmed a woman

writing a letter by the light of a kerosene lamp. At best, there was one footcandle. "I would have sworn it was a four-stop push," he says, "but the film recorded the image exactly the way the scene happened."

In a sense, much of this rubbed against the grain for Cooke. "I believe photography is lighting and composition, whether you are talking about stills, news or features for theaters," he says. "I will go through a great deal of trouble on a 60 *Minutes* interview, for example, to set up appropriate backgrounds for interviews. That helps the audience visualize whom we are talking with. On the island, backgrounds were pressed upon us. As for lighting, we had a small battery-powered Frezzi with us, but I never turned it on."

One reason was that the light would have attracted even more onlookers. However, a bigger reason was that artificial illumination would have changed



A visit by the camera crew to the refugee camp at Pulau Bidong revealed that every level and habitable square foot of the cone-shaped, tree-covered island was taken up with makeshift shelters and people. There was no room for farming or anything else. The people were already squeezed together on the small island and thousands of others were arriving every day. The scene was a study in human misery. The mass of people pressed upon the camera crew members at every turn.



the character of the scene. "I didn't want to change the feeling of the location in any way," he explains.

Cooke and the rest of the news crew were assigned picnic tables where they were invited to sleep. It was comparatively deluxe accommodations, he says.

That evening, the news photographer did a great deal of thinking about what was needed to make the story of what was happening on the island flow. In addition to the talks with the refugees, Bradley also targeted in on an American official assigned the task of determining the futures of the refugees. "It was obvious most of the people were going to suffer from the bureaucratic process of cataloguing priorities for immigration," Cooke says.

"What was missing was a sense of what was happening on the island without the news crew there. In a way, we had become a part of the story. But I felt we were missing transitions that showed the overall camp," he adds.

In effect, Cooke drew storyboards in his head. "I played back everything we had shot and tried to picture what was needed to make it work," he explains. That is a technique commonly used in his *60 Minutes* work.

"Say we are doing interviews with two attorneys who are adversaries," he says. "First of all, I will arrange backgrounds so the environment tells what each individual is like. It could be the decor of an office revealing a certain kind of taste. Second, I might have one facing the right side of the screen and the other the opposite way. That way, when cuts are made, the audience can more easily follow who each attorney is and which side each attorney is on. Screen direction is very important so that characters aren't confused."

Important transitions on the island involved thinking about the perspective the footage should have for natural cuts, and recalling what might be missing—possibly a close-up of an object or background mentioned in an interview.

"In a situation like this, it is very easy for a photographer to get caught up in the excitement of the event," Cooke says. "The awareness that you are there while some sort of history is being made can be a moving experience for me personally; but unless you have everything photographically you need to tell the story on film, you don't have a thing."

The next morning, Cooke employed a blitzkrieg technique to get the backgrounds he wanted without masses of people crowding around the camera waving and pointing. "I had a pretty good idea of where everything was in the camp by then, including where crowds congregated," he explains.



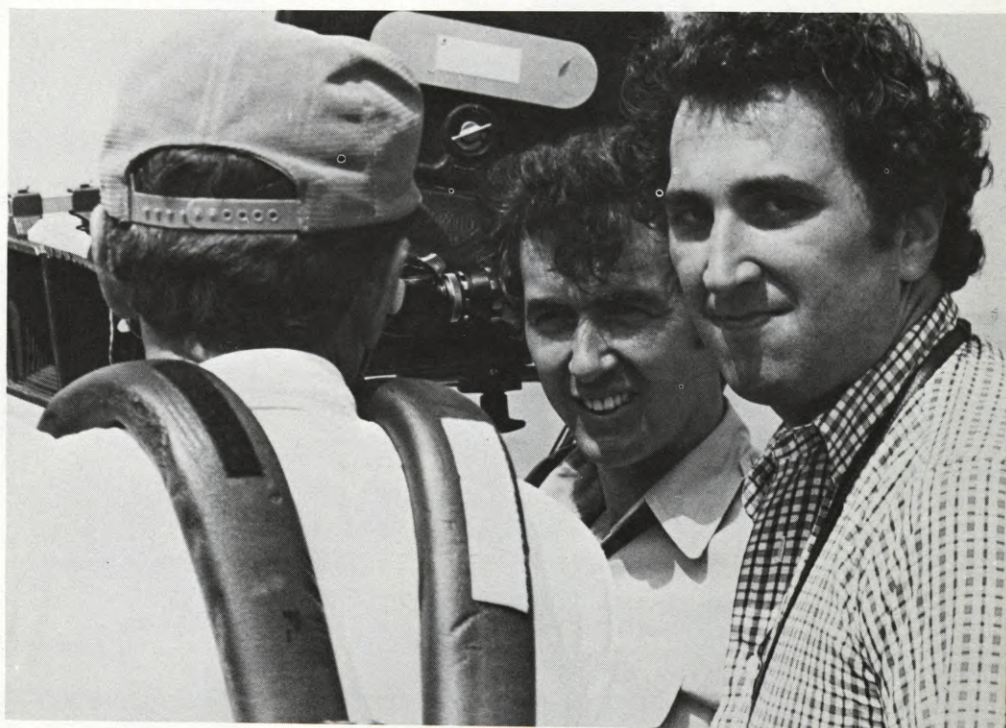
Ed Bradley helps a Vietnamese refugee come ashore. (Left to right) Greg Cooke, Producer Andrew Lack and soundman Jim Camery. The predominant impulse of the crew members was to reach out and try to help these people, but they were often abused by local people when they tried to do so.

gated," he explains. "So I put one of the zoom lenses on the camera and set it up on a tripod. Then I took off at a fast pace, walked around corners and started shooting. Usually, I got 15 to 20 seconds on film before people noticed me and started responding."

That provided some essential estab-

lishing scenes. The tripod was very necessary for this type of work. "Steadiness was very important with the longer lenses," Cooke says. "It allowed me to zoom in on faces in the crowd in a very believable way. Remember what I said before about allowing viewers to be like a
Continued on Page 1034

Jim Camery (back to camera), Greg Cooke and Andrew Lack. Cooke, a contributing news photographer for *60 Minutes* and *CBS Reports*, says: "As a news cameraman, there is always the chance I will touch people's lives and give them a view of something from a perspective no one will see quite the same way as I do."





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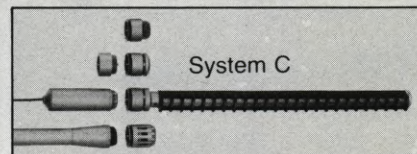
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"THE BOAT PEOPLE" AS FILMED FOR CBS

Continued from Page 1031

fly on the wall getting a real feel for what was happening?"

Another technique Cooke used during that morning was to put the Zeiss 9.5mm lens on his shoulder and follow quickly and quietly behind Bradley moving through the camp talking with people. "There was a feeling of looking right over his shoulder," Cooke explains. "There is virtually no distortion with this lens. Usually I got 15 to 20 seconds before someone would notice the camera was there."

The soundman had a small wireless mike on the correspondent which did away with the distraction of waving a large microphone in the breeze while also doing a better job of evenly recording both sides of the conversations, Cooke notes.

"I may be a little old-fashioned in that I prefer working with a camera sync cable instead of crystal in this kind of a situation," he continues. "In this instance, it was a terrific advantage. All I had to do was nod, and Jim would start sound rolling. We were in sync within four frames. Considering the short takes we had to do before the crowds closed in, that was very important."

Some of the best footage came at the end of the day-long visit to the island. As the crew was getting ready to leave, a spokesman for the refugees asked if he could say something. Cooke started rolling. "Please help us survive so we can live in freedom," he pleaded. Another man said, "The United States is our only hope."

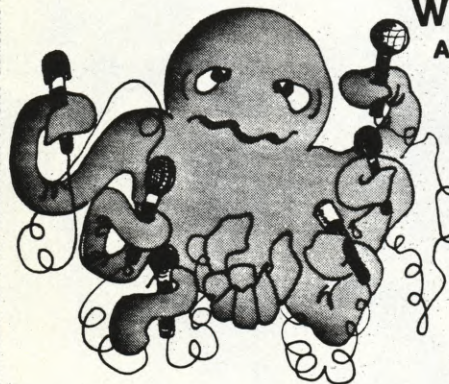
"All I could think of was the official on the island telling us about priorities and procedures," Cooke recalls. "There we were, leaving, going back to what these people could only dream of."

As the boat pulled out, some of the refugees swam long and hard after it, pressing a few last letters onto Bradley's hands. Finally, the last person reached the boat far off shore, and with a hard effort, pushed his letter forward. "A huge cheer went up from the crowd," Cooke says. "I looked out, and there was that mass of humanity, smiling bravely, hoping for the best, thanking us for being there to tell their story. Trusting us to tell it."

Cooke kept the camera rolling. People who saw the documentary will probably never forget the desperate swim of a refugee carrying one more letter and the dramatic still frame of the triumphant look on his face when he delivered it.

There was still work to do. The next day Cooke's crew was joined by a free-lance crew from Hong Kong headed by Ian Wil-

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son. "They had shot some excellent footage on the Hai Hong, one of the boats that hadn't yet been permitted to land," Cooke says. "If anything, conditions on the boat were worse than the island. There was absolutely no fresh food or water or medicine."

The two crews zeroed in on one of Bradley's interviews with Malaysian Home Minister Schafi, who predicted things were going to get worse after the monsoon season ended. The Minister said the problem belonged to the world, not just his country. "The United States is especially responsible because of its involvement in Vietnam," he challenged.

"It was all over in five days," Cooke says. "Between us we had exposed around 50 400-foot magazines. We normally shoot at least that much film on a 60 Minutes segment. So, there was very little margin for error. But if ever I wanted a story to work, this was it."

From Cooke's perspective, everything went about as well as could be expected. "Our equipment got there, and everything was in good shape," he says. "We never had to use the backup camera. The environment presented challenges. Some screws in our cameras started corroding in a day from the ocean mist. We stayed on top of it and kept everything as dry as possible."

Cooke also used a freon spray to blow out the camera after each roll, and magazines after every four or five rolls.

"I was most concerned with the humidity causing fine film shavings to stick to the emulsion," he says. "But, we took the proper precautions, and there were no problems. We didn't lose a frame."

In the end, the documentary came together the way Cooke envisioned the scenes that night on Pulau Bidong. "I think we reached out and touched people," he says, "and that is what makes it all worthwhile. Being there while history is happening is exciting. Helping other people see it that way is what our job is about." ■

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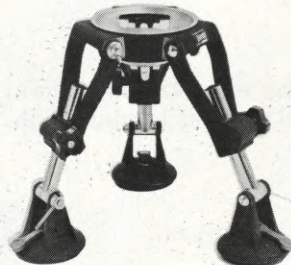
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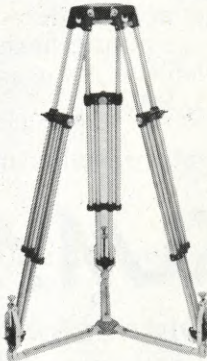


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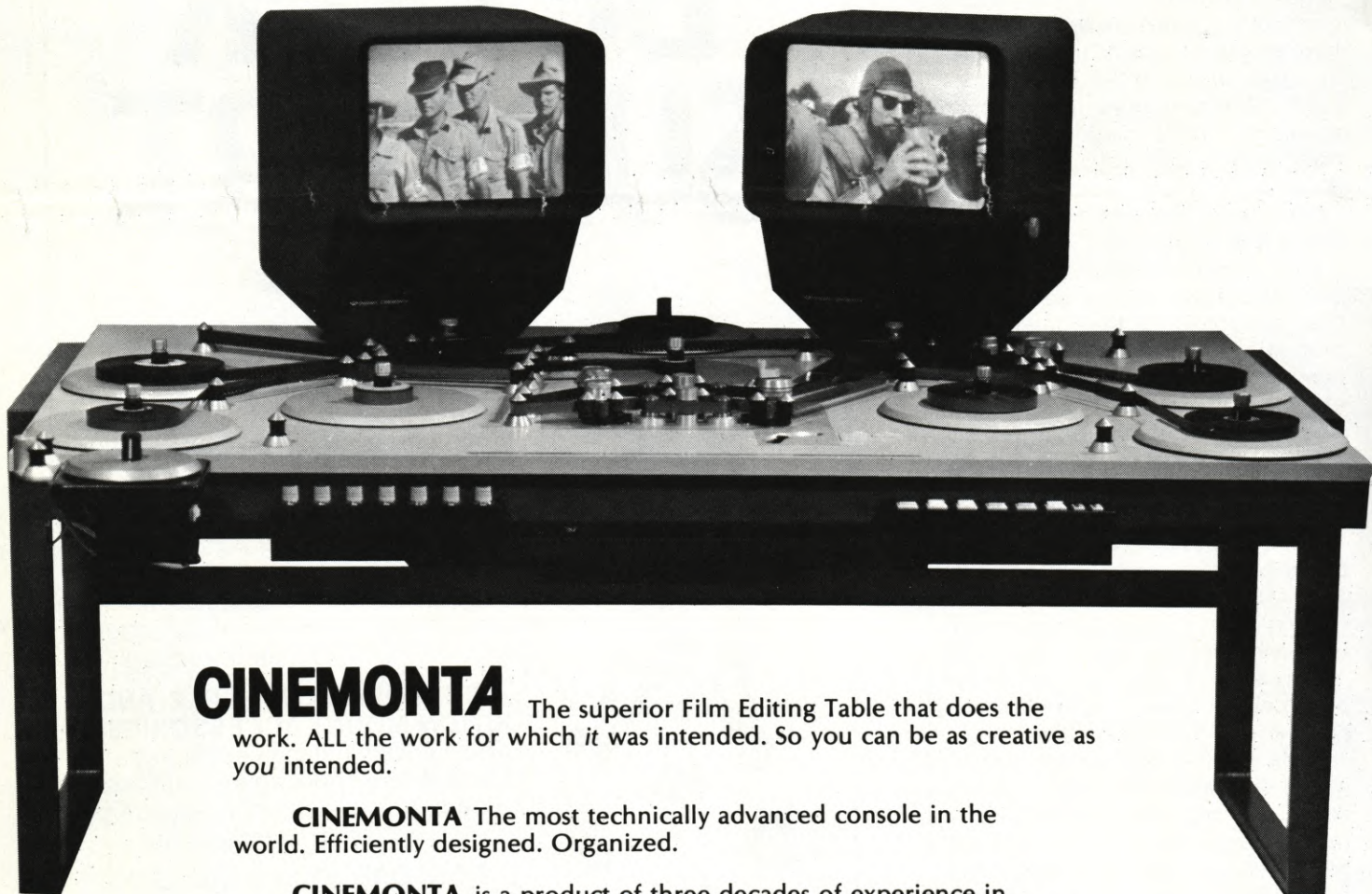
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U S F I L M

The image features two large, stylized white film reels on a black background. The reels are positioned on the left and right sides of the frame, with their inner hubs and outer edges clearly defined. The background is a solid black, and there are a few small white specks scattered across it, resembling stars or dust. The overall aesthetic is minimalist and graphic.

Utah/US Film Festival
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"THE ELECTRIC HORSEMAN"

Continued from Page 987

ing THE ELECTRIC HORSEMAN?

ROIZMAN: *The basic visual concept of the picture which came out of my discussions with director Sydney Pollack resulted in our trying to preserve a very dark, active-looking frame for all of the Las Vegas interiors, in order to counter-play these against the bright, serene, peaceful-looking atmosphere of the exteriors to be shot in Utah. With that in mind, for the Las Vegas interior sequences, I always tried to put a little bit of red or some other garish color in the frame. We used a lot of pink and red gels and the machines themselves had a lot of warm red coming from them. The ceilings in Caesars Palace are red and there seems to be a predominance of red in the decor, so I chose red as the color that I would add whenever possible—which also lent a tremendous richness to the interiors. Also, instead of shooting at 3200°K, we added warm gels to almost all the lights all the time, in order to get a richer skin tone which, we felt, would also counter-play against the brighter exterior light that we were going to use later.*

QUESTION: *Shooting at T/1.8 and wider, you must have had a considerable depth of field problem. Can you tell me how you handled it?*

ROIZMAN: *Well, when shooting at T/1.1 and T/1.4 (where we were most of the time) and even at T/1.8, there is practically no depth of field. This presented*

The star has a look through the camera viewfinder, as Roizman and Pollack are amused by something out of frame, while on location in St. George, Utah. At first it was kind of fun, but when snowflakes kept falling on their heads, the company finally had to shut down for two weeks to wait out the weather.

certain inherent problems which seemed very obvious to me, but which became even more apparent when we had to deal with them on a day-to-day basis. For one thing, your actors are a bit restricted, because they can't just shift all over the place. Also, it's very difficult for an assistant to judge the subtleties of a two-inch change when he doesn't have two inches of depth of field. Therefore, it put a great deal of pressure on my assistant, John Jensen, to be on top of these things constantly and keep his eye on the actors, in order to make sure that they were at a certain distance from the camera. When we had moving camera shots he had to estimate precisely to make sure that he had as much of it as sharp as possible. Miraculously, he did an unbelievable job, because there were virtually no shots that you could say were out of focus. It was very, very difficult for him and my operator, Jim Glennon, to keep their eyes on these things, but they did a tremendous job of it.

QUESTION: *Working at such wide apertures, did you have any hope of holding background detail?*

ROIZMAN: *Under such conditions, the prospects of picking up anything that happens in the background are very limited. Focus on the background falls off so much that you end up lighting it in such a way that you can just barely see that there's something there. You don't want to overlight it or let it go flat and mushy. It's best, I believe, to maintain a certain contrast between the background and foreground, so that you can make the sharpness a little more appar-*

ent than it really is.

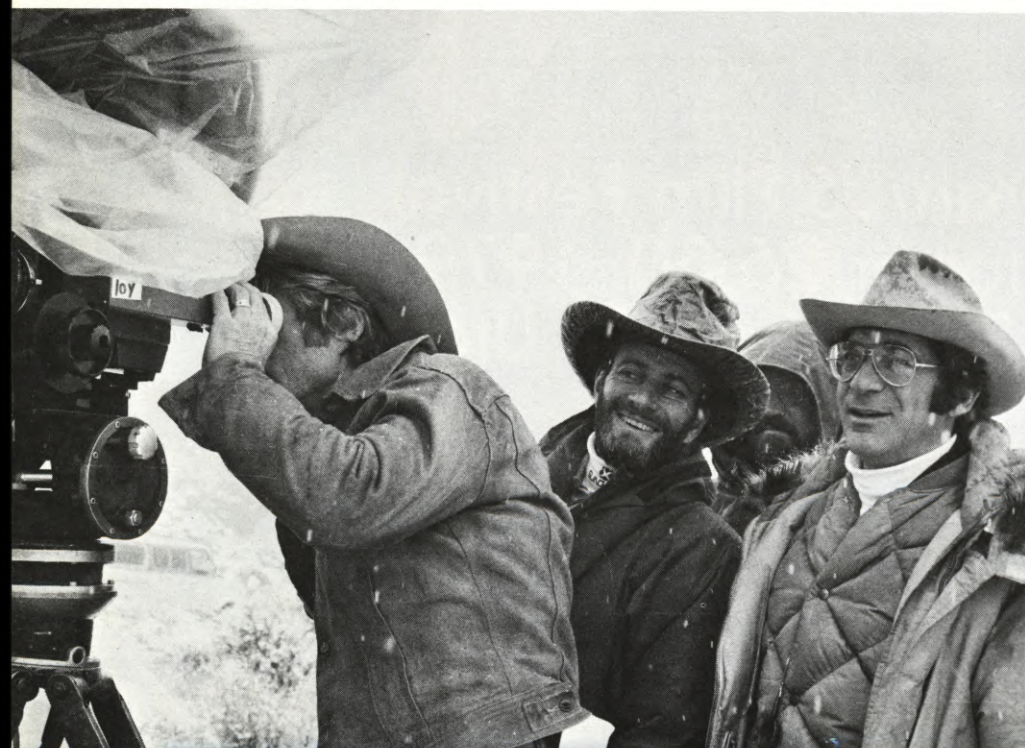
QUESTION: *Working constantly with such a shallow depth of field, did you ever have to resort to rack-focus?*

ROIZMAN: *As a general rule, I try to avoid rack-focus, so we really didn't do any rack-focusing. We would simply focus on the subject we wanted to focus on. What we did do sometimes in a three-shot, where it's very difficult to keep everybody in focus, was to hold sharp on the person speaking, then subtly change focus when somebody else started to speak. We shifted focus from one to the other for the lines. This took a little planning and choreography between the director, the assistant and the operator, because the operator would make subtle changes in the framing also. It was important for everyone to know when each actor was going to speak, but this was not a very difficult problem to solve. At times, ironically, the shallow depth of field worked in our favor, because the crowds in the background would become so unbearable that we couldn't control them. However, they would be so far out of focus that they could literally be standing there watching us, looking right at the camera, and you wouldn't know it. That turned out to be a plus. I must say that the sequences we shot inside the casino area of Caesars Palace would have been impossible to get without the magnificent high-speed Panavision anamorphic lenses and the Panaflex-X camera, with its exceptionally bright viewfinder system.*

QUESTION: *After Redford walks his horse through the casino of Caesars Palace and out onto the "Strip" lined, as it is, with huge hotels and casinos, how did your lighting situation change?*

ROIZMAN: *Since the Strip is ablaze with light from the gigantic electric signs outside the hotels, we decided that we could shoot this particular sequence with no lighting of our own. That's how we did it, except for the one scene where he comes right up into camera and exits the frame. In that scene we added a couple of small lights just to pick up some detail in his face. In the longer shots he's so far away that any light we added wouldn't have made much difference. Also, the lights that rim him help provide separation from the background.*

QUESTION: *But since you had to shoot at T/1.8 in order to pick up the*





lights on Redford's suit consistently, didn't that mean that the super-bright hotel signs in the background would burn out?

ROIZMAN: The signs that had color in them presented no problem, because they would still maintain their basic color, even though they were so far overexposed at T/1.8. But in the case of the big fluorescent-lit signs it was very difficult to hold the lettering at that exposure. If I had stopped down even another 1/4 of a stop, I probably could have held the lettering better, but then I would have lost the brightness of the lights on Redford's suit, which would have been a shame after setting the balance to carry him that far. So we just let those lights go and as long as there were enough dark

areas around, the contrast took care of itself.

QUESTION: After you finished filming in Las Vegas and went on location to St. George, Utah, what kind of filming conditions did you encounter?

ROIZMAN: Everybody had been worried about the logistics of shooting in Vegas, so when we wrapped there and left, pretty much on schedule, we felt that we had the roughest part of the filming under our belts. We thought that going to Utah would give us a sort of breather—that we'd be able to shoot all of our exteriors in a nice sunny climate with no problems. Well, it turned out to be one of the worst winters that Utah ever had. They usually don't get any snow in

southern Utah, especially in St. George, but we got it all. We got snow, we got rain, we got clouds; it was a mess. We'd start a sequence in sunlight and halfway through the day it would suddenly just cloud up and stay overcast for days at a time. Then we'd try to figure out a sequence to shoot in the overcast. Finally we started to build cover sets and to design exterior night sequences to be shot on a set, but we were even afraid to do that because we'd be using up all our cover sets. Production would try to lay things out so that we could shoot some footage in the overcast and make it work within the context of the script—just so we would have something to shoot. It was a difficult situation. We were constantly running back and forth filming
Continued on Page 1063

FILMING "LIFELINE" FOR PRIME TIME TELEVISION

By **ROGER PHENIX**

Associate Field Director/Sound Recordist

ROBERT ELFSTROM

Director/Cinematographer

and **ALAN DATER**

Second Unit Cinematographer

As the film crew that had worked on the pilot film for the LIFELINE series, we were pleased in January, 1978, to learn that the series had been funded and that our crew would initiate production of the next films in the series for NBC Television. Our association with the producers of LIFELINE dates back to the Emmy Award-winning THE BODY HUMAN series, which we filmed for CBS. With less than two months to gear up for pro-

duction, our crew spent the following seven months shooting seven of the thirteen hour-long films for NBC's prime time series about the lives of doctors.

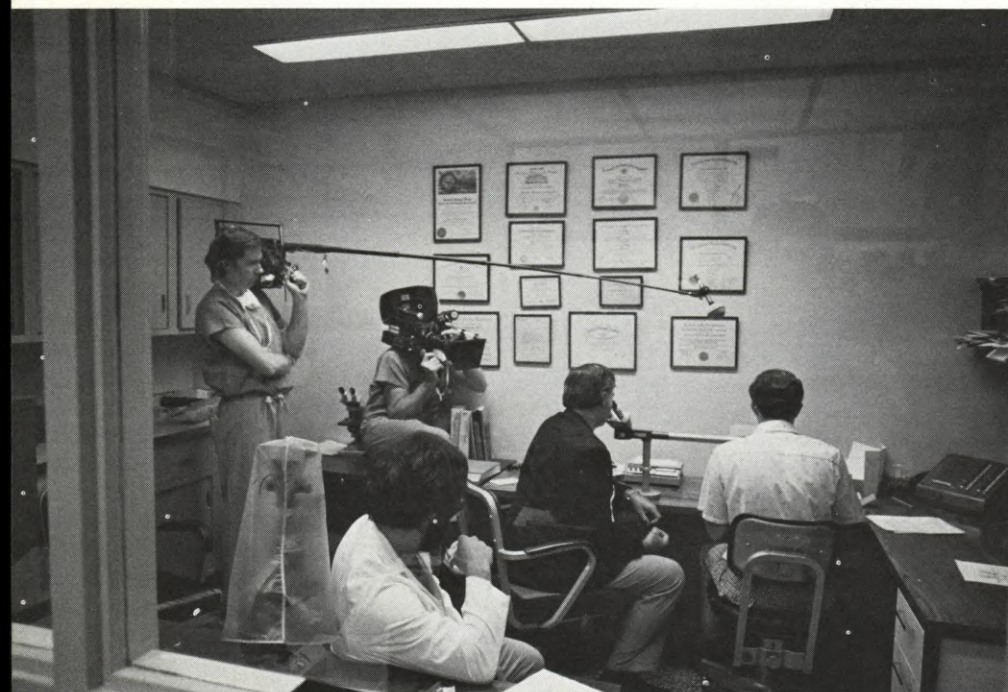
During the shooting of the pilot, the three of us had discussed our ideas about the best methods of working, and the types of equipment we would like to have for the series. Most of the tools we wanted were not readily available, and might never have been assembled had

we not done so ourselves. The equipment we eventually deployed was designed for shooting in tight quarters in dimly-lit hospitals, but readers might find different applications for some of our ideas. There were a number of crews who worked on the other films in the series. Each of those groups used their own ideas and quite different equipment, with excellent results.

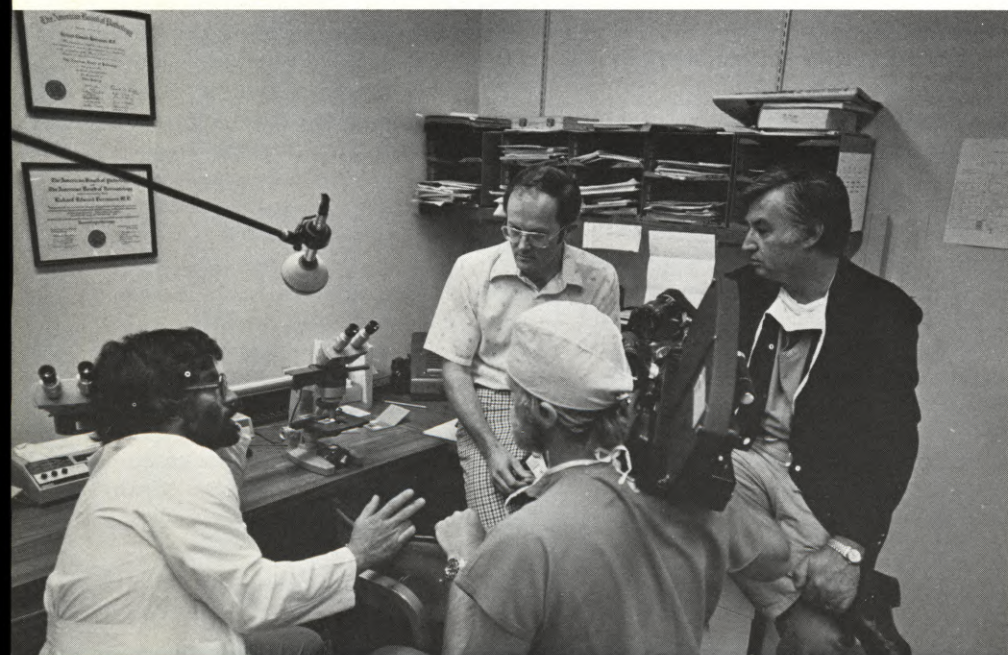
A great deal of pre-planning and pre-production conference time was invested in each film. The direction of the dramatic coverage was carefully calculated during the weeks spent on each location. Key decisions sometimes had to be made very quickly. Fast-breaking moments in the lives of the doctors and their patients demanded very portable and versatile response from the camera crew. We needed lightweight equipment, a small crew, and close coordination.

Bob Elfstrom chose the Frezzolini Reflex Camera for its light weight and small size. The proven reliability, quiet operation, and availability of technical assistance from Jack Frezzolini, Jack Zink, and Bruno Neuman at their New Jersey facilities were positive factors as well. Machine shop service was sometimes available on a same-day basis. When we requested, for instance, that an inching knob be built into the camera mechanism (a suggestion of the sound man), it was almost instantly designed and accomplished.

The light weight and low cost of the Mitchell-type magazines meant that we could travel to a location each day with twelve loaded magazines, and shoot all day without ever having to change film. We carried two identical camera bodies, which facilitated instant magazine or lens changes, and also enabled us to set up a second unit on very short notice. Alan Dater could set up the second camera and follow an important thread of a story to another part of the hospital, while Bob Elfstrom stayed with the prime subject. During a LIFELINE film involving helicopter rescue, one camera was permanently assigned to the helipad atop the hospital, with a Nagra SN strapped to its side. While one cameraman remained at the hospital with the sound man preparing for the patient's arrival, the other cameraman would go out with the flight crew to film the rescue, taking sound as well.



Roger Phenix and Bob Elfstrom film, as Dr. Henry Cleveland and pathologist examine specimen under dual microscope, while Resident Philip Schecter watches. (BELOW) Schecter discusses medical aspects of a case with Dr. Cleveland, while Elfstrom, still in scrub clothes, sets up shot.



Our lenses were a combination of Zeiss High-Speed Distagons, Cooke primes, and Angenieux zooms. Elfstrom obtained the first 9.5mm T/1.3 Zeiss lens to be privately owned in the United States, and it rapidly became the most used lens of the set.

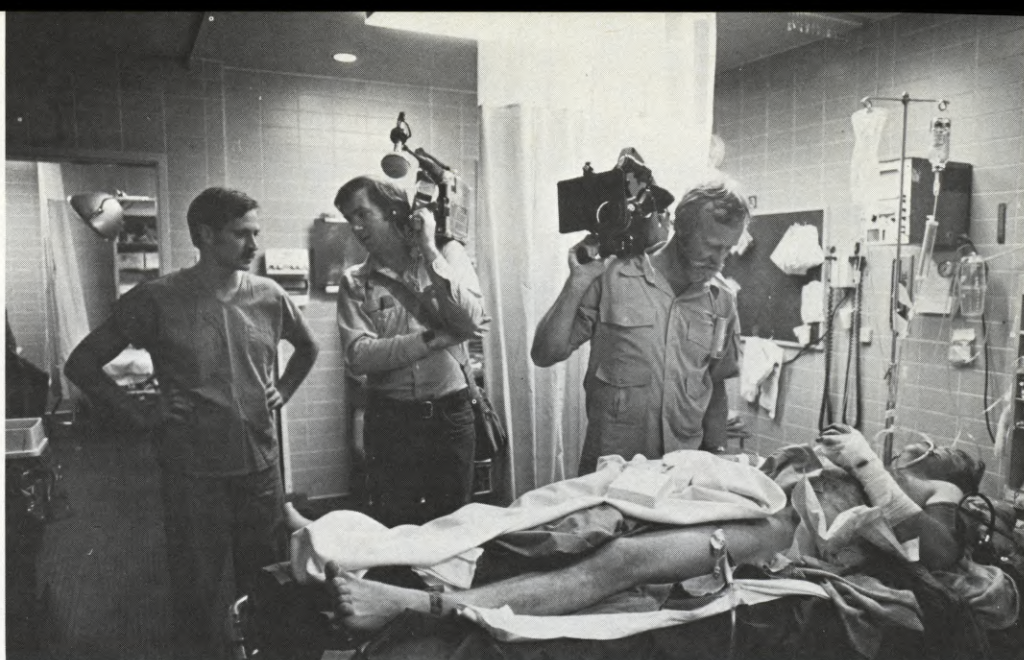
There was a time and a place for the documentary feeling in the LIFELINE series, and there was a time and place for a photographic feeling that was more attuned to dramatic fiction. Composition was carefully considered. Unlike in a fictional drama, there was seldom a guarantee that a reverse angle setup or a lens change could be made, so the camera with its prime lens had to move constantly.

Focus had to be continually racked, and there was no room for a person to do this. Elfstrom devised a mirror periscope with diopter so that with his left eye he could observe the T-stop and footage scales on top of the Distagons while using the viewfinder with his right eye. He modified the lens footage scales with hieroglyphics which could be read in very low light. Using a small stick, he pulled focus with his left forefinger. The zoom lenses were used in situations where operating room detail was required, or in emergencies when medical personnel occupied all positions close to the doctor and patient.

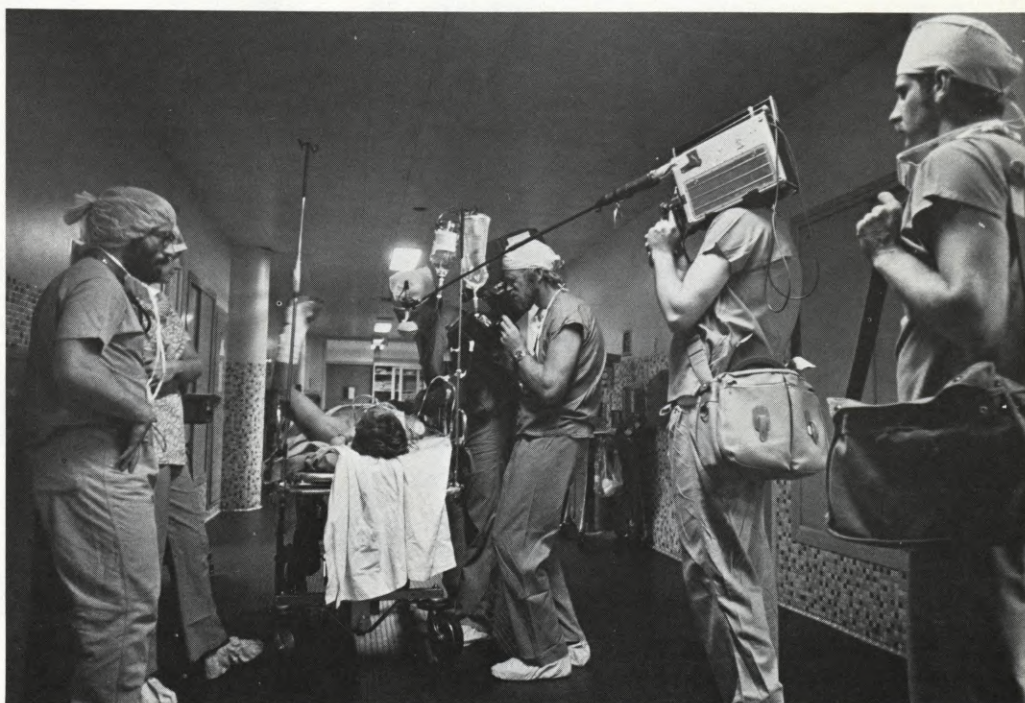
An Arriflex SR mattebox was one of the most helpful features of the camera assembly. The shade was used with all lenses and could be carefully adjusted to effectively control flare, a constant threat in fluorescent-lit rooms with low ceilings.

The Zeiss lenses, in combination with Eastman Color Negative II, allowed us to shoot without lights or forced processing in locations which would have been previously impossible. Moviellab in New York provided us with timed dailies on location, and we could not have been happier with the results.

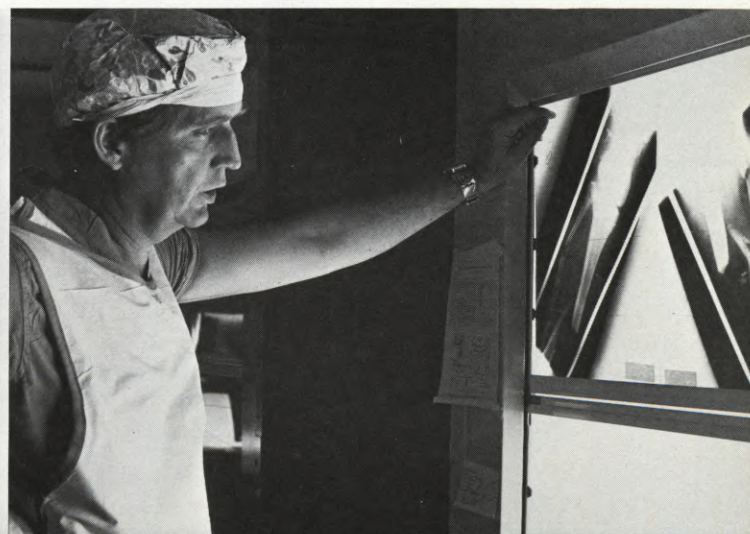
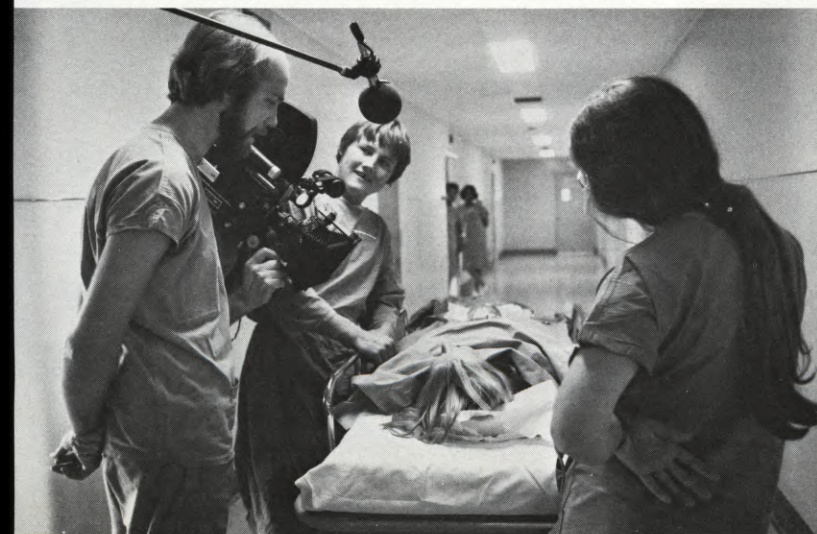
Each day, our film crew of three—



Alan Dater and Roger Phenix discuss helicopter rescue while Bob Elfstrom and accident victim get to know each other waiting for X-Ray. (BELOW) Elfstrom, Phenix and Dater move with accident victim and surgeons into operating suite at St. Anthony's Hospital, Denver, Colo.

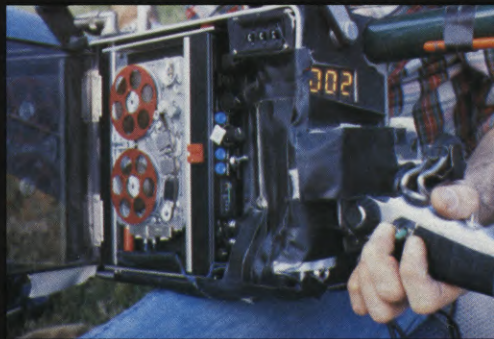
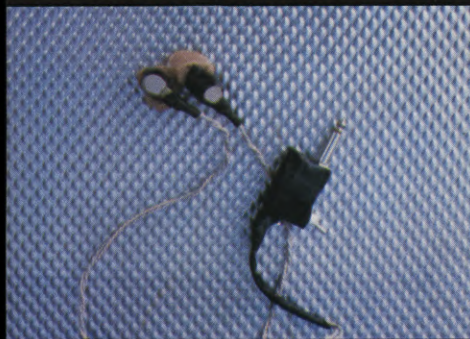


(LEFT) Dr. Daniel Smith, Chief Resident in Obstetrics at Los Angeles County Hospital, congratulates new mother and father on birth of their baby. Dr. Smith is fitted with a wireless transmitter, while others are miked with the boom. (RIGHT) Dr. Donald Trunkey, Emergency Trauma Surgeon-in-Chief, San Francisco General Hospital, studies X-Rays of motorcycle accident victim's leg. The doctor participated in the decision to amputate, an operation watched by millions of LIFELINE viewers.





(LEFT) During surgery, the cameraman stands directly behind the surgeon's shoulder. Crew could risk expulsion if sterility was compromised by touching instruments or doctors during surgical procedures. (CENTER) Alan Dater sets up second camera for helicopter rescue in Colorado Rockies, with Nagra SN attached. (RIGHT) Robert Elfstrom views top of the lens through his special diopter/mirror periscope for focus and T-stop adjustments while shooting.



(LEFT) Audiologist Yosh Furuya and Roger Phenix designed the special earphones which mix stereo room sound with the tape recorder playback sound. Toggle switch on phone jack turns stereo monitoring on and off. (CENTER) Phenix's shoulder-mounted sound rig was manufactured in motel rooms at night during shooting of early series films. The Nagra SN-2 recorder is seen mounted in a Noriyuki SNM-3 mixer, imported from Holland. A Cinema Products camera handle contains controls. (RIGHT) "Dater Light" is used in bar scene which opens film about Surgeon Henry Cleveland.



(LEFT) Dater lines up a short, using the Sachtler tripod. All zoom lenses were fitted with fluid collars for smoother zoom action. (CENTER) Zeiss High-speed Distagon T/1.3, 9.5mm lens was responsible for ability to shoot without lights. Crew obtained the first one to be privately owned in the United States. Modified footage scale facilitated quick focusing in low light, through an arrangement of mirrors and diopters. (RIGHT) Elfstrom and Phenix film, as unseen accident victim explains events which brought him to hospital.

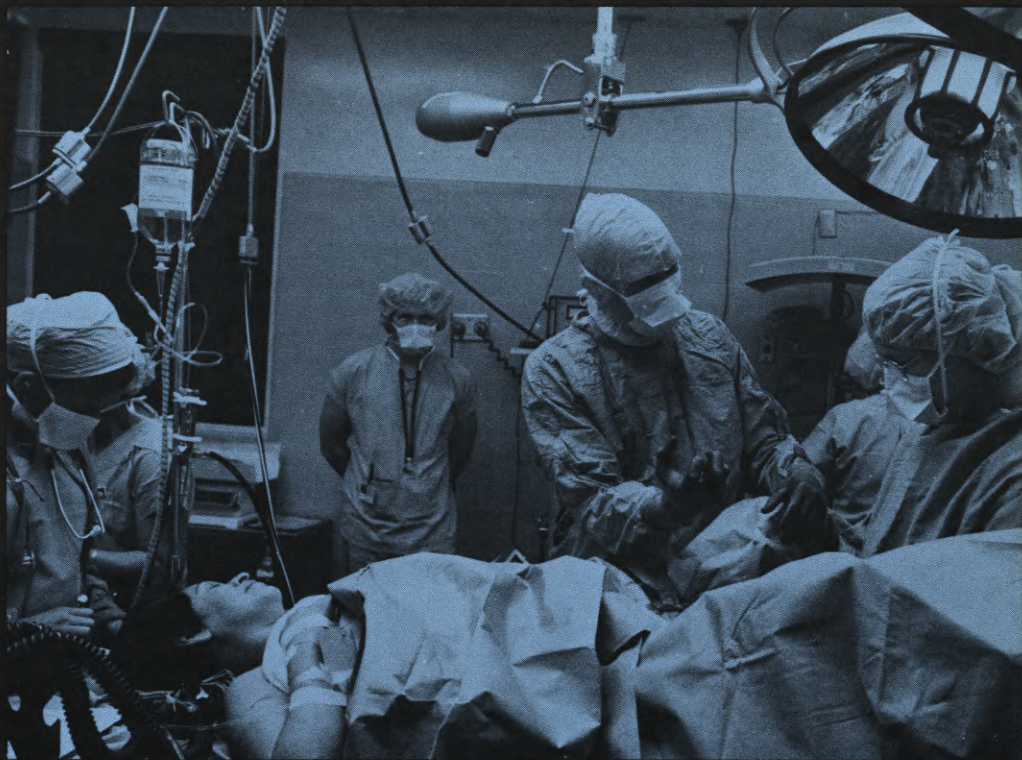
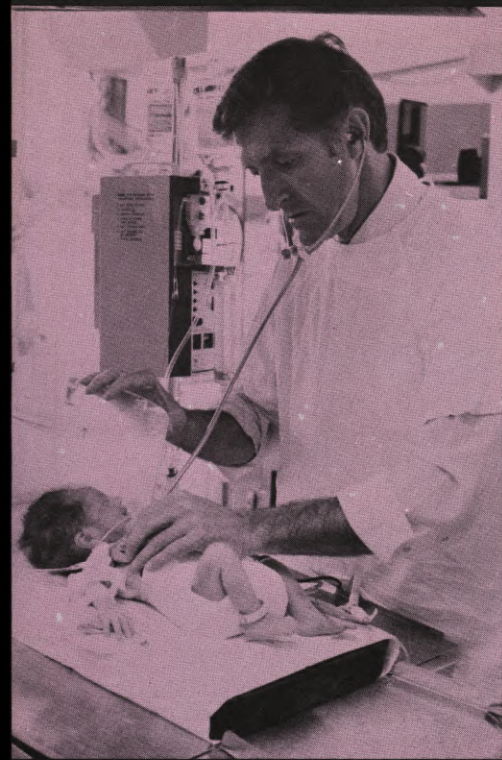
sometimes accompanied by a production manager—would walk with the doctor and his residents on a tour of the hospital to visit with each patient who might become part of the film. The doctor was fitted with a wireless microphone transmitter, and the other people were miked with a telescoping boom. Frequently, Elfstrom's camera was within ten inches of the subjects. This tour, dubbed "TV Rounds" by the doctors, allowed the tel-

evision audience to get to know the patients well during the course of their treatment. The lack of lights, tripod, and associated crew helped us to remain non-invasive. But we were not invisible. Many patients were so concerned with their own frightening problems that we did not attract much attention from them at first. In time, we became allies of some of the patients and their families. We spent time with them when the doctors

could not, and took interest in more than just their medical problems.

The High-Speed lenses reached their limit at a symphony orchestra concert in Pasadena. We wanted to film a surgeon attending the concert, and could not afford to disrupt the performance in any way. Alan Dater unveiled his six-volt battery-powered light, obtained at a hardware store on his day off for \$12.95. It

Continued on Page 1066



(LEFT) Dr. Judson Randolph, Surgeon-in-Chief, Children's Hospital, National Medical Center, Washington, D.C., checks on one of his tiny patients, whose life was saved by an emergency reconstruction of a birth defect. The pilot film for the LIFELINE series focused on the eight-week battle to save this baby's life, which was resoundingly successful. (RIGHT) Dr. Daniel Smith teaches obstetrical techniques to a surgical resident. The crowded operating room functions efficiently; extra people and equipment must become part of the team.

(LEFT) Wide-angle mirror on sound rig allowed 360° view during shooting in tight quarters. Light at end of boom allowed slate marks to be obtained by camera without panning 180° to see digital numbers on sound rig itself. Cameraman's left eye can see top of lens through black tube, which is a diopter/mirror periscope. (CENTER) Elfstrom and Phenix film interview with five-year-old boy at home after 20-hour brain operation which saved his life. (RIGHT) Three-man crew films doctors on daily "TV Rounds", which allowed viewers to get to know patients.



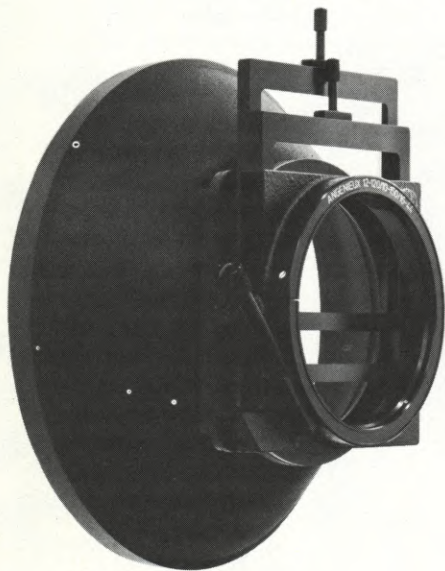
(LEFT) During frequent elevator trips film crew got to know doctors, who walk miles daily on their rounds. (CENTER) Elfstrom, Dater (in scrub clothes) and Phenix stayed on call 24 hours a day for two weeks at a stretch for the emergency medicine films they worked on. (RIGHT) Dater sets up his "Dater Light" for use in a room too dimly lit for the Zeiss lens. Six-volt luminaire was bought in a hardware store for \$12.95, did not attract attention or annoy bystanders, yet allowed filming in dim environments. (Photographs by RICHARD LERNER.)





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CINEMA WORKSHOP Continued from Page 972

dures on most ENG/EFP cameras. By learning these procedures and the corresponding adjustments, even the most unelectronically oriented cameraman can keep his camera delivering optimum picture quality. In reality the modern EFP/ENG camera is a reliable and stable device, and aside from these very few adjustments, the more than 200 or so pots rarely require attention.

Next month we will look into some of the more basic diagnostics that a cameraman can perform for himself. ■

"GLOBAL VILLAGE" Continued from Page 1024

were numerous problems, as you can well imagine. The "bolts" were shot many times until we learned the unique character of this experimental technique.

Another problem that had to be solved was making the starting point of the "bolts of light" look sharp. If the start point was not very delicate, pointed and fine, the effect looked as though it were on top of the scene instead of in the scene. And if the double exposure wasn't shot properly, the light would miss a window or even the whole building (that it was intended to hit) and appear like it was coming out of something else, such as a bridge or a tree. We finally ended up with seven excellent "bolts". By flopping the initial seven "bolts" (upside down, backwards, upside down and backwards) we achieved the illusion of twenty-eight (28) different "bolts of light". After tedious experimentation, shoots, and reshoots, we ended up with an effect that was refined, with pointed starts, in the right position, translucent, with just the right amount of flare and glow. The effect did not look like flat artwork, but as if it were actually happening in the scene. It breathed and was alive!

Once we finished creating the (symbolic) "lights", they were double-exposed (burned in) into the numerous backgrounds, (over 100) instead of being optically printed. We ran six rolls and double-exposed the images. The final job was printed on A, B, C, D, E and F rolls. There were six passes, with hundreds of short editorial cuts and around 6,000 edits. The negative cutter, Lawrence Mischel, our timer, Murray Quito, Francis, Sasha, Byron, and myself, all held our breath during the hours it took to go through the printer. It was amazing that all rolls got through perfectly . . . but they did!

As we shot, we delicately incorporated the use of time-lapse and stop-action photography. Although the effect en-

hances the over-all design of the film, there were other important and practical considerations that went into making that decision.

In Tokyo, we filmed the Stock Exchange, which was a huge area, and we were only allowed one hour. There was no way to light such a vast space! There was, however, enough ambient light coming in through the windows, so that if we shot at six frames per second instead of twenty-four, we would get a good sharp picture. Coupled with that, the men were wearing white shirts that acted as a thousand moving reflectors, which helped brightness in the overall scene. The six frames per second also added a comic cartoon quality in its speeded-up action. It gave the feeling of acceleration and urgency to the fast-paced world in which we live.

Another example of a segment shot at a low frame speed was at the Arc de Triomphe in Paris, at night. We shot this particular segment at four frames instead of 24 to again speed up the action and also to get enough brightness in the car lights to illuminate the scene properly. It created a very stylized, surreal effect, like an animated painting.

A great example of where time-lapse photography and speeded-up action was used took place in one three-second cut, where you see an empty lot and then a building being completely built and then instantly coming down. Len Gittleman is the cameraman who shot this segment. It took three years (the time in which it took to build the building) to actually shoot, and was footage I knew Len had. He had locked down his camera in one place and taken one still picture of the construction site every few weeks. It was laid out as flat animation artwork and then put on the optical stand and printed with dissolves. It gives you the illusion that the building is going up right before your eyes.

To illustrate General Electric's huge computer center and how it worked, we searched for a fresh combination of techniques. General Electric's computer headquarters is huge, and I felt that just panning down rows and rows of computers was very expected and boring. We convinced General Electric to allow us to take stills of the computer hardware (such as reels, panels, and actual computers, and then we animated them. We shot clouds in speeded-up time-lapse, put a horizon line on the ground and placed the computer parts on it (sitting out in a stylized desert), making them spread and grow like a computer city. I designed the animation and B & B Animation in New York executed it. We also photographed miles of footage of interior wires, blinking lights and some things that had nothing whatsoever to do with

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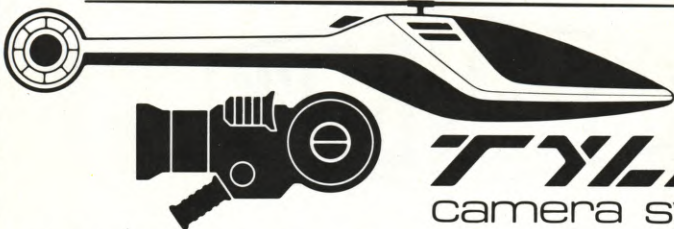
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the inside of a computer, like Japanese neon signs. But when we cut them into the interior section of the computer, they gave the impression that you were actually inside the huge General Electric computer, experiencing information being digested and processed (in an entertaining way) around the world.

To further represent the "global reach" of the system, we incorporated additional animation at the end of the film. We showed the earth receding while rapidly encircled with jetting white-hot glowing "lines of light". These white lines become the symbolic network pattern for the General Electric service in action, and give way to a red glow. The globe was painted by George Casey and Associates. It looked exactly like a NASA shot of earth. Various areas that we wanted to show were covered with painted clouds, so these parts of the globe had to be repainted in order to make certain parts of northeastern America (the home of the computer center) visible. The clouds were removed and the earth repainted. We then rephotographed and put the photo of the earth on the animation stand.

The symbolic "bolts of light" were created and then we superimposed these "bolts" (in a burn-in) over the globe. Along with myself, two very talented editors, Dick Langenback and Sasha Hammid, we worked with Tim on the editorial in charge of positioning the light lines, wrapping around the earth at the end of the film. This was extremely concentrated work and it took 72 hours of straight shooting (no sleep) to achieve this complicated effect (a three-dimensional sphere of moving lights!). In fact, there were many two and three-day no-sleep marathons to achieve the complex editorial and special effects and meet the various deadlines.

The live action sequences were shot with a basic crew of four people who traveled from the New York area to Maryland, Virginia, Washington, D.C., Tennessee, Los Angeles, San Diego, San Francisco, Tokyo, London, Paris and then back to New York. Although there were some crew changes at different points along the way, the basic unit consisted of cameraman Tim Housel, production manager Mike Fitzwater, assistant camera and sound man Bill Steele, and myself as producer-director.

Traveling around the world, we worked 120 days straight (non-stop). Although local people were hired along the way as production assistants, drivers, runners and translators, the gripping, propping, casting, styling, gaffing, and shooting were basically done by the nucleus crew. A typical scheduling would have us shooting from 8 a.m. until ten or eleven at

night, then we would pack and fly from Tokyo to London, take only one day for prepping, including casting, and then start shooting again immediately. The heads of multi-national corporations and General Electric's clients were pre-scheduled, so the crew could never fall behind the tight schedule, and amazingly enough, we never did!

There were a few problems that arose while shooting the computer terminal insert shots. These closeups are laced throughout the film. For example, companies such as Coca-Cola, McDonald's, Disney World, etc., (large clients of General Electric) had priority in regard to computer time. We could be in the middle of a complicated set-up, shooting computer print-outs for inserts, and would have to shut down to accommodate an occasional computer overload. So shooting the computers, which would have taken three days, stretched into two weeks.

Another problem we found was that because the film was shot in 16mm Ektachrome reversal, an extreme amount of light was needed to make the skin tones look correct during the interior shots. The office situations were cramped and because we used so many lights, it was very hot and uncomfortable—especially being right in the middle of summer in Tokyo and Paris.

Then there was the time when we were filming the sequence of Booth Fisheries in the active, and hectic all-night Fulton Fish Market—where buyers come to buy their fish between three and six in the morning. We had made a deal with a vendor and paid him for the use of his space. We were right in the middle of shooting at 4:00 a.m., when he decided that he had had enough and proceeded to throw us out! So we went across the street, cramped between trucks and traffic, and finished the close-ups. No one has ever seemed to notice, but if you look closely, you will see that trucks appear to be going right through the interior of the marketplace, due to the change of local.

One accident took place during a cable car sequence which we shot in San Francisco. Our actors had to jump on a cable car while it was moving. During the first take, one actor accidentally jumped on a lady passenger's foot and while trying to step off her foot, slipped and fell to the pavement. The cable car continued on its way, dragging him along the street, tearing his suit and scraping his leg. Fortunately, the injury wasn't serious. And with great spirit, he changed his clothes, (an expensive three piece suit) and we re-shot the scene before lunch.

There is so much "punch" to the overall film that we needed a strong wrap-up,

using a logical and interesting-to-watch process which utilized the same scenes that opened the film. We took the whole opening sequence and printed it backwards. We printed two frames, skipped one foot, printed two frames, skipped one foot, and so on, and then put the film on an optical printer to make an exciting montage, reversing the opening "problem" sequence. Then we had those symbolic "bolts" of light coming out of windows all over the world until the whole earth was wrapped in them. Then the glowing globe receded into space and became the General Electric Information Service's logo.

It took nearly six months of research and writing before the script was approved and production began. Then, after 120 days of straight non-stop filming around the world and months of concentrated editorial, animation and music (I produced the music with the brilliant composer Al Gorgoni), hard work and dedicated effort, GLOBAL VILLAGE was finally finished. It has won five international awards and when it was screened for everyone, it was at a special screening in Virginia. Executives flown in from around the world by General Electric filled the theatre. There was a standing ovation. The head of General Electric Information Services called it a work of art, and not one thing was touched or changed. They loved it! ■

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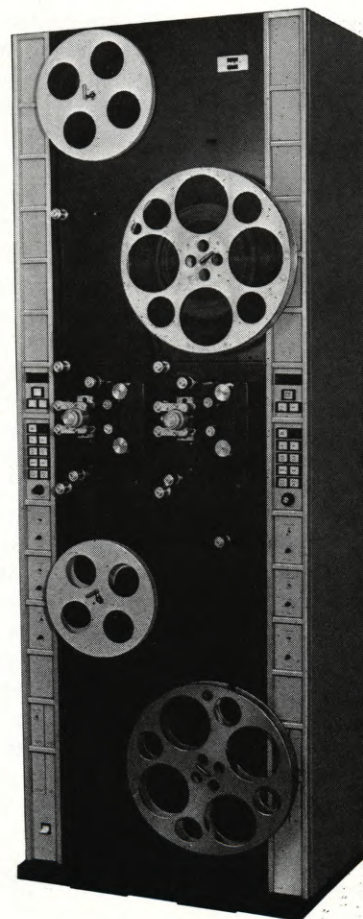
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COMPUTER ANIMATION
Continued from Page 1003

packages, TWEEN and PAINT, were first run on an earlier computer system in mid-1975 and replaced by production versions a year later. TWEEN, written by the author, provides a means of generating and manipulating digital forms of character images. PAINT, which was developed by Alvy Ray Smith of the CGL, allows an artist to paint by using the pen and tablet and watching the color monitor. The SCAN-AND-PAINT software, which was developed more recently by Garland Stern (the current director of the CGL), is a complete animation system that is particularly advantageous in substantially speeding up coloring of character drawings.

TWEEN Software

The artist in FIGURE 3 is using the TWEEN software package to generate a drawing of a rooster. He has placed a paper drawing of the rooster on the digitizing tablet and is tracing the outline with the electronic pen. The rooster is simultaneously appearing on the screen of the graphic display processor and, when completed, is stored in the CAAS at the artist's command. Alternatively, the artist may develop character images directly on the tablet, without originals for tracing.

A series of images consist of "extreme" drawings (such as at left and center in FIGURE 4) and, between each pair of extremes, a number of "inbetween" drawings. The artist enters extremes which provide the computer with the necessary graphic information to generate automatically the inbetweens (such as the three displayed with the extremes at right in FIGURE 4 in a timed exposure). That is, the computer interpolates shapes and positions on the extremes to determine what the intermediate images should look like.

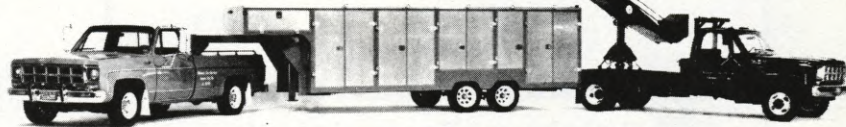
Once a specified number of inbetweens has been produced, the artist reviews them in sequence on the graphic display processor. If an inbetween is wrong, the artist makes the necessary modifications with the electronic pen and considers the corrected drawing an extreme. The computer is then told to redraw the remaining inbetweens to the next extreme so that they too will be corrected.

The artist can immediately check the animation of extremes and inbetweens by specifying an electronic pencil test at the animation station. The screen of the graphics display processor presents all the drawings in rapid sequence for study by the artist. Again, any necessary changes are made in individual drawings

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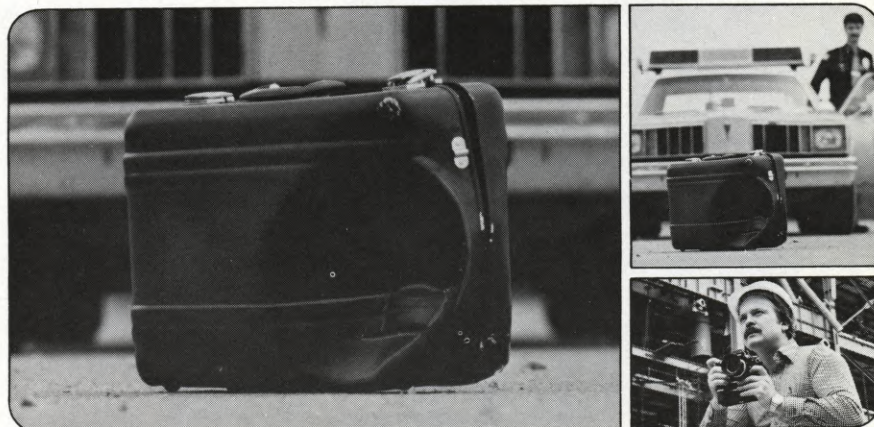
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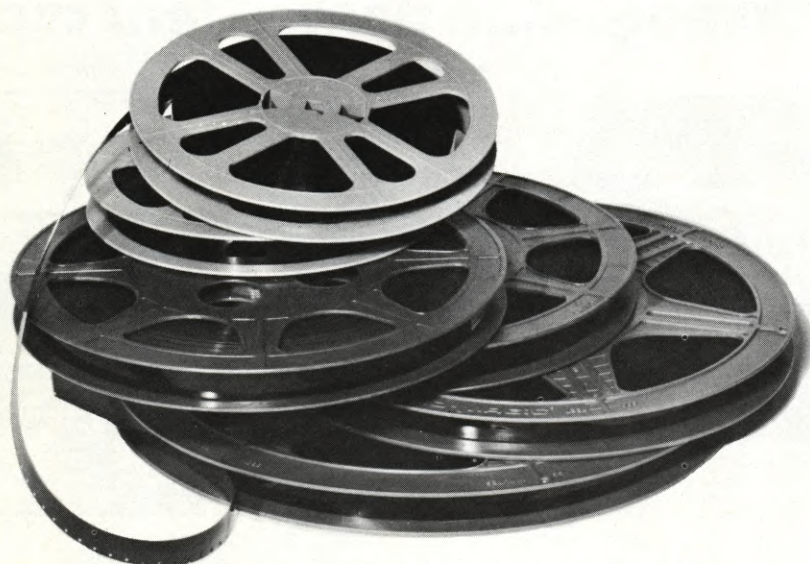
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until the artist is satisfied with the entire animated scene.

The character artist's task is simplified, too, because CAAS permits any number of levels of animation. That is, as in conventional animation, a separate drawing can be provided for each character in a scene or for parts of characters (such as head or legs) in order to simplify the generation of inbetweens that will satisfactorily simulate motion at projection speed. Conventional animation is limited to five levels of character images because the acetate overlays are not totally transparent. As many as 20 levels have been used in early CAAS productions. (There is no degradation of the image in computer-assisted animation whatever the number of levels.)

The exposure sheet used in conventional animation, which includes a row for each frame and column for each level of animation, specifies the dialog for that frame, order of all character images, background and camera position. The exposure sheet for CAAS (FIGURE 5) is very similar to conventional exposure sheets, including instructions on zooms and pans. The CAAS exposure sheets are entered into the system in order to guide the VAX-11/780 computer in frame-by-frame assembly of the scenes in an animation sequence.

PAINT Software

The PAINT software package is used mainly in creating background images such as the two scenes shown on the color monitor in FIGURE 6. In painting a background, the artist designs a "virtual paintbrush" (traces it on the monitor screen) in whatever size and shape are most convenient for a particular painting task. The color selection is essentially limitless.

Having created a virtual paintbrush (at least several are likely to be used for any given background), here are some of the PAINT commands that the artist can call on in painting a background:

- PICTURE: The artist can paint a simple element and then place multiple copies of that element at different points in the picture. For example, in creating a forest background, the artist can draw a small clump of leaves and then distribute them over the branches of the trees. Afterwards, some leaves would likely be drawn individually to avoid a repeated pattern.
- FILTER: Shading with the virtual brush.
- SMEAR: In the direction of the brush movement.
- SLIDE: Moving sections of the image around (as with the clump of leaves).
- ZOOM: Enlarging just one section of

the image in order to work on detail (and then returning to original size).

By using these commands as needed, artists can generate background images much faster without limiting or changing their individual painting styles.

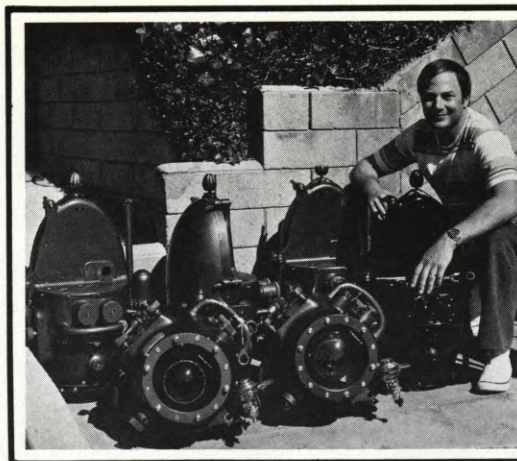
SCAN-AND-PAINT Software

The SCAN-AND-PAINT software package, in conjunction with PAINT for backgrounds, spans the complete production process from drawing character images to assembled animation frames. Character drawings on standard animation paper are scanned by a DeAnza scanner (FIGURE 2a) and stored on a magnetic disk or placed on a frame buffer for immediate painting at an animation station. It takes less than one second to scan an original drawing, do whatever image enhancement is needed, and store the image.

SCAN-AND-PAINT coloring of character images (FIGURE 7), which is done with a much simplified version of the PAINT software, consists of filling in enclosed spaces in the character with colors already specified by the background artist. The character artist slides the pen over the tablet until the cursor on the screen moves onto a selected color on a "palette" along the bottom of the screen. After pressing the spring-loaded pen on the tablet at that point, the artist moves the cursor into the enclosed space in the character that is to be painted and there presses the electronic pen again. The desired color immediately fills the space on the monitor, and the artist goes on to the next space. The TINT-FILL module in SCAN-AND-PAINT eliminates aliasing (also called staircasing or "jaggies") that has been a problem with computer-assisted color filling of character images.

The last stage of SCAN-AND-PAINT is the merging of the painted character images with the background image (FIGURE 8). An electronic exposure sheet is entered into the CAAS to guide the computer in matching the one or more levels of painted character images with the appropriate background image. The VAX-11/780 computer assembles one frame at a time and stores each frame temporarily on three frame buffers, one for each of the primary colors. The frame buffers provide the video signals for recording the frame on standard 2-in.-wide video tape on the IVC 9000 recorder (FIGURE 2a). The assembled frame is also compressed onto magnetic disk storage. From there, the frames in a scene are decompressed on command and scan lines transmitted to the high-resolution monitor in the color film recorder for photographing.

The assembly of character images and background image for an individual frame



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is a massive computing task; a zoom operation, as specified by the exposure sheet, involves a particularly large amount of CPU (Central Processing Unit) time in the computer. The Digital PDP-11/70 minicomputer (FIGURE 2a) originally assembled the animation frames (and still does so frequently as production back-up). Each frame consumed about 45 seconds of CPU time, however, so that the total assembly time for one animation scene of, say, 350 frames would have monopolized many valuable instruments in CAAS for half a day.

The VAX-11/780 is twice as fast as the PDP-11/70 and, as a result, assembles a frame in from 20 to 25 seconds. Therefore, the video tape recorder, film recorder and frame buffers that are involved in frame assembly are themselves more effectively used.

Initial Experience With CAAS

The CGL's first character animation feature was "Measure for Measure," a 28-minute film on the metric system for schools and public television. This fully animated film was produced with several techniques, TWEEN and PAINT, SCAN-AND-PAINT, and the conventional manual procedure. A full-length feature film, PUSS 'N' BOOTS, is currently under production.

The CGL's experience with these and other animation projects indicated both reduced touch-time at various stages and shorter start-to-finish time for animation production. In full animation work, for example, the TWEEN software was found capable of automatically generating four to five inbetweens for each extreme. And the process of filling in color in animated characters was 12 times faster with CAAS than with manual painting on acetate in conventional animation.

In addition to the characteristics of the animation software already cited, artists at the Computer Graphics Laboratory have observed a number of improvements in the day-to-day animation process. Among these are:

- The background artist, in preparing a palette for painting characters, can place sample characters in front of a background on the monitor screen and try different colors to check their match with the background image. (With conventional animation, copies of the character images must be separately painted for each color combination that is being checked.)
- The fill-in colors on characters need not be changed when they are moved from one animation level to another. (In conventional animation, the colors often have to be changed as characters change levels in order to remain optically the same.)

- Color can be changed in a given area of a figure in all character images simultaneously. (In conventional animation, the images must be replaced or the paint scraped off the acetate in each image and re-painted.)
- Any errors in line or color work are easily corrected, either immediately or after the frame has been completed. (In conventional animation, all errors are difficult to handle.)

Other Animation Tools

The CGL has for several years been engaged in developing a system for creating, manipulating and rendering three-dimensional images (FIGURE 9). These images are designed, animated and played back on an Evans & Sutherland Picture System Two calligraphic display unit under control of a dedicated PDP-11/45 minicomputer. The technical tools are now available to produce three-dimensional feature-length films.

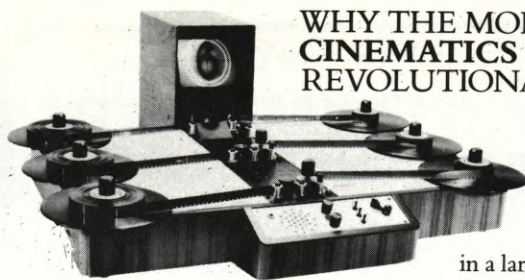
Computer-assisted animation in three dimensions is a very different technical task from that in two dimensions. In particular, much more computation must be performed in order to provide such 3D graphic effects as shading and placement of light sources. Moving 3D characters in the CAAS is mainly limited to rigid objects such as ships and robots, which are pictorially far simpler than human-like figures.

Development of 3D backgrounds has progressed much further. A software package called TEXAS (written by Alvy Ray Smith) composes 3D images like that in FIGURE 9 by electronically arranging units of scenery like flats on a stage. The artist can place background flats at any angle to the plane of the frame so as to give a realistic impression of depth (in contrast, multi-plane cameras can only handle flats that are parallel to the plane of the frame).

Although 3D characters are usually robots, 2D character animation can be used in conjunction with the TEXAS 3D software module. In this way, without further technical development, 2D animated characters can be automatically combined with 3D backgrounds.

The Computer Graphics Laboratory has also developed a software library of special animation effects which allow the artist to modify any image on a frame buffer. There are program routines which permit the artist to pan, zoom, blur, highlight and distort images. The artist can use fancy dissolves, and stars and sparkles, and matte out and replace selected parts of any 2D or 3D image. The two sample frames in FIGURE 10 were produced primarily with the PAINT software and special effects routines. ■

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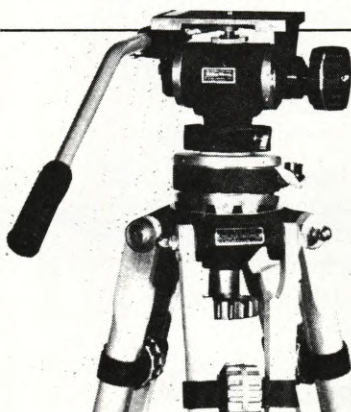
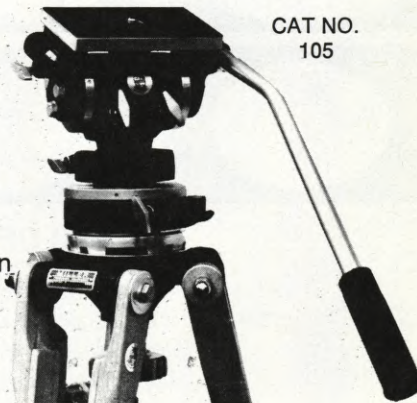
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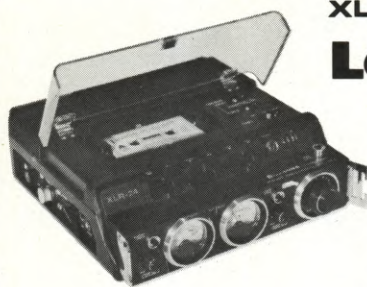
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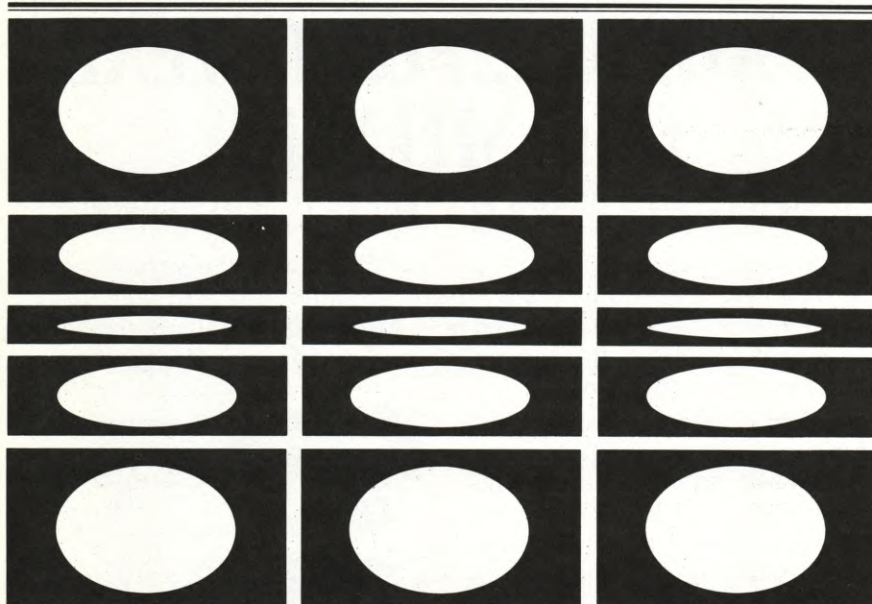
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FREEFALL FILMING

Continued from Page 1009

tion each time. This meant changing the lens, sight alignment and frame rate every jump. Each point of view required a change in flying techniques, as well—once or twice that technique was just to hang onto the jumpers' feet or arms! Eventually, everyone became more adept at keeping the fight in front of the camera, although I still spent much of my freefall time in a vertical dive.

Because the location of the drop zone was a bit removed from the "big city," we had made arrangements for a portable projector and a wide screen. Dailies provided a great source of entertainment, as well as being our greatest single critic.

Five weeks after our arrival, I had made 76 camera jumps and my neck was almost back to normal—size 18 (it used to be 15½). We had about 25 minutes of film "in the can" which would eventually become about three minutes—not a bad ratio for the type of sequence undertaken. Very little film was shot at a normal frame rate, and the only lenses used were the 30mm and 40mm Panavisions—50mm and larger had led to difficulties following the action with any degree of steadiness. Assistant Cameraman Phil Pastuhov had done an excellent job of caring for and readying the camera between jumps—as a result, we came through without a single frame of scratched negative (the conditions were extremely dusty the entire time). Continental's camera performed flawlessly, even at the highest frame rates. Though all concerned would like to have started again at that point to go it one better, we had come a long way and were satisfied with the results.

As though to end it all on a warning note, my last jump was solo to film some plates—after 60 seconds of freefall I deployed my canopy . . . and was looking straight into the door of another Cessna on jump run, which had missed me by about 30 feet.

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The Seminar also featured clinics on editing, lens testing and camera maintenance. Equipment papers were presented on HMI lighting, diffusion materials and sealed lead-acid batteries. Lenses and accessories discussed included the Arriflex lens stabilizer, long distance surveillance with telescopic lenses, zoom lenses compared with high-speed prime lenses and special effects filters. Other papers covered Super-8 production and pointers for successful sales films.

Media Equipment Center's annual two-day flea market and swap shop drew a large variety of basic production equipment and gadgets brought in by the conferees. Equipment exhibits included many nationally known manufacturers and gave the filmmakers an opportunity for a hands-on look at new and different equipment plus a chance to talk to the exhibitors on a one-to-one basis. ■

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CONFESSIONS OF A LIGHTING DESIGNER Continued from Page 992

equipment—even if someone else carries it. It clutters up the working area, the station wagon, the motel room. It drains the energy of the crew and slows up the work. I generally spend extra time at the beginning of a job organizing the equipment into a minimum number of portable cases—if I can't get my assistant to do it for me. It's hard to believe how much time and energy this can save in the course of a few days shooting.

Most of my exterior shooting is too remote for electricity and generators, which leaves battery operated lights and reflectors. Batteries don't last very long—so that leaves reflectors as the most practical "fill" for low budget assignments. Back in the early sixties, there were two choices: the impossibly heavy units with steel stands or improvised ones with no way of stand mounting. One of the tell-tale signs of the beginner (along with wild pans and zooms) is the face lit from a ground-level reflector.

The standard reflectors had aluminum leaf bonded with Japan lacquer to one side providing a marvelous reflecting surface, both bright and smooth—but vulnerable. To protect the surface, several reflectors were packed in a crate which was so big that it wouldn't fit into a station wagon—even the larger wagons of the "good-old-days". So the reflectors were often transported minus case. What returned from location was a station wagon full of aluminum leaf particles and an expensive resurfacing job.

What I thought was needed for those "truckless" locations was a portable reflector that would mount on a stand and have a scuff-resistant surface. What I eventually came up with was a unit made out of a series of resilient aluminum slats bonded to an embossed, aluminized mylar with a vinyl backing. This material functioned as both a reflecting surface and a hinge, so that the panel could roll up for storage. Channels attached to the edge held it rigid. The conventional yoke had to go in the interests of portability, and, in its place, I used a tilting bar that fit on a stand. The disadvantage of the bar was that the reflector couldn't be tipped down very far in the unusual event that the light source was below the reflector. But the bar made it possible to design into the reflector a flood control. By turning a cam lever, the reflector could be bowed, spreading out the light on any one axis and reducing the intensity up to one-third. This proved to be an important control, at least in my own work, because reflectors that are too bright are worse than none at all, and the "nets" used on



conventional reflectors are an all or nothing proposition. With the brightness control, it's also possible to adjust the fill light continuously if the subject moves towards or away from the reflector.

The entire reflector, plus its wide-base stand, could fit into a tube-like carrying case for storage and travel. I called it the Lowel Veriflector. One problem was the difficulty of assembly if any of the aluminum slats became bent. Variflector II solved that problem.

By now our little company was a little larger.

Just as the early automobiles reflected their predecessors, the horse-drawn carriages, for years and years location lighting gear reflected studio equipment. But the problems and requirements are entirely different for location and studio work.

Most studios have overhead pipes or platforms from which to hang lights, as well as units for lighting the cyc in position, ready to be turned on. Sets usually don't have ceilings, so it's simple, with standard gadgets, to position units on top of the walls for backlights and background lights. Generally, there's a good assortment of spotlights and softlights and, since studio stands have wheels, weight is not an important consideration. The same holds true for size, since there's plenty of room for positioning and storage.

On locations, however, there aren't all those studio "sky hooks". Many ceilings are disastrously low. Space is at a premium—hardly enough for camera and crew, let alone bulky lighting gear. The bulkier the equipment, the longer it takes to transport and the more distant the location, the more expensive and complicated to get it there—especially by air. True, some locations are only a short walk away—but that's after the plane, jeep and donkey ride.

Another consideration is that some locations can't be scouted in advance so we're not sure what problems we'll encounter. The natural tendency is to play it safe and take enough extra stuff to "be prepared". Not taking it may mean major compromises in quality or size of shots.

All of this leads up to what I consider the five important considerations for location lighting equipment. Size, weight, dependability, versatility and efficiency. Anyone who's tried to fit large studio lights into a station wagon or use them in a small room knows there's something wrong in the size department. Anyone who's strained his budget (or his back) transporting steel stands to location knows he's blown it in the weight department. Anyone whose equipment has to be repaired frequently can't count on its dependability. Anyone who can't

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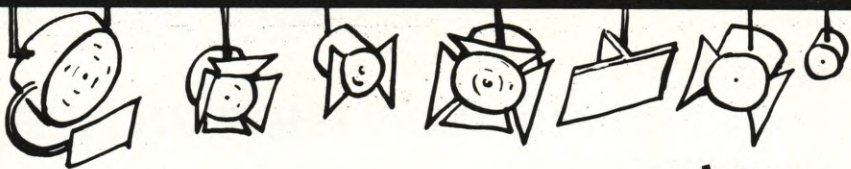
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quickly put lower-wattage lamps in his lights when the fuses start to pop or can't convert his units to soft light, when the mood requires it and the amperage allows it, could well have some complaints in the versatility area. Anyone who's burned his hand because a knob was too small or had to choose between a smooth light and a bright one has probably been impressed, belatedly, with the importance of efficiency.

I tried to address all of these considerations when I designed my first tungsten-halogen light. Working almost entirely alone and at odd hours or between film assignments, it took a couple of years. The result was largely, but not entirely, successful. The problem was, I didn't know when to stop.

Called Lowel Quartz, it utilized a brand new series of single-ended, two-pin lamps: 500, 750 and 1000 watts, including a 1000-watt 240-volt one. Because it was single ended, I decided to orient the lamp filament on the axis of the beam rather than transversely as was traditional. As a result, the parabolic reflector had a smooth pattern, a wide focus range and high output. It avoided the typical cross-over pattern, which overheats accessories and makes barn-dooring ineffective.

Since lights are invariably just a little out of reach and since we can stretch higher with one hand than two, I worked out a constant tension tilt system that, unlike yoke systems of that period, required only one hand to operate. In any case, yokes on small lights add very little except weight, and generally limit the angle of tilt.

For a long time I had been frustrated by the fact that even the best focusing lights were limited in their spot/flood range. None were capable of producing the kind of intensity required for very long "throws" or for high-speed filming. So that when such performance was required, special purpose, high-intensity lights and their accessories had to be taken on location, even if they were needed for only one shot. And of course, these units had no other function on the job.

It seemed relatively simple to design the light so that the standard focusing reflector could be instantly interchangeable with a specular, super-spot reflector. That way, the unit could be converted to a high-intensity light when required, and all of the standard accessories could be used. That part proved simple and turned out to be one of its most popular features.

Another was that it weighed only 1/3 to 1/2 of the conventional, open faced quartz lights then available.

Its least successful feature was the



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"remote" control of focus and tilt, with the help of four chains that could be reached when the light was inaccessible. Trouble was, the chains tended to tangle when the light was stored and to be noisy in the wind. It was the first product I didn't field-test.

Normally I use prototypes on my jobs and ask other cameramen and gaffers to test and criticize the equipment. This sometimes results in valuable suggestions, which are incorporated into the equipment or kits. Some of the many professionals who have helped us in this way are David Quaid, Walter Stewart, Celeste Gainey, Tibor Sands, Robert Schlenger, Jon Fauver, Brian Heller, Joe Consantino and Doug Harris.

A new model, called the Lowel Quartz "D", through a masterful stroke of hindsight-engineering, eventually appeared minus chains and allied apparatus. Even the non-chain model quartz light was unconventional in its appearance. Probably because the form was dictated by the function. The square back end, for example, was a novel but convenient way of providing generous ventilation to avoid the shortened lamp (bulb) and wiring life that sometimes plague "coffee can" designs. It also simplified the mounting of things like oversized handles. Knobs and handles should be large enough to operate with or without gloves, and it shouldn't require a second hand to steady the unit while focusing or tilting.

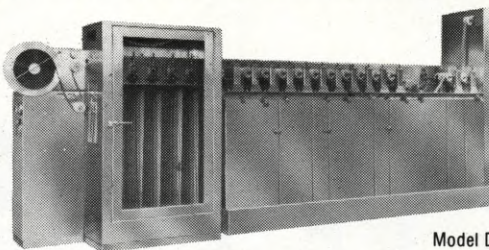
Now that our Quartz light has been around a while, it doesn't look so funny, partly because several of its features have influenced light designs in Europe, and also because time helps the unusual to look normal.

The next system evolved out of my frustration with grip and lighting support equipment which was too studio-oriented or single-function in concept. For example, if I might need spring poles only occasionally on a job, I had to drag them along for days or weeks and couldn't use them for anything else. A boom might prove just as useful on location as in the studio, but how many productions could afford the luxury of all that weight and bulk? Similarly, a support to hang no-seam paper or a riser to extend a stand. Other examples abound. It was obvious that a modular approach with interlocking components was the answer. The components were to be useful by themselves and in various combinations. For example, the extending pole was to be a stand extension or, with other poles and components, it could help form a boom, a sun diffuser, a background support, a floor-to-ceiling pole, a gobo arm, and any number of rigging, bracing devices.

I called it the Lowel Link System. It has proved especially useful on productions

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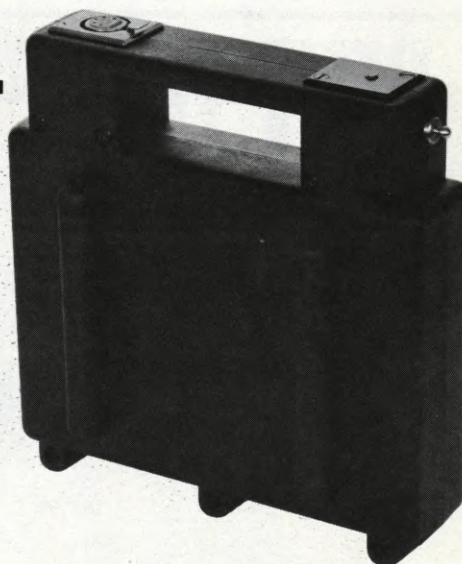
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In this partial view of Charger, red and green lights are both on, showing trickle-charge mode.

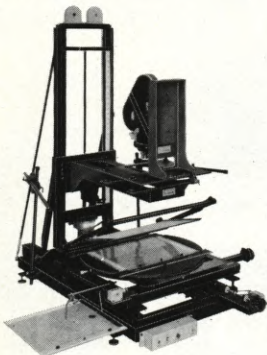
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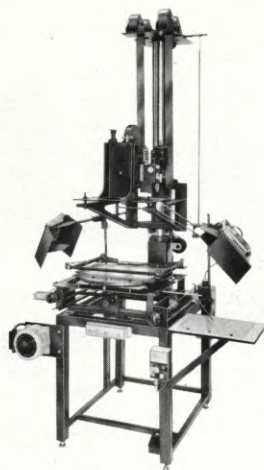
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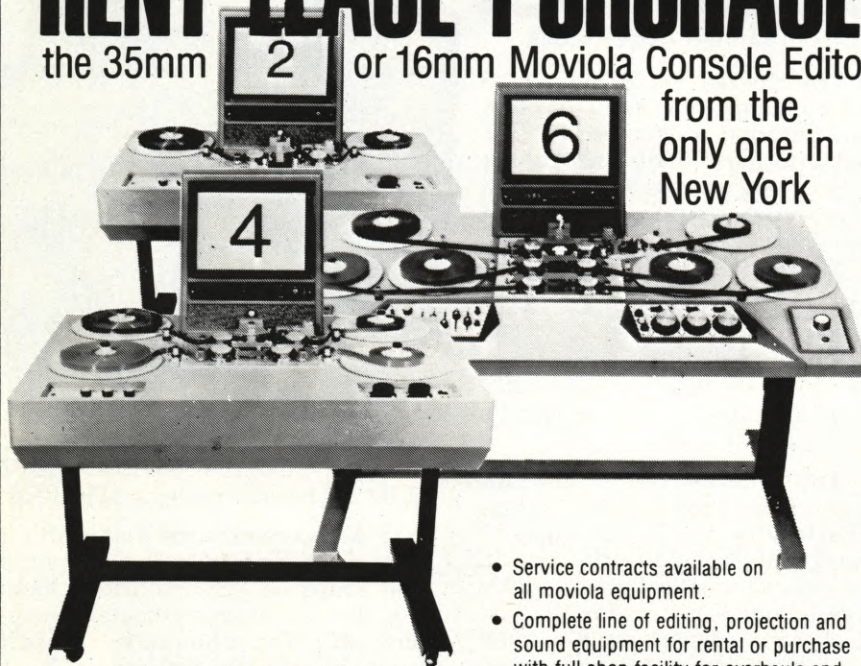
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smaller than a feature but requiring more control than is typical on most documentaries. Its biggest problem is that for many who are not familiar with the link components or combinations, there's likely to be some confusion at first, but later, most users become quite inventive with the possible permutations.

It always surprised me how often crews shipped sand bags to location to stabilize reflectors; sometimes a number of them, weighing 25 pounds each, were shipped by air to desert locations. One of the minor components of the Link System is a plastic non-sand bag, that can be filled with water and hung on the end of our boom as a counter-weight or hooked onto the base of a stand for added stability. If water isn't available it can be filled with beer. This keeps almost everyone happy. Except, toward the end of the day, the boom tends to get a little "light-headed".

Coming up with new ideas has never been a problem—it's the realization that's so difficult. The more unique the invention, the more difficult its realization. As much as 90% of a new design can be completed in a few weeks or even a few days. But that last ten percent may take a year or two. Every little change, every improvement, creates at least two new problems. Escapades into the uncharted regions of equipment design seem to be fraught with the perils of quicksand, avalanches and ferocious beasts. But there are also those rewarding moments when the peak seems to be within reach. The danger is that false peaks look like real ones. Many a time I've thought "this is it" only to discover, when the mental fog has lifted, that I was far from the end of the journey and more than a little lost.

Over the years, many of us had come to depend upon the beautiful quality of soft light. While it's easy to achieve in the studio, it's difficult to create on distant locations. Umbrellas were one answer but they were generally too cumbersome to balance and adjust. Bounce light was inefficient or unreliable in terms of color. Massive studio softlights were impractical to transport without a truck. Sometimes we would set up a bank of lights behind heavy diffusion in an attempt to create one large, soft source, but moving it was a production. What was needed was an adequate size softlight that could fold up compactly for travel.

The solution lay in a fabric-backed reflective shield that could be removed and a folding frame. The unit was large enough to require a yoke and, since cables have a way of getting entangled in yokes, I brought the cable out of the exact center of the yoke pivot, and, lo and behold—no more tangles. Best of all, it



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could be turned 360°, endlessly.

It was the first unit light enough to hand-hold. Its disadvantage (there always is at least one) is that it takes a minute or two to set up. But three of these units could fit in one portable case.

One thing this Lowel soft light proved is that, in terms of durability, resilience is more important than weight. When a conventional soft light is dropped, its own weight may damage it, whereas ours tends to bounce back.

As mentioned earlier, sometimes important suggestions are made by professionals, which are incorporated into new equipment during the trial-by-fire period. An exception to this has to do with a question raised by a student of mine in a New York University lighting class. He asked why barn-doors didn't have reflectors on the inside of the panels.

This question by Barry Rosenbush, now a professional himself, was the stimulus for one of our most successful systems, the Tota-light. The adjustable reflecting doors, in combination with a long-filament lamp, enabled the user to exercise a degree of control previously impossible with "broad"-type lights. Various door positions provided (1) wide angle lighting (up to 220°), (2) illumination concentrated into the sitting/standing area of a room (3) four-wall lighting from the corner of a room with surprisingly even brightness on all walls, (4) compensation for the infamous and seemingly inevitable "inverse-to-the-square-of-the-distance" fall-off that plagues cyc lighting and angled-wall lighting. The doors close up like a clam to protect the lamp and reduce storage space.

Our next system was based on a relatively low wattage (250 to 650), multi-voltage (30, 120 and 240) source. It's called the Omni-light and is exceptionally small and lightweight. One of its most unique features, thanks largely to Marvin's input, is its ability to use many of the components in the Tota System. This means that when both types of lights are taken on location, their accessories can be shared, reducing the amount of equipment that has to be purchased and schlepped.

Like the Lowel 1000 watt unit, the Omni also has interchangeable reflectors, including a super-spot reflector. There are a number of innovations and firsts, particularly in the lighting control components, such as a graduated scrim. And like the Tota, the Omni can be mounted on walls and windows with an accessory device and Gaffer-Tape. The same device, flipped over, hangs on top of doors, open or closed, and allows either light to be positioned for 360 degree shooting without stands.



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In designing the Omni, I had more help than on any other system. My partner, Marvin Seligman; a fulltime engineer, Al Calamai; a consulting illumination engineer, Tom Lemons; our sales manager, Arthur Kramer; our production manager, Carl Yearwood; our purchasing agent, Brian Ellis; and our graphic artist, Lynn Goodkin Hamilin.

On its twentieth anniversary, our company has grown considerably in size and reputation. Many of the early systems which seemed bizarre when introduced are now considered state-of-the-art. Some Lowel innovations have been paid the "respect" of international emulation. Our lights have been selected for use at the 1980 Winter Olympics in Lake Placid.

But for me the most rewarding aspect of the company's growth has to do with the opportunity I have of working with so many resourceful, inspired professionals. Associates at Lowel-Light. Those who distribute and sell our equipment. And those who use it.

One of our greatest "natural resources" is the willingness professional film people have to offer suggestions, praise, criticisms and insights. Besides improving our systems, it helps to diffuse the otherwise rigid boundaries that separate those who create the equipment from those who use it to create the images. ■

(ABOUT THE AUTHOR: ROSS LOWELL holds seven U.S. patents for location lighting equipment he has designed, and one that he shares with his partner, Marvin Seligman. He has taught film lighting at New York University and written numerous articles on the subject.

Ross is also a director/cameraman. Films he has worked on have won two Academy nominations, one Academy Award, A Peabody Award, Emmy Awards, Golden Eagle Awards, an Atlanta Film Festival Award, a "Special Award for Outstanding Photography" from the National Press Photographers Association and dozens of television commercial awards.

He recently directed, photographed and co-produced, with his wife, a short film about a sibling relationship. It is called "OH BROTHER, MY BROTHER", and is distributed by Pyramid Films.)

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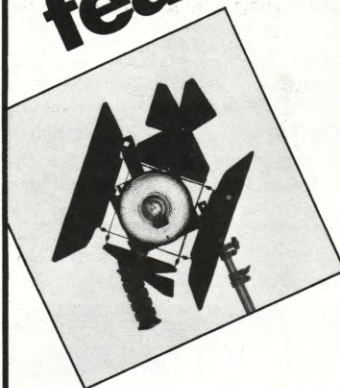
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THE PHOTOGRAPHY OF "THE ELECTRIC HORSEMAN" Continued from Page 1039

bits and pieces in sunlight or overcast to piece out unfinished sequences we had begun in sunlight or overcast. In the middle of all that it would start to rain and we would have to wait out the rain for half a day because there was just nothing else to do.

QUESTION: Did it snow, as well?

ROIZMAN: On a Sunday, the day before we were scheduled to shoot a particular sequence, it snowed so heavily in St. George (where it never snows) that they decided to shut the picture down for two weeks while they got everything together, hoping the weather would clear up. During all this time, the script was still being written, so there were days when we didn't have definite scenes ready to shoot. Sydney Pollack was writing day and night. The actors wouldn't know what scenes they were going to do until the next morning when he would give them their pages (which had been written the night before) and then they would have to learn their lines and we would run out and try to shoot a scene. It was a scramble all the way. It was extremely difficult for the actors. Sometimes we'd end up spending the morning just rehearsing with them, because it would be a scene they'd never seen before, and then we'd have to squeeze it in and shoot the whole thing in an afternoon—a sequence that would normally have been scheduled for a whole day. We would do it in a half-day, and try to match the light that was ever-changing. It was one of those nightmare situations. But I must give tremendous credit to our Production Manager, Ron Schwary, who managed to keep things going during this long and difficult location. He was so well organized and so well prepared that he managed to keep everyone happy and the show moving along, in spite of the weather catastrophe.

QUESTION: What methods did you personally use to keep things moving under those conditions?

ROIZMAN: One of the methods I had to resort to, which seemed to work, was keeping my fingers crossed. It was tricky. On some sequences we would literally shoot one shot and then have to come back days later to shoot another shot of the same sequence. It was a matter of trying to remember what we had done and matching it. Fortunately, I always keep a very strict log on every

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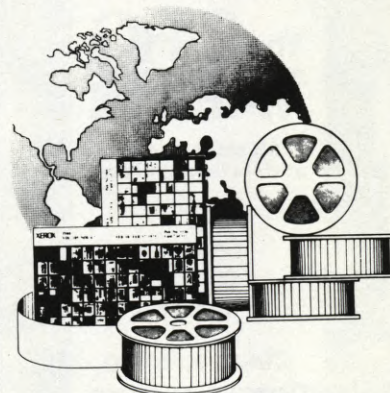
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scene I shoot, including the exposure, how much I've underexposed or overexposed for an effect, what lenses and filters were used, etc. I do this so that if, for any reason, I have to go back a month later and match a scene to cut into a sequence, I'll have a reference to jog my memory as to what I was doing that day. This is necessary because I have a tendency to do what I feel like doing for each scene and each particular day, rather than having a set formula for the whole film. I go by instinct, by what I feel the mood should be, even though it might mean changing filters or changing exposure or whatever. Sometimes I'll forget the technical details if I don't have them written down. I won't remember what I did that day, because I just did it on gut reaction.

QUESTION: What about booster lighting for your exteriors? Did you use Brutes or HMI units?

ROIZMAN: Well, we used everything. Predominantly we used HMI lights because they were easier to move around in the mountains and the rocky terrain where we were working, but there were occasions when we would use Brutes. I used whatever was necessary—Brutes, HMI units, big white reflectors, which I liked to use outdoors when it was sunny. When it wasn't sunny I had to go to lights, and I definitely had to use lights on Jane Fonda. It was good to use a little extra booster light on Jane for closeups, especially in overcast weather. In sunlight we'd photograph her in backlight whenever possible and not use any extra booster light—maybe just a soft balance light. When it was overcast I had to use booster, and generally it was HMI. My gaffer, Ted Holt, was right on top of it. He had a special little meter that would read the frequency of the current for the HMI lights and if it drifted off, he would know about it instantly. We used HMI lights throughout the filming in Las Vegas and Utah and never had any problems with them.

QUESTION: What about the use of filters on this film?

ROIZMAN: We started out with a very hard, sharp look, but when we got to the lyrical, romantic part of the film, I started to use nets and increased them very subtly by degrees, so that the effect became more romantic. Basically, that was the only kind of filtration I used.

QUESTION: Did you use the moving camera much for THE ELECTRIC HORSEMAN?

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ROIZMAN: Yes. We did lots of long dolly shots and my key grip, Bob Rose, would sometimes have to set up 100, 200 or 300 feet of dolly track on the special rail system that he has. He would be able to lay it down incredibly fast—and when the weather was with us, it was fine—but all of a sudden, sure enough, the weather would change right in the middle of the operation and just frustrate everybody. The light would change totally. This was particularly the case when we were working among the big rocks. We'd get part of a sequence done in the matching light and then go for another cut, only to find that the sun had shifted so much within the rock formation that there was no chance of matching. You couldn't artificially light it because there was just too much area in the background—especially with the anamorphic format. We had to deal with vast backgrounds even in the closeups, so we had our hands full.

QUESTION: What about your cover sets? What were they like and where did you build them?

ROIZMAN: We built cover sets just to protect ourselves from the weather. We had an exterior sequence which we were supposed to shoot at night on location, but because of the unpredictable weather we decided to build it on the stage. We didn't actually have stages there. These were little warehouses that our Production Designer, Steve Grimes, found. He managed to put sets in them, but there was very little height—nothing like what we were used to on a real sound stage. It was very tricky to light within the confines of such a small stage—especially a set that was supposed to represent the open plains at night. Normally you would do it with one big light, set far back and high—but here we had to use five or six lights and make them look like a single source—like moonlight, to be exact. Getting the proper effect was very time-consuming and tedious.

QUESTION: Were you able to maintain adequate contact with the laboratory from the Utah location?

ROIZMAN: Yes. We were using the Technicolor Lab and they did a great job of maintaining consistency from day to day. Our lab contact was a young man named John Fiedler and this was his first big feature. He was extremely conscientious in the handling of our dailies and gave us very accurate reports. It was very reassuring to have him working with us.

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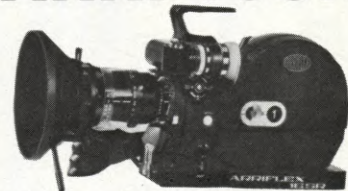
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Continued from Page 1042

was diffused and scrimmed down to a level which would not overpower the light-gathering ability of the lens. The light level was enough to expose the film, but dim enough so that it went virtually unnoticed by the surrounding audience. The footage was so successful that the Dater Light was called upon occasionally throughout the series for extra-low-light applications.

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Roger Phenix chose the Nagra SN-2 as the prime recorder because it could be designed into a new sound recording configuration. By placing the recorder on the shoulder instead of the hip—like a film camera is positioned—he could eliminate the awkwardness of dangling cables and tangled straps and antennae, and improve balance. The resulting unit, called EXP-3 by the crew, was a decidedly smaller threat to the tubing, wires, and other medical equipment crowding the operating rooms and intensive care units.

The EXP-3 unit consisted of the miniature Nagra SN-2 recorder, the Dutch Noriyuki SNM-3 mixer, the Vega Diversity wireless receiver (we received the first unit delivered by the factory to Ron Topham's Audio Service Co.), and the Audio Services incandescent digital slate. These and a power supply were housed in a Nagra 4.2 chassis box to which was bolted a nine-foot telescoping fiberglass boom imported from France by Jerry Bruck. Controls were built into a CP-16 camera handle. The EXP-3 Shoulder Rig made Phenix a foot narrower and twelve pounds lighter than had he used the Nagra 4.2L over the shoulder. Now he could run full-speed while recording.

The EXP-3 represented a departure from the traditional method of documentary shooting style. It could be put down as easily as the camera, and picked up and rolling just as quickly, while the Nagra 4.2 with wireless and boom requires several seconds longer to get into action. A light at the mike end of the boom—suggested by Elfstrom—allowed sync marks to be obtained by the

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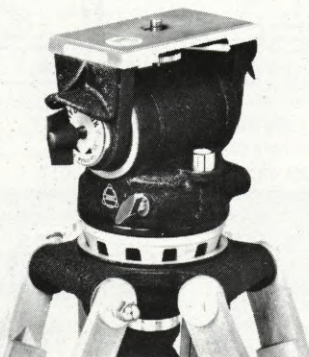


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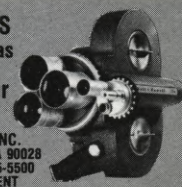
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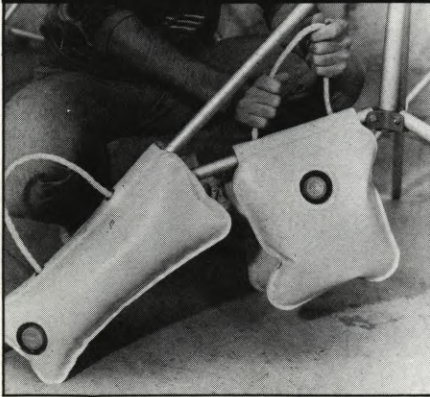
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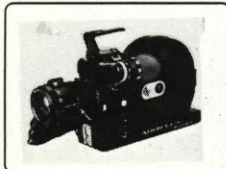
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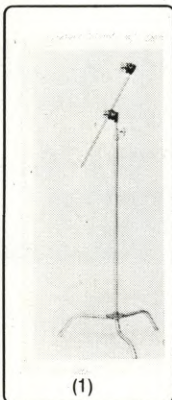
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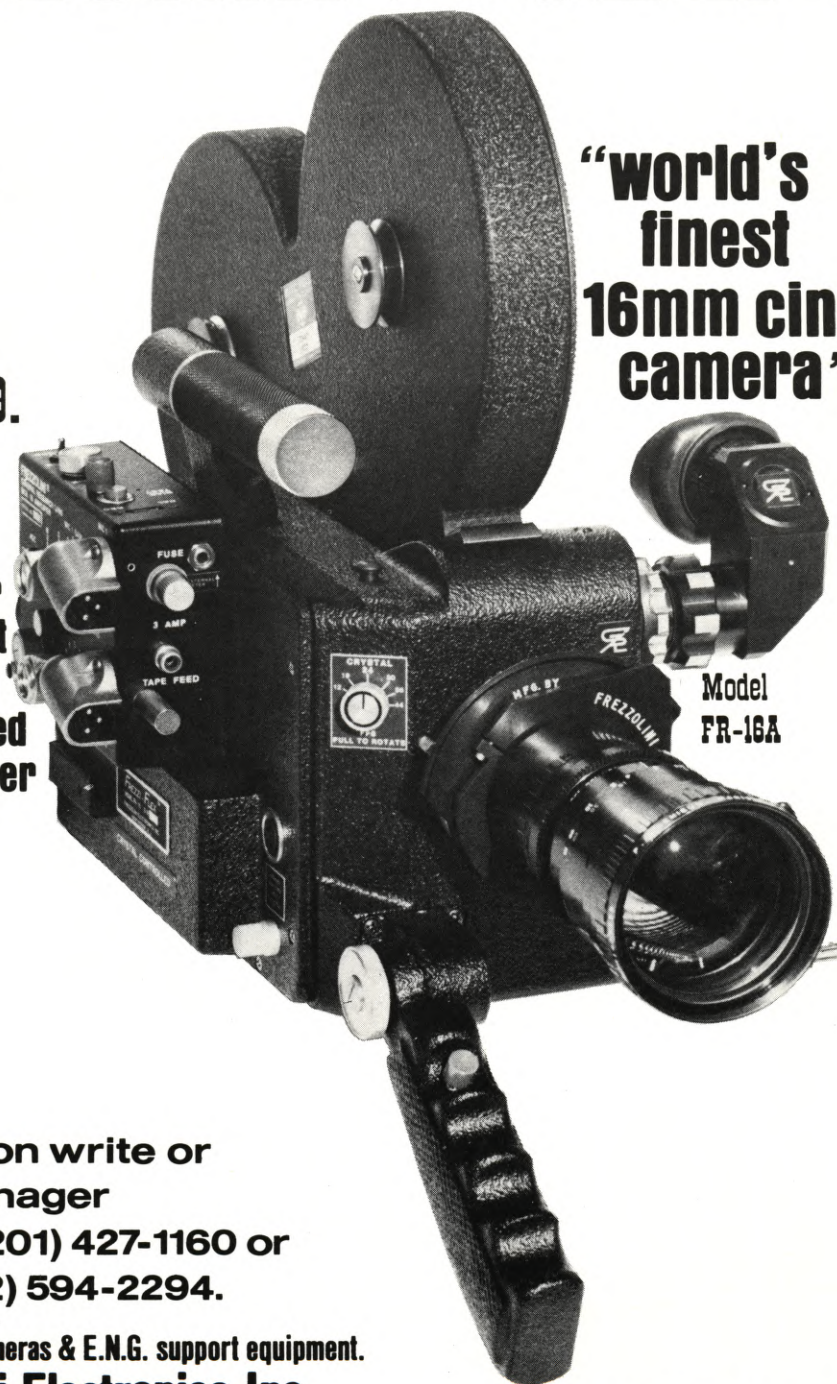
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