

American Cinematographer

International Journal of Motion Picture Photography and Production Techniques

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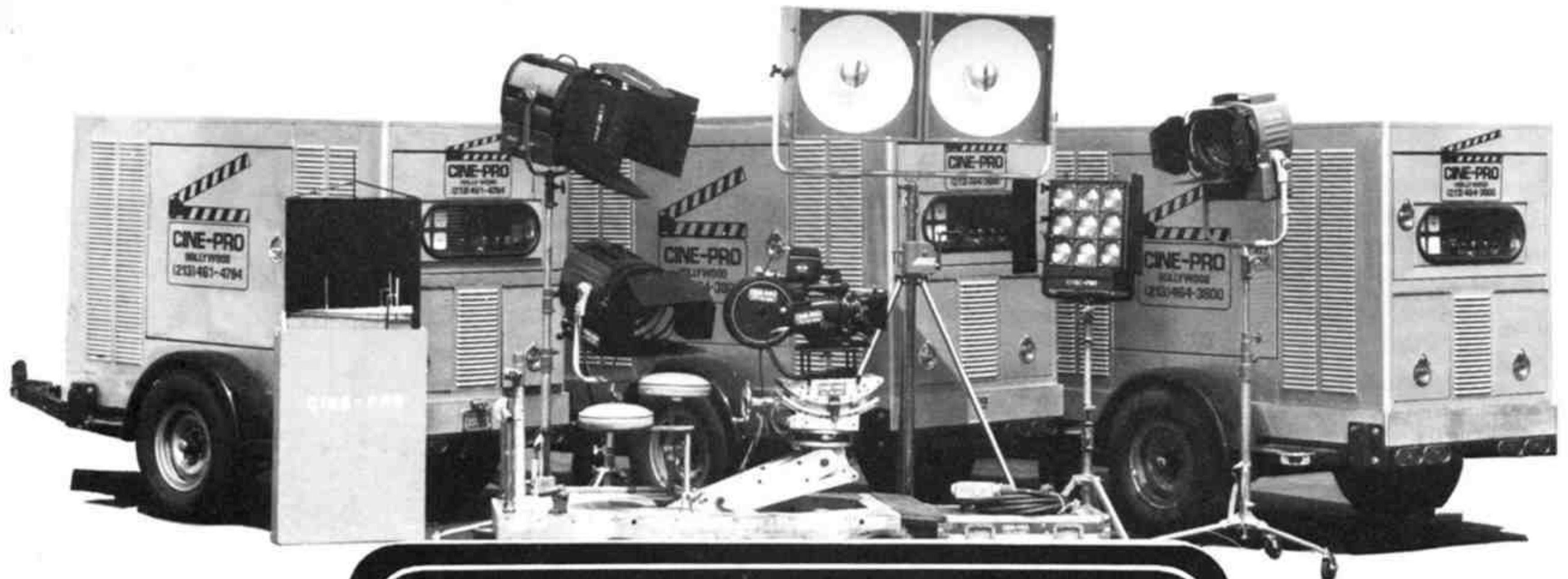


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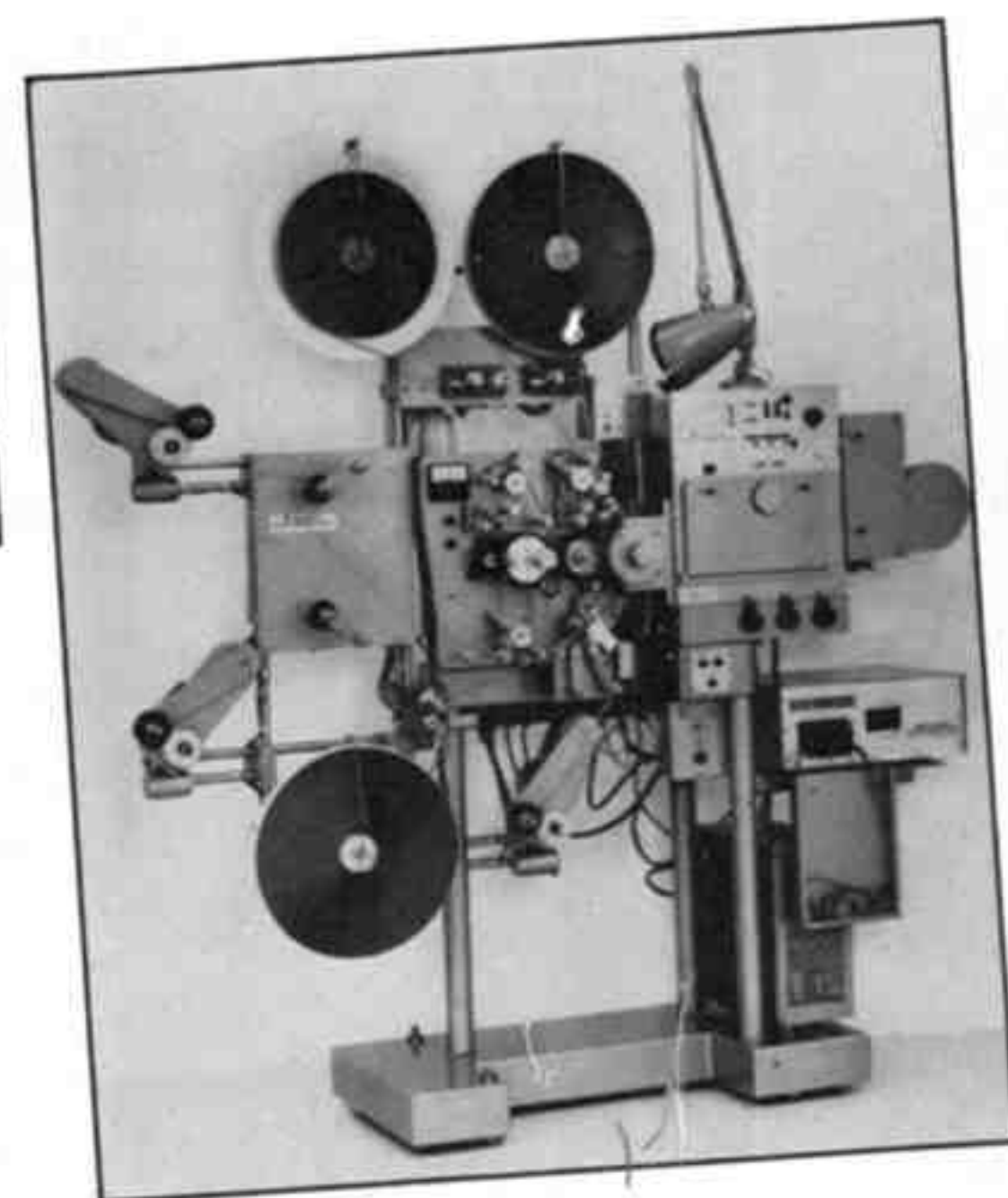
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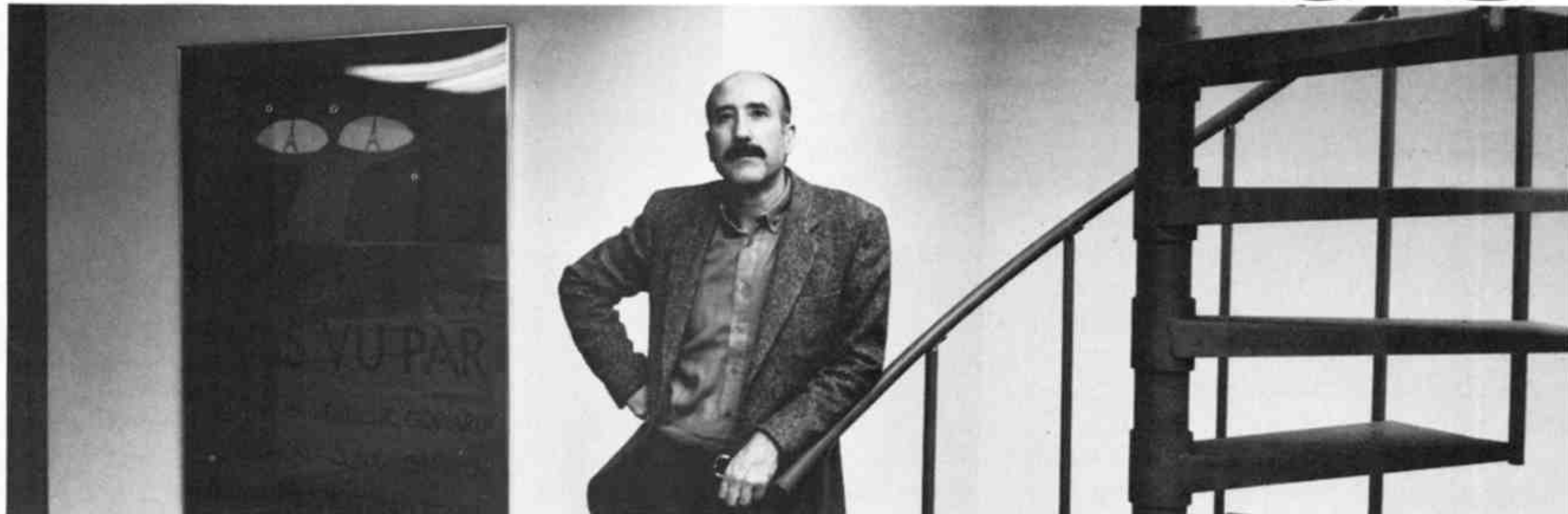
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ON THE COVER: A rendering of Harrison Ford and Karen Allen in their roles of Indiana Jones and Marion Ravenwood for the Lucasfilm Ltd. production of "RAIDERS OF THE LOST ARK", directed by Steven Spielberg and released by Paramount Pictures. Artwork by DREW STRUSAND, courtesy of Lucasfilm, Ltd.



ALMENDROS



"One great moment is worth waiting for all day."

Spanish-born cinematographer Nestor Almendros has earned Academy Award nominations for the cinematography of three of his first four major American films—*Days of Heaven*, *Kramer vs Kramer*, and *The Blue Lagoon*—and in 1978 he won the Academy Award for *Days of Heaven*. He has been celebrated for his work with premiere French directors, including François Truffaut, Eric Rohmer, and Barbet Schroeder.

"My background is different from most cinematographers. I never apprenticed with a master, so I never directly copied a master's style or techniques. I just grabbed the camera and started shooting. I merely was infatuated with the avant-garde cinema I had seen—especially in the first films of the French New Wave: those by Jean Rouch and others. That kind of cinema verité, the handheld camera look, was what I was after: show things as they are, with no distortions.

"That is still my approach. I use a minimum of artificial lights. I light sets by my eye, and use the light meter only to set exposures later. Lighting should be logical, not arty. *Days of Heaven* was shot with very little light. Oh, we had lights, even big arcs. But most of the time we weren't using them. I felt I didn't need all those lights. What I wanted was bouncing light, natural light. Rather than create an artificial moment, I'd wait for the real one to happen. One great moment is worth waiting for all day.

"*Kramer vs Kramer*, on the other hand, is an imitation of natural light. It's mostly

done in the studio. I applied natural-light technique: imagining the sun, for instance, outside the Kramers' apartment. It was a realistic approach to an artificial situation. I would not have a back light if it were not justified by a window or light behind. And I refused catwalks and sets without ceilings. In reality, lights don't come from the angles of a room, they come from the center top, table or floor lamps, or the windows. An audience can intuit if lighting is artificial. They sense something is glossy or unbelievable. You can cheat more in black-and-white, but color film especially calls for reality.

"In most movies, including my current film, *Stab*, I have restricted myself to a color or two only. Black-and-white is like a tuxedo, always elegant. Color, if you're not careful with it, can be vulgar. *The Blue Lagoon* is different from any other film I have done. The subject matter called for the use of all colors. It was a challenge to use all the colors to try to produce a beautiful and elegant film. *The Blue Lagoon*, incidentally, was shot entirely on Kodak film and developed in Sydney. The scene where the girl is swimming at night and the boy sees her for the first time as a woman was the result of superimpositions. The Eastman color negative II film 5247 could really take it. *Days of Heaven* was also on the 5247 stock and developed in Vancouver. The prints were done in Hollywood.

"There has been relatively little change in cameras, but film technology has advanced rapidly, especially the possibilities of

pushing and increasing the speed of Kodak color film. I simply could not have shot *Days of Heaven* the way I did on early color stock. The great thing about film is, everything looks better than it is. Tape, on the other hand, is too real. There is no magic, no transposition.

"Cinematography is not an art in and of itself, it is part of an art. For an art to be an art, it has to be independent of anything.

"Since my childhood, I have always been a film buff. So I consider it a great privilege to have shot Charlie Chaplin's last film—a beautiful documentary, scenes with his wife and children. And I was lucky enough to do the last feature by Roberto Rossellini, in Paris, just two months before he died. And my parents didn't want me to be a filmmaker!"

If you would like to receive our monthly publication about filmmakers, Kodak Professional Forum, write Eastman Kodak Company, Dept. 640, 343 State Street, Rochester, N.Y. 14650.

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**America's
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CINEMA WORKSHOP

By ANTON WILSON



NICAD BATTERY LIFE II

There are three categories of battery failure:

1. The "permanent" failure,
2. The "temporary" or "reversible" failure, and
3. The "functional" failure.

There are remedies for the latter two conditions but "permanent" failure is death to a NiCad cell. The permanent failure usually results from either an internal short circuit or an open circuit. The short circuit can either be a "dead" (low resistance) short or a high impedance short. In the case of a dead short, the cell in essence becomes a piece of wire. It will not accept a charge nor will it contribute any power to the battery. The symptoms of a shorted cell are typically an open circuit (no load) voltage 1.3 to 1.4 volts lower than normal and a voltage under load that is about 1.2 volts lower than normal. Note that capacity of the remaining cells in the battery is not seriously affected assuming that the device being powered can still function on the reduced voltage. By the way, this is one of the big benefits of the modern wide range "switching type" regulators found in most state-of-the-art video equipment. Such equipment will usually function on voltages from 10.8 up to 18 volts. Thus a 14.4 volt NiCad can lose one or even two shorted cells and still power one of these devices without any problems. On the other hand, if a 12-volt NiCad battery is employed, the device being powered will cease to function as soon as even one cell becomes shorted.

The "high impedance" short circuit can be considered a "partial" or "slow" short circuit. This partial short provides a small path that will slowly self-discharge the afflicted cell. Such a cell can be charged if the charge current is significantly higher than the current being dissipated by the slow internal short. However, even if the cell is charged, it will slowly lose all its capacity in a few days or even hours depending upon the severity of the short.

The symptoms of a battery afflicted with a high impedance shorted cell will vary depending upon the time elapsed since charging. Immediately off charge, such a battery will behave perfectly normally with little or no reduction of capacity or voltage. However, with longer interims between charging and actual use, the battery will

exhibit progressively less capacity. Once again, the high-voltage 14.4 or 13.2 volt battery will tend to compensate for this problem, whereas a device powered by a 12-volt battery will die as soon as the weak cell is fully discharged. The best way to combat the high impedance short problems is to fully charge or recharge a suspect battery at the *slow overnight* rate, the evening immediately preceding the day of use.

These internal short circuits are the most common cause of death for a NiCad. As with all things, death is inevitable, but certain conditions and practices will certainly speed its arrival. The internal short is usually caused by the two plates inside the cell coming into contact with one another. This could be the result of a physical shock or a direct hit that dents the cells. The two plates are kept apart by a tissue-thin separator material. A dent in the case can pinch the separator material and cause the two plates to touch (dead short), or almost touch (high impedance short). Obviously the best defense is not to bang batteries about. Despite the best of intentions, batteries in our industry are bound to experience some rough handling and in anticipation of such, a battery should offer some protection to the cells inside. Choose batteries with hard outside cases, as opposed to soft coverings. The construction should not transmit the shock of a fall directly to the internal cells.

The other main cause of internal short circuits is separator breakdown caused by excessive or elevated temperatures. Prolonged exposure to high temperatures will accelerate the decomposition of the separator material. Obviously, the best defense is to keep batteries cool. Do not leave them on overnight charge longer than 16 hours.

Extending the overnight charge rate for days or even weeks will *not* damage the battery due to overcharging (venting), but the elevated temperatures resulting from this continuous charge current will reduce the life expectancy of the battery. Do not leave batteries in a hot trunk or van. Do not leave batteries in direct sunlight, whether indoors or out. Brief exposure to higher temperatures will have little effect on life, but frequent excursions to elevated temperatures that result in the raising of the average battery temperature will most

assuredly have an adverse effect on life expectancy. Heat is the biggest enemy of batteries. So whenever possible keep batteries in the coolest available place. In hot climate batteries that will not be used for an extended time should be charged and then stored in an air conditioned room or refrigerator. (While heat is the number one killer of cells, very low temperatures must likewise be avoided during charging).

There is also a certain amount of heat generated within the cell during discharge, due to its internal resistance. This is usually negligible at low current drains but can become significant at higher relative currents, especially in hotter climates. For example, a camera drawing 2 amps will discharge a 4-ampere-hour battery ("D" size) in two hours at the 1/2 "C" rate. This same camera will discharge a one-ampere-hour (sub "C") battery in a 1/2 hour at the 2 "C" rate. Because the smaller one-ampere-hour sub "C" cell has a higher internal resistance, it will generate more heat during discharge. One can thus expect longer life and more dependable service from the larger "D" size 4-ampere-hour battery. Likewise, "D" size 4-ampere-hour batteries in portable lighting service (8 amp/2 "C" rate) should not be expected to give the same length of service they would if used with a portable 3/4" VTR (one-amp/1/4 "C" rate).

Over-discharging a battery can also invite a short circuit. Because a short circuit is a direct path from the positive to negative, tremendous current will flow through this internal path the instant it forms. Assuming the cell has some charge left, this high current can often vaporize internal short circuits as they develop. This self-correcting phenomenon cannot take place if the cell is discharged close to zero volts. Therefore, it is good practice not to over-discharge a battery. Change to a fresh battery at the first indication of depletion and charge depleted batteries as soon as possible after use. Batteries should be stored in the charge condition and should receive an additional slow overnight charge the night preceding re-use. I have heard some people mention that they have corrected an internally shorted cell by charging it for a few seconds with a tremendously high current. While this procedure is sometimes suc-

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“Shooting in the intense heat and humidity of the Amazon jungle was the acid test for my GSMO. It came through with flying colors.”

Jan Peterson
Cinematographer

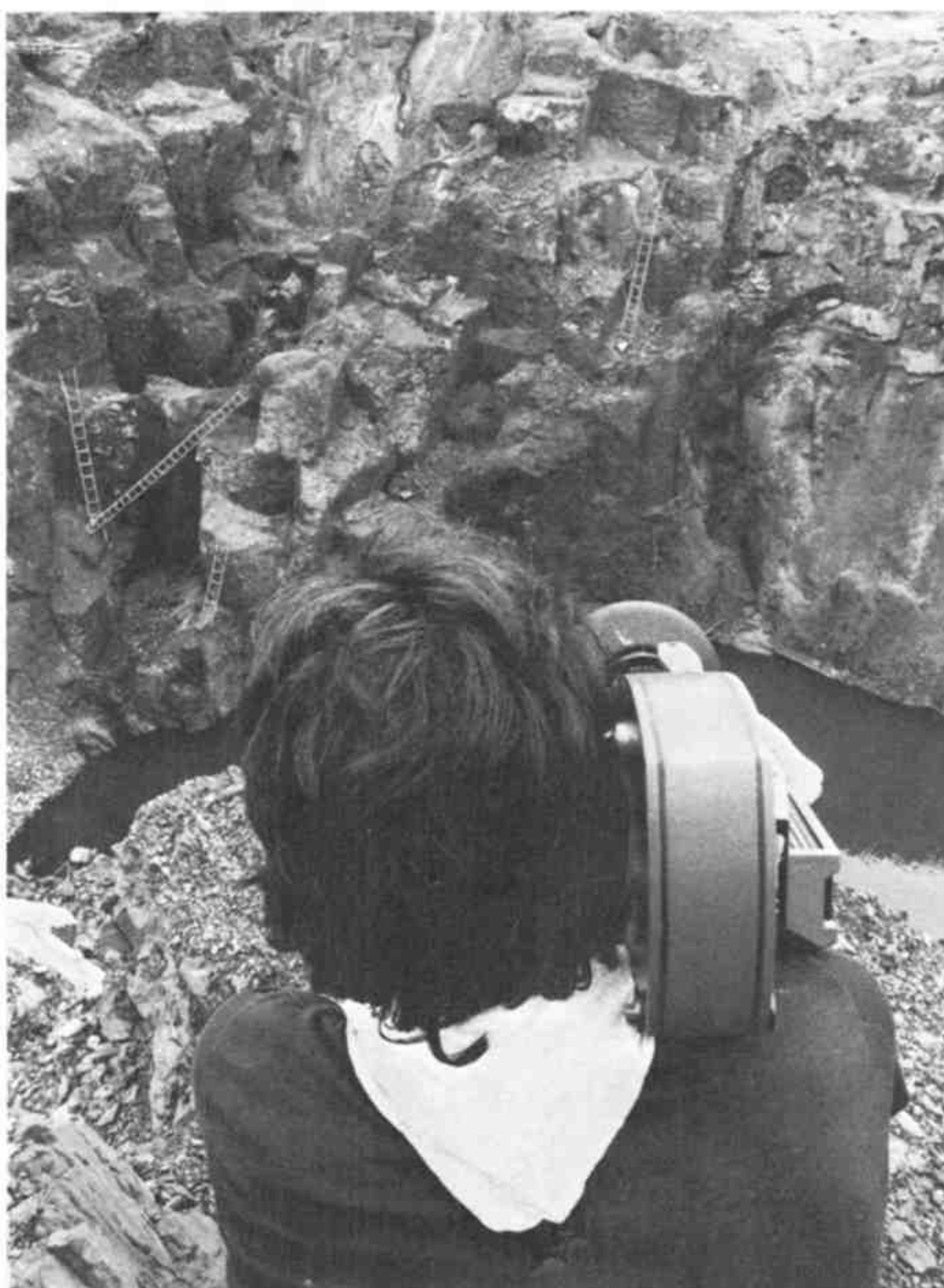


“Working on the Amazon gold rush story for ABC-TV’s *20/20 News Magazine* involved filming in the roughest terrain imaginable, in an area that is not even charted on the map—far away from any scheduled commercial flights that could rush replacement equipment, if necessary. And the nature of the terrain was such that we had to travel light, with no backup camera.

“I took a gamble on one camera: my own GSMO, equipped with two 400’ cassette-load magazines, three plug-in batteries, and one Angenieux 9.5-57mm zoom lens,” says Jan Peterson, the New York-based cinematographer whose recent credits also include a promotional documentary featuring Hollywood designer Edith Head.

Steep Inclines and Sudden Downpours

“For five days I was handholding my GSMO constantly. Carrying my gear in the intense heat, trekking up steep inclines, walking across deep ravines, climbing over giant fallen trees.



“It was the rainy season. Temperatures averaged around 100–105° F. We were constantly beset with heavy humidity, as well as subject to sudden downpours that turned everything into mud. There were times I couldn’t even put the camera down for fear it would sink under. Yet none of this all-pervasive mud ever got inside the GSMO camera.

“What with all the dirt, the mud, the intense heat and extreme humidity, the Amazon jungle shoot was quite a test for the GSMO. Especially for the electronics of the camera. But GSMO came through it all with flying colors, performing flawlessly.

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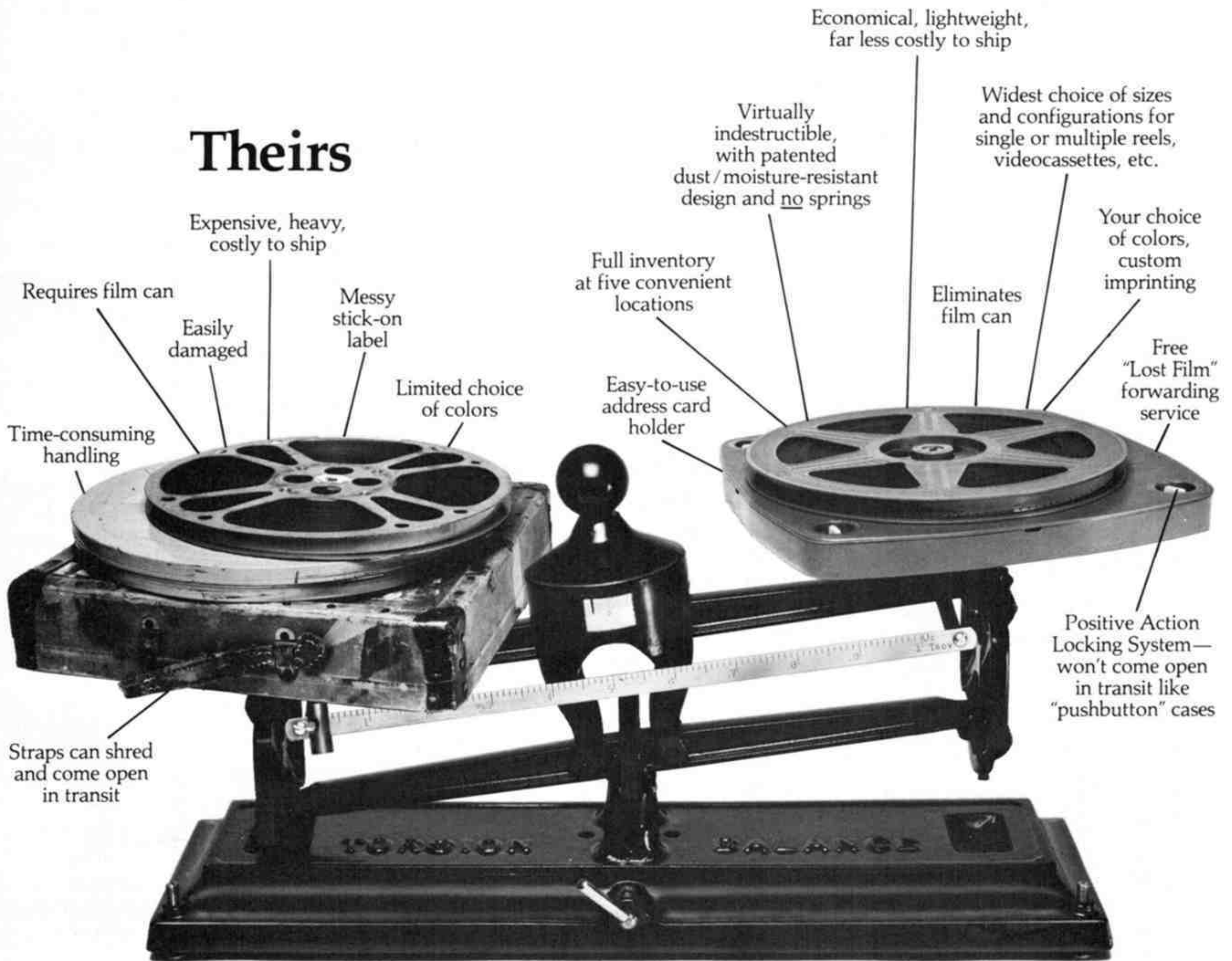
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THE BOOKSHELF

By GEORGE L. GEORGE

ASPECTS OF CINEMA

Published since 1934 as the *Screen Achievement Record Bulletin* by the Academy of Motion Pictures Arts and Sciences, it became in 1978 the Academy's ANNUAL INDEX OF MOTION PICTURE CREDITS. Edited by Verna Ramsey, the recently issued 1979 edition compiles a full record of all films shown in the Los Angeles area during the covered year. Each cross-indexed entry provides complete production data on the film, its producer, director, writer, cinematographer and other technicians, and the cast (Greenwood Press, 88 Post Rd. W., Westport, CT 06880; \$150).

In a revised edition of *HOW TO READ A FILM*, noted film scholar James Monaco investigates the psychological, political and social effects of the medium on contemporary life, and pinpoints the motivations of our concerns for the artistry and techniques of film (Oxford U. Press \$25/11.95).

John Mercer's knowledgeable survey, *THE INFORMATION FILM*, deals with production techniques, distribution potential, teaching methodology and usefulness of educational films, providing valuable guidance to both educators and students (Stipes, 10 Chester St., Champaign, IL 61820; \$6).

A perceptive study of American documentary films from 1931 to 1942, *FILM ON THE LEFT* by William Alexander presents a detailed historic overview, based on talks with leading filmmakers, of the major trends that affected the development of this committed *genre* and the social orientation of their authors (Princeton U. Press \$27.50/12.50).

James Brosnan, in an updated edition of *JAMES BOND IN THE CINEMA*, discusses the continuing popularity of the Agent 007 figure and his personality changes caused by successive performers, and provides expert information on the films' spectacular special effects (A.S. Barnes \$12.95).

In *THEORIES OF AUTHORSHIP*, editor John Caughie assembles scholarly essays on the film author as the central figure in cinematic theory and critique, synthesizing ably the philosophical and pragmatic debates surrounding this con-

troversial concept (Routledge & Keegan Paul \$28/14).

THE CHANGING HOLLYWOOD

In *MOVING PICTURES*, Budd Schulberg vividly recaptures Hollywood of the 1920s and 1930s, with its gold rush atmosphere and cutthroat competition, and traces the career of his father, movie tycoon B.P. Schulberg. This is an exceptionally engrossing book about an explosive era of film history (Stein & Day \$16.95).

An ever-popular film *genre* is heralded by Clive Hirschhorn in an entertaining volume, *THE HOLLYWOOD MUSICAL*. This comprehensive survey of every song-and-dance film since 1927 provides lively synopses, perceptive appraisals of directors and performers, and lists songs and musical numbers in an attractive and well-illustrated large format book (Crown \$30).

Robert Dooley's sweeping panorama of American films of the 1930s, *FROM SCARLETT TO SCARFACE* is an appealing combination of film history, popular culture and fond memories. Dooley's familiarity with the industry, its leading personalities and memorable accomplishments add up to a superb evocation of a grand era (Harcourt Brace Jovanovich \$25).

The spirited atmosphere surrounding film production is captured by photographer Arlene Alda in *ON SET*, a sensitive words-and-pictures report on the making of *THE FOUR SEASONS*, a film written, directed and starring husband Alan Alda (Fireside/S&S \$9.95).

In *THE MOVIES GROW UP*, the discerning film critic of the Los Angeles Times, Charles Champlin, traces the medium's progress from 1940 to 1980, contrasting the lush times of yesteryear with today's competitive uncertainties (Ohio U. Press \$25.95/12.95).

The economics of film are knowingly analyzed in *THE MOVIE BUSINESS* by David Lees and Stan Berkowitz, stressing the risks involved and the weight of decision-making in today's volatile market (Vintage \$4.95).

David Thomson, in *OVEREXPOSURES*, shrewdly assesses the crisis of the American film industry—decining profits, rising costs, television competition—but sees hope in the emergence of a new breed of maverick filmmakers (Morrow \$13.95/8.95).

The story behind the Academy Awards is told by Peter H. Brown in *THE REAL OSCAR*, a lively and often sensational tale of shady deals and underhanded coercion, but also of honest achievements and deserved glory (Arlington \$15.95).

ARTS AND TECHNIQUES

In *DIRECTING: THE TELEVISION COMMERCIAL*, Ben Gradus shares his experience of many years as a top practitioner of the craft. His book is a thoroughly professional and exhaustive guide to the technical know-how, the esthetic sense and the psychological attitude a successful TV spot director must develop. Sponsored by the Directors Guild of America, Gradus's text provides invaluable guidance to students of the medium and a unique standard of reference to his fellow directors (Hastings House \$26.95/16.95).

Avant garde director John Waters, whose recent feature *POLYESTER* is achieving the cult status of his earlier *PINK FLAMINGOS*, presents in *SHOCK VALUE* an unvarnished view of underground filmmaking. It is a provocative, fascinating and hilarious autobiography, a spirited defense of bad taste that transcends itself to the point of normalcy and reveals a lively subculture of style and substance (Delta \$9.95).

In *WHO PLAYED WHO IN THE MOVIES*, Roy Pickard provides an ample list of celebrated personalities of history, literature and mythology, and the names of performers who played them on the screen. It is both a useful reference work and a boon to cinema buffs (Schocken \$6.95).

Expert advice on surviving in Hollywood while building a film/TV acting career is offered by CBS producer Bernard Sampler (with Steve Posner) in their serviceable manual. In *FRONT OF THE CAMERA* (Dutton \$13.95). Lea Bayers Rapp's *PUT YOUR KID IN SHOW BUSINESS* is an informative, practical guide for parents on how children can break into film, television and modeling (Sterling \$12.95/6.95).

Ingmar Bergman's screenplay, *FROM THE LIFE OF THE MARIONETTES* is a paradigm of the director's view of life and its underlying potential for violence. Its stark realism, fully carried out in the film itself, involves action taking place at different times in an effective contrapuntal style (Pantheon \$8.95/2.95). ■

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1 PICTURE, 2 TRACKS



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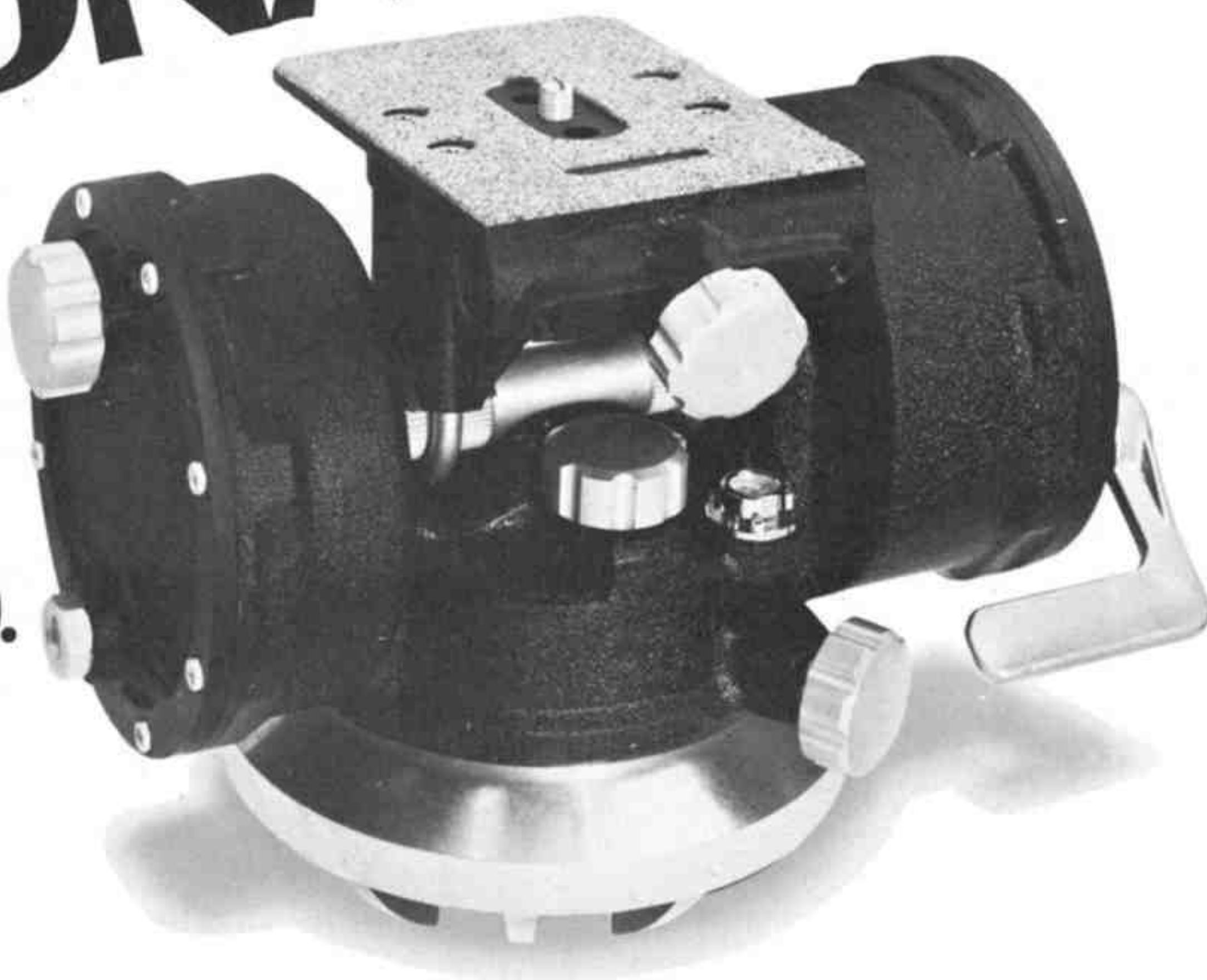
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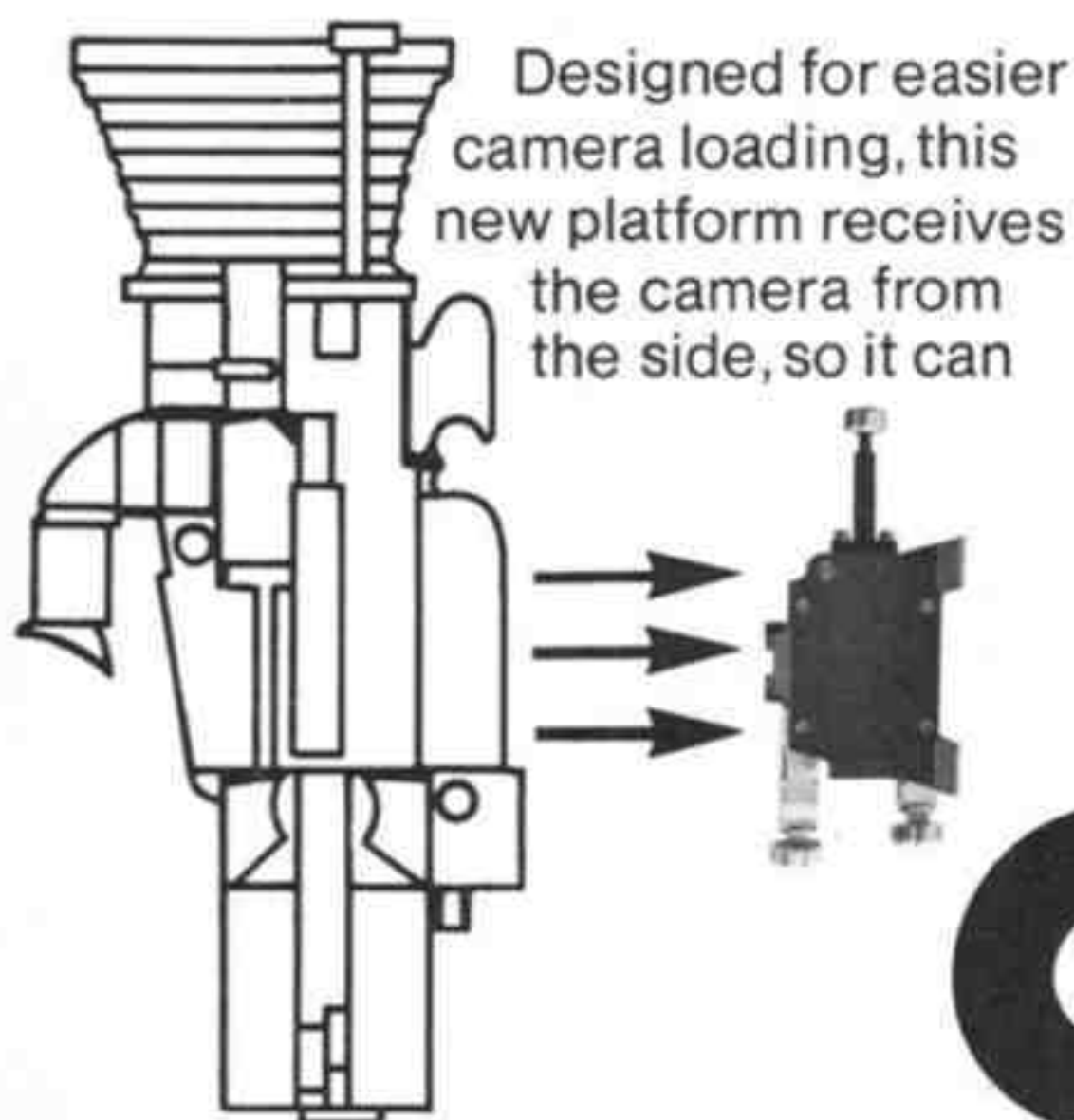
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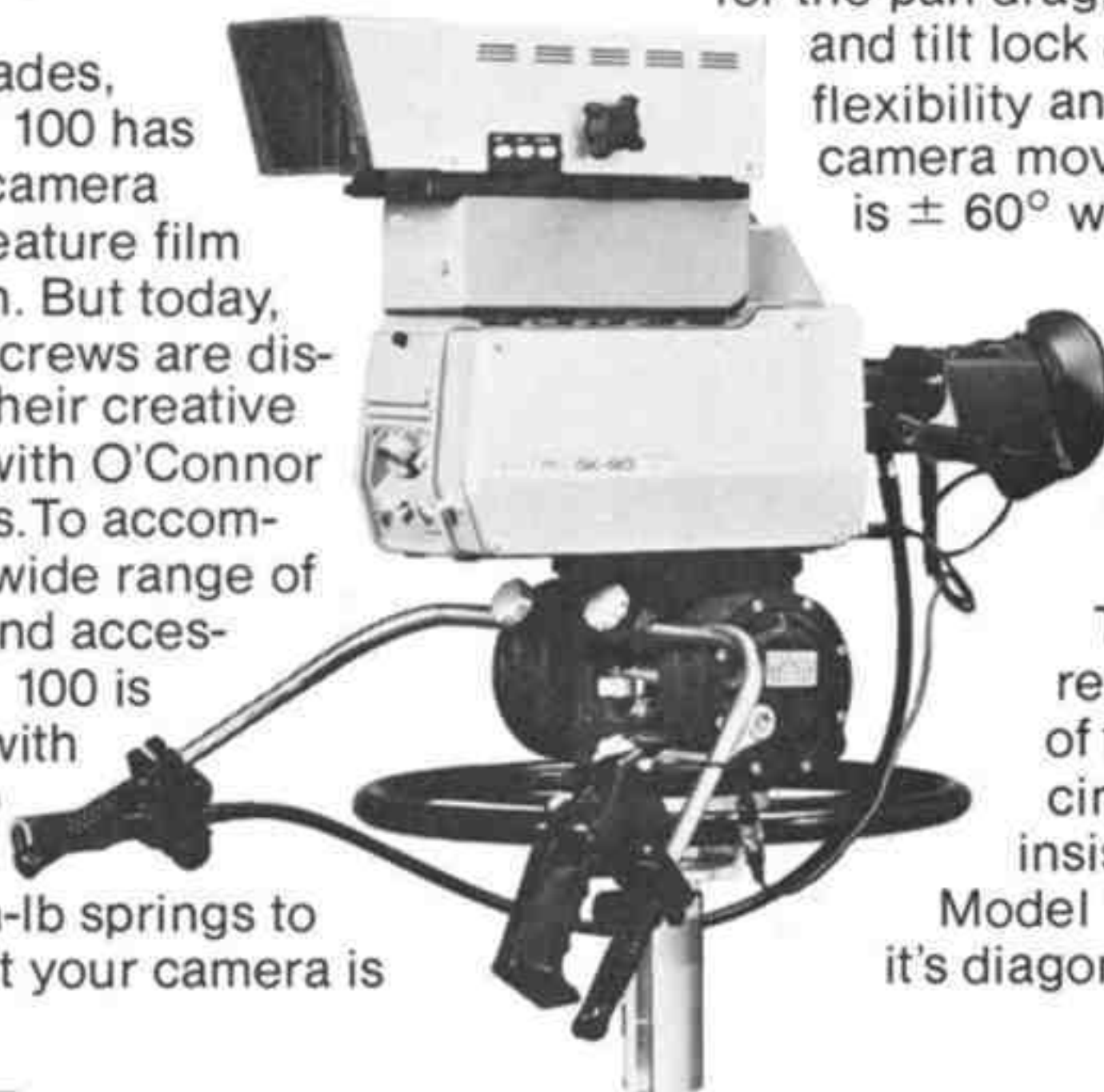
properly counterbalanced at all times. Double handles are also available for video users.

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Built of magnesium and aluminum alloy castings, this low profile head weighs only 16 lbs. Separate controls for the pan drag, pan lock, tilt drag and tilt lock all improve the flexibility and repeatability of camera movement. The tilt range is $\pm 60^\circ$ with a 360° pan.

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TALKING TECHNICALLY

By DAVID W. SAMUELSON

BACKGROUND REPRODUCTION RATIOS

One of the consequences of all the Special Effects pictures being made these days is that in order to satisfy the demand for greater background image quality, it has encouraged us equipment suppliers to bring out the large format cameras from the store room, where they have languished for years.

When I was at Panavision in Los Angeles, earlier this year, they were busy checking out 65mm cameras as though it was an everyday event, and in London we have recently bought four butterfly-type Vistavision cameras, which we are modifying to make into modern reflex viewfinder crystal-controlled cameras, and into compact projectors, for Front Projection purposes.

We, like Industrial Light and Magic, go for Vistavision rather than 65mm, because it can be processed by any laboratory, whereas 65mm ECN II color negative can, so far as I know, only be processed by MGM in Culver City.

The reason for all this renewed interest in large format cameras is the need to maintain photographic quality during the various stages of process photography, so that an image which is a combination of many elements may be inter-cut with scenes which have only been through the

camera once.

Even the most simple superimposed background will be a negative-positive generation older than the foreground and, whereas a 1:1 copy ratio is perfectly satisfactory, background image degradation soon begins to manifest itself if the director demands a big-head closeup which only takes in a small part of the background.

The size of the background screen makes no difference to image quality, so long as the maximum amount of plate image is used and the camera takes in the maximum area of the plate or more.

Whether the background screen is 10 feet or 100 feet wide is immaterial; it is the area of the plate camera negative compared to the area of the foreground camera negative that counts.

When using a regular 35mm motion picture camera to shoot background plates the regular "Academy" aperture mask should be removed or the aperture plate exchanged for one with a "full" or "silent" size opening to make use of the largest possible negative area that a regular 35mm camera can produce.

The size of the opening of an "Acad-

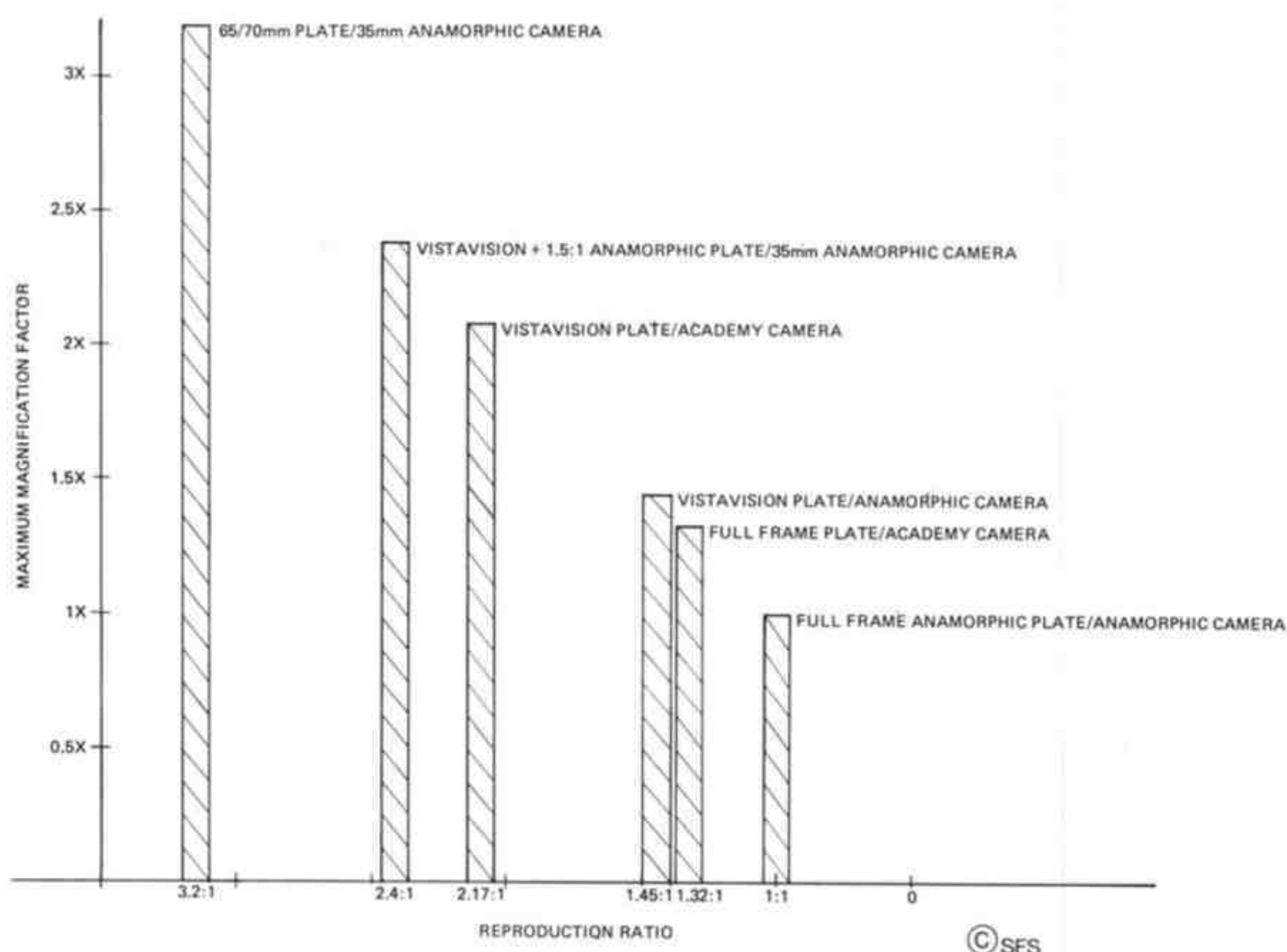
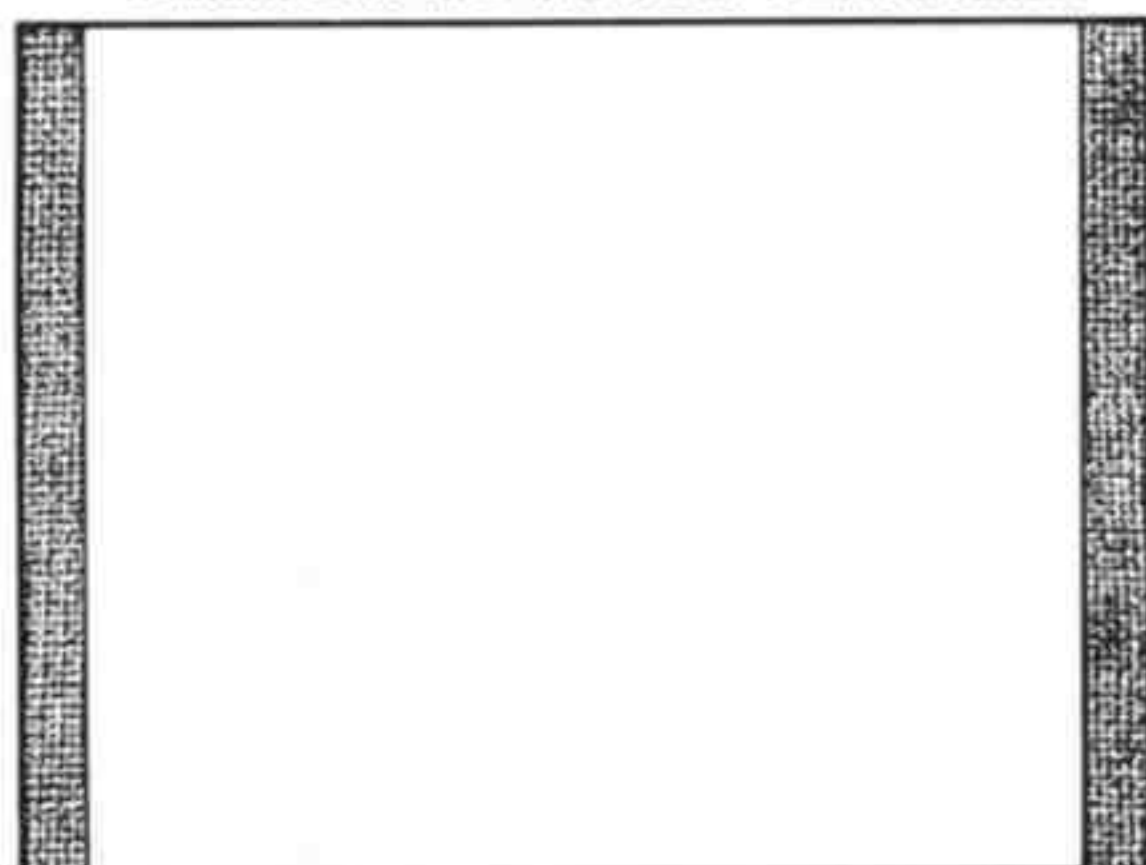
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1:1 copy ratio

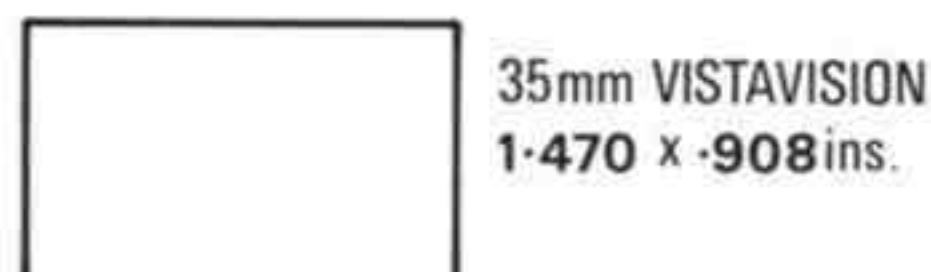


ACADEMY INSIDE FULL FRAME

ANAMORPHIC INSIDE FULL FRAME



65/70mm
1.912 x .870 ins.



35mm VISTAVISION
1.470 x .908 ins.



35mm ANAMORPHIC
.864 x .732 ins.



35mm FULL FRAME
.980 x .735 ins.



35mm ACADEMY
.864 x .732 ins.



16mm
.404 x .295 ins.



8mm
.209 x .158 ins.

RELATIVE NEGATIVE IMAGE SIZES

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THE NAGRA SOUNDTOTE

Now the Nagra SOUNDTOTE is here to take a load off your shoulders. It's not just another carrying case.

The Nagra SOUNDTOTE has been designed by a professional soundman to solve the problems of location sound recording and to provide maximum comfort and ease of operation while recording under any conditions.

Eliminates fatigue. The Nagra SOUNDTOTE uses a specially designed suspension belt and harness so that 90% of the weight of the Nagra and accessories is distributed evenly on the hips, the balance is on the shoulders.

Hands free operation. On long hikes to difficult or remote locations, the Nagra SOUNDTOTE can be reversed and worn as a low backpack for more comfort and frees the hands while climbing and hiking. A specially fitted front pocket is used to hold two wireless microphone receivers or extra rolls of tape. The suspension belt and harness allows the operator to quickly attach or remove a fully loaded Nagra in the SOUNDTOTE without disconnecting cables.

Changing batteries with the Nagra in the standard carrying case is a time-wasting hassle. Now you can change batteries *without* removing the Nagra from the SOUNDTOTE in less time than ever before.

Padded shoulder harness. Relieves neck strain and tired shoulders.

Quick release buckles.

On-the-move operation. Easy access to all controls and connections. Can be used with 5" or 7" reels on Nagra Models III, IV, and 4.2.

No runouts. The remaining tape can be easily seen through a window located conveniently on the front.



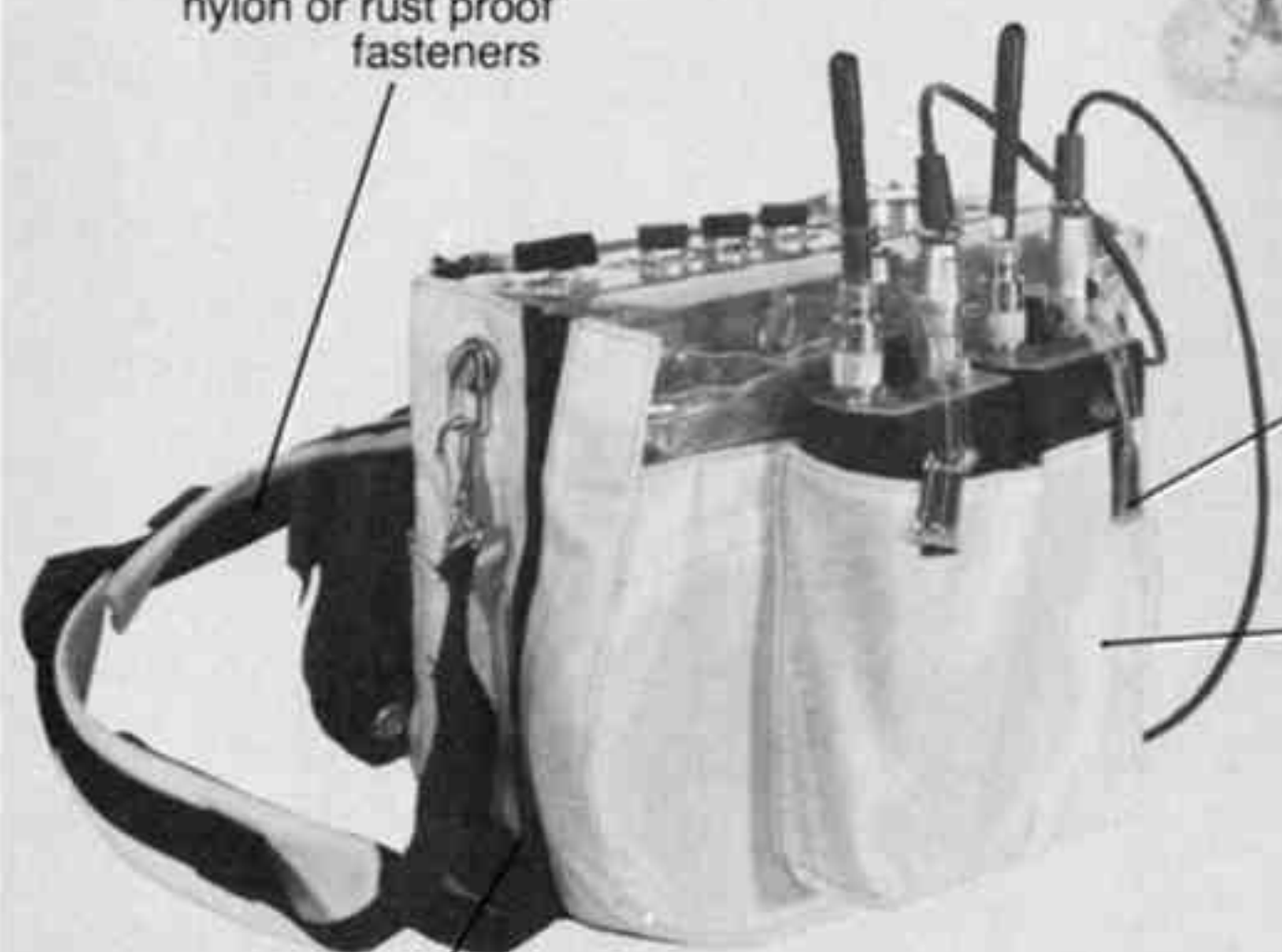
Clear cover allows access to controls and provides protection from the elements.



Weight is supported on hips, with quick release buckle on the back.

Accessory pocket for wireless receiver.

All straps are 100% nylon, attaching hardware is heavy-duty nylon or rust proof fasteners.



Zippers are extra-strong brass and all closures are velcro for water and dirt protection.

Constructed of a special lightweight, heat-reflective, water-repellant material. Absorbs 90% less heat than a conventional black case.

Weighs 28 oz. without recorder.

The Nagra SOUNDTOTE is so comfortable . . . so easy to use . . . that you must try it to believe it. Check it out before your next location production. Ask ALAN GORDON ENTERPRISES about all your other sales and rental requirements. **Most pros do.**

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TABLE A		OUTPUT AT FULL FLOOD POSITION:	
BRAND X 4k			
DISTANCE	FOOT CANDLES	SPREAD	
50 ft	94 fc	52 ft	
40 ft	150 fc	41 ft	
30 ft	260 fc	30.5 ft	
20 ft	650 fc	20 ft	
ARRI 4k			
DISTANCE	FOOT CANDLES	SPREAD	
50 ft	128 fc	45 ft	
40 ft	200 fc	36 ft	
30 ft	380 fc	28 ft	
20 ft	880 fc	18.5 ft	



Above: Lighting Director Peter Edwards aligns ARRI 4k beam on plaster cyclorama.

Emmy-winning Lighting Director tests the ARRI 4k HMI[®] versus the competition:

After testing twice, Peter Edwards finds the ARRI has more output and less fall-off at the edges.



Photocell centered in beam with remote meter scale near lamphead.

TABLE B		FULL FLOOD OUTPUT, EQUALIZED SPREADS:	
LIGHT	DISTANCE	FOOT CANDLES	SPREAD
BRAND X	28 ft	340 fc	30 ft
ARRI	36 ft	360 fc	30 ft

aligned. By the time another unit was available, we had bought the better of the other two brands. To satisfy our curiosity, we later decided to compare the second ARRI with the brand we'd bought."

"We duplicated our earlier test procedure. As Table A shows, the second ARRI unit had greater output than ours. The ARRI beam spread was more even, edge-to-edge, with a sharper drop-off. It wasn't as wide."

"To compare apples with apples, we pulled the ARRI unit back until its beam spread exactly matched the other light's. Table B shows the results. The ARRI's out-

put was greater, even with the unit 20% further away."

"The ARRI's beam had almost the quality of a hard-edged spotlight," says Mr. Edwards. "Very linear across its field — unlike most Fresnels."

"To blend with another source, you could feather the ARRI's edge by spotting the fixture up a little and either pulling it back or dropping in a scrim. For single-source lighting, the ARRI's even field would make exposure much more consistent right across the subject."

"The ARRI unit is built like a tank. It's a handful, compared with the brand we bought; but you could rely on it to work in any weather, I should think, which is important for a location tool."

ARRI

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Peter Edwards is Supervising Lighting Director at CFTO-TV in Toronto; and he is Chairman of The Society of Television Lighting Directors, Canada. He has won two Emmy Awards for his lighting.

"CFTO wanted to buy HMI lights for a series to be shot on location," says Mr. Edwards. "So we ran side-by-side tests comparing the 4k units of three imported brands. The ARRI 4k had by far the worst output."

"It turned out, as I suspected, that the ARRI unit had been mis-



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CP-16R



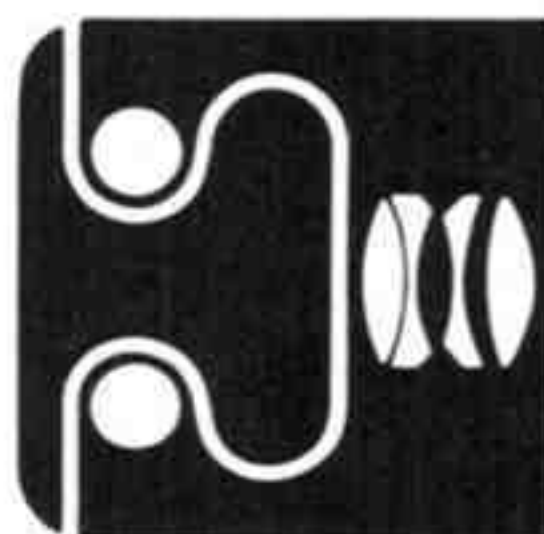
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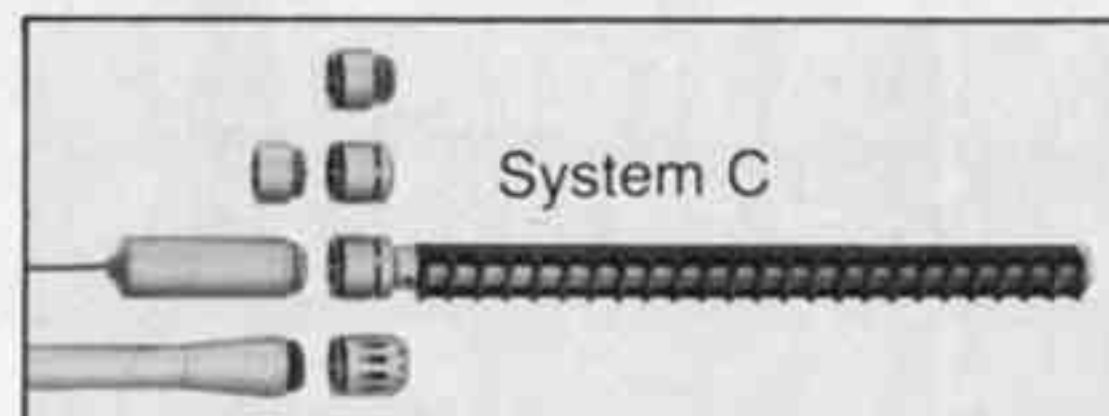
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Why is Aäton alone?

Super 16 is getting a lot of publicity* these days. The reasons are many, the first being simply the 40% increase of usable image dimensions for 35 mm blow up. That, plus high definition TV (in 1 : 1.66 format ratio, 1200 horizontal lines) is one of the principal motivations of going from 16 to Super 16. People are going from 35 to Super 16 as well. The reason is economics : not just the raw stock, but running expenses, cost of equipment purchase or rental.

But why is the Aäton 7LTR alone in being chosen for Super 16 applications? Why do discerning filmmakers prefer the Aäton to other 16 mm cameras when it comes to blow-up?



The answer is image quality.

The Aäton 7LTR is the only 16 mm camera originally designed with both Super 16 and standard 16. This doesn't mean just an interchangeable aperture plate with a wider gate : any camera manufacturer can do that. It means *optimum image steadiness : vertically, horizontally and in depth.*

Vertical steadiness is ensured by various means : some cameras have registration pins... With its absolutely linear claw movement, the Aäton LTR positive claw provides vertical steadiness in the range of 1/2000th of image dimensions.



Bob Young chose the best equipment available for the film he directed in order to study the relative merits of Super 16 and 35 mm. The results — very favorable for Super 16 — can be seen at Du Art Laboratories in New York. (Photo : Diane Young.)

The Aäton meets the same tolerances for **horizontal steadiness**, because the film is positioned laterally with micron accuracy at the gate. Some other cameras have no lateral positioning system whatsoever at the gate... and the projected images weave from left to right.

In-depth steadiness is obtained by maintaining the film firmly in the same plane at all times : this is easy in the LTR, because the film loop is long and flat, and the rear image pressure plate spring loaded so as to keep the film in place firmly. Such a system obviously provides better steadiness than one in which the film «floats» over the aperture.

With the progress of lenses and film stocks, with the promise of high definition TV to come, Super 16 has an enormous potential.

Film-makers : think about Super 16, the standard for 16 mm film. **Be demanding** : ask for more than just a bigger aperture.

Camera manufacturers : join us.

Super 16 is the future of the 16 mm film medium.

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* Articles in the American Cinematographer. Sept. and Nov. 1981 by Irwin Young & Rune Ericson respectively, in Eyepiece (London) by David Samuelson : papers presented at SMPTE 1980 Technical Conference by Irwin Young, and at Film'81 in London.

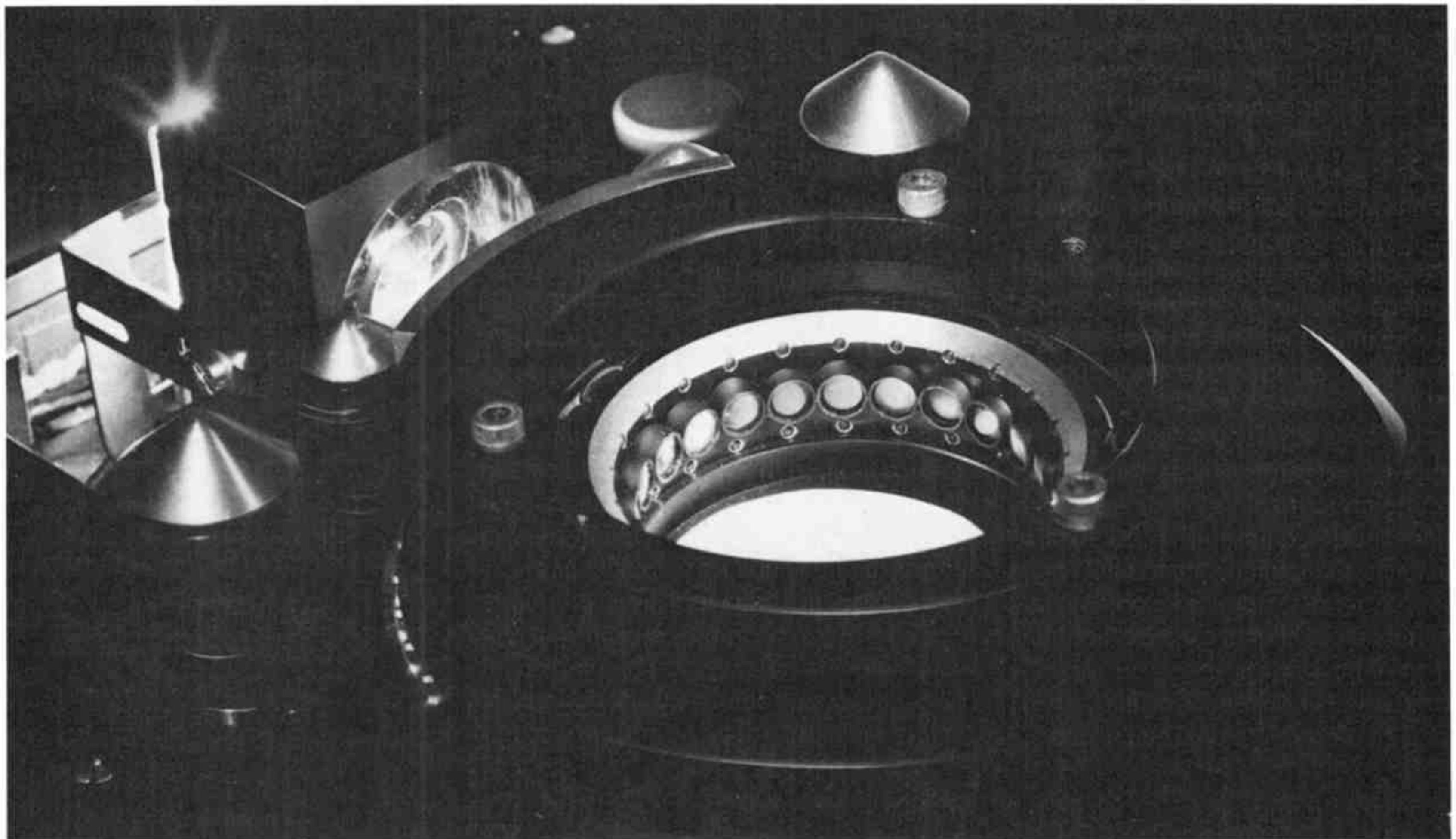
The optical crown
and the perfect editing-table

Cinemonta

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of a button an electric counter times the film in seconds, minutes, feet, metres and frames. And at speeds from 1/2 up to 2 1/2 synch we've cut out all that Donald Duck chatter. The secret? A tone corrector that can be fitted to the Cinemonta: it keeps speech and music understandable. Does all this add up to perfection? We believe it does.



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"I've used TVC successfully for several years. I know I can depend on the people there. They care about my film."



Fred Levinson

Fred Levinson and Company



"Wherever I'm shooting, I feel as though TVC is right there. I like their work and I like their attitude."

Lou La Rose

Director/Cinematographer, La Rose Production, Ltd.

"100% of 'Maniac' was Chem-Toned. That saved us a ton of money."



Bill Lustig

Director/Producer "Maniac"



"You could say that the Chem-Tone process was absolutely essential to this film."

Ira Wohl

Director "Best Boy"

"At TVC the quality control is beyond reproach."



Jimmy Collins

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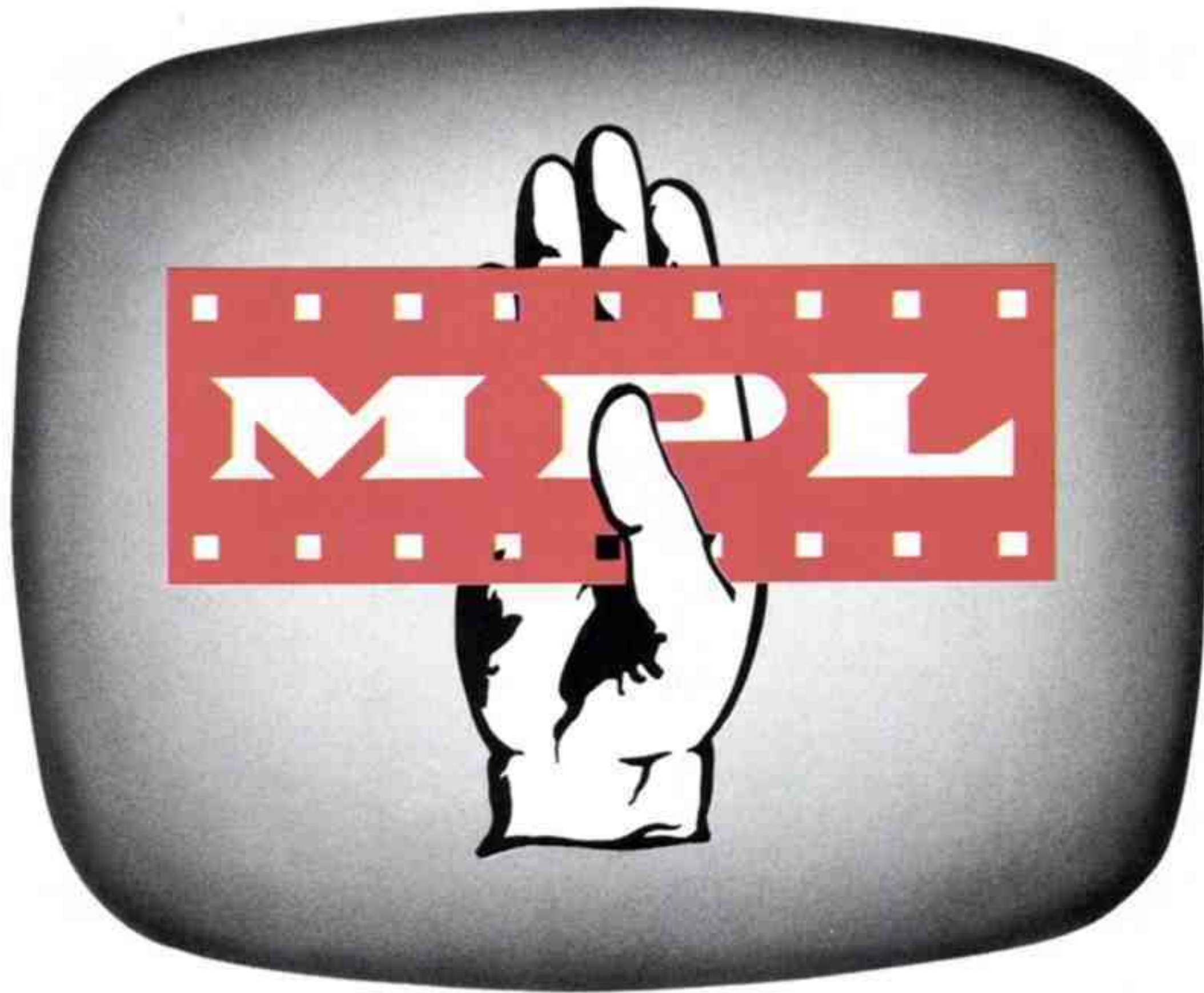
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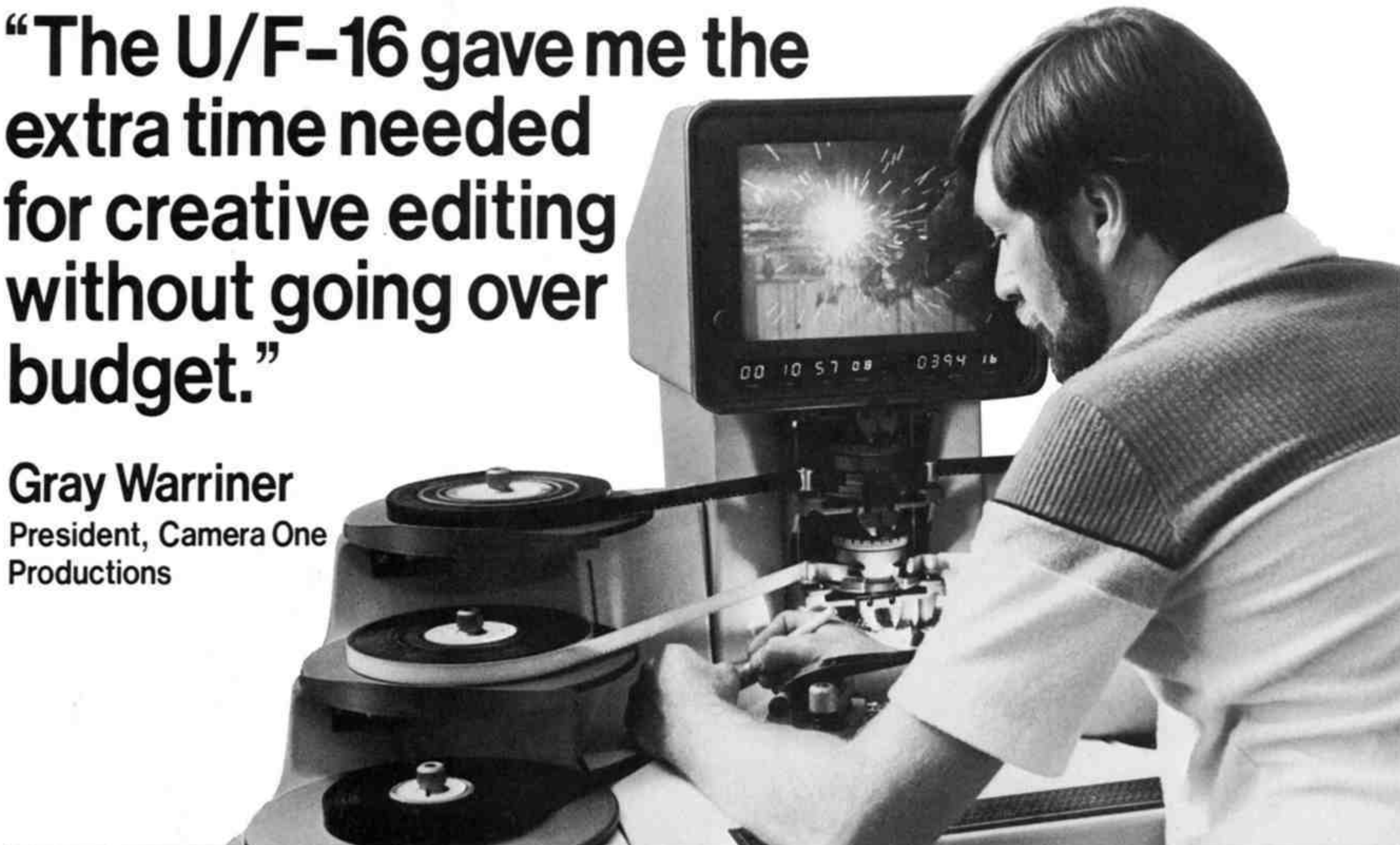


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Gray Warriner
President, Camera One Productions



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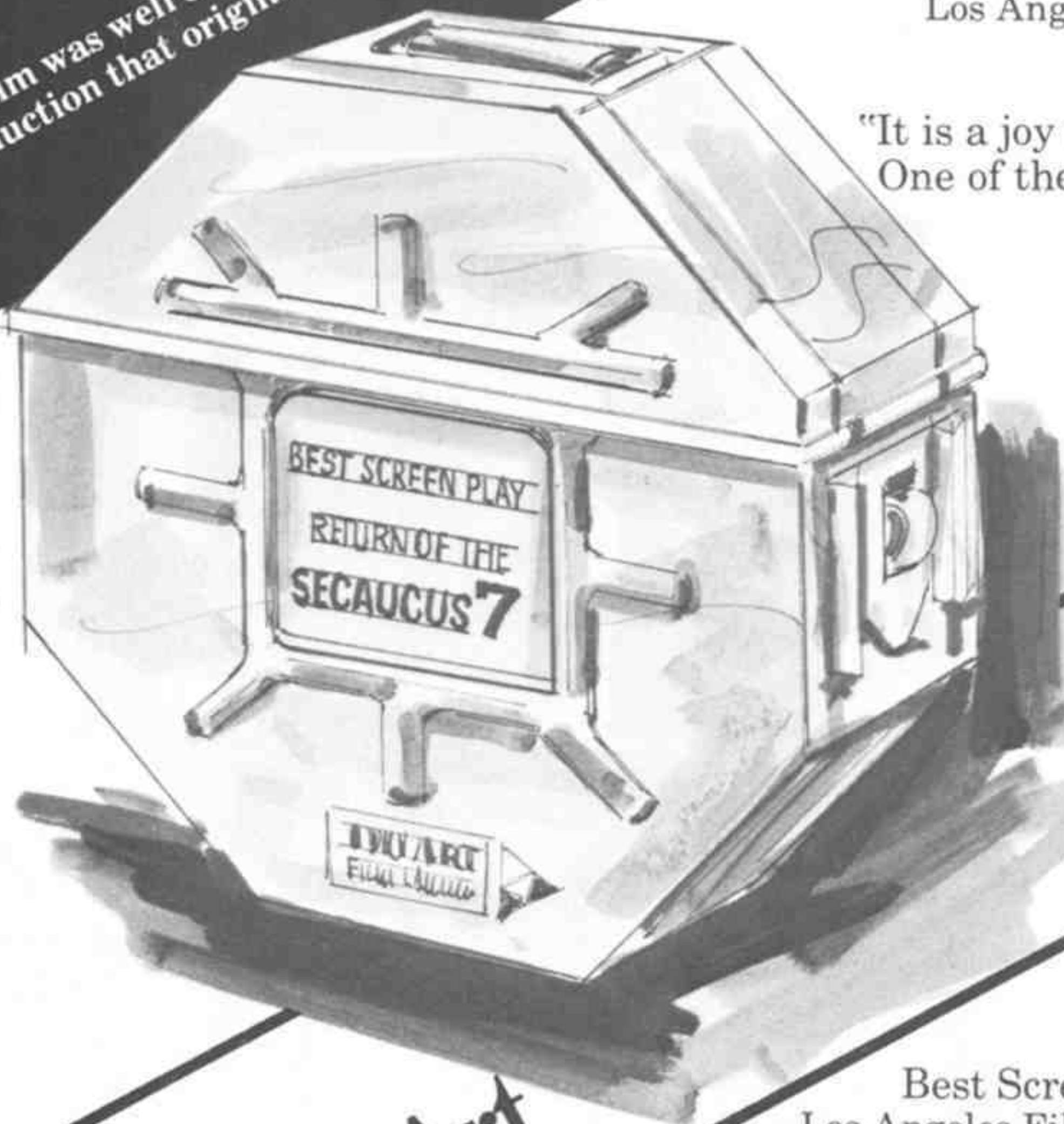
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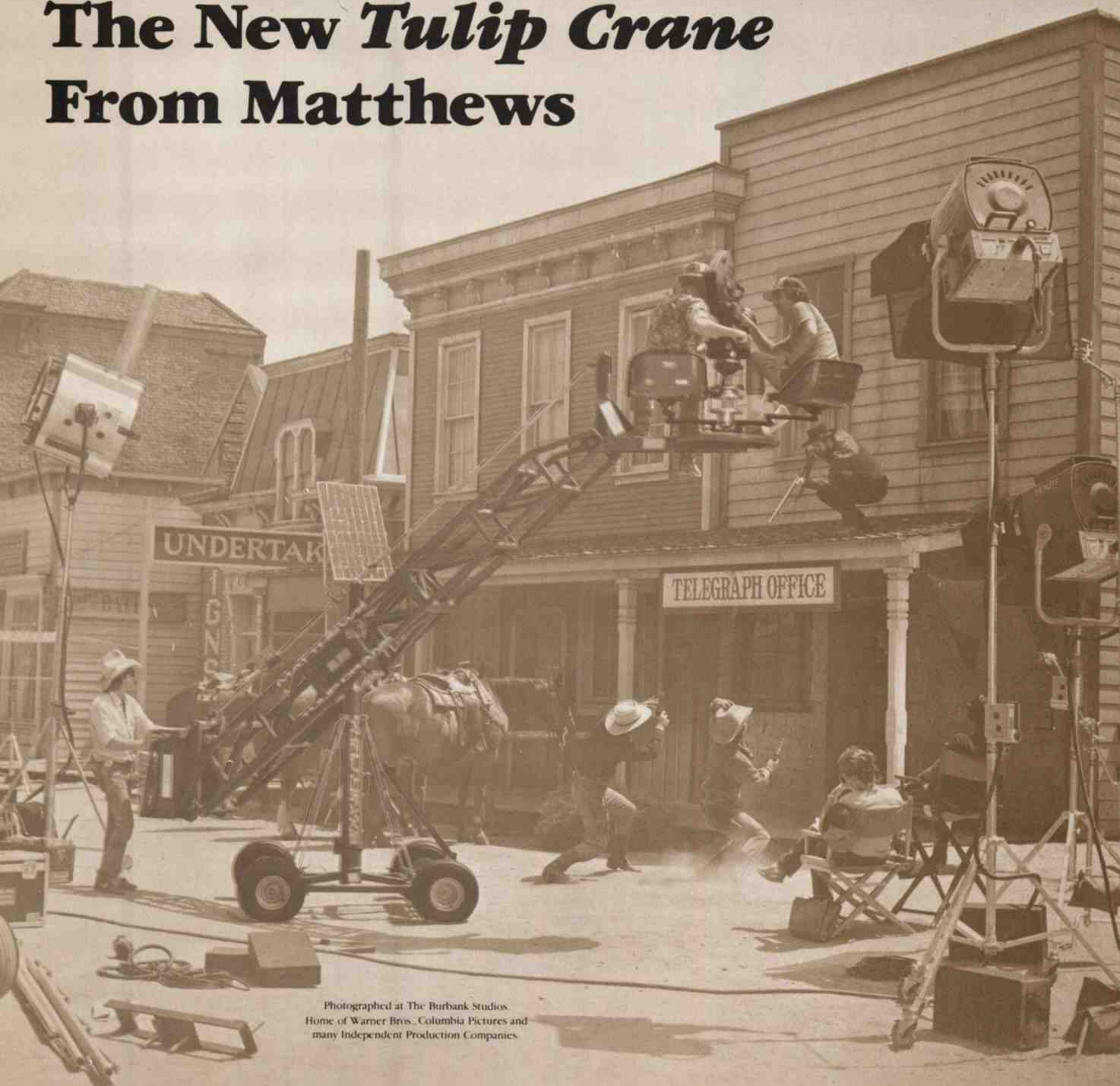
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INDUSTRY ACTIVITIES

1981/82 UNITED STATES FILM AND VIDEO FESTIVAL SET FOR JANUARY

The United States Film and Video Festival, the country's major showcase for American independent filmmaking and video production, will be held for its fourth consecutive year, January 22-31, 1982. For the second year, the site of the festival will be Park City, Utah, a historic mining town and ski resort in the mountains 26 miles east of Salt Lake City.

The newly appointed Board of Trustees and National Advisory Council demonstrate the festival's commitment to expanding its range of film and video interests. Actor and director Robert Redford is honorary chairman of the event. Mark Rosenberg, Senior Vice President of Production, Warner Brothers Studios, is chairman of the festival. Director Sydney Pollack, honorary chairman last year, remains on the Board of Trustees.

The three major television networks are represented on the Advisory Council for the first time, joining representatives from motion picture studios such as Warner Brothers, Paramount, 20th Century Fox, Universal and United Artists. Additional Advisory Council members come from talent agencies, independent producers, creative talent and industry management.

The highly successful 1980/81 United States Film and Video Festival was attended by approximately 15,000 participants. Film industry representation increased four-fold over the previous year, and attendance at film screenings and seminars more than doubled. Highlights included seminars and speeches by Robert Redford, Martin Sheen, Lamont Johnson, Mark Rydell and Peter Fonda; the John Ford Medallion honoring Henry Fonda; awards for independent feature films to "Heartland," "Gal Young Un" and "The Return of the Secaucus Seven;" and special screenings of documentaries and films by new directors.

The 1981/82 festival will include screenings, competitions, seminars, workshops, banquets and special events to highlight excellence in film and video. Complete programming details will be distributed to press as they become available.

**2nd Annual Visual Communications
Congress/West Scheduled November
10-12**

VCC/West, which made its debut last

year, will be back with its program of comprehensive seminars and an equipment exhibition November 10, 11 and 12 at the Century Plaza Hotel in Los Angeles. Attendance at the Congress reflects the rapidly expanding use of visual techniques for more effective business, industry, medical, and government communication. The VCC also reflects interest in the new communications technologies such as interactive video, videotext, telecommunication, videodisc, etc.

The Los Angeles Times, in its review of the first Congress, called VCC/West ... "a communications showcase ... a preview of techniques that will be used for communicating information, presentations, and promotions." The New York Times in reviewing the 3-year-old VCC/East called it ... "stimulating ... new and interesting ... filled with visual excitement."

The seminars cover a variety of subjects dealing with film and television production, photography, and audio-visual presentations.

In addition to the seminar program, several associations such as the International Television Association, the Information Film Producers, and the Association for Multi-Image will conduct concurrent meetings.

The New York VCC draws over 10,000—a mixture of production specialists and management who supervise or use these services.

VCC/West attendance was over 4,000 in its first year with a projected 6,000 for the second year.

Corporate management attendance includes sales, promotion, and advertising executives, training supervisors and public relations managers. VCC also attracts educators, medical media specialists, law enforcement officials and government officials who are involved in these subjects.

For information on the 3-day seminar program contact: VCC/Conference Management Corporation, 500 Summer Street, Stamford, Conn. 06901. Exhibit information is handled by the Visual Communications Congress Exhibit, 475 Park Avenue South, New York, N.Y. 10016.

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BEHIND THE SCENES OF

RAIDERS

of the
LOST ARK™

Top talents from two continents lend their varied expertise to create a rousing action-adventure romp that is delighting audiences everywhere

RAIDERS OF THE LOST ARK is the result of one of the most significant film-making collaborations in motion picture history. It was directed by Steven Spielberg, the filmmaker responsible for two of the most successful films in history—CLOSE ENCOUNTERS OF THE THIRD KIND and JAWS. RAIDERS was conceived by George Lucas, the creator of the phenomenal STAR WARS saga, and produced under his Lucasfilm Ltd. banner. This collaboration marks the first time during their 11-year friendship that these two important filmmakers have worked together.

Their decision to collaborate came about in 1977, while both were vacationing in Hawaii, a week before STAR WARS premiered in New York. "George had gone to Hawaii to get away from what he thought would be a monumental disaster,"

says Spielberg.

"When George got the news that the film was a hit the first week, and he was suddenly laughing again, he told me the story of these movies he wanted to make, a series of archeology films."

Spielberg remembers that Lucas described this series "as following the exploits of an adventurer/archeologist, Indiana Jones" and resembling the serials from the 1930s and 1940s.

"I said, 'That's really an exciting film. I've always wanted to bring a serial to life that blends Lash LaRue, Spy Smasher, Masked Marvel and Tailspin Tommy with elements from Edgar Rice Burroughs and George's great imagination.'"

For Lucas, the concept of a RAIDERS series took form about ten years ago. "I wanted to make an action/adventure kind of serial film. This idea came to me about

the same time I had the idea for STAR WARS. But I got more interested in STAR WARS, so I put RAIDERS on the shelf, figured I'd get to it someday," he says.

About six months after their Hawaii trip, Lucas offered Spielberg the project. Spielberg accepted, and they made tentative plans to begin production in 1980.

Lucas says he was inspired to write RAIDERS OF THE LOST ARK for very personal reasons. "I really did it so I could enjoy it. Because I just wanted to see this movie."

Since RAIDERS was conceived as a serial, he also has two more chapters sketched out; these will definitely be made, now that the first film has proved successful.

RAIDERS OF THE LOST ARK stars Harrison Ford, Karen Allen, Paul Freeman, John Rhys-Davies, Ronald Lacey and Denholm Elliott. It is a Lucasfilm Ltd. production of a Steven Spielberg film, directed by Spielberg and produced by Frank Marshall. Lawrence Kasdan wrote the screenplay, which is based on a story by George Lucas and Philip Kaufman. George Lucas and Howard Kazanjian are executive producers of the Paramount Pictures release. The music is by John Williams.

Lucas chose to set his story in 1936 in order to use some intriguing facts. Adolf Hitler was an avid student of religious doctrine and artifacts, and believed in the power of the occult. There exists documented proof that the German Reichschancellor had commissioned professional investigations into all manner of religio-occultist claims.

Lucas' epic tale centers around the fantastic adventures of an archeologist/adventurer, Indiana Jones (Harrison Ford), and his perilous quest for a valuable holy artifact, the Ark of the Covenant.

Styled after the cliffhanging serials that, in the 1930s, played on Saturday afternoons in theatres across America, RAIDERS contains many of the high-action elements that left audiences on the edges of their seats.

The story incorporates exotic locations, lost cities and mad ambitions in addition to power-crazed villains, and their well-matched rivals. There are also romantic interludes, dangerous liaisons and terrifying chases. Furthermore, our daredevil hero is endowed with remarkable dexterity and ingenuity which allow him to escape certain death.

The elusive treasure that provokes a race between nations is the Ark of the Covenant, a gold-encrusted wooden chest which, according to Biblical lore, contains the broken tablets of the Ten Commandments. The Ark is said to bring

On location in Tunisia for RAIDERS OF THE LOST ARK, hundreds of extras dig at the site of the ancient city of Tanis, where it is believed that the Ark of the Covenant last came to rest. This archeological excavation set was dug out of the Sahara Desert at Tozeur, Tunisia in more than 130-degree heat, a horrendous experience for the cast and crew.





The two most brilliantly original (and successful) filmmakers of the decade—George Lucas and Steven Spielberg, looking “Beau Geste” in Tunisia.

invincible and mysterious powers to the one who possesses it. But, the legend goes, there are disastrous consequences for those who meddle with it.

No one has seen the Ark since its disappearance from the Temple of Solomon in Jerusalem in approximately 980 B.C. According to one legend, an Egyptian pharaoh may have carried it to Tanis and buried it in the tomb known as the Well of the Souls.

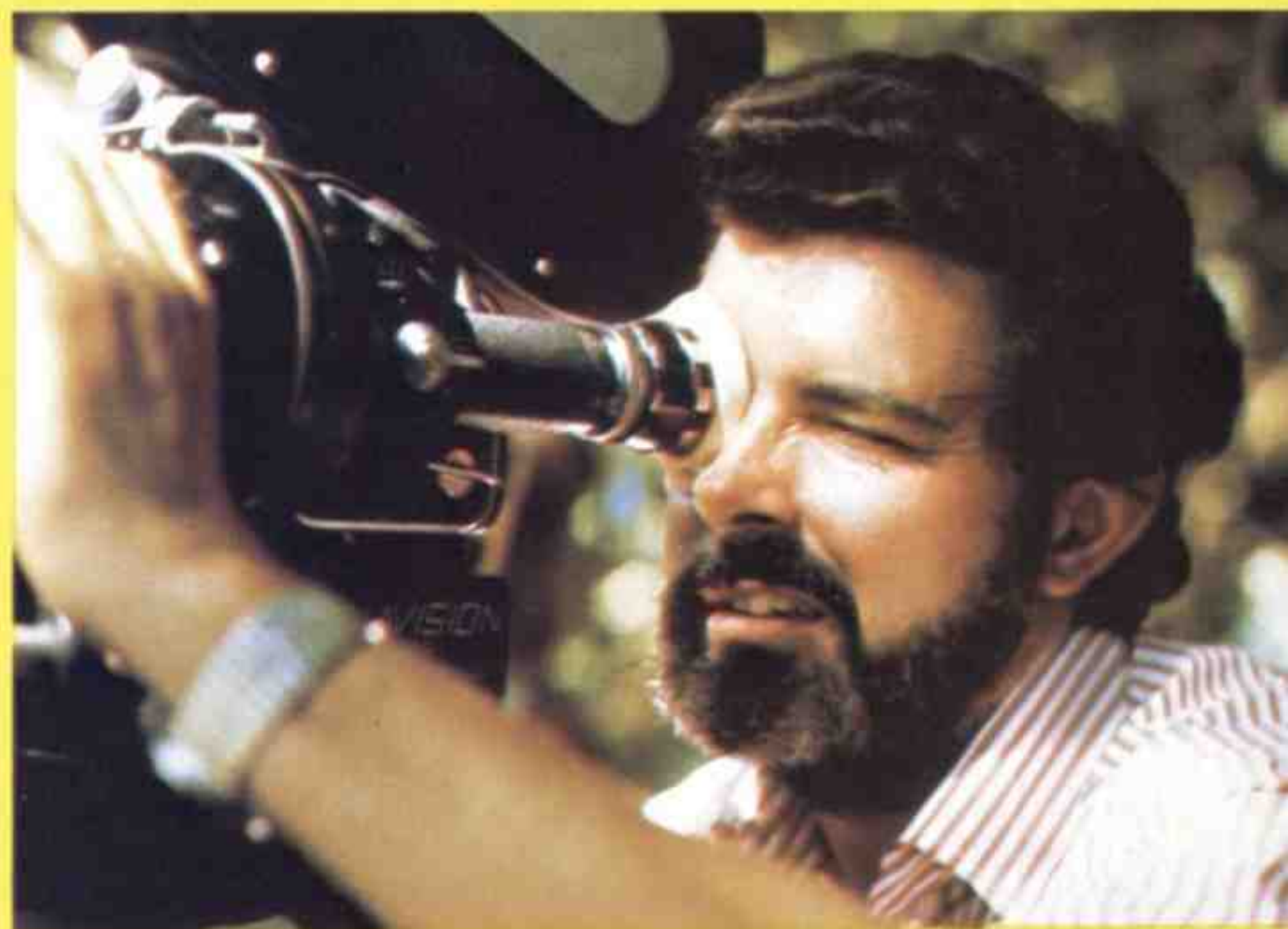
In 1936, American Intelligence has established that the Nazis are excavating in Egypt and that they seem to have found the lost city of Tanis. Their mission? To find the Ark of the Covenant for Hitler, whose tyrannical power will be legitimized by its possession. As pointed out in the Old Testament, the Ark will be recovered at the time of the coming of the True Messiah, a designation Hitler lusts for.

The Nazis don't have the necessary headpiece to the staff of Ra which is needed to determine the precise location of the Ark. Professor Abner Ravenwood,

Continued on Page 1115



Star of the film Harrison Ford perches atop a 45-foot jackal statue on the Well of the Souls set at EMI-Elstree Studios outside of London.



(LEFT) Lucas and Spielberg pose with the Hovitos Indian extras on location in Hawaii, which served as the setting for the South American scenes in RAIDERS. (RIGHT) Executive Producer Lucas takes a look through the camera. (BELOW LEFT) Producer Frank Marshall; executive producers George Lucas and Howard Kazanlian, director Steven Spielberg, cinematographer Douglas Slocombe; and first assistant director David Tomblin on the Hawaii location. (RIGHT) A German submarine carrying the priceless Ark pulls into an elaborate pen hidden in a beautiful tropical island.



Tough Rolux

How to use Rosco's Tough Rolux for a little diffusion. Or a lot of diffusion. Or a spot of diffusion. Or anything in between.

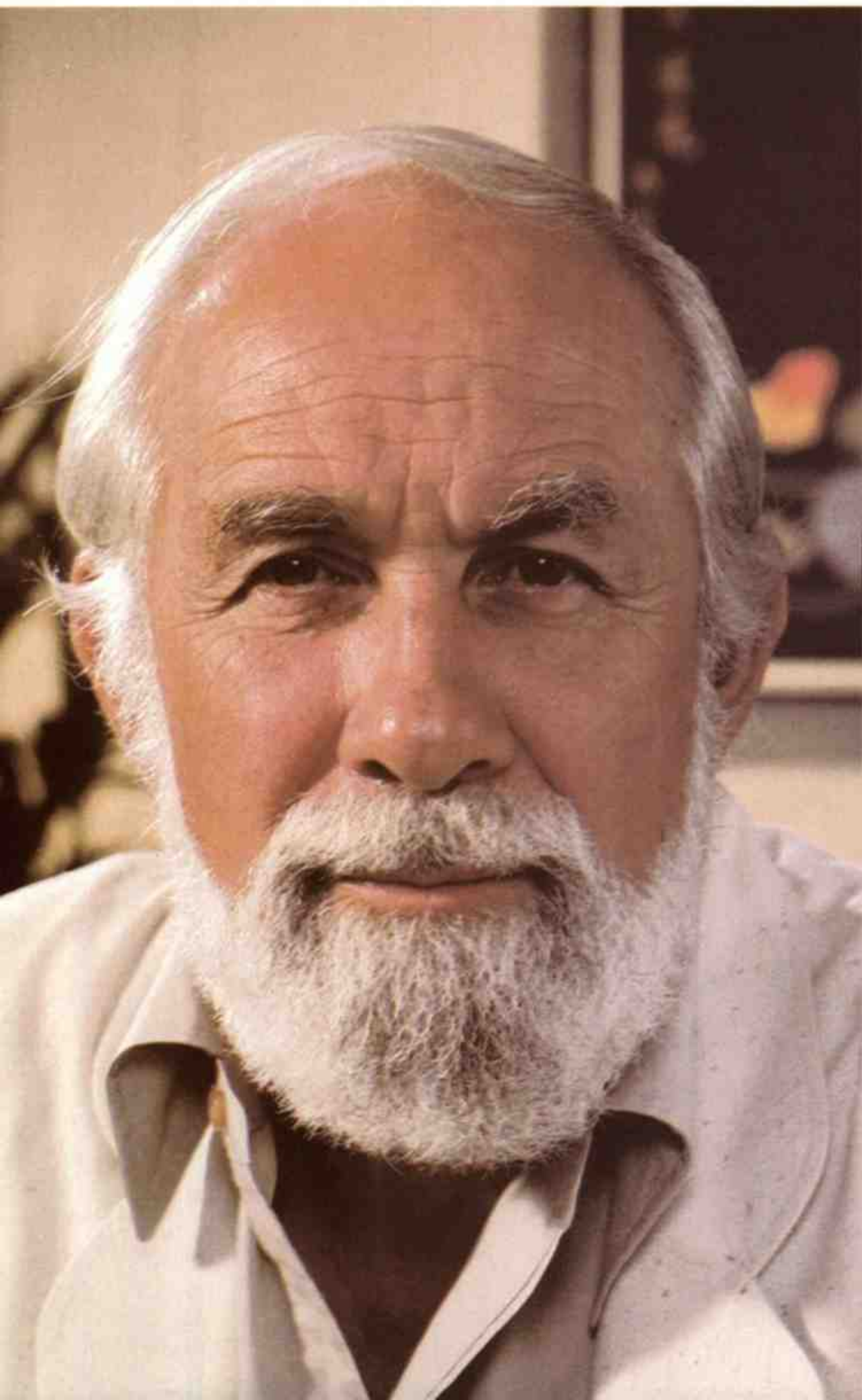
There's no limit to the texture of lighting you can achieve when you keep rolls of Rosco's Tough Rolux on your set.

William Fraker, who directed and then posed for the pictures below, suggests four techniques for Tough Rolux diffusion... all geared to getting the desired effect in a particular situation.

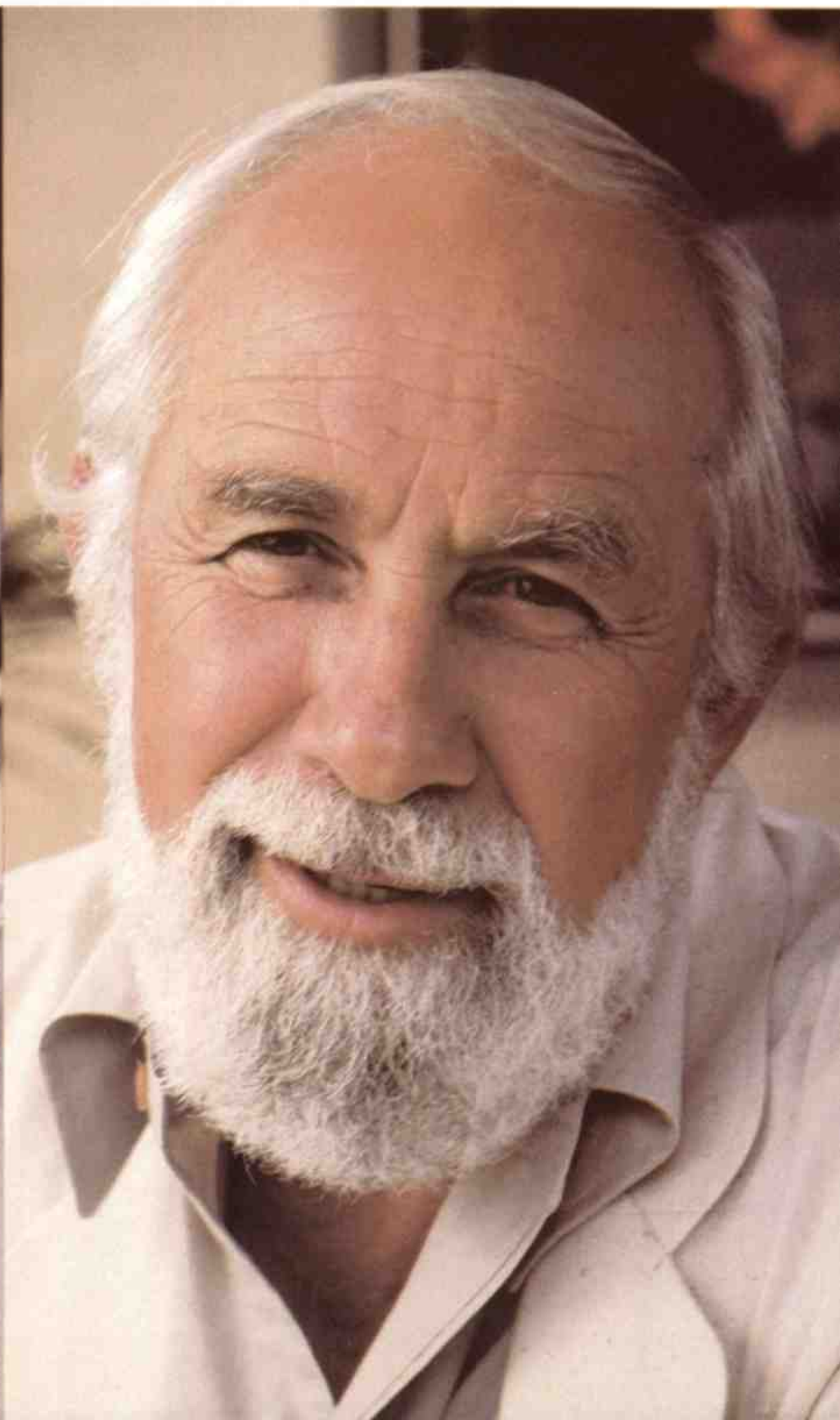
Rosco calls the material Tough Rolux because it's tough enough to stand up to hot lights. Each roll of Tough Rolux yields 100 square feet of material. It can be used in the gel frame of a light fixture, or rolled out in large sheets in front of a bank of lights. Fraker, and other filmmakers, have used it as a tent, shredded it, cut holes in it—and even used it as a white reflective surface for bouncing light.

As versatile as it is, Tough Rolux is only one of 16 useful Rosco diffusion

Shredded Rolux



Framed Rolux



materials. You'll find them all at your rental house or Rosco dealer.

Fraker on diffusion

Rosco asked Bill Fraker to demonstrate in print four techniques for diffusing light with Tough Rolux. He lit the scene with four HMI fresnel units in flood position. Because he prefers a mixture of hard and soft light, Fraker left one hard light without diffusion throughout all the photos. It was positioned behind his right ear.

Shredded Rolux

Because Tough Rolux handles heat so well, it can be used directly on the luminaire. In the first picture below, 3" vertical slashes were cut in the Rolux and inserted into the color frame of the key light. This technique helps bring out the texture of skin tones, adding life and character to them.

Framed Rolux

Tough Rolux was clipped into a 4 ft. square grip frame and positioned 5 ft. in front of the key light which was opened to full flood.

Tented Rolux

For overall soft light, nothing has quite the effect of building a tent with Tough Rolux. The individual light sources (three used here for soft front lighting) virtually disappear and the full "tent" becomes the effective source.

Slit Rolux

For a dramatic highlight, Fraker had a slit cut into Tough Rolux so the hard light punched through to provide an arresting accent.

About Bill Fraker

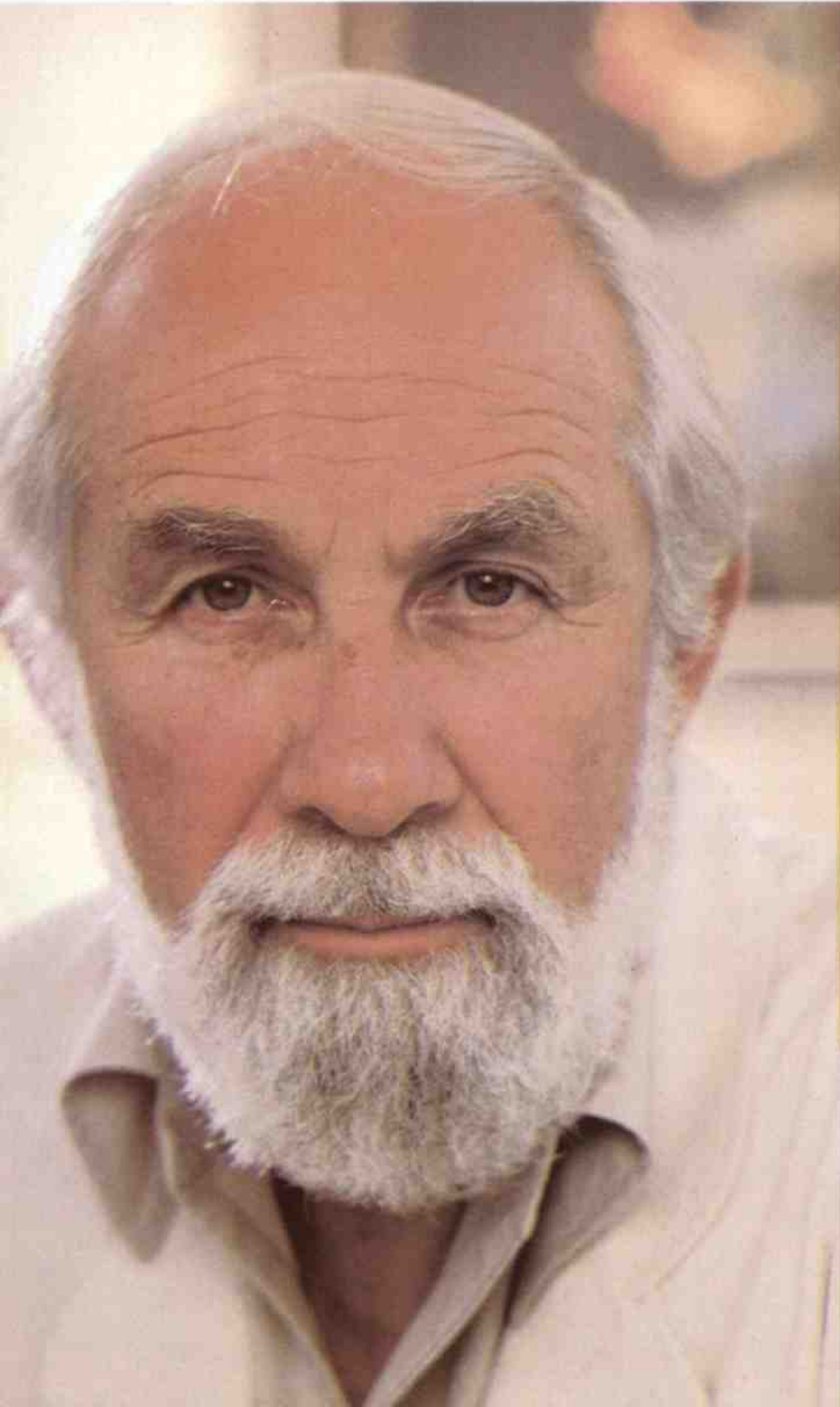
William A. Fraker, ASC, has just completed directing "The Legend Of The

Lone Ranger." A four-time Academy Award nominee, he photographed such films as "Heaven Can Wait", "Looking For Mr. Goodbar", "Rosemary's Baby", and "1941". He is president of the American Society of Cinematographers and a member of the Board of Governors of the Academy of Motion Picture Arts and Sciences and the Executive Board of IATSE Local 659.

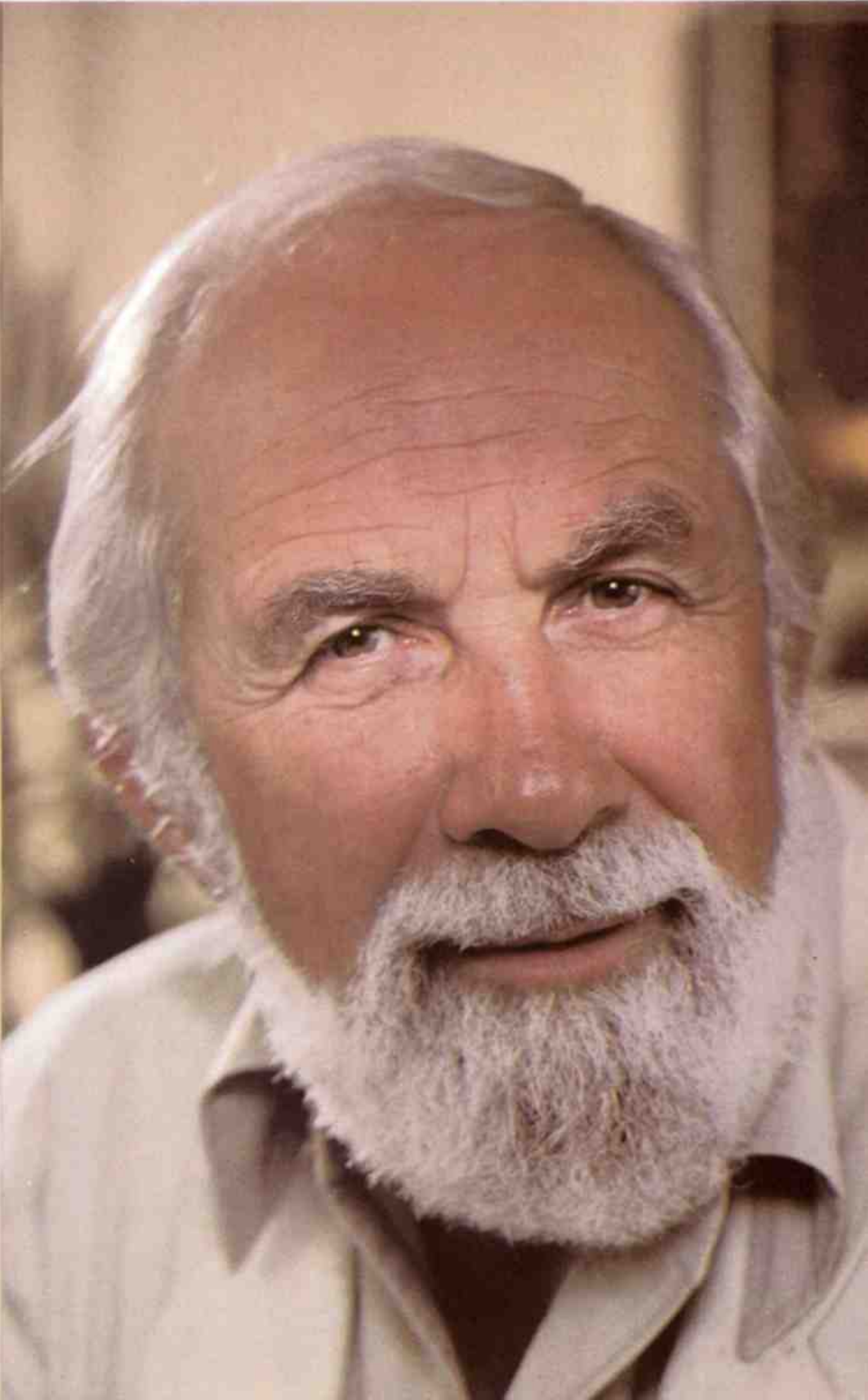


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Tented Rolux



Slit Rolux



"OF NARROW MISSES AND CLOSE CALLS"

By **STEVEN SPIELBERG**
Director

Homage to a galaxy of Saturday matinee serial stars and their derring-do inspires a wild adventure flick with non-stop action all the way through

The project which eventually ended up on the screen as **RAIDERS OF THE LOST ARK** began with George Lucas in the early 1970s. As I understand it, he got two ideas very close together: **STAR WARS** and **RAIDERS**. He was going to make one or the other at the time and decided to make **STAR WARS** first.

George and I happened to be in Hawaii at the same time in May of 1977. **STAR WARS** had just opened and George came back from the telephone, having discovered that the film, in the first weekend of its initial limited run, was a big hit.

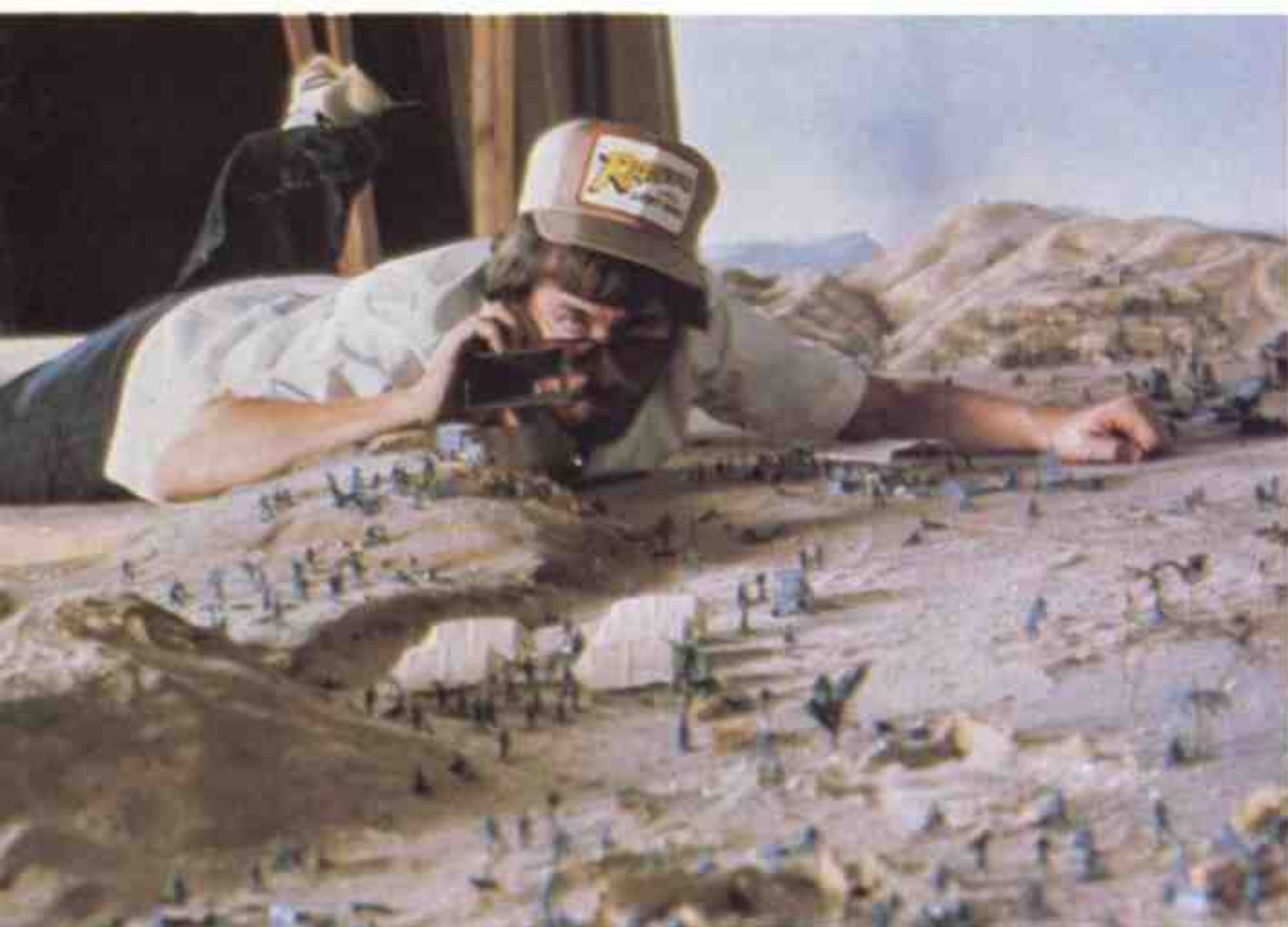
Then he told me the story, as if to say, "... and for my next number, I'm going to ..." So began **RAIDERS OF THE LOST ARK**. He told me he wanted to make a movie about an archeologist who was also an adventuring soldier of fortune, Indiana Jones, and his pursuit of the lost Ark of the Covenant in a race against time and des-

tiny with Hitler's best Nazi archeologists. I had told George some time before this that I had always wanted to make a James Bond-style adventure thriller and he said, "I've got something very similar to what you would like to do." Sure enough, there were all the "Bonding" elements, but without the hardware and the gimmickry, which is what appealed to me.

During that fateful encounter on the beach (while we were building a monumental sand castle), George finished telling me the basic elements of the story, and my tongue was hanging out when he dropped a bomb by informing me that the film was probably going to be directed by Phil Kaufman who had helped him initially with a few elements of the story. George asked me to hold my breath and he would check with Phil and see if Phil was going to give it up for something else and, sure enough, some months later George

called me and said, "Are you still interested in that movie I told you about in Hawaii, because Phil isn't going to do it now?" I said, "Yes, I am, certainly." We sat down and George suggested that I select the writer. I had just convinced Universal to purchase a script for me called **CONTINENTAL DIVIDE** by a new writer I had discovered named Larry Kasdan, who had only written one screenplay prior to that called **THE BODYGUARD**. When I got Universal to buy the script—at the time, for me to produce and direct—I brought Larry in to meet George. I was very impressed with Larry, and I said, "I'd like Larry to write **RAIDERS**."

George read **CONTINENTAL DIVIDE** over the weekend, and on Monday we all had a meeting and George and I offered him the job. Larry began working on **RAIDERS** and, in four or five months, came back with a wonderful, but overly



(LEFT) Director Steven Spielberg used the meticulous miniature of the Tanis archeological digs to develop and prepare camera angles for **RAIDERS OF THE LOST ARK**. (RIGHT) Filming on the set of the Tanis archeological digs in Tunisia. (BELOW LEFT) Spielberg looks through a viewfinder at his star, Karen Allen, among dozens of spooky, foul-smelling mummies, as camera operator Chic Waterson (in mask) looks on. (RIGHT) Spielberg, George Lucas and cast members break for lunch while filming aboard the tramp steamer *Bantu Wind*, off the coast of France.





In **RAIDERS OF THE LOST ARK**, director Steven Spielberg captures in an authentic way the spirit of the great 1930s action-adventure flicks.

long first-draft screenplay. Several months after that George and Larry did some private work on it and George helped to streamline and cut it down to a shootable length and then it was turned over to me and I began making the movie. That was in December of 1979, when I officially started on it. We began shooting in June of 1980 and finished in Sept. 1980. It was actually the shortest schedule of completion that I've been involved with since **THE SUGARLAND EXPRESS**. **SUGARLAND** took 55 days. **RAIDERS**, for all of its spectacle and expansiveness, we shot in 73 days, which I'm quite proud of.

I had grown up with serials. There was a revival theatre near my house in Phoenix, Arizona, the Kiva theatre, and on Saturdays they would show a double feature and sandwich in between 10 cartoons, previews of coming attractions from 20 years past, and usually two serials. Every Saturday I would go there and I would see these old revival movies and these old revival serials: **TAILSPIN TOMMY**, and **MASKED MARVEL**, **SPY SMASHER**, **DON WINSLOW OF THE NAVY**, **COMMANDER CODY**—and I always wondered why Hollywood hadn't done anything to revive the *genre* of the outdoor adventure; of narrow misses and close calls. It was just amazing to me that it hadn't been done before.

When I sat down to make the movie, George, as Executive Producer, was very true to form, as with Irwin Kirshner on **THE EMPIRE STRIKES BACK** and Bill Norton on **MORE AMERICAN GRAFFITI**, in the sense that he believes that a director directs and an Executive Producer com-

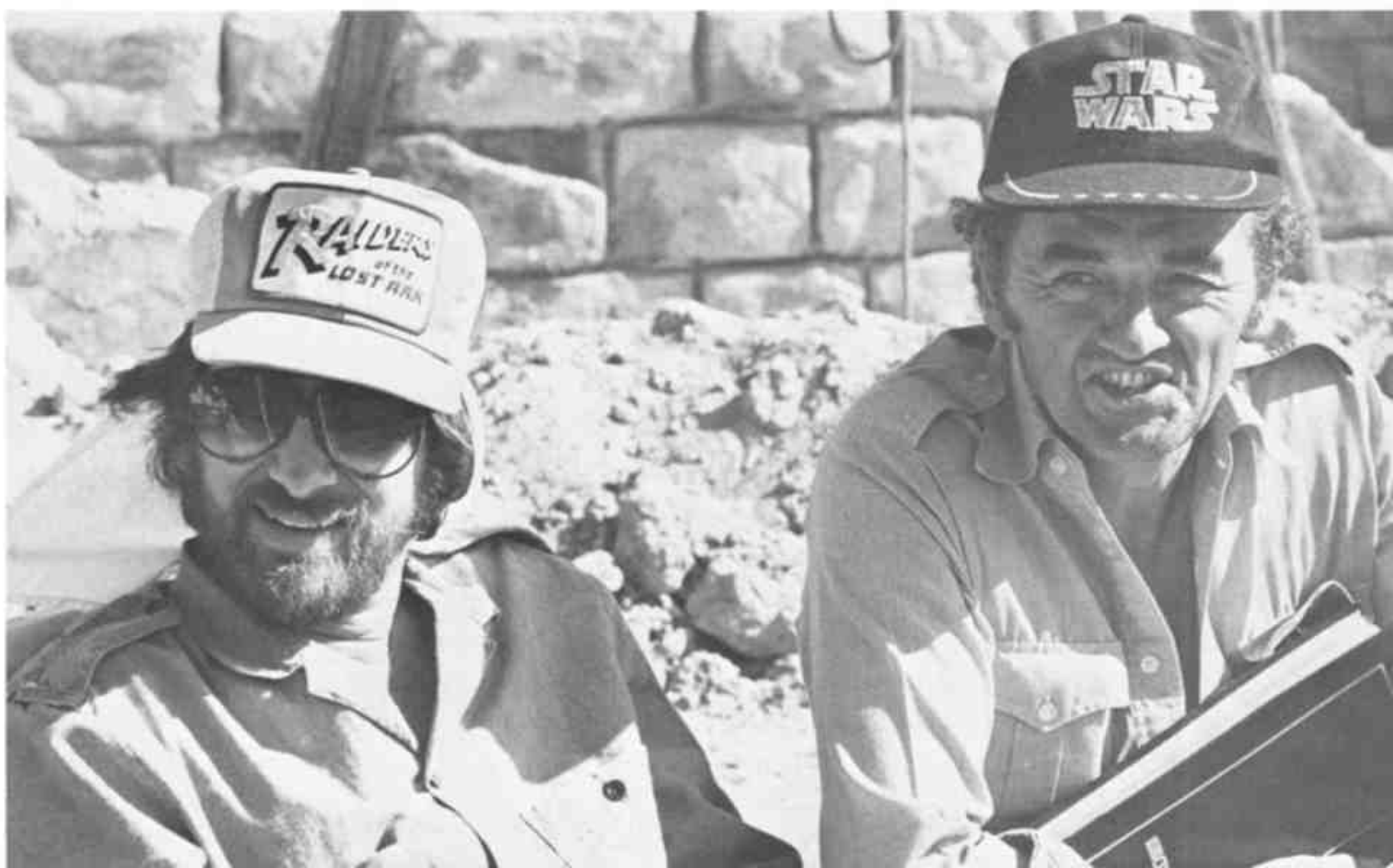
pliments the team with positive reinforcement and George was wonderful at that.

My first choice as Director of Photography, of course, and the first person I hired, was Douglas Slocombe. Having worked with Dougie for the two weeks of prep and shooting on the **CLOSE ENCOUNTERS** India sequence, I had met Camera Operator Chic Waterson and Assistant Camera-man Robin Vidgeon and Dougie in India for the first time, and that's quite a place to get to know somebody. We sort of gave each other shelter from the culture shock of working on the outskirts of India and got to know each other very well over the twelve days that we were there.

Afterwards I told Dougie that I really wanted to work with him on a complete feature and I'm sure that he thought I was just another Hollywood director blowing



Spielberg, who makes films to turn both the audience and himself on, has fun with Karen Allen and a small furry friend on location. (BELOW) Spielberg on location in Tunisia with production designer Norman Reynolds, who created some bizarre and spectacular sets for the picture.





Spielberg decided that the only way he could bring this movie in on schedule and on budget was to storyboard not only the sequences involving fights and chases, but also the sequences involving behavior, attitudes and dialogue. He wound up having to use four storyboard artists instead of the usual one. (BELOW) Closeup of a single storyboarded scene.

DESCRIPTION: MS Belloq (phony head). Belloq's head explodes. Column of fire is in FG.

ELEMENTS: Phony head - Belloq
Column of fire - Pyro

SCENE NO.

SHOT NO. 0A56

OF

NOTES

FRAME COUNT 120

ANIMATION:

PROC. PLATE NO.

THE RAIDERS

PAGE 99

Yankee smoke up the British Union Jack, so three years later he was very surprised to hear from me.

Of course, the second person rounded up was Michael Kahn, who had edited "1941" and CLOSE ENCOUNTERS, plus two films I had executive produced: USED CARS and POLTERGEIST. Michael has been with me for five years now and is a remarkable collaborator.

I had always wanted to work with Production Designer Norman Reynolds who, coincidentally, had just finished with George on STAR WARS and THE EMPIRE STRIKES BACK.

George suggested Robert Watts, who had been with him for a long time, to be the Production Manager and Associate Producer.

When I went to England on my first

"recce" I discovered a well-oiled STAR WARS machine of technicians and artisans who have been working on the STAR WARS series now since 1976. They were very used to working together and we all, in concert, decided to get the same team that made STAR WARS, THE EMPIRE STRIKES BACK, and also, by coincidence, SUPERMAN. They were very accustomed to difficult locations, spectacular sets, and eccentric special effects, so it came as no surprise to them when they first heard news that the script was going to take place in four countries on three continents with seven massive scenic structures and many physical and optical special effects. They had been there before.

Every movie has surprises. You can make all the JAWS and STAR WARS in the world, but every special effects movie has something in it that teaches you something you probably wouldn't want to do again. I keep saying to myself, after I finish a massive production, that I'm going to make my "little movie," and I never have. I said it after SUGARLAND, which was massive in its day and in its own scale. After JAWS I said I would never go underwater and work with anything with pneumatics or hydraulics; and after CLOSE ENCOUNTERS I said, "That's it with 70mm and optical effects and matte paintings." After "1941" I said, "No more miniatures and no more multiple story lines." And I wound up smack dab in the middle of it again with RAIDERS OF THE LOST ARK.

I really wanted to make RAIDERS economically and make it look like \$40 million and, in fact, spend only \$20 million—which was the original intended budget. The \$20 million actually would pay for 87 days of shooting, but I had devised a second schedule of 73 days that very few people knew about—Paramount Pictures, for one.

That was the schedule that we ultimately met. I just found that, by not doing 15 takes on each shot, but by doing only, let's say, three to five takes, I was able to get a lot more spontaneity into the film with less self-indulgence and pretentiousness. I didn't have a lot of time to try different things, but I think I've made enough movies that involved horrendous logistics—JAWS, CLOSE ENCOUNTERS and "1941"—for me to finally receive my diploma, graduate with both honor and infamy, and get into the field where I could make a movie responsibly for a relatively medium budget that would appear to be something more expensive.

That was the challenge. That and, of course, trying to make a movie that would

Continued on Page 1138

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THROUGH A GLASS NOT-SO-DARKLY

By DOUGLAS SLOCOMBE, BSC
Director of Photography

I first worked with Steven Spielberg when he asked me to photograph the Indian sequence on *CLOSE ENCOUNTERS*. My faithful crew consisting of Chic Waterson, operator, and Robin Vidgeon, focus, were, as usual, with me and we had an exhilarating week in Bombay where we had the opportunity of appraising our talented new director. We had just finished shooting *JULIA* with Fred Zinnemann and did not realize then that this picture was

later to join our own as a nomination for the Oscars with Vilmos Zsigmond eventually walking off with the coveted award.

Steven was a delight to work with—clear and definite in his ideas of set-ups and how he would like the result to look and, at the same time, receptive to alternative ideas. The shooting went very smoothly, and, in fact, we were several days ahead of schedule. He subsequently promised me one of his future pictures

The director felt he wanted a *film noir* approach—until he saw these images, infused with subtle luminosity, shining from the silver screen

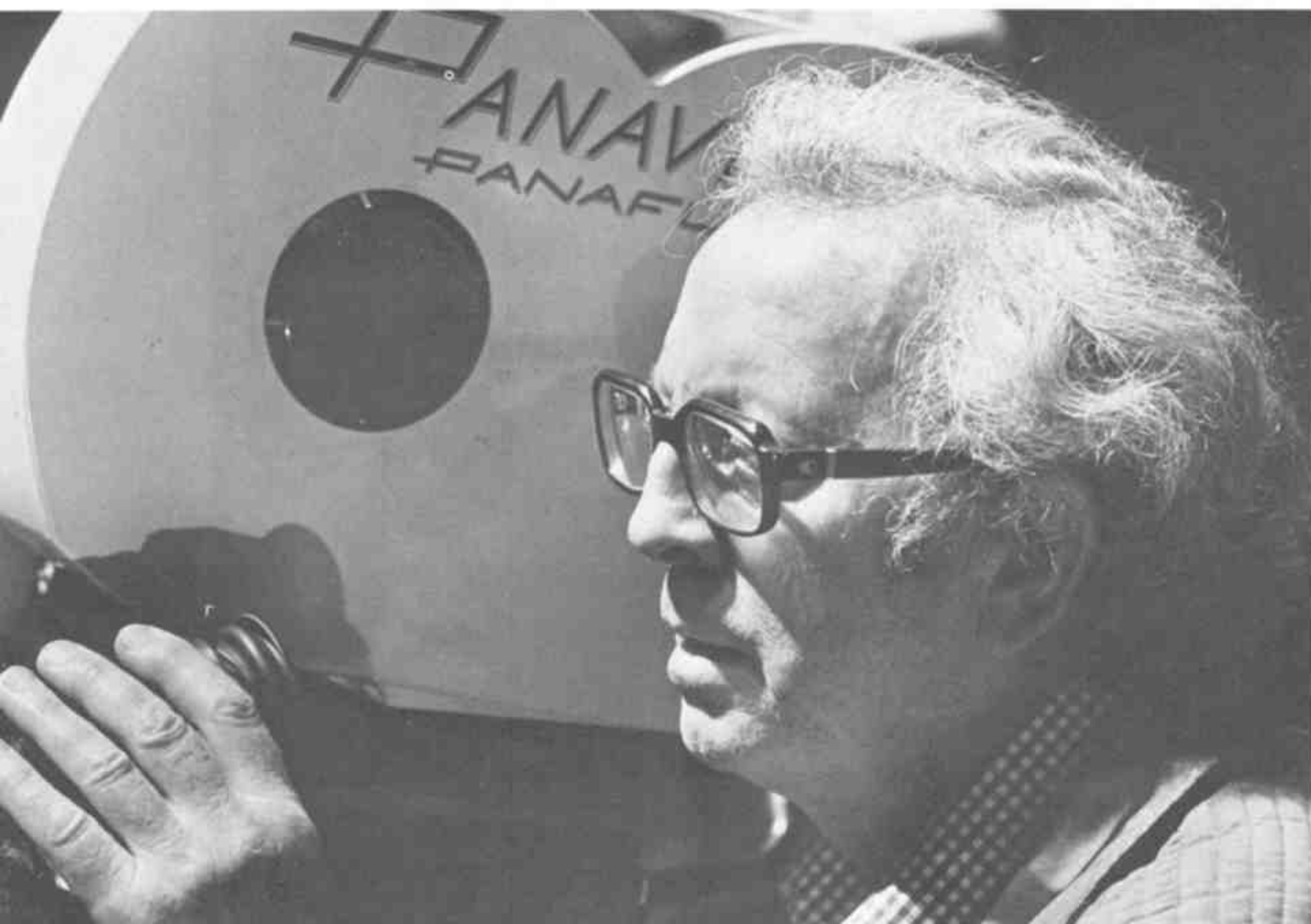
and, to my delight, kept to his word and offered me *RAIDERS*.

The weeks of preparation were to become as fascinating as the shooting. Endless discussions with the art department and Norman Reynolds, together with Kit West, of Special Effects, started at the drawing stage, then continued while we pored over models, and were still being fabricated while the wood and plaster began to be assembled on the various stages. During these early days, Steven discussed lighting effects with me, as well as the various visual tricks to be provided by Kit West. Norman Reynolds was able to incorporate early in his sets the gaps I needed for hiding lights and Kit required for his electro-magnetic cylinders of compressed air and thousands of evil-looking, but hopefully harmless, darts. In addition to all of this, the proverbial storyboards were drawn up and exhibited on 8 x 5-foot tracking boards which were carted around from offices for discussion to the actual sets when shooting.

I have personally fought slightly shy of these, feeling that the invention on the floor was often more creative and less inhibited than the preconceptions fostered while gazing at a model or a batch of set drawings. However, with a director like Steven, my fears were soon at rest, for the drawings helped the props and general floor crew to appreciate and provide for what was about to be attempted. Steven was relaxed enough to be able to discard the original conception if he saw a better approach at the last minute.

Many directors are happy to leave the camera set-ups to the cameraman or operator, and we have always enjoyed this trust, but Steven is so generally inventive that he likes to make these decisions himself, and obviously enjoys this direct approach to fulfill his ideas. This does not mean that he was not open to suggestions and, in fact, often listened to ideas put forward by Chic or myself. He also loves the feel of the camera and often liked to take the camera and operate himself (much to Chic's consternation. Being a particularly talented operator and highly jealous of his craft—he doesn't even like me to take the camera.)

Most of the sets on *RAIDERS* were on the large side. The submarine pens at La Rochelle were huge gloomy dungeons with fading German graffiti on the damp walls to bear witness to the Nazi German wartime presence in France. This was our first location and we started off well, re-



RAIDERS OF THE LOST ARK Director of Photography Douglas Slocombe, BSC, whose credits include: *THE LION IN WINTER*, *JESUS CHRIST SUPERSTAR*, *TRAVELS WITH MY AUNT* and *JULIA*, among many others. (BELOW) Spielberg and Slocombe, who had worked together on the India sequence of *CLOSE ENCOUNTERS*, discuss lighting of the climactic sequence of *RAIDERS*.





(LEFT) On Kauai, Hawaii location crew prepares to shoot scene of entrance to the temple of the Chachapoyan warriors. (RIGHT) In Hawaiian jungle setting, Spielberg checks out nature's lighting to make sure that enough "shards" of sunlight are shimmering through the foliage, while Slocumbe (extreme left) looks on. (BELOW LEFT) Rehearsing a tense scene with Harrison Ford on the set of the Temple of the Chachapoyan warriors. (RIGHT) The crew gathers around the Flying Wing to watch Ford in a fight scene with actor Pat Roach on location in Tunisia.



With the aid of expert snake wranglers, Spielberg and Slocumbe plot an artistic composition of large reptiles for Well of the Souls sequence.



turning to England ahead of schedule. There the studio sets awaited us in various degrees of readiness and I had an interesting time as all of them needed different types of effect and mood lighting.

The mystery of the Peruvian caves with their supposedly pre-Colombian built-in protective weaponry, the 1930s tavern with the sinister Nazi agents' shadows on the wall (an idea of Steven's), and the gradual replacement of the flickers from a central log-burning fireplace by the all-engulfing flames of the subsequent real fire.

Perhaps the most rewarding sets were the so-called map room, with its single shaft of light from the top opening (for which we used an army searchlight), supposedly in the desert, and the Well of the Souls either requiring to be top-lit, as if from the tablet-covered opening at the top, or from the flames of the torches with which the several thousand snakes were apparently held at bay below.

Then the discovery and revelation of the Ark required a special luminous effect. The later sequence in the canyon, where the Ark is at last opened, needed not only

Continued on Page 1123

Spielberg, Slocumbe, camera operator Waterson and assistant director David Tomblin watch camera rehearsal of a scene between Ford and Allen.



CREATING THE SPECIAL VISUAL EFFECTS FOR "RAIDERS"

By **RICHARD EDLUND**
Photographic Effects Supervisor

When I was assigned to work on RAIDERS OF THE LOST ARK, I had been doing a couple of space movies, and even though THE EMPIRE STRIKES BACK is a kind of fantasy, we had to deal with white, snowy backgrounds in terrain where people had actually been. Therefore, the material that we had to provide for the film had to look real and at least be stylistically integral with the rest of the picture.

RAIDERS, on the other hand, was set back in the 1930s, and everyone has been in situations that resembled, to a degree, some of the situations in RAIDERS. We had stormy skies and we had matte shots in which we had to fly airplanes that were no longer in existence, as well as shots in which the environment was familiar.

In the climactic sequence of RAIDERS

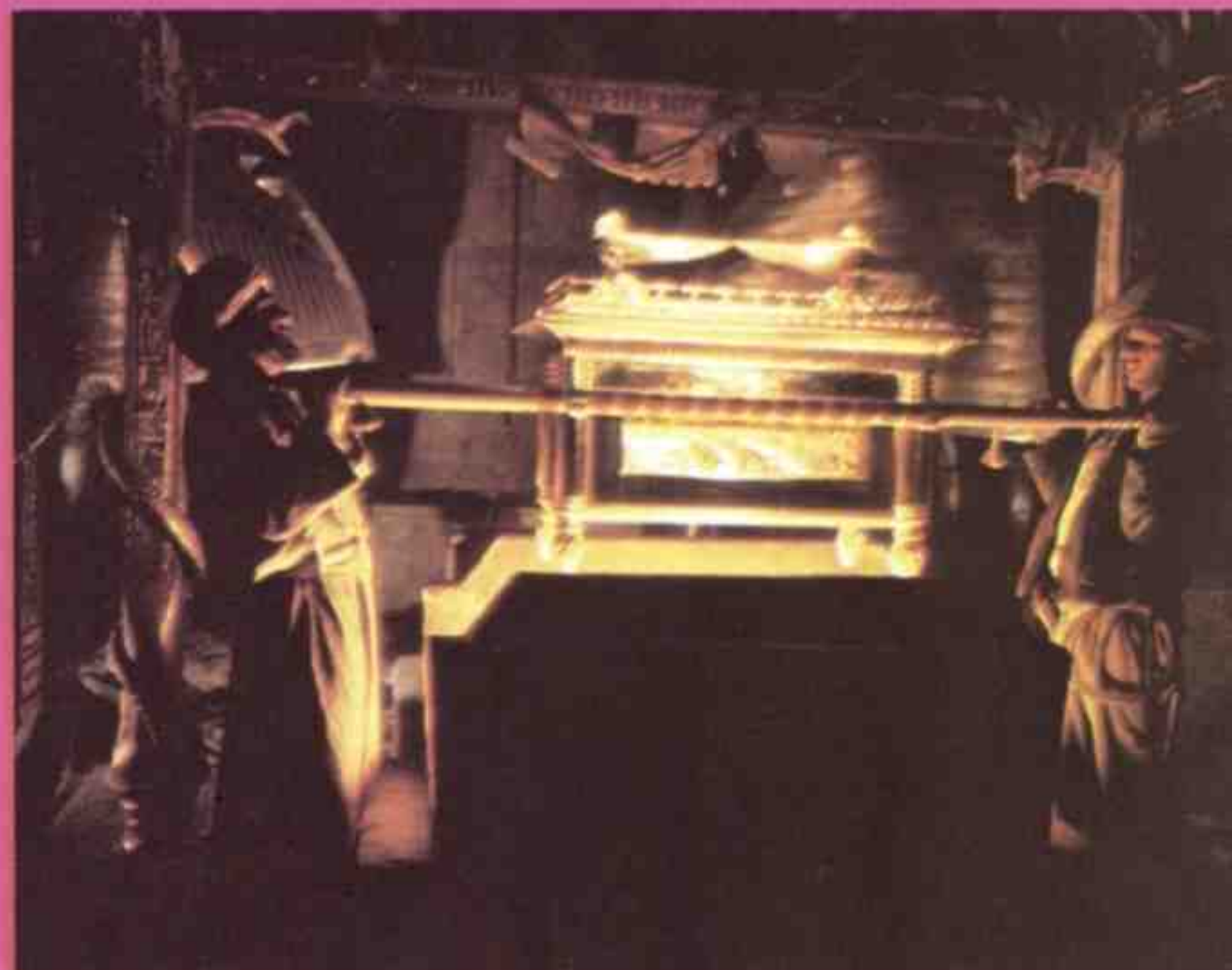
there is a real on-the-earth situation in which men are walking up to the Ark, looking in and experiencing the Wrath of God. We had to portray that in a fitting way to follow the inspired act of Steven Spielberg, who is a virtuoso director (I feel that some of his best work is in this picture). We also had to follow the spectacular work of Glenn Randall, who coordinated the stunts. All of a sudden, at the end of the picture, after the unbelievably break-neck pace these people had established, we had to come up with a final sequence that topped off the rest.

That final sequence also involved ghosts, which are a touchy subject. I felt that a lot of people have their private fantasies about what a ghost may or may not look like. Looking back through the films that had been done involving ghosts, I

A corps of dedicated technicians whumps up a whole bag of tasty tricks to thrill audiences and make incredible situations look quite believable

found that there had not been many which had portrayed ghosts in a memorable sort of way. I hoped that our ghosts would be somewhat memorable, but the problem is that you can't show too much or you will start revealing your tricks. On the other hand, you can't show too little or the audience will feel cheated. That was one of the real difficulties: to come up with something that looked like a ghost, that looked like it had speed and maneuverability and could wreak damage of one sort or another—and still look kind of beautiful and "angelic," in a sense. George Lucas came by and kept an eye on these effects in progress and also had a good hand in cutting that final sequence.

In that sequence we also had a lot of difficulty in controlling the pyrotechnic material involved. We had to portray fire in a



(LEFT) An eerie light shines from the stone case holding the Ark, as Indiana Jones and Sallah remove its lid. (RIGHT) Indiana and Sallah lift the magnificent Ark from its stone case. (BELOW LEFT) Harrison Ford and Karen Allen shown tied to a stake prior to the apocalyptic climax of RAIDERS OF THE LOST ARK. The blue screen behind them is for the purpose of composite matting a special background into the scene later. (RIGHT) Indiana and Marion watch the Nazi soldiers (and film crew) react when the "power" of the Ark causes the lights on the set to explode.



controlled way, so that it looked like it might have some sort of mind of its own. We had to build a miniature of the entire set (about four feet wide and five feet deep) and run fire through it in order to sweep up the Nazis, who had expired as a result of looking when they shouldn't have looked. There were also a number of matte paintings, most of which were done by Michael Pangrazio. To top it all off, we had to create a special makeup for the monster-type work dealing with Toht's melting head, Belloq's exploding head and Dietrich's shrinking head—as well as producing the myriad of ghosts.

When we started the picture and evaluated what would have to be done in the final sequence, we assumed that, with the ghosts and all, a lot of the work would involve animation. In the meantime I came up with a couple of ideas for filming certain materials during the course of principal photography that would give us something to tie in to when we got to the effects studio. One idea involved a special filter that we shot the sequence with, and the other was a sort of harness arrangement that all of the various Nazis wore in the set. This harness had a very bright little projector bulb in the front, sticking out on a little bendable wire apparatus. Then around behind, inside their shirts, was an enormous flashbulb that produced a flash lasting about two seconds. The flashbulb was bright enough to light up the entire inside of their shirts to look like they were being struck by the Wrath of God. It would not be an effect that we would have to animate on top of each person; it would be something that would actually be part of the original photography, causing flares to bounce from one actor to the other and onto the ground, as though the effect were actually happening in the scene.

Many times, when you try to animate that sort of thing on top of live action, the subtleties of the light that is bouncing around from one object or person to another, plus the subtleties of cloth texture and other elements like that, turn out to be details that you can't quite get without more testing and more work than you can afford.

We did some tests at Industrial Light and Magic in Marin County that involved casting high school students and dressing them up in Nazi uniforms. We got some interesting dry ice pumps arranged and placed a big anamorphic mirror inside the Ark that would reflect light back into the camera through this filter which I had built on a machine. I didn't want the filter to produce the effect of a star filter, and yet I wanted it to be something unique. I had come up with this filter idea a couple of years before and had been looking for



Harrison Ford lets off a bit of steam in horseplay with Photographic Effects Supervisor Richard Edlund between set-ups. (BELOW) Edlund rides the crane during filming of a miniature of the Nazi submarine. A full-size submarine, built by Bavaria Studios in Munich, was shipped and assembled in La Rochelle, France for other scenes.



Artist at work on a matte painting of the Nepalese settlement in which the Raven Bar, belonging to Marion Ravenwood (Karen Allen) is located. RAIDER required quite a few matte paintings, but not nearly as many as George Lucas' THE EMPIRE STRIKES BACK.



something to use it on. It produces a "crowned" flare from a source, so that the effect is that of a sort of winged flare, instead of a straight one across the screen. It is a somewhat subtle element, but I think it was helpful in making real that destruction scene, when all the Nazis get hit. We shot the tests at I.L.M. and even cut a little sequence together. At this time, Steven was shooting in London and I went over there and worked with Dougie Slocombe on the lighting and the "look" of the sequence.

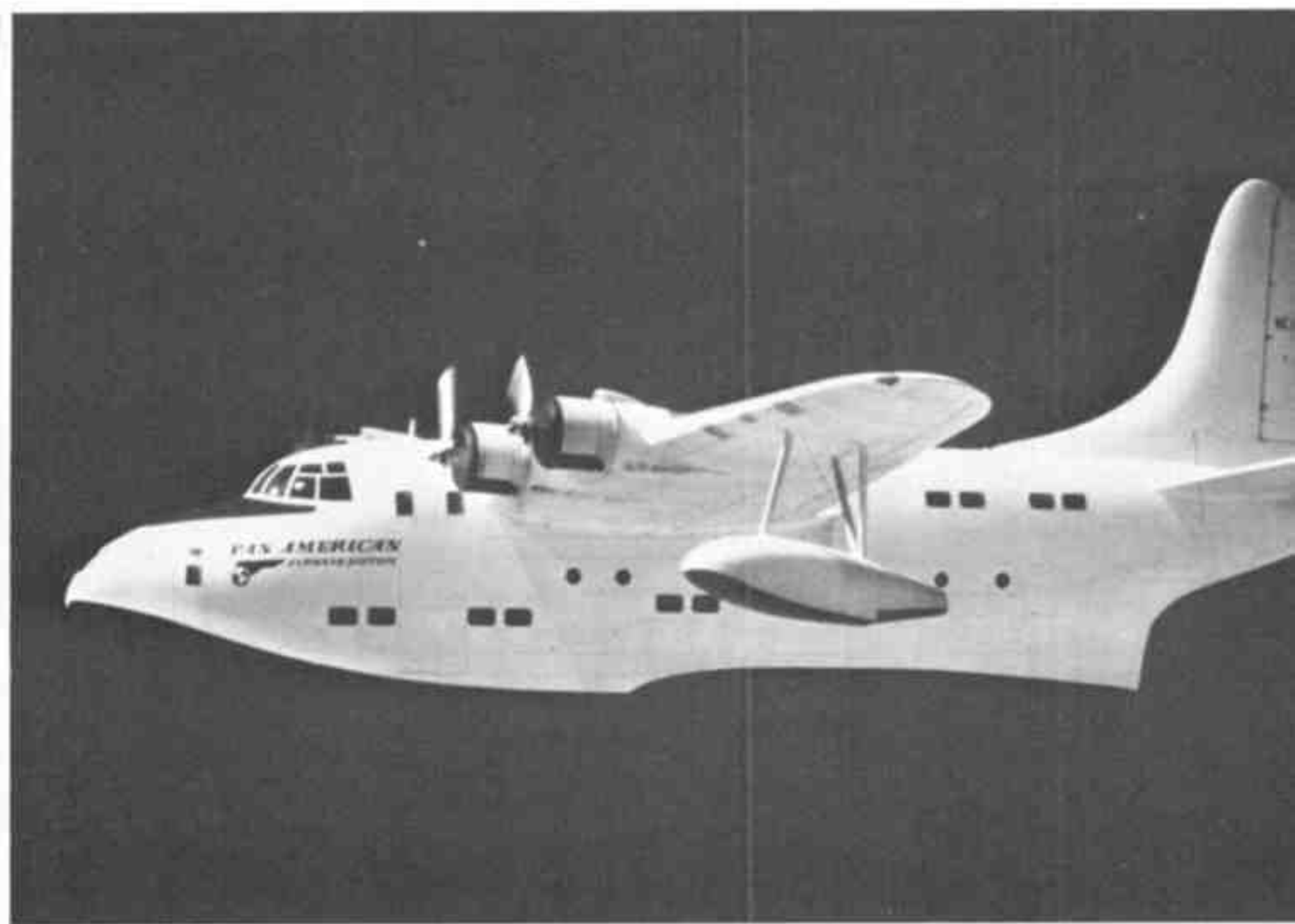
We had built our own Ark at I.L.M. and had put in quite a bit of work to get a certain look worked out. Then we communicated transatlantically with Norman Reynolds, who was doing the production design, as well as supervising construction of the major props, in order to get some of these effects elements lined up.

When we got to London I found out that all of the shirts these guys were wearing were a bit small for them, so we had to be very careful about putting those big flash-

Continued on Page 1144



A group of miniature Nazi soldiers used in the hair-raising truck chase sequence to portray the fall of the soldiers over a cliff. This is quite possibly the most intricate sequence in the picture and involved a wide range of movie magic, most of it performed by stuntmen. However, Edlund and his crew shot several inserts and closeups under the moving truck.



(LEFT) For the Pan American "China Clipper" sequence it was discovered, fortunately, that there was a British-made flying boat of the same type located not far from the studio and actors were photographed boarding it, with the proper surroundings matted in later. (RIGHT) A miniature model of the flying boat built to show the aircraft in flight. (BELOW) Technician operates the electronic controls that make the model perform realistically. (RIGHT) Photographing the model "in flight."



Q & A



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Q I have a scene to film that requires panning from bright (f/16) exterior light to dim (f/3.2) interior light. I will not have available the equipment necessary to balance the interior light level with the exterior. What do you recommend in order to make a smooth transition and exposure change?

A If you are unable to redesign your shot, try manipulating the aperture of the lens as you pan from exterior to interior. Work with the aperture much like a focus puller does. Adjust the aperture from f/16, to f/8, to f/5.6, to f/4, to f/3.2. With a properly adjusted aperture, you should not be able to see these changes. It should come out as a perfectly natural transition. The aperture changes have to be made right alongside the camera, by hand. There is no substitute for it and you have to design your shot with that in mind. One word of caution: aperture changes of this type will work as long as you don't have visible depth-of-field changes. On a pan, there should be no problem. However, you will be in trouble when filming something coming straight toward you, where you would suddenly see areas going out of focus. The limitations with this technique are severe to this extent.

Q What is the name of the screen material that is used for front projection?

A The most successfully used material for this process is called Scotchlite, manufactured by 3M Company. It is used because of its tremendous reflectance qualities.

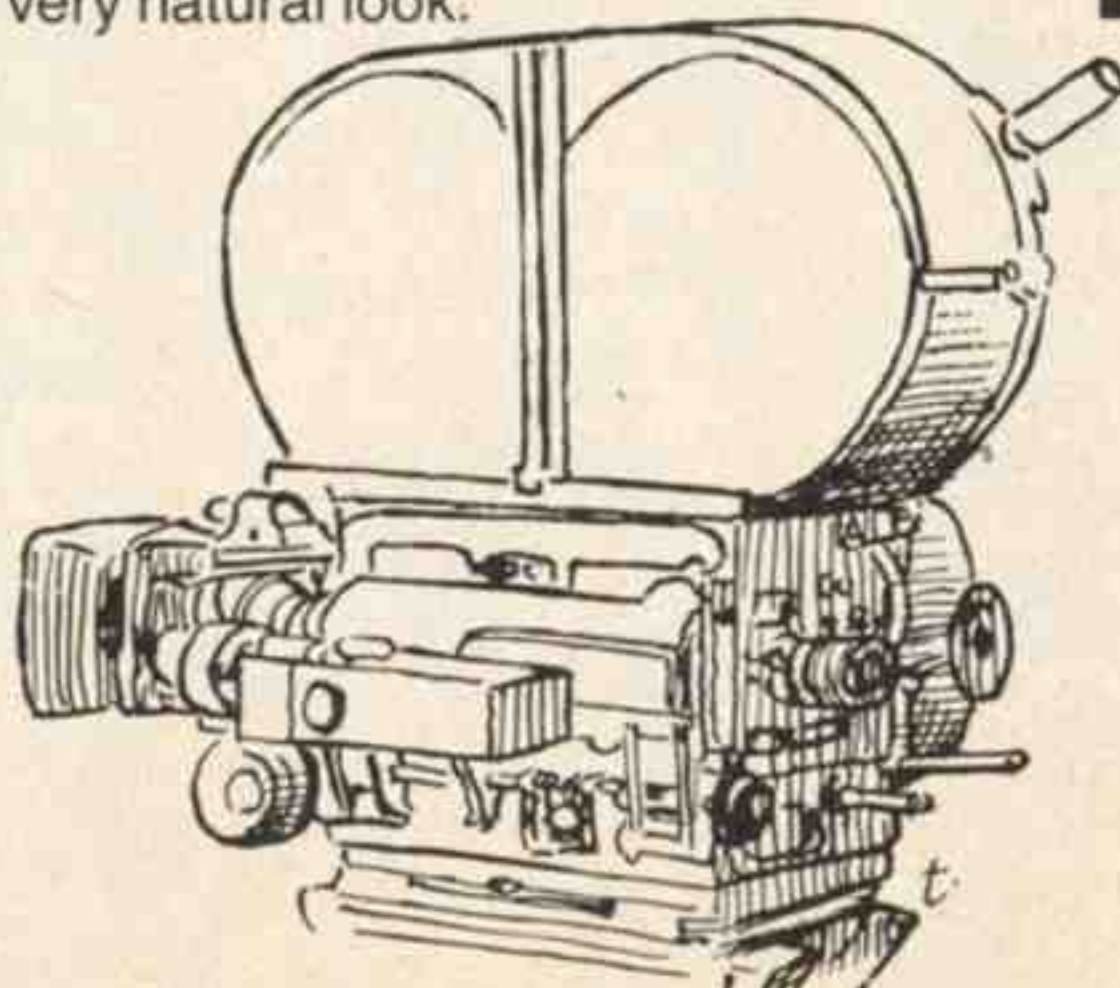
Q I have heard the term "video tap" used with reference to film cameras. Can you explain?

A This term applies to the use of a small video camera tapped into the film camera optical viewing system for purposes of accurately recording your film

sequence on video tape. This has been a very controversial tool from its first inception. However, properly used, many directors find it invaluable to be able to instantly replay a given scene to review the contents. Directors, such as Blake Edwards, find it extremely helpful to be able to replay a comedy sequence and see if it works right, then and there. Camera operators, however, oftentimes find the video tap to be a hindrance, especially when stopped down. The TV camera takes away a lot of light from the eyepiece, making it difficult to see the frame edges. With rapid television technology, these problems should be solved in the near future.

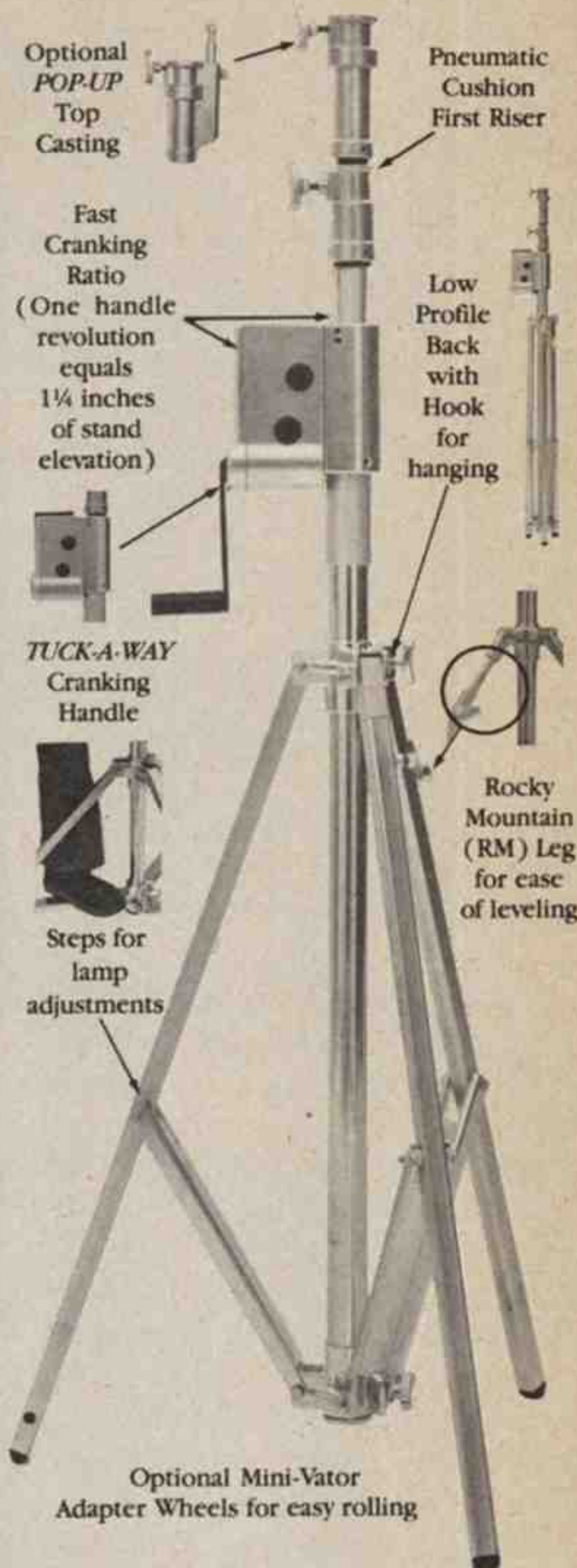
Q I am about to film a sequence on location that is lit entirely by fluorescent fixtures. It is a large room, with more than eighty fixtures overhead. I am aware of the use of fluorescent light compensating filters. Do you have any other suggestions to film under these conditions?

A Yes, measure the light with a color temperature meter—it may well read somewhere in the range of 4000°K. Rather than filtering your camera lens, which will affect everything in the scene, filter only your kicker and fill lights using Rosco half-blue gels, which will bring these lights up to about 4000°K. Then, most importantly, call your lab timer and tell him you are lighting everything at 4000°K. Knowing that, he will be able to bring the entire thing down to 3200°K in the timing. This process should give you a very natural look. ■



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MAKING SURE THE ACTION NEVER STOPPED

The wall-to-wall knock-down-and-drag-out in this film required not only derring-do, but a thorough knowledge of stuntwork mechanics

What sticks in the minds of most delighted viewers of RAIDERS OF THE LOST ARK is the fact that the action begins almost on the first frame of the picture and never stops all the way to the end. Mainly responsible for this wall-to-wall action was Stunt Coordinator Glenn Randall and his international crew of top stuntmen.

Randall was literally raised in the film industry. His father, Glenn Randall, Sr., was a horse trainer and showman who, among many other movie-related accomplishments, trained Roy Rogers' famous horse, Trigger, and was associated with Rogers for more than 20 years.

"I grew up going to Republic Studios when he used to take care of Trigger," recalls Glenn Randall, Jr., "so I can remember playing on some of those backlot sets when I was a very small boy—dreaming of the day when I would grow up to be a stuntman. Either that or a professional football player. I was good in athletics, but lacked the size."

During his teenage years he worked as an entertainer in rodeos. "I think I worked every major arena from Madison Square Garden to the Cow Palace between the ages of 17 and 20," he says. "I appeared in these rodeos as a performer, not as a competitor. I was part of a contract act and we worked all the rodeos, international horse shows and outdoor events."

After that, he got his boyhood wish and became a top stuntman in Hollywood. Although he is now a Stunt Coordinator and Second Unit Director, he still does some of the stunts for every picture he works on. "I usually do the most demanding stunts myself, so that the stuntmen working with me will know that I wouldn't ask them to do anything I'm not willing to do myself," he explains.

The closest he ever came to getting killed was on Michael Winner's production of FIREPOWER. However, he considers THE BLACK STALLION to be the toughest job he ever had to tackle. "I had to be the watchdog for a very young boy and a very valuable horse. I was required to put them into very dangerous areas—so it was very nerve-wracking," he says.

In addition to RAIDERS OF THE LOST ARK, his most recent assignments have included: LION OF THE DESERT, GHOST STORY, POLTERGEIST and Steven Spielberg's A BOY'S LIFE, on which he is currently at work.

In the interview for *American Cinematographer* which follows, he describes the special action challenges posed by

RAIDER, and explains how he went about meeting those challenges.

QUESTION: Having worked very closely with Steven Spielberg on RAIDERS OF THE LOST ARK, what comments would you have on that working relationship?

RANDALL: When you work with Steven, he forces you to learn and you are constantly learning with him. He's not afraid to try new things and he has a good concept of what he is going after. He'll take advantage of whatever situation presents itself, so he does keep you on your toes.

QUESTION: What was your initial impression when you were first made familiar with the project?

RANDALL: RAIDERS was a challenge from the very beginning. After reading the script, I knew I had my work cut out for me, but Steven had each entire sequence quite well story-boarded, so from there on it was a matter of figuring out how we could duplicate the storyboards in terms of action and put on the film what he had drawn on paper.

QUESTION: What kind of preparation time did you have?

RANDALL: We had ample time to prep everything in London and, luckily, I had done several films there, so I knew what talent in the stunt field I had to draw from. I

was fortunate in being able to get the best boys in Europe. I drew one man out of Italy and the rest came from London. Then I brought over a couple of key boys from the States. Collectively we had one hell of a crew. I can't say enough about the personnel that was collected to work on the film. They got the top people from both continents. They were all very dedicated and worked hard and Steven kept everyone on their toes.

QUESTION: What was your major aim in preparing the stunts for RAIDERS?

RANDALL: Going into it, what I had in the back of my mind was to try to keep Harrison Ford as involved in the action as I possibly could, so that the audience would realize it was actually Harrison performing all those feats. We were able to come up with devices and shoot in such a way that Harrison was capable of doing about 95% of what his character was called upon to do in the script. I was proud of that and I was also proud of the way that Harrison cooperated with us in getting it accomplished. There were several instances in which I absolutely didn't feel that we wanted to take any chances or risk his safety, but he did all his own fights and he worked very hard with the choreographing and trying to learn those things that we wanted to incorporate into the various sequences.

QUESTION: What would you say was your greatest challenge in "putting

On the set of RAIDERS OF THE LOST ARK, Stunt Coordinator Glenn Randall choreographs a fight for Harrison Ford and opponent. Like the matinee serials of the 1930s and 1940s, RAIDERS derives its impact from non-stop action, which called for a great deal of pre-planning on Randall's part, plus the ability to improvise on a moment's notice when plans were changed.



him into the action," so to speak?

RANDALL: One of the major challenges was getting Harrison onto the front of that truck in the chase sequence—hanging onto the front of the truck, a leg on either side of a wheel, while racing down a bumpy road—which can be highly dangerous. It takes only a bad turn, a bad rock or a bad bump and you are in a lot of trouble. We came up with some rigs and devices that would put him safely into those positions. Of course, after you figure those things out, they become very simple. But when you first consider the problem, you say, "How in the hell are we going to do this?"

QUESTION: Was the truck you used a standard model or did you have to have one specially built for the sequence?

RANDALL: There were a lot of little problems that we had to overcome in respect to that truck. The cab of the real truck that we used during the chase was so small that we actually couldn't do any of the fighting inside of it, so we had a process cab made up. It was probably a third larger than the cab of the real truck that we used. It was a mock-up that we had them build and we put it on the back of the camera car and were able to do about 70% of the fighting inside that mock-up cab. It's those problems that you look at very closely in pre-production, while trying to figure out how you're going to accomplish the effects that Steven is going to shoot.

QUESTION: Is it true that the bulk of the sequence was shot by the second unit, with the cuts of Harrison filled in later?

RANDALL: We spent about three weeks shooting the major portion of the sequence and when the first unit joined us we punched in with all of Harrison's close-ups and closeups of the principals and tied them to the action. I find that this is the best way to do it—shoot your action first and then come back with your principals and do your coverage. It's normally done just the opposite.

QUESTION: Do things sometimes happen which aren't in the script, but add to the impact of a sequence?

RANDALL: Yes. When you're doing action, many times things will happen that you can take advantage of. For example, in *BEN HUR*, when Charlton Heston fell out of the chariot, that was not planned. That was a stunt that went wrong, but it

was such exciting footage that by incorporating a shot of Heston crawling back into the chariot they came off with a magnificent bit of action. It's things like that you could take advantage of if you shoot a lot of your action first and then come back and incorporate your principals into those exciting moments. The end result can be overwhelming. Hollywood has always done it just in reverse. We have had to match the action that was done by the first unit, and normally that can be very dry and uninteresting.

QUESTION: How did it happen that you were able to do it the other way around on this picture?

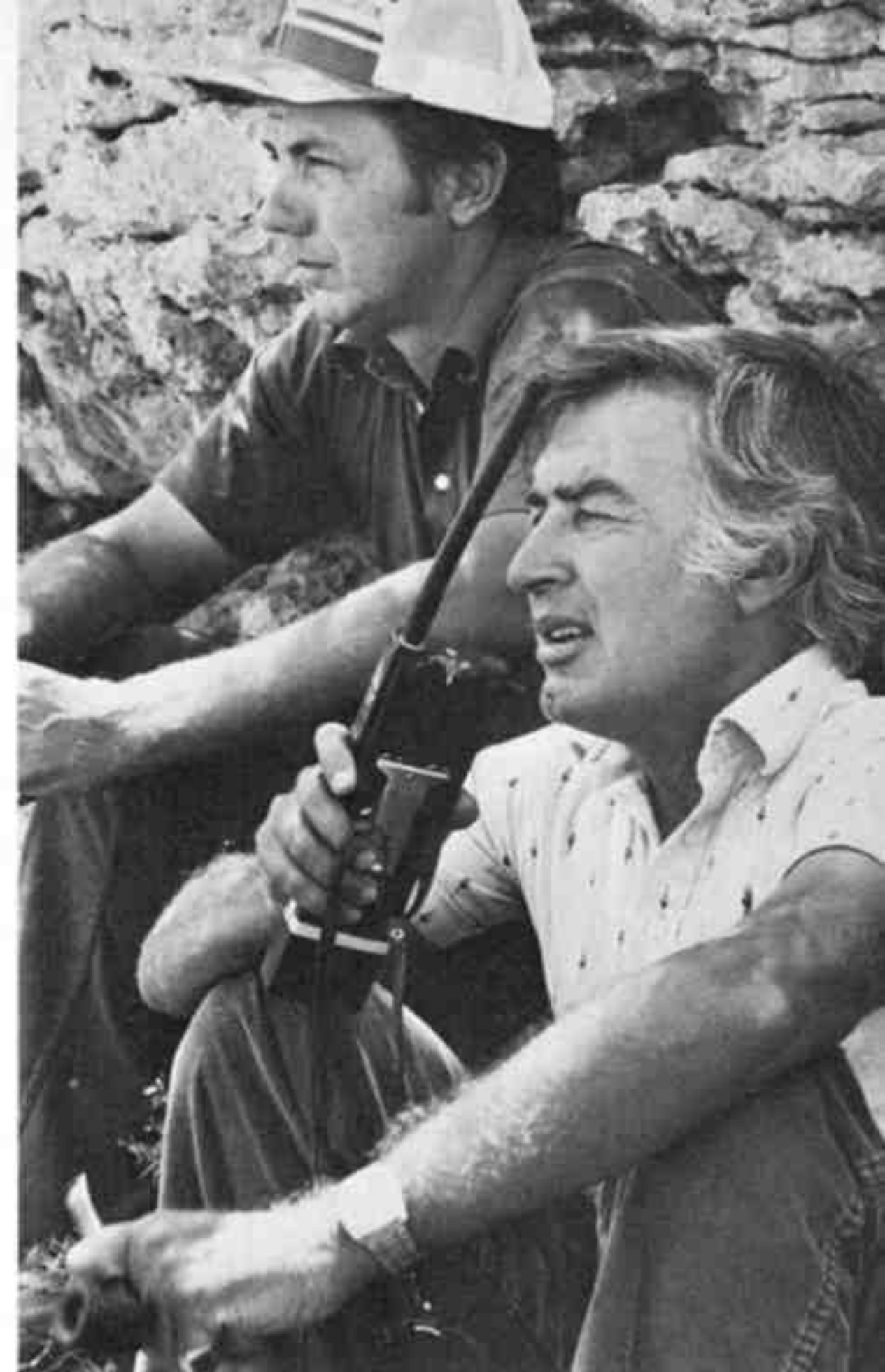
RANDALL: I really don't know how it came about. It just seems that's the way the time scheduling worked out. I'm sure there was quite a bit of thought put into it, but I would think they preferred to leave a unit there in the beginning to get started, so that when the first unit came over everything was pretty well in hand and had been tested and proven.

QUESTION: How did you approach matching the principals' footage with the action you had already shot just with the second unit?

RANDALL: We knew going in where we planned to do our matching and where we were going to put Harrison. Those areas we knew about well in advance. But after you've had the opportunity to do it once so that you know where all your problems lie, you have a chance to get the bugs out of your rigging and correct all the mistakes you may have made with the stuntmen. So when it's time to shoot the principals, it's proven. You've already tested it and you know what's safe and where you can put him in without really jeopardizing him.

QUESTION: As a result of how you did it on this film, do you now feel this is the proper approach as a standard procedure?

RANDALL: Most definitely—without question. I would advocate doing it that way on all features. It just works so much better. In the situations we encounter while filming, you're often shooting in a strange location, with strange livestock, strange equipment and a lot of variables. As you work with those strange elements, you have an opportunity to solve your problems with the second unit, before you get your principals in. It's so much safer. You are able to get much better



Randall spent many months in the Libyan desert staging mass action for *LION OF THE DESERT*. He is shown here with UCLA-educated director Moustapha Akkad.

stuff because you know what the horses and equipment are capable of, how far you can push them, and just what problems you are going to run into with them—and those are more or less worked out before you really get involved with shooting the money, so to speak.

QUESTION: Where did you shoot the truck sequence?

RANDALL: Near Nefta, a little town in Tunisia. We worked about 50 miles out from that town. We tried to utilize three different looks in the sequence, ranging from high desert to oasis to mountains and we had to have continuity changes in all of them so that the footage would pretty well match.

QUESTION: Were there special hardships attendant to shooting in that particular location?

RANDALL: Anytime you go out of the country you are going to have hardships. The materials and special equipment you might find necessary aren't available to you. Whatever it might be, you'd better have thought of it well in advance and brought it with you, because the chances of being able to go to a store to get it or have it shipped over in a matter of days is very remote. It's not like Hollywood, where whatever your need might be, you make a

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INDEPENDENT FILMMAKERS AND THE NEW HOLLYWOOD

By SCOTT HENDERSON

Seminar indicates that current revolution in film financing, production and distribution may offer independent producers increased opportunities

The event was sold out far ahead of its scheduled date, and on that day a crowd of 450 film-oriented men and women (predominantly young) packed the ballroom of the Hollywood Roosevelt Hotel practically to the rafters. The happening: an all-day seminar entitled "*The New American Cinema: A How-to for Independent Feature Filmmakers*," which was sponsored by the Independent Feature Project (Los Angeles) in conjunction with FILMEX.

The program consisted of five separate panels designated as follows: (1) HOW TO FINANCE AN INDEPENDENT FEATURE, (2) HOW TO GET A FILM SEEN AND RECOGNIZED, (3) HOW TO SELL A FILM, Part I (Theatrical Distribution, Domestic and Foreign), (4) HOW TO SELL A FILM, Part II (Television Sales, Domestic and Foreign) and (5) THE INDEPENDENT AND THE INDUSTRY.

Appearing on the various panels were 30 experts in various areas of filmmaking and distribution, including representatives of the major studios, pay-TV, cable, agents, publicists, film critics, exhibitors, independent distributors, entertainment lawyers, plus independent producers and directors. The panelists represented the most experienced, most practical and most knowledgeable group to grace such a podium within memory. To a person they were highly articulate, and what they had to say added up to a fund of valuable information for anyone interested in independent filmmaking.

In 1979 the IFP was formed when a group of filmmakers got together in New York with the idea of creating a greater awareness of the American independent movement, and of serving the particular needs of independent filmmakers.

To answer these needs the IFP has held

two successful independent film markets, has collected and made available valuable resource information, and has publicized the independents and their work internationally.

The Independent Feature Project is a national organization, and its Southern California arm is the IFP/L.A., an association of local independents.

"*New American Cinema*" was designed as a conference to address the special problems of true independent filmmakers in America, and their new strength in the expanding market, a market which includes pay-TV, cable, cassettes and discs.

The features under discussion were not those made by the "mini-majors," nor the big independents who function essentially like the studios. They were the work of individual filmmakers who get their films done, often at a fraction of the normal Hollywood budget, because they have something to say and feel strongly enough about it to buck the odds. More often than not, they have no pre-arranged distribution, and must work at selling their films once those films are completed.

In the first seminar of the day, HOW TO FINANCE AN INDEPENDENT FEATURE, Jonathan Sanger, producer of *THE ELEPHANT MAN*, said, "Although I believe in independent financing—and I believe in 'independence' as a key word—my reason for making *THE ELEPHANT MAN* as an independent film was really because I wanted to have control over it, not because I felt that it would be impossible to finance through normal studio channels—although I think it would have been very difficult."

Sanger went on to say that he raised the money through a network pre-sale and

advances against foreign distribution. He observed, "It was very important to me to keep within a very tight budget, because I knew the amount of money I had to raise was money that I wasn't going to get anymore. That was it. Whatever I could raise was all I was going to have, and if I ran over budget, there was no place for more money to come from. I was going to have to shut down."

Susan O'Connell, co-producer of *TELL ME A RIDDLE*, said, "I'd like to talk a little about private investors, because an awful lot of independent filmmakers are going that route right now ... You go to your friends and family first. You have to be able to get people who believe in you and know you ... So some of the people who invested with us were family and friends, but immediately we had to go out to perfect strangers ... At the same time you are convincing people that they are going to make money, you also have to let them know that they may not make a dime, because it is a high-risk venture."

Ms. O'Connell went on to say that it is advisable to look for "virgin investors" in the midwest, rather than in the large urban centers of both coasts. "When we were fund raising, we didn't get a dime from Los Angeles and we didn't get much more than that from New York," she said ... "We got a lot of money from Chicago and a lot from San Francisco, so there are a lot of places that are untapped."

Los Angeles attorney Ed Mosk, a top specialist in motion picture business and law, was asked for his advice on attracting film investors, and he replied, "I've had people come in and ask me to be of help to them with projects that were so unthought out, so ineptly prepared, that there was just no way that they were going to get

(LEFT) Prepaid tickets are eagerly picked up for all-day seminar entitled "*The New American Cinema: A How-to for Independent Filmmakers*," held recently at the Hollywood Roosevelt Hotel. (RIGHT) The seminar was sold out early on and the demand for tickets exceeded the supply several times over. Many people came from distant cities and out-of-state to attend.





(LEFT) Attendees packed the ballroom of the Hollywood Roosevelt Hotel. Approximately 450 people occupied every available space. (RIGHT) Panelists get together prior to "going on" in order to decide who will cover what. (BELOW LEFT) Gregory Nava welcomes those attending the seminar and explains that the Independent Feature Project was formed two years ago to help further and promote independent filmmaking and to share information that might not otherwise be easily available. (RIGHT) Moderator Anna Thomas dons Groucho mask to loosen up crowd, as she prepares to lead panel discussion on HOW TO FINANCE AN INDEPENDENT FEATURE.



anyone interested. As far as I'm concerned, the first point is doing your homework. Doing your homework means having thought through, as far as your project is concerned, why someone should be investing in that project ... As a matter of simple professionalism, I think these days it is absolutely essential that you have a prospectus. That prospectus must be carefully prepared and recognize the nature of the people with whom you will be dealing ... You put into that document the elements of the risk factors ... Those are the things that literally say to the investor, 'You're crazy if you invest in this project.' Yet those elements are absolutely essential. Their purpose is to protect you, so that if the project doesn't work out and some unhappy investor decides to sue you, you can at least say to him, 'Look, I gave you fair warning of the problem.' If you have failed to give fair warning, there is an element of danger."

In this seminar, grants and endowments were discussed at some length, as were bank loans and letters of credit.

The second seminar, HOW TO GET YOUR FILM SEEN AND RECOGNIZED, made the point that film festivals, critical

reviews and free publicity are essential to the marketing of an independent feature. Festival directors, publicists, filmmakers and *Los Angeles Times* film critic Kevin Thomas discussed the best strategies for making use of the festival circuit, domestically and abroad, and ways for getting critics to see and review films.

In the United States, the Chicago, New York and San Francisco film festivals were considered most important for independent filmmakers, while the Rotterdam, Edinburgh and Berlin film festivals ranked highest abroad.

The third seminar, HOW TO SELL A FILM, Part I (Theatrical Distribution, Domestic and Foreign), got down to the nitty-gritty by discussing what you do with a film once you've made it. One of the most salient points was brought home by Seattle film entrepreneur Jeff Dowd, who said, "I think it is very important, when you make a film, to start by thinking about what your audience is. If it's a personal statement, it had better be a personal statement that other people share, or you should be writing a poem or article. But if you are going to go out there in the marketplace and ask other people to take

a chance on you, then you'd better not burn them because they want to take that chance ... The reason that people go to a film after the first weekend—which is usually bought or promoted in various ways—is that one friend turns to another friend and says, 'I saw a film, *THE BLACK STALLION*.' The other friend says, 'What did you think of it?' In the next two sentences—or maybe the next five minutes—friend A is going to tell friend B the reason why he has to go see that film ... So you have to start considering what it is that creates the sense of urgency that people *must* see your film."

A great deal of discussion followed on how to get a distributor, negative pick-up deals and marketing.

The fourth seminar, HOW TO SELL A FILM, Part II (Television Sales, Foreign and Domestic), dwelt on the point that STV, cable and foreign television have a need for, and are buying, independent film products. It was established that in the United States, there is an increasing connection between cable TV and theatrical release. This seminar examined how TV sales and theatrical release can be used together for the successful marketing of

an independent film.

The fifth and final seminar, **THE INDEPENDENT AND THE INDUSTRY**, posed the question: Can there be a healthy relationship between the film industry and the independent filmmaker, or must an American "New Wave" by its very nature be anti-Hollywood? Studio executives, independent filmmakers who have worked in Hollywood, as well as independent filmmakers who have stayed independent, discussed the creative and financial questions involved.

Following the seminars, there was a cocktail reception, during the course of which the discussions continued on an informal basis far into the evening, with everyone agreeing that the event had been most informative and worthwhile.

What follows are opinions and comments of some of the IFP/L.A. members on the seminar in general and the aims of the organization in particular:

GREGORY NAVA

The thing that is amazing to me is that nine filmmakers—all of whom are extremely busy—felt the need to take the time to organize such an event. It was a tremendous amount of work. There was more involved here than just a conference on independent film; we wanted to see how much interest there was among filmmakers in L.A. in the idea of independent feature filmmaking. The response was overwhelming. Even the most optimistic of us was taken by surprise.

I feel that all this is indicative of the fact that the climate is right for the development of a true independent film movement in the United States. There have always been independent filmmakers, but this is the first time that there has been a powerful need to start a nationwide organization that will focus the energies of independent filmmakers.

Naturally, what we're talking about is an extremely difficult thing to achieve. Financing and marketing, the central fo-

cuses of our conference, are the greatest obstacles to overcome. But everyone, even people in the studio system, sense that the film industry is at the beginning of a great change. As a result of the expanding pay TV systems that are growing in the United States, the next ten years are going to be critical ones for the film industry. I believe that independent filmmaking will grow tremendously in this period.

ANNA THOMAS

To a large extent, people don't read anymore. They watch and listen instead. The film language has become our main form of communication. And right now, almost everything that hits the screen in this country in a major, effective way is controlled by a very closed industry. Half a dozen people make all the decisions. Why should anyone be surprised that the product all seems the same?

But if this situation doesn't change, it's very bad news for all of us. I'm not saying there shouldn't be an industry—there should. But there must be room for different, individual voices, or freedom of expression will just become a term in the history books.

There's a huge wave of interest in independent filmmaking in this country right now, a sort of renaissance. Partly it's a reaction to that stifling, closed up industry, and partly it's economic—there are new markets screaming for product and the independents are finding ways to provide it.

But so much time is wasted when people work in isolation from each other. The studios have systems that more or less work for them, and we need systems that can help us do what we're doing. Being independent and retaining your individual vision doesn't have to mean that you can't communicate with other filmmakers and learn something from their experiences. My hope is that the IFP/LA can facilitate that kind of "keeping in touch"



Los Angeles Times film critic Kevin Thomas, one of those rare reviewers who genuinely likes film, appeared on **HOW TO GET A FILM SEEN AND RECOGNIZED** panel.

here. It can do things like consolidate information about what are the best avenues of distribution for our films, and the most reasonable avenues for financing. Eventually, I think it could very efficiently put independents in touch with people who offer services we need, and with people who want to buy what we're selling. That has already happened to some extent with the IFP Market in New York, and we hope to do more of it.

Frankly, it's very refreshing to be in a situation where you don't have to explain what an independent film is, and people are really interested in the exact kind of film you make. But the way things are set up now, most filmmakers waste a huge amount of time before they get into such a situation. The IFP, as it gains strength, could really cut down on that wasted time.

LAN BROOKES RITZ

The IFP/L.A. is a paradox. Propelled with the force and substance of a mastodon and the curiosity and vitality of a child, it goes everywhere at once. Its alternating current, neither moored nor encumbered by tradition or precedent, is both prismatic and myopic, lumbering

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(LEFT) After each panel discussion, members of the audience lined up at microphones to ask questions of the panelists, all of whom were carefully selected experts in their fields or independent filmmakers who had been successful in producing and distributing their films. (RIGHT) Lively discussions continued into the post-conference cocktail reception in the hotel's supper club. Vastly encouraged by the high degree of enthusiasm displayed at this conference, the Independent Feature Project/Los Angeles plans to sponsor other events and activities of interest to filmmakers.



BEHIND THE SCENES
Continued from Page 1097

the archeologist who has the headpiece, was last seen in the region of Nepal. The American government has recruited Indiana Jones to find the riddle-breaking medallion and to get to the Ark before the Nazis do.

"The thing to keep in mind about this film is that it is only a movie," says Spielberg. RAIDERS is not a statement of the times. It's certainly not a historical documentary of the way things were in 1936. It takes all the license of an exotic entertainment that aims to thrill and scare and strike one with a sense of wonder."

Producer Marshall adds that as the script was being written, the filmmakers were very careful to make certain all circumstances in the film were believable. "It was important that there was a way Indy could get out of all the amazingly difficult situations. He couldn't cross that line where people would say, 'No, it's absolutely impossible to survive that.'"

Spielberg distinguishes the style of this film from more realistic pictures by its heightened drama.

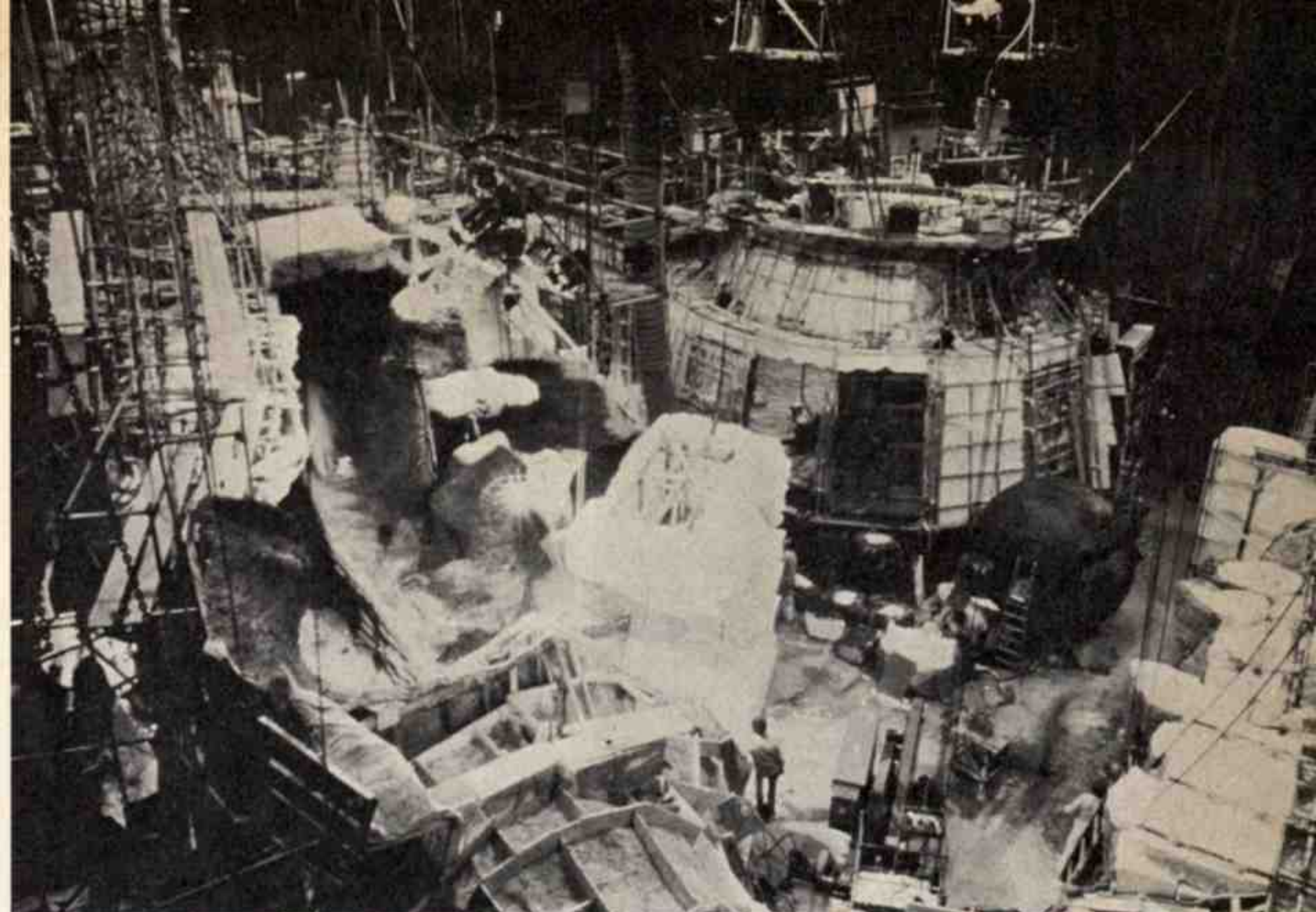
While Spielberg is quick to point out that the film is not about real life, he also stresses that "it's not a send-up, and it's not an imitation of anything. It's a supernatural adventure—it's found its own fantastic elements in a *genre* that sadly has been dormant for decades in American cinema."

RAIDERS OF THE LOST ARK does not employ technological special effects on the order of STAR WARS. "The film essentially takes place during a period of time in which the cleverness of the hero is pitted against an enemy of despicable class and wit," Spielberg notes.

But like the STAR WARS films, RAIDERS embraces the highest and most visually stimulating production values "to give filmgoers that extra special tingle of expectation and excitement that makes them gasp, sigh, laugh and cry," says Marshall.

Director Spielberg says, "It was getting to the end of the time for choosing a lead and I had gone to see THE EMPIRE STRIKES BACK and Harrison was so obviously right to play Indiana Jones that George and I approached him the next day. Harrison is a remarkable combination of Errol Flynn from THE ADVENTURES OF DON JUAN and Humphrey Bogart as Fred C. Dobbs in THE TREASURE OF SIERRA MADRE. He can be villainous and romantic all at once."

Ford says he quickly recognized "a really good part in what could be a really good movie" when it was offered to him.



Massive units for the elaborate set representing the ancient South American temple of the Chachapoyan Warriors under construction at EMI-Elstree Studios. Under Production Designer Norman Reynolds, direction, more than 200 plasterers, carpenters, riggers, painters, electricians, special effects technicians and scenic artists worked together as a team.

But he was as concerned as Spielberg "about any elements in the role or the film that might be similar to Han Solo or STAR WARS," and generally tried to avoid this.

"I think the two characters are as unlike each other as they are alike," he points out about Solo and Jones. "They're both adventurers. They're both fast-talking, smooth guys in a certain way. But Indiana Jones is a character who has some other dimensions. Han Solo is a less complicated person than Indiana, a less sophisticated person."

"Indiana is kind of a swashbuckling hero-type, but he has human frailties, fears and money problems, and, therefore, is more down to earth."

"He does brave things, but I wouldn't describe him as a hero. He teaches, but I wouldn't describe him as an intellectual. He doesn't have any fancy gadgetry keeping him at a distance from enemies and trouble. He's right in there with just a bull-whip to keep the world at bay."

Karen Allen, the star of ABC's multi-part series of John Steinbeck's EAST OF EDEN, was cast as Indiana's beautiful and spunky companion. She also has co-starred with Brad Davis in A SMALL CIRCLE OF FRIENDS and with Al Pacino in CRUISING.

Locations for RAIDERS OF THE LOST ARK were scouted by executive producer Howard Kazanjian, producer Frank Marshall, associate producer Robert Watts and production designer Norman Reynolds. Their exhaustive worldwide search concluded with a decision to shoot the film in the French coastal city of La Rochelle, at the EMI-Elstree Studios outside Lon-

don, in the Tunisian desert and in Hawaii.

Production began in the beautiful, historic city of La Rochelle (nest of Calvinism in the early 17th century), which is located approximately 100 miles north of Bordeaux. Its primary attraction for the film's producers was the German U-boat that sat securely in an antiquated World War II submarine pen near La Rochelle. Since a location was needed for the suspenseful scene in which Indiana Jones' and Marion's tramp steamer is ambushed by a German submarine, La Rochelle saved the production inestimable costs.

The submarine pens, which proved invaluable to the production, are huge caverns built to house six submarines each. Despite the many direct hits scored by Allied bombers, evidenced by pock-marked craters on their exteriors, these pens continue to stand as poignant reminders of World War II.

Consisting of 12-foot-thick walls and two six-foot-thick roofs, the pen used by the production had a stark, gray interior. The visual impact of the pen was further enhanced by a rocklike sea entrance constructed by the art department.

Before filming began in La Rochelle, the production faced the challenge of finding a 1930s-era tramp steamer for Indiana Jones' and Marion's escape with the Ark.

An original coal-fired version was not to be found. A replica that had been constructed at the Bavaria Studios in Munich wasn't deemed seaworthy. Fortunately, an adaptable Egyptian vessel was spotted in an Irish port, commissioned for a month, refitted by the art department and

Continued on Page 1128

THIRTY-THIRD EMMY AWARDS PRESENTATION

In contrast to last year's telecast of TV's top awards, made dismal by the actors' strike, this year's was a spectacular in every way

By HERB A. LIGHTMAN

As has been the custom during the past several years, the Thirty-third Annual Emmy Awards Presentation of the Academy of Television Arts & Sciences was divided into two parts.

The Emmy Awards Banquet, with Gil Gerard and Connie Sellecca as hosts, was held in the Grand Ballroom of the Los Angeles Bonaventure Hotel on the evening of September 12, where Emmys in 33 categories of television production were presented.

On the following evening, the awards for what the Academy oddly calls "Nighttime Programming" were presented on a nationwide telecast originating from the Pasadena Civic Auditorium. This was followed by the Governors Ball at the Century Plaza Hotel.

It must be said that the show featured on the telecast was one of the most entertaining and thoroughly professional spectacles of its kind ever presented by any Academy or like organization. Hosted by Edward Asner and Shirley MacLaine, produced and directed by Steve Binder in stunning sets by Roy Christopher, with lively choreography by Lester Wilson and spirited musical direction by Jack Elliott, the show teed off with a rousing musical number in which the casts of dozens of the top TV shows sang successive verses of an up-beat patter song. It was a *tour de force* of production and editing.

From that point on, the pace never faltered, despite the fact that Emmys were awarded in 28 additional categories. Asner and MacLaine were genial, witty hosts and even though some of the winners thanked everybody but the doctors



(ABOVE RIGHT) Director of Photography William H. Cronjager, ASC accepts EMMY Award for "Outstanding Cinematography for a Series" (for a single episode of a regular series) for the "Hill Street Station" pilot episode of the HILL STREET BLUES series. (BELOW LEFT) Annette Funicello, former teenage star of the original "Mickey Mouse Club" show, poses with her old pals, Mickey and Minnie. (RIGHT) Photographs of happy EMMY winners were abundant.



who delivered them, the actual award presentations moved right along.

It was an especially touching moment when homage was paid to Lucille Ball, one of the true pioneers of TV programming and a grand trouper in every medium of entertainment.

Of special interest to *AMERICAN CINEMATOGRAPHER* readers were the cinematography awards. Two awards relating to cinematography were presented. The first, for "Outstanding Cinematogra-

phy for a Series" (for a single episode of a regular series), went to William H. Cronjager, ASC, for the "Hill Street Station" episode of the *Hill Street Blues* series.

The second cinematographic award, for "Outstanding Cinematography for a Limited Series or a Special" (for a single episode of a limited series, or for a special), went to British cinematographer Arthur F. Ibbetson, BSC, for "Little Lord Fauntleroy." Mr. Ibbetson could not be present to accept his "Emmy" personally. ■



It was a truly emotional moment when Shirley MacLaine presented a special award to grand trouper, Lucille Ball, for her contributions to the art of TV.



Music by Manny Harmon and his orchestra enlivened the Emmy Awards Banquet in the Grand Ballroom of the Los Angeles Bonaventure Hotel, the first of the two Emmy Awards ceremonies, held on the evenings of Sept. 12 and 13, respectively. (BELOW) Loni Anderson, star of "WKRP IN CINCINNATI", lent her luminous presence as a presenter on both shows.



Peter O'Toole (ABOVE) and Rod Steiger (BELOW) electrified the telecast audience with their readings from the works of the late Paddy Chayefsky.



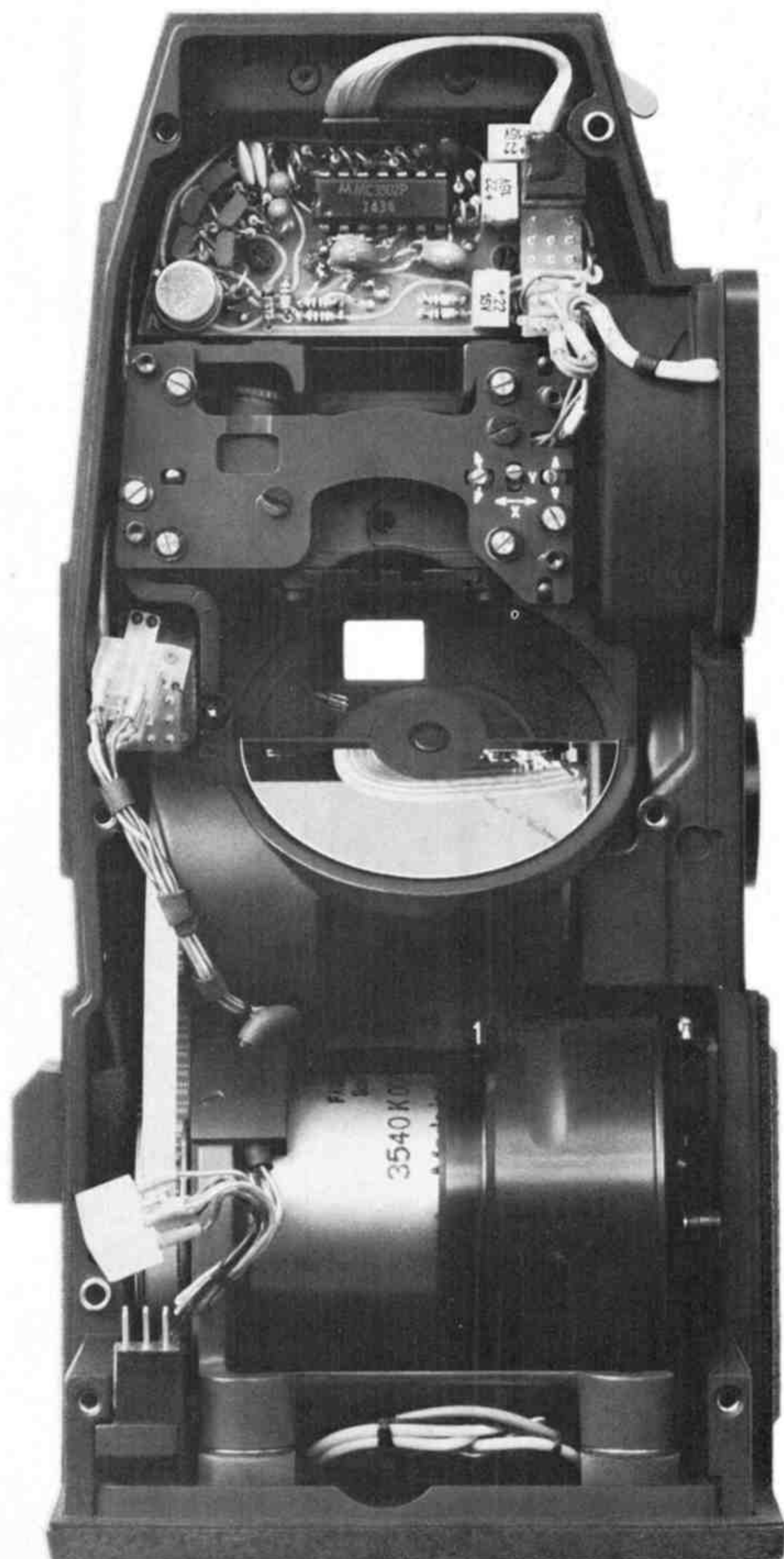
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The big photo at left shows the front of the rear half of the 16SR camera housing (*see caption below it*). In the top right corner, you can see one of several plugs. Eight gold-plated pins, pointing directly at you—two in the top row, three in the rows below.

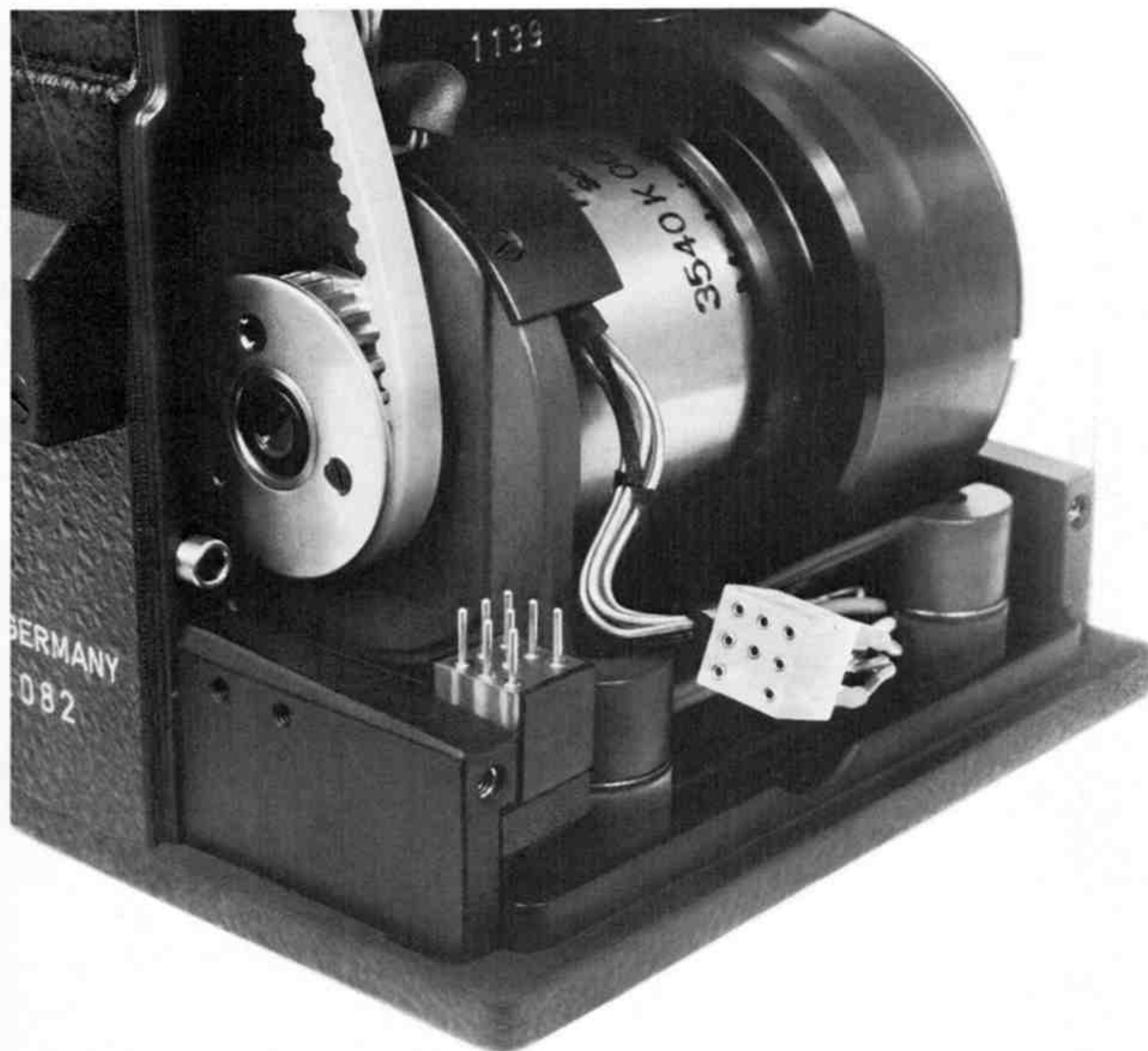


Small photo at right shows 16SR with magazine removed. You can see film channel and aperture on the camera housing. That housing consists of two

modular die-castings: front and rear. Big photo above shows front of rear casting. You are looking at aperture from other side—from *inside* the housing.



Technology of the 16SR/One of a Series:



In big photo at far left, you can see wiring harness emerging at various points inside rear half of camera housing, plus several gold-plated pins and sockets. Photo above is a closer look at

one of those. Note that pins and sockets are *keyed* so they can be connected only one way, to ensure correct polarity. Photo at far left is the actual size of the compact 16SR camera housing.

Those pins are part of the wiring harness of the rear half. They connect with a gold-plated socket that's part of the wiring harness inside the *front* half of the camera housing.

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AN EMMY AWARD-WINNING CINEMATOGRAPHER TALKS ABOUT THE FILM THAT WON

A compromise between so-called documentary photography and "Hollywood" quality presented a technical challenge which led to the coveted award

At the Emmy Awards Banquet held at the Los Angeles Bonaventure Hotel on the evening of Saturday, September 12, a capacity black-tie crowd of television artists and technicians gathered to pay tribute to their peers who had been nominated for awards representing outstanding work during the previous season.

Two awards relating to cinematography were presented. The first, for "Outstanding Cinematography for a Series" (for a single episode of a regular series), went to William H. Cronjager, ASC, for the "Hill Street Station" episode of the *Hill Street Blues* series.

The second cinematographic award, for "Outstanding Cinematography for a Limited Series or a Special" (for a single episode of a limited series, or for a special), went to British cinematographer Arthur F. Ibbetson, BSC, for "Little Lord Fauntleroy." Mr. Ibbetson could not be present to accept his "Emmy" personally.

In the interview that follows, William H. Cronjager, ASC discusses his work on the pilot of the popular *Hill Street Blues* series which, incidentally, garnered an armload of awards for various members of its cast and crew.

QUESTION: Can you give me a bit of background to your photography of the "Hill Street Blues" pilot, which won you the Emmy Award?

CRONJAGER: The pilot film that we shot, called "Hill Street Station," had to do with a ghetto area police precinct in Chicago and all of the problems which they had to deal with as a law enforcement agency. When I went in for the interview to discuss my doing the show, the producers told me that they had ideas for an entirely different photographic approach—which was to make a so-called "documentary" type of film, but with good photographic quality.

QUESTION: And what was your reaction to that suggestion?

CRONJAGER: At first it was somewhat difficult for me to conceive of it. On the one hand, they wanted a documentary approach (which, in my opinion, implied straight news photography) and, on the other hand, they wanted to incorporate into it stylistic "Hollywood" motion picture photography, as we call it.

QUESTION: How did you resolve this dilemma?

CRONJAGER: We kind of kicked the idea around and came up with the approach of degrading the image on the film to a certain degree. This is nothing new, of course. It has been done quite often before.

QUESTION: What means did you use for "degrading" the image?

CRONJAGER: We employed certain filtration to achieve the desired look—not "Hollywood," but not documentary either. Halfway down the street, you might say. The story line of the pilot film was powerful and the episode was well acted so, fortunately, we had an opportunity to employ our photographic idea and, in that respect, things just worked out fine.

QUESTION: What are some of the specific elements of the photographic style—besides the degrading of the image?

CRONJAGER: A lot of hand-held work, a lot of movement here and there within the precinct. Then, as we proceeded from episode to episode, we would discover new methods—but, as you know, in motion picture photography there's really nothing "new" under the sun. We just kind

of "sophisticated" some old ideas. I used a lot of techniques learned from the people I'd worked with in the past, while I was growing up as an assistant cameraman and operator—great cinematographers like Joe Ruttenberg, Leon Shamroy and Arthur Miller. Everybody learns from everybody else.

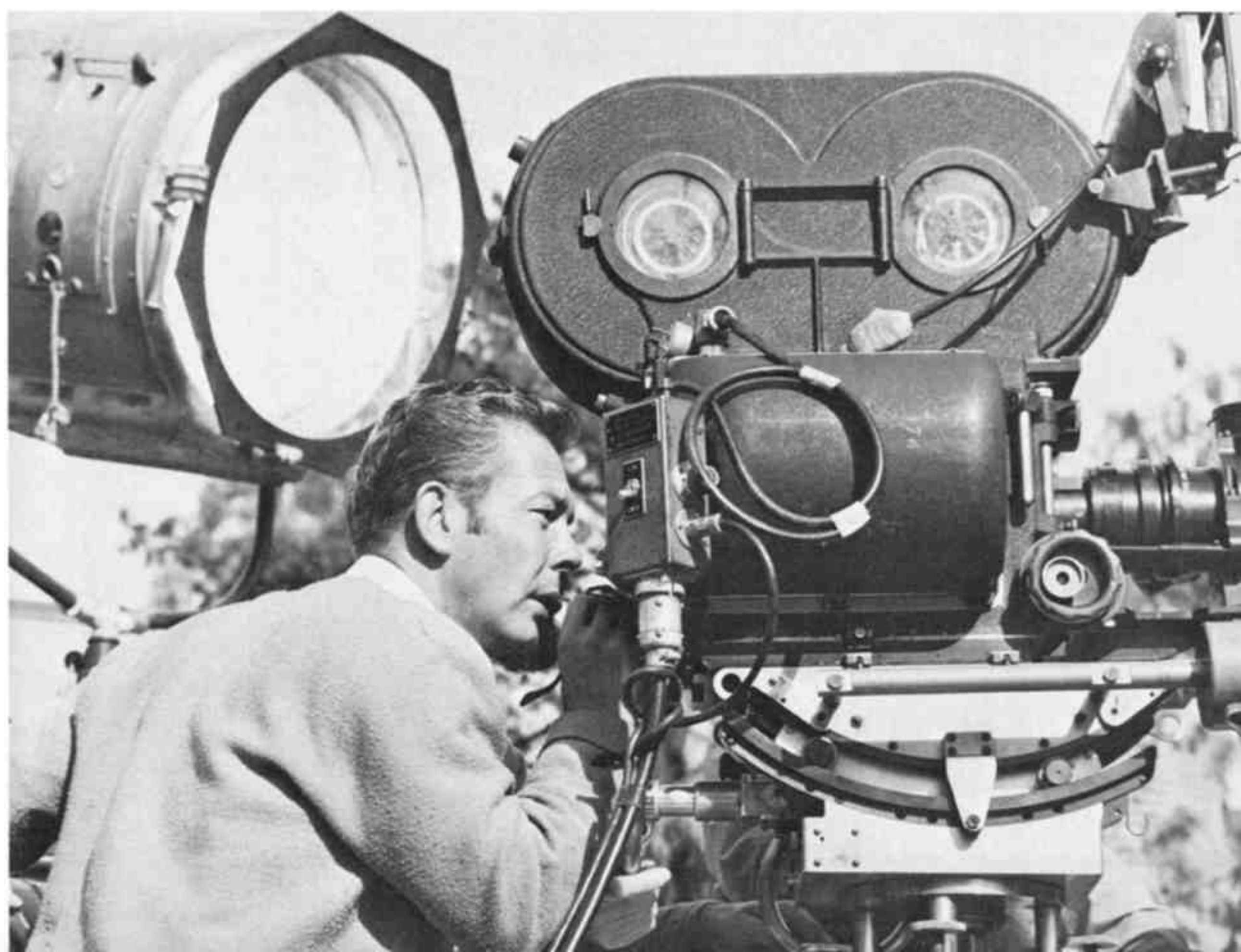
QUESTION: Am I correct in assuming that while the "Hill Street Blues" series supposedly takes place in Chicago, it is shot in its entirety in Los Angeles?

CRONJAGER: That's right. We shoot it here, but have to make it look like Chicago. We employ downtown L.A. and East L.A., the derelict areas. We work with rival gangs and all that sort of thing—down around 5th and Main or Wall Street and San Pedro. We have, probably, six to eight Los Angeles police officers with us at all times.

QUESTION: And what is your personal reaction to working in those areas?

CRONJAGER: While it's dramatically interesting, it's also kind of depressing for a motion picture crew to go down into those areas. We work in sleazy bars and shabby rooming houses—and we see the other side of humanity.

William H. Cronjager, ASC, winner of "Outstanding Cinematography for a Series" EMMY for his photography of "Hill Street Blues" pilot. A fourth generation cameraman, with two great uncles, an uncle and his father behind the camera, Cronjager trained with such legendary cinematographers as Joseph Ruttenberg, Leon Shamroy and Arthur Miller—and he works in the classic tradition.



QUESTION: Getting back to the photographic style, you said that the producers wanted a documentary feel to the photography, but also a certain Hollywood polish. Were you actually able to meld those two opposing ideas?

CRONJAGER: *Pretty much. I would still employ cross-light, half-light and back-light—what I learned from some great cameramen in the past—but we would achieve something of a documentary look through the combination of filtration and the lab process. We achieved it with the cooperation of Deluxe Laboratories.*

QUESTION: Are you personally comfortable with this mixture of styles?

CRONJAGER: *Basically, when you try to mix two such opposed styles, you're working in a dangerous area. To make the statement that you want the style "documentary," but you also want it good—those two ideas just don't equate.*

COMMENT: There was a time—and not so long go—when the term "documentary" was synonymous with bad photography.

CRONJAGER: *Correct! And, realistically, that's the way I've always judged it. You think of a combat cameraman out in the field, getting whatever he can get. To have a quality picture and a bad picture at the same time is a very difficult thing to deal with.*

QUESTION: While the exteriors for "Hill Street Blues" are shot on location in various areas of Los Angeles, it's my understanding that most of the interiors (sleazy bars and shabby rooming houses excepted) are shot on the sound stage. Is that correct?

CRONJAGER: *Yes. On the sound stage we have a huge station house complex which includes the booking desk, the fingerprinting area, the main squad room, the roll call room, the chief's office and the bathroom. It's a very large standing set.*

QUESTION: Now, if you're on the streets for your exteriors (the "real" thing, so to speak), but on the sound stage for your interiors, how do you maintain a consistency of the good-bad look your producers want?

CRONJAGER: *We use one form of filtration for the location exteriors and a completely different filtration process for the sound stage interiors. This enables us to*

come halfway between the seedy documentary look and that certain degree of quality that we're trying to maintain. For us, the difficult part was to hit this midpoint between documentary and quality. Sometimes, when you're talking to a producer, he'll say, "I don't want it to look good." How, as a photographer, can you respond to such a statement? Your whole training has been dedicated to making things look good. But I feel that I've managed to achieve a certain degree of realism on "Hill Street Blues" without making it look bad. The result is a completely different look.

QUESTION: Getting onto the subject of lighting, I would assume that, with all those location exteriors, you would use some HMI lighting. Is that so?

CRONJAGER: *No. I use 9-lights and arcs. We've been making good pictures with such lighting units for a long, long time and I see no particular reason to change. But then, I'm a fourth generation cameraman—two great uncles, an uncle, my father and myself—and that represents a lot of cinematic history. My philosophy is to keep it simple. Simplicity is the keynote of art.*

QUESTION: Do you use basically hard or soft light?

CRONJAGER: *Basically, it's hard light—Babies, Juniors, Seniors—strictly hard light. No soft, diffused lighting. Essentially, it's old-fashioned Hollywood "good" lighting. We don't fake them out with 25 footcandles of fill light.*

QUESTION: Do you believe, as many top cameramen do, that in recent years soft light has become a kind of cop-out?

CRONJAGER: *In my personal opinion, it has become a cop-out to cover a lack of knowledge. Any slide-rule technician can flood a set with soft light and get an exposure—especially in color. But, as I've said before, There aren't many Artie Millers and Leon Shamroys and Joe Ruttenbergs and Bob Surtees running around these days.*

QUESTION: You mentioned earlier the hand-held aspect of photographing "Hill Street Blues." Could you tell me a bit more about that?

CRONJAGER: *Well, it's a deviation from the norm of always staying on the crab dolly. Hand-held photography is especially effective in covering some kind of*

fight—a gun fight, a fist fight or falling on boxes. We have employed it a lot in interiors like the roll call room—which has worked for the action in that room. It just kind of offsets the general steadiness of the rest of the picture. We've taken it out of the rough-and-tumble scene that would normally call for hand-held work and we've moved it into the basically normal roll call room, with actors speaking their dialogue.

QUESTION: Do you use stabilization devices like the Steadicam or Panaglide?

CRONJAGER: *We haven't up to this point—although we have an operator who is so smooth with the hand-held camera that we call him "Panaglide." We really haven't had the necessity for using those devices yet. I'm not saying that we won't in the future, but we seem to be surviving on the path we've been travelling so far.*

QUESTION: What about camera movement in general? Is there a lot of it in these shows?

CRONJAGER: *There's a great deal of it. Like in the squad room, where it's just a hustle-bustle of activity—guys going to the filing cabinet and bringing in drunks and all of that. We often go from one side of the set to the other. Practically every set-up is a relight for the whole set. We kind of work our way through that. It's a jumble, but it's meant to be a jumble. We're trying to convey the atmosphere and activity of a police station that is pretty much understaffed, but which continues to deal with immense problems.*

QUESTION: Do you have a lot of night exterior shooting?

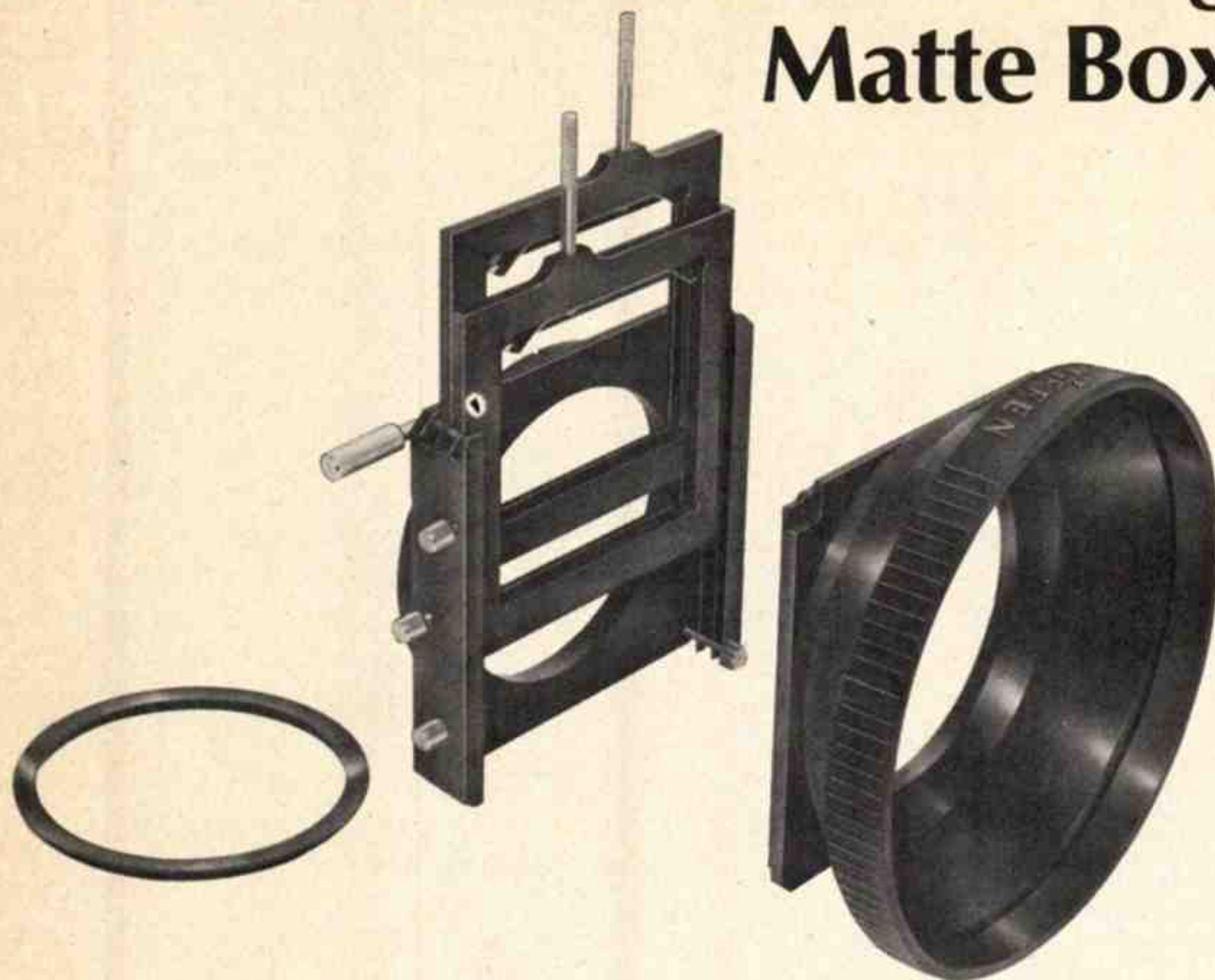
CRONJAGER: *Not a great deal—just an average amount, I would say. We might go four shows without working one night and then, on the fifth show, we would work two nights. There were two nights involved in the pilot, but it's pretty much a daytime show.*

QUESTION: How do you feel about the content of the show?

CRONJAGER: *It doesn't pull any punches, but it doesn't seem to offend anybody. Racial and ethnic terms that might be considered insulting are used blatantly, but they are just very honest statements and not meant to offend anybody. They're just calling it the way it is, and I believe this accounts, in part, for the success of the show. Even in East Los*

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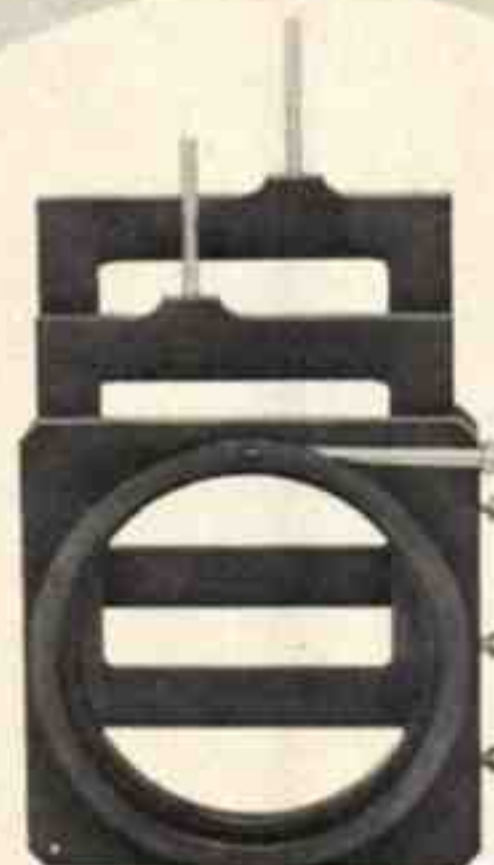


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Angeles, the ethnic groups accept it. It's real to them.

QUESTION: When shooting night-for-night, do you ever push the film, or do you just expose it normally?

CRONJAGER: Sometimes I do. It just depends on the conditions. It's the same as discussing another cinematographer's work. Sometimes my wife asks me, "What do you think of this show?" I say, "I can't really answer your question, because I don't know what conditions they were operating under."

QUESTION: Obviously you were trained in the old school of cinematography, and that is where the quality lies. At the same time, on a television schedule, you can't always take the amount of time that it requires to get that kind of perfectionist quality. How do you keep it moving and still maintain a high level of quality?

CRONJAGER: Herein lies the difference. When we did the pilot, which was a one-hour show, we had a 12-day shooting schedule. That gave us more time to deal with certain aspects of quality. But then the schedule went to seven days and we were back to episodic television. This is where we are right now with "Hill Street." We're in episodic television, but still trying to maintain a certain degree of quality—which is very difficult to do, because you just don't have enough time. "DOCTOR ZHIVAGO" was a beautiful picture, right? Well, it should have been. There were 165 days of principal photography. It's like a still photographer who goes out and shoots 2,000 pictures a day and comes up with two good ones, as compared to giving a photographer four rolls of film and saying, "Have at it!" There's a difference.

COMMENT: Even so, having been trained in the school where a certain amount of time is necessary in order to get the quality result, it must have taken quite an adjustment for you to have to rush so fast.

CRONJAGER: I remember many years ago at 20th Century-Fox when I was an assistant cameraman and the studio was carrying Leon Shamroy, a great cinematographer, on contract. They had this TV pilot to do and, since they were paying Shammy anyway, someone suggested that he be assigned to photograph it. But someone else said, "Shammy can't handle it. He's just a big feature cameraman." Well, I have to tell you—and I was his as-

sistant at the time—that the man was amazing. With the amount of knowledge he had, he was able to breeze through it at half-speed and make it look wonderful. He was the only guy I ever saw in my life who could walk off a set with a racing form, go to the barbershop and come back to his gaffer and say, "What happened to that light in the corner?" Just as it's unfair to assume that a "big feature cinematographer" can't shoot fast enough for TV, it's also unfair to think that a so-called TV cinematographer can't shoot features. I know some darned good TV cinematographers who could do quite well on big-budget features, given a feature shooting schedule. ■

PHOTOGRAPHING "RAIDERS"

Continued from Page 1105

cooperation between Steven, Norman, Kit West and myself, but also that of Richard Edlund, who brought with him a Vista-Vision 8-sprocket pull-down camera, together with his background of virtuosity from the George Lucas ILM (Industrial Light and Magic) Company.

Here, at times, I would have to light the set with the subsequent added effects in mind and have to incorporate stage effects that would match in with the subsequent additions.

Our locations in Tunisia were mostly in town or desert and brought up the age-old problem of how to treat the desert cinematographically. Sand can either be made to look heat-haze-hot by overexposing it (with the added benefit of seeing actors' faces and expressions) or you can expose the sand normally and have shadowy figures. We opted mostly for the former, as Steven felt the heat effect to be paramount—and I agreed.

The jungle scenes which open the picture, and which typically were shot last, were, on the contrary, mostly in overgrown jungle-type forest and were deliberately made gloomy with shafts of light, plenty of shadow and some mist effects.

Shooting was accomplished in Panavision anamorphic through mostly wide-angle prime lenses and the lighting contrasts varied between a 3:1 ratio and 10:1. The negative was developed by the Rank Labs in England and the final grading was done in the MGM Labs under the able supervision of Bob McMillan and Steven himself, who invited me over to join them, only to be prevented from doing so by an operation for a torn muscle induced by the apparently incorrect use of a chain saw at my country home.

Seeing the final print in 35mm as well as 70mm, I was well satisfied and only regretted missing the trip to California and a chance to see my friends again. ■

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TALKING TECHNICALLY Continued from Page 1080

emy" format camera aperture plate is 0.864 x 0.630" (21.95 x 16mm), 0.544 sq. in. (351 sq. mm), and that of a "full" frame, 0.980 x 0.735" (24.89 x 18.67mm), 0.720 sq. in. (465 sq. mm), an increase of 32%.

In order to take advantage of this increased copy ratio (1.32:1) it is necessary to have a slightly wider angle lens on the camera than on the background projector, a situation which can be maximized when one or the other is fitted with a zoom lens. Even when using lenses of similar focal length on both the projector and the camera, where there will be no definition advantage, the larger projector image will give the possibility to make small camera pans and tilts without going off the edge of the plate.

When using process photography only as a means to put an image in a window or other opening in a set, the copy ratio can be very high, in which case there will be little, if any, noticeable loss in background image quality compared to the foreground.

The height of an anamorphic frame is the same as that of Full frame (0.735 in., 18.67mm) and the width is the same as the Academy frame, so the advantage of shooting plates on the larger format using an anamorphic lens on the plate camera is the possibility of doing a slight pan without a reduction of the magnification ratio.

To gain reproduction ratio with the anamorphic format, it is necessary to shoot plates with an 8-hole "double frame" 35mm Vistavision format camera or a Super Panavision 65mm camera.

Hopefully, Eastman Kodak or some other film stock manufacturer, will eventually produce a fine-grain, high-definition, low-contrast negative for process photography, even if it does cost two or three stops of film speed.

The camera aperture size of the Vistavision format is 1.485 x 0.991 in. (37.72 x 25.17mm), an image area of 1.472 sq. in. (949.5 sq. mm), with an aspect ratio of 1.5:1. This is a slightly wider ratio than Academy (1.37:1), leaving a little space to pan on either side of the plate when the Academy frame is enlarged to take advantage of the extra area. It is considerably higher than anamorphic, leaving space to tilt up or down. Used to its maximum the copy ratio using a Vistavision camera with an Academy format camera is 2.4:1 and 1.45:1 with anamorphic.

A 1.5:1 anamorphic attachment is available to use with the Vistavision format, giving a resultant aspect ratio of 2.25:1. When this system is used in conjunction

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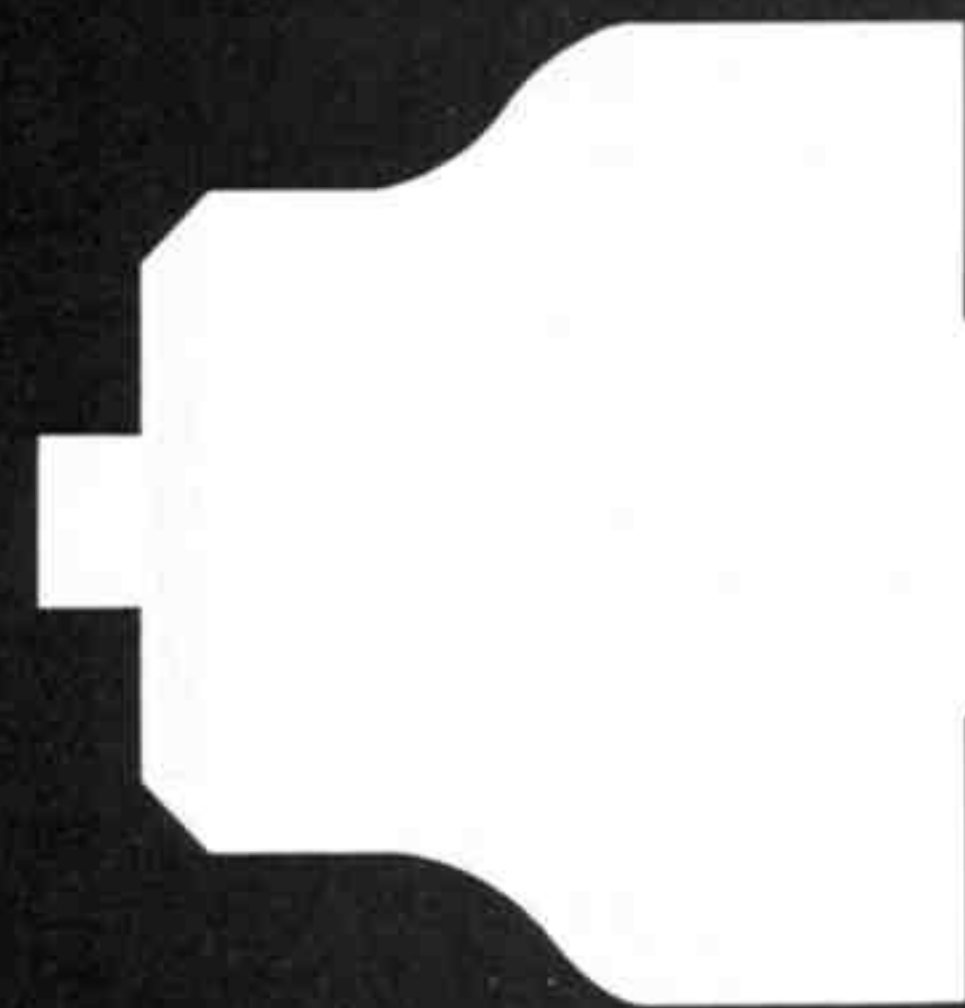


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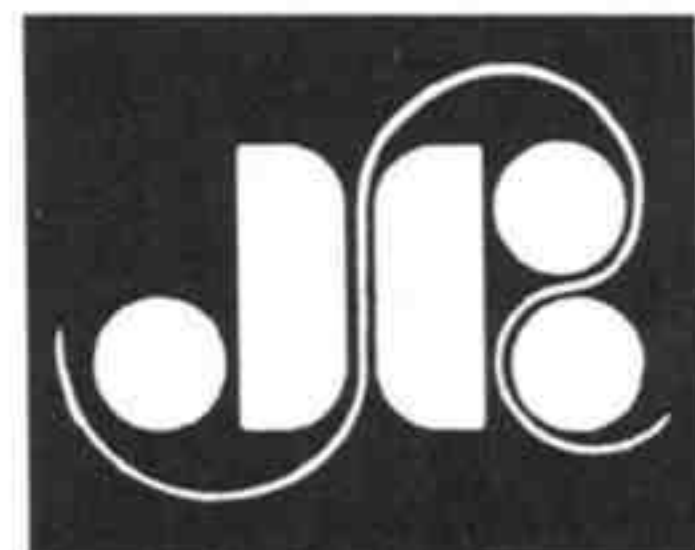
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with a 35mm anamorphic camera, almost all of the Vistavision plate is utilized, giving a copy ratio of 2.17:1. If the same anamorphic unit is used on both the plate camera and the plate projector, any optical distortion incorporated at the time of photography will be corrected on re-photography.

65mm original photography and 70mm projection is a non-anamorphic system which gives an aspect ratio of 2.29:1. The size of a 65mm camera aperture plate is 2.072 x 0.906 in. (52.63 x 23.00mm). An area of 1.88 sq. in. (1210 sq. mm). When used with a 35mm anamorphic camera the resultant copy ratio is 3.2:1.

The size of a 16mm camera aperture is 0.404 x 0.295" (10.26 x 7.49mm), 0.119 sq. in. (76.85 sq. mm), making the use of a 16mm camera with a full-frame 35mm process plate, where there is an image area increase of 506%, a very attractive proposition.

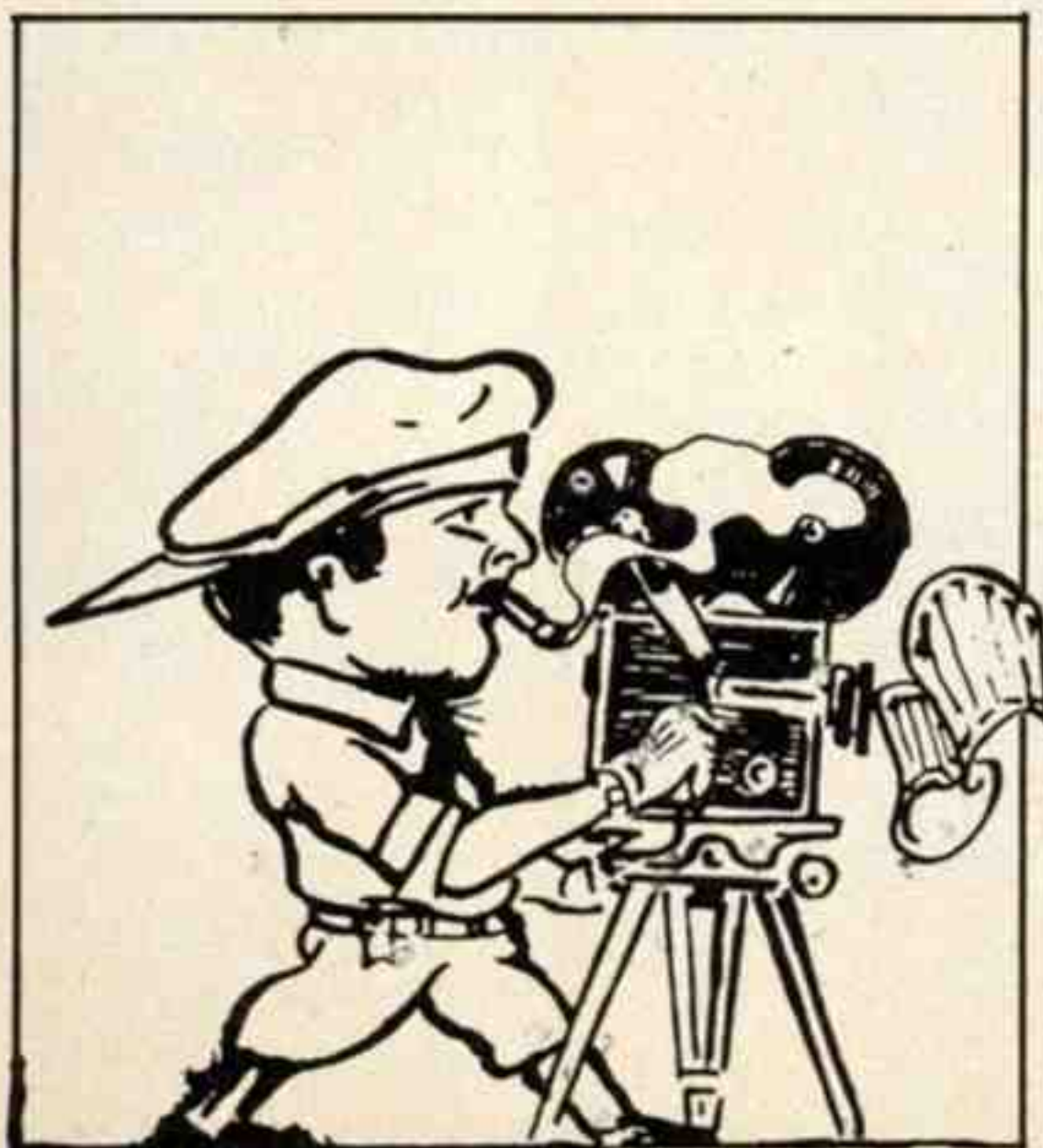
Another important reason to shoot process plates with a full aperture gate in a 35mm camera is the possibility of being able to "flop-over" the plate so that it may be used in either direction. Thus, providing there is no distinguishable lettering or other "handed" object on the plate, a 3/4 back travelling plate can be used either way round simply by projecting with the emulsion towards the lens or to the light source. For this reason, lettering, etc., should be avoided when shooting process plates. ■

CINEMA WORKSHOP

Continued from Page 1072

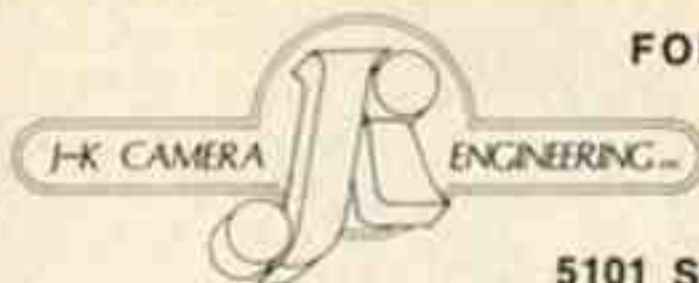
cessful in zapping away the short, it actually burns a larger hole in the separator. Thus, the rebirth of the cell is only temporary and the short will undoubtedly be quick to return.

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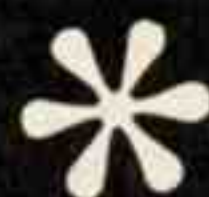
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sailed to the coast of France.

There were many problems associated with filming both vessels on an open sea. "To get a clear skyline, we had to shoot three miles out," reports Watts. "If the waves got higher than three feet, the owners wouldn't let the sub out. We had to get the shot within five consecutive days, and it was raining when we arrived.

"Each day we had to ferry out cast, crew and equipment to the steamer, transfer everything across a heaving four-foot gap between vessels—which looks like a mile when you're going up and down in the swells and have to jump—and by the end of several days' shooting in those conditions, everyone's hotel room was pitching and swaying."

From La Rochelle, the production moved to London's EMI-Elstree Studios. Five of Elstree's major sound stages had been reserved for two massive sets which would involve three months of construction and ten months of shooting.

These sets were the Well of the Souls (where Indiana Jones finally locates the Ark and its deadly protectors) and the Temple of the Chachapoyon Warriors (where Indiana encounters an ingenious system of traps and snares).

Conceived by Lucas, the sets were designed by STAR WARS Academy Award-winning art director, Norman Reynolds, who served as production designer on *THE EMPIRE STRIKES BACK* as well as *RAIDERS*. Under Reynolds' direction, more than 200 plasterers, carpenters, riggers, painters, electricians, special effects technicians and scenic artists worked together as a team.

The sets may well be the most expensive and complex built on a sound stage in a decade. They may also be among the last.

"The cost of producing sets like these is huge," says Reynolds. "Very shortly, inflation will make it impossible to do this kind of picture."

Lucas adds, "That, in fact, is why I am concentrating on this big production-value type film now—while we can still afford it."

The Well of the Souls is involved in one of the film's most intriguing sequences. After making careful calculations with the headpiece of the Staff of Ra, Indiana Jones finds the hallowed tomb, removes a stone slab for access through the roof, then discovers that what appears to be a thick carpet on the Well's floor is in fact a slithering mass of poisonous snakes.

Despite the obvious dangers, Spielberg used more than 6,000 live reptiles, including pythons, cobras and boa constrictors,



Producer Frank Marshall, doubling as a snake wrangler, sets up an insert of his scaly charges on the Well of the Souls set. Says Marshall of this experience, "I had to cure myself of a common phobia about snakes. But once you see other people, like a snake handler, not worried about it, then you touch one. Then I got to be real comfortable with them."

to shoot this sequence. All of these creatures were handled by snake expert Mike Culling and five well-trained assistants. "Most of the cobras in the film are around six feet long," says Culling. "We did use a 12-foot one that took four of us to hold."

Spielberg remembers, "Karen Allen couldn't find her mark because there were over 6,000 snakes on the ground."

Every unit member on the set wore protective clothing: high rubber boots and strengthened canvas trousers and jackets.

"Most snakes should be handled with caution, because most people can't identify them correctly," says Culling. "The cobras can kill inside three minutes and can paralyze a person in 30 seconds. Their double fangs can punch through thick leather and deliver sufficient venom to stun their victim or make him unconscious instantly.

"We couldn't film these scenes without having serum standing by with a doctor to administer it. In fact, the day before we started shooting, we discovered the serum was out of date and we had to have a replacement stock specially flown in from Paris, the only place we could find it."

Since there are no existing illustrations of the Well of the Souls, Reynolds created their Well from various Biblical and scholarly references.

The result was an impressively large altar consisting of four towering statues of the jackal-like Egyptian god, Anubis. Standing 30 feet high, the statues support the roof of the chamber that Indiana Jones enters. Adjoining the Well of the Souls are catacombs containing several hundred

human skeletons.

An equally impressive set was that of the Temple of the Chachapoyon Warriors. Among the devious traps laid for unwary intruders like Indiana Jones are hundreds of tarantulas, poisoned darts aimed to kill when triggered by broken beams of light, stone doors with steel teeth that clash shut impaling their prey, and a colossal boulder that blocks escape.

Appealing to everyone's worst fears, Spielberg again opted for using real creatures. Working with about 50 live tarantulas, he actually affixed them to the clothes of Ford and actor Alfred Molina for their scene in the temple.

Reynolds also designed two other sets: Marion's Nepalese drinking den, *The Raven*, which is razed to the ground by fire and explosion; and a 100-acre excavation site featuring extensive mineworks, towers, and bivouac for 1,000 Nazi soldiers and Arab laborers.

The Nazis' archeological excavation set was dug out of the Sahara Desert on location at Tozeur, Tunisia, in more than 130-degree blistering heat. After searching the Mediterranean for a suitable location, Spielberg and Reynolds settled on the STAR WARS canyon area in Tunisia. Again, they were faced with an extensive logistical task of building a major exterior set 1,500 miles from their studio base in England.

"We had to lay an aircraft landing strip and two-foot-thick concrete taxiing area, build mining shafts and lay truck rails on wooden viaducts for hundreds of yards. And it all had to be done in the middle of summer when temperatures were 130

degrees and more in the shade. From the set construction point of view alone," Reynolds says, "I can tell you no effort was spared. It's all there on the screen."

Reynolds' Academy Award-winning art director, Les Dilley, concentrated on building and/or acquiring vehicles of the 1930s era. He found an original Nazi staff car for the thrilling chase scene in which the Nazis attempt to escape from the desert with the Ark. But the car's rarity made it impractical to use in the chase sequences. Dilley turned to Classic Cars, an English firm specializing in vintage car renovation, and commissioned two replicas using modern Jaguar chassis and engines.

Assistant art director Fred Hole supervised the colossal destruction of the full-sized Flying Wing aircraft he had researched and designed for construction by the Vickers Aeronautical firm. A succession of strategically placed charges set by special effects expert Kit West ripped the plane apart.

"Working with the British crew on RAIDERS was the best experience I've had working on a movie. From Norman Reynolds, the art director, and his entire bunch, Doug Slocombe and his camera crew, to the 'chippies' and the 'sparks,' it was absolutely fulfilling. There was no bitterness, no temperaments; everybody worked together to make a good movie," says Spielberg.

He continues, "They worked faster than any crew I've had, which is one of the main reasons we finished the film 12 days ahead of schedule. We were averaging 40 set-ups a day on location, and inside, under difficult lighting conditions, we were averaging 15 shots a day. That is the fastest I've ever shot next to my experience in television. I never shot a picture this quickly without having to compromise quality. And it proved to me that you can make a movie that should have cost \$35 million for \$20 million."

While Spielberg was filming at the Elstree Studios, veteran action director Mickey Moore was directing the second unit in a hair-raising suspenseful chase sequence which alone took five weeks to film.

It was the first time Spielberg had worked with a second unit director. While Moore worked from nearly 200 storyboard sketches provided by Spielberg, he made many valuable additional contributions.

"Mickey kept to the basic sketches so we could cut the picture, but for every sketch he must have gotten me three or four extra shots I'd never planned on getting, bonuses that often were much better than the original sketch I had drawn," says Spielberg.



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HOW THE WORLD LOOKS THROUGH THE EYES OF (CINEMATIC) WOLVES

By ROBERT BLALACK

The script for *WOLFEN* clearly and eloquently called out the idea of "Alien Vision," as an integral part of the screenplay. Alien Vision was a visual technique by which some aspects of the character of the Wolfen were to be presented. Wolfen are not able to speak words, at least words intelligible to humans. The director was limited to showing the Wolfen in action, showing their point of view, and having people talk about them.

Before I was involved in the film, the director, Michael Wadleigh, and the producer had commissioned a series of film tests, before principal photography, with various film emulsions, such as ultraviolet-infrared. They also looked into the various facilities with "electronic" printers to see what they could do. Not satisfied with the possibilities of the various techniques open to them prior to principal photography, they decided to shoot all of the Alien Vision during daylight, so as to have a fully exposed negative, and then, in post-production, to deal with the problem of how to transform the footage into "Alien Vision."

I was asked in September, 1980, to explore the possibilities of the footage they shot. We structured a situation where for ten weeks we would produce a series of different "looks" for how the Wolfen saw at night, how they saw during the day, what they saw when they were looking at people, what their memory looked like, and a series of other tests. The most interesting test series was called "SmelloVision," which was the director's term for the Wolfen's ability to reconstruct what had happened between people by the remnants of the smells they left behind, a sort of visualization of the detective's "nose."

We went through a very extensive battery of tests, searching for the "day" look and the "night" look. The night look tests ranged from a black sky, to a sky that has graduation in it, from blue to green. We did a series of tests where we printed the foreground with natural color, and tinted the sky a series of colors. We added to these permutations, a series of tests when we flashed the red, green and blue separations, all the way to about a 1.2 density flash over base, so that the contrast was greatly reduced. Then we tried adding in hi-con outlines which we derived either by the color or the contrast in the scene.

We went through just about every possible printing combination that we could come up with and showed Michael Wadleigh and Orion the material in the first part of November. They arrived at a decision

for the night look, and wanted to do more exploration on the day look, so we spent another six weeks experimenting with how Wolfen see during the day.

We went for a very desaturated look, that was just a little above black and white. When we cut the desaturated material against the objective footage in the film, we found that there wasn't enough visual contrast between the objective photography and the Alien Vision, so you really didn't know which was normal and which was Alien Vision. It turned out that the "electric" look, which is in the film now, was the most successful day look.

During January, 1981, we started into production and worked through June, up to about two weeks before the release prints were in the theaters. We did approximately thirty-five minutes of material during the period of January to June, of which, as they were continually editing, they ended up using approximately twenty minutes.

We had discussions during the test phase as to whether the Wolfen point of view should attempt to simulate realistically how a wolf sees. We ran very quickly into a brick wall in that area, as we could not find anyone who could say he had seen through the eyes of Wolfen or wolves. This area is very speculative, and limited largely to dog research.

Some researchers feel that dogs see in a monochrome, like black and white, and

that they don't distinguish color. Other researchers feel that dogs have a color sensitivity, but it is not experienced in the same fashion that we experience color sensitivity.

We rejected doing the Wolfen point of view in black and white because, like the desaturated material, it simply wasn't a visually interesting point of view. We finally ended up taking the position that what we had to do was create the *idea* of how these creatures see, and not the *reality* of how they see. We hoped to leave the audience with an impression of how another creature might see the world, as opposed to a scientific description.

Presenting the world through the eyes of another was a key part of the script—whether it was the Wolfen, the Indians, the rich, or the detectives. Obviously the film is concerned both with different points of view and the prejudice that we all have, at some levels, for those points of view which are not identical to our own.

Basically we had to come up with a series of techniques that worked visually, and could be done with a volume of shots somewhere between a hundred and fifty and two hundred and fifty cuts. So the techniques couldn't be so elaborate that we simply wouldn't be able to do them within the available time period.

The technique that we finally arrived at for the night look was to derive the sky matte from a panchromatic hi-con, taking

Robert Blalack accepting Academy "Oscar" for his work on special effects team of *STAR WARS*. Of the *WOLFEN* project, he says, "Aside from the three key people who helped us coordinate the exact requirements, there was a team of 12 people at Praxis [his company] headed by Bob Block. To the degree that the effects are successful, the success was produced by the dedication to craft and teamwork which the entire group demonstrated through their efforts."





(TOP OF PAGE) Bright outlines around objects in this ghostly park scene create an almost "solarized" effect. (ABOVE) LEFT) One early version of night vision simulated a "phosphorescent" feeling, in which the light appeared to come from *within* the objects and people. (RIGHT) Daytime test in the abandoned ship graveyard. The blood red ship symbolizes the Wolfen perception of the anger and indifference of city life. (BELOW LEFT) A day-for-night test wherein the "mustard gas" look was designed to provoke a feeling of the poison the Wolfen could taste. (RIGHT) The same scene with a gradation of color in the sky. (BOTTOM OF PAGE) The scene as it finally appears in the film.





(TOP OF PAGE) Desolate ghetto area of New York with dark sky printed in. (ABOVE LEFT) An early test for the color mood of Wall Street. The black clouds obscure the gold hues of the area. (RIGHT) At one point the day exteriors were tested with a slightly green flesh tone and a pale red sky. (BELOW LEFT) An early test for night vision, which had the Wolfen seeing night as if it were day. (RIGHT) An early test for night vision in which the distant glow on the horizon simulates the energy from the city lights. (BOTTOM OF PAGE) A bridge scene with distant almost white buildings silhouetted against a black sky.



the positive 5369 directly from the 5247 negative, using either red, green, blue or white light. Then, based on what the color was in the original scene, we would make a negative from that positive at the proper exposure so that the negative would become the sky matte. In about ninety-five percent of the cases, we made the sky matte in one full generation of positive and negative.

Some of these lab procedures, such as making the hi-con positives and separations were done at Technicolor. We tried to push as many of the basic film elements as possible onto Technicolor, because when we got the film elements, we would have to make a whole series of other custom film elements.

The basic problem on a job like this, which is different from something like the blue screen composites that I was responsible for in STAR WARS, was that the WOLFEN shots were each slightly different in terms of how they would react to our basic Alien Vision techniques. When you set up to do a volume of blue screen shots, you can lock into a set-up, as long as your blue screen negative is exposed consistently. Once you have a blue screen set-up, it's a routine procedure to produce the shots, and a large volume of blue screen composites becomes little more than a film handling problem.

In WOLFEN, we still had all of the film handling problems and problems of making intermediate elements, but the original negatives varied wildly, because they were shot under semi-controlled situations outdoors, where you cannot control either the color of the sky or which part of the sky the cameraman is framing. We had to treat each shot differently, within our general technique. It turned out in some cases that a green separation was better for a sky matte and in some cases red was better, etc. We had to methodically work through each shot to find which variation of the technique would work for that particular shot.

We went through a whole series of tests where the sky was an electric magenta, people's flesh tones were tinted yellow or blue or green, a number of different combinations. We ended up with basically the natural colors that are in the scene and the addition of two separate hi-con overlays which add a line outline, producing a glistening effect.

The thing that was most intriguing in terms of how we perceive color, was that through all of the tests that we did the most striking visual effect, the effect that had the most impact with the largest group of people, was the technique where we printed back the scenes with their natural color, with the addition of either the sky

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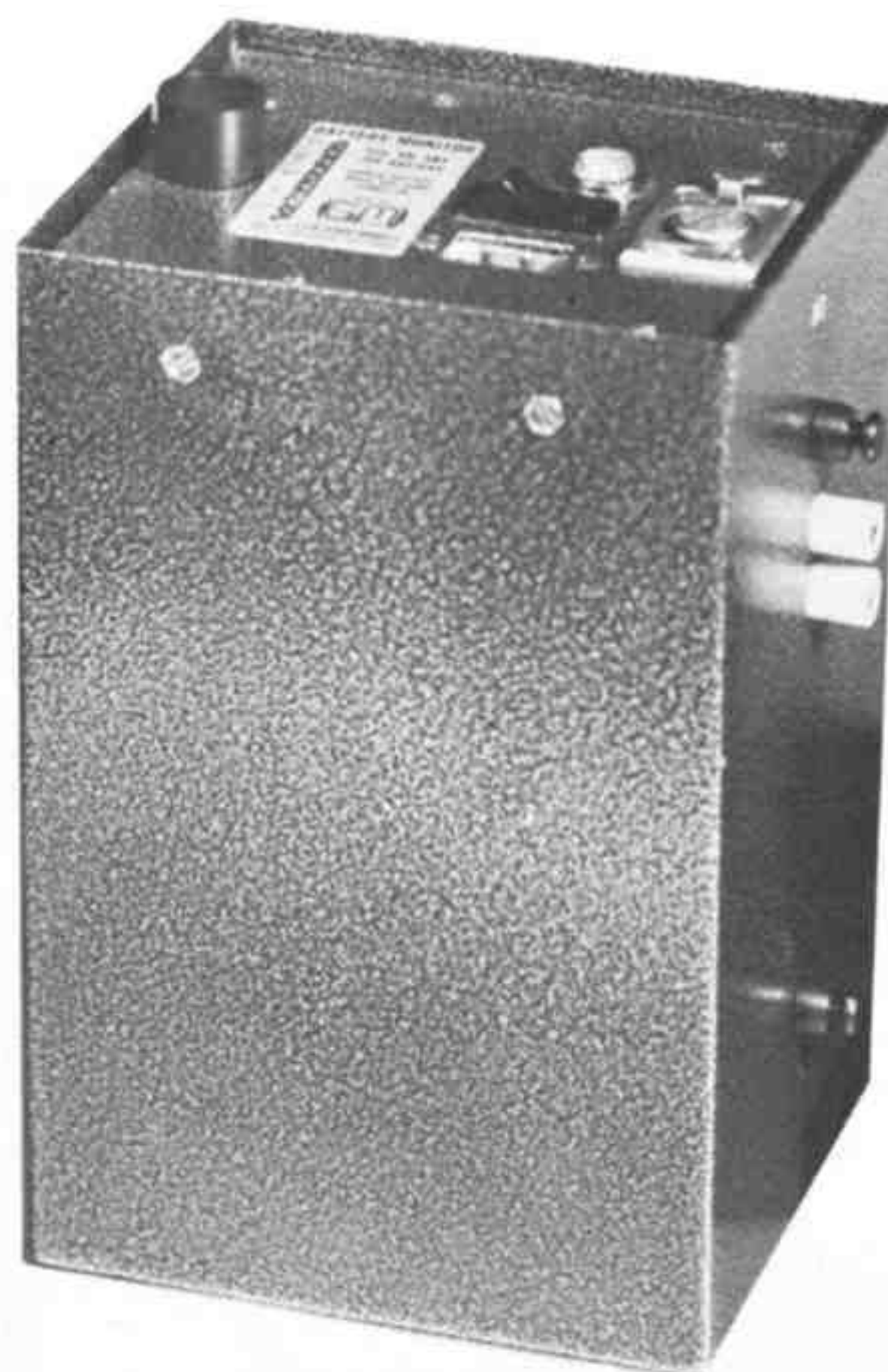
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matte or an outline on top of it.

I found this to be contrary to what I would have expected. I thought that people would prefer the more "exotic" looks we had achieved. So we found a very interesting perceptual reality through all of this testing.

The line outline which produced the kind of glistening effect I mentioned has been likened by some viewers to the "solarization" technique used in printing by some still photographers. The word solarization is, of course, a kind of catch term for all of the techniques involved with manipulating negative and positive images from an original scene. In a sense, the blue screen techniques involve elements of solarization, where you use a negative and a positive. There hasn't been a lot of sophisticated work done in this area of solarization in motion pictures. What we did just scratches the surface. What I think is a more accurate description of what we did is the term "masking techniques," where we create masks or mattes which can either be hi-contrast or continuous tone, to print down (or up) sections of the image.

I mentioned earlier that all of the original photographic material provided to us was daylight exposed. The reason for this was that once we generated a sky matte, we could print the foreground either at full daylight brightness or down as far as desired. By printing the daylight negative down a stop in exposure on the printer, we produced the idea that the Wolfen had a much more sensitive visual ability. They could see night as if it was day, as far as we mere mortals are concerned.

In the climactic sequence of WOLFEN the two human characters stalking the Wolfen use so-called "night scopes" to see through the darkness. The director deliberately put these electronic image enhancers into the film in order to create an analogy between what "weak" humans have to use to see at night, as opposed to the "strong" Wolfen, who use their own eyes.

We found that the mask used to matte the sky, when carefully exposed and developed, would matte only sky, and the foreground below the sky would be unaffected by the matte. In some cases we would have to come in with rotoscope animation and clean up areas other than the sky where we couldn't photographically separate the sky and the foreground.

There was a whole series of shots where there was some of the negative sky matte appearing in the foreground, and it didn't appear objectionable, and actually enhanced the image. The sky was generally bright enough that if we were careful in how we made the positive first-generation

panchromatic hi-con, and the negative from it, we could clip the gray scale at a point where we isolated the sky.

When we ran into a sky which was basically white, for some reason, that I am still not clear about, it turned out that either a white separation, red, green and/or blue, would be the best first-generation positive. We had to wedge test the four color combinations and see how the sky would react on film. We would then pick the color in the positive that produced the most clear sky because that would then come back dark in the negative.

The rim lighting effect which I mentioned earlier turned out to be a bonus generated by an undersized sky matte. As we increased the exposure of the sky matte, we eliminated that line outline, or rim light effect. The denser we made the sky matte, the tighter the matte fights reducing the rim light effect. It was the choice of the producer and the director to do a dramatic line outline which, in purely technical terms, might be described as a kind of "fringing." It is somewhat ironic that fringing is usually the element you fight to get rid of in conventional composite work. It is certainly something you wouldn't want to promote in blue screen. In fact, we go to great lengths to avoid it in our blue screen work.

The number of individual pieces of film needed to generate the required effect varied somewhat from scene to scene, but for a typical scene we would composite three color separations, printing back each separation bi-packed with the sky matte and a supplementary matte. So on a night shot, we are typically looking at a printback involving about seven pieces of film.

On a day shot, the number of elements were more elaborate. We were still printing back from three color separations, and we might have either a red or a green hi-con, from which we would make five or seven generations. We would also run a light sky matte for the day material, which was very thin. So we would have twelve to fifteen intermediate pieces of film elements for the day shots.

As filmmakers again embrace the subjective fantasy, which currently seems to be the basic attraction to Hollywood's "public," this sort of imagery becomes more attractive to filmmakers. We are currently providing sequences for CAT PEOPLE for Paul Schrader, and are testing sequences for ESCAPE ARTIST for Caleb Deschanel. Both films have different needs and involve quite different techniques. I won't talk about them here, but will leave the reader to make his own judgement as to the success of this style of image enhancement.

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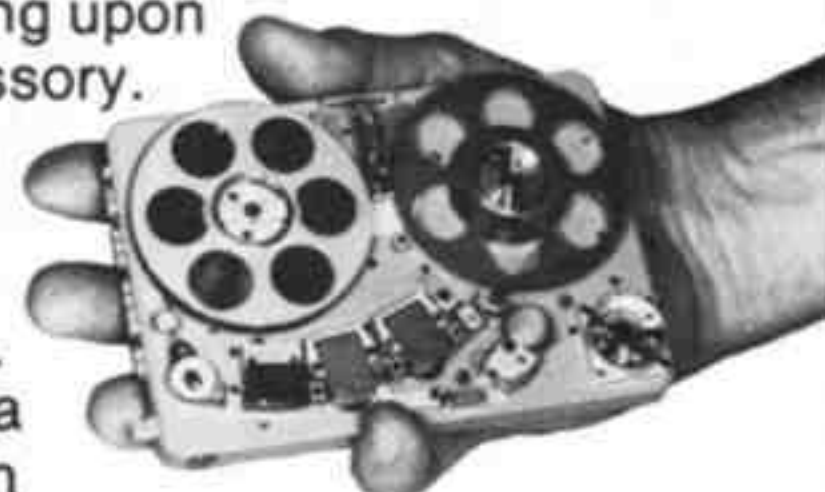
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"RAIDERS" ACTION
Continued from Page 1111

phone call and it's there within two hours. It takes a lot of coordinating and a real good game plan before you even get started. And whatever it is, if you think you might need it you'd better bring two of them. Chances are they are just not available where you're shooting.

COMMENT: Aside from those problems, I should imagine there were many others having to do with sheer logistics—accommodations, transportation, catering—that sort of thing.?

RANDALL: Surprisingly not. Because George Lucas shot in Tunisia before (on *STAR WARS*) and we were using a lot of his key production people, they had everything so well-organized that we had very few foul-ups, as compared to doing films on location in the States, where we have problems on a daily basis. When you go to a very primitive country like Tunisia where there is a language barrier, you have a right to expect all kinds of problems with a production company as big as the one we had for *RAIDERS*. But to have so few foul-ups is quite a feat in itself and a tribute to the people in those departments who were able to accomplish it.

QUESTION: What about the language

Although as Stunt Coordinator he is not required to do so, Randall often performs the most dangerous stunts himself to maintain high crew morale.



problem in those exotic locales?

RANDALL: It's strange, but I've done three films in foreign countries where I've had to work with a language problem and it's amazing that there is an international language that we all speak and that is film. Even though we might have different terminology for equipment—we call it a camera car, they call it a "casper;" we call it scaffolding, they call it a "rostrum"—it's basically all the same. So the language difference, in my field, didn't really present that big of a problem.

QUESTION: How did the English stuntmen stack up against ours?

RANDALL: On the whole, the American stuntmen are the finest stuntmen in the world. In England, in recent years, they have started to adopt the attitude of the American stuntman—meaning that they are more aggressive, more willing to take chances in new fields. I found them to be rather hesitant about trying something they had not done before and proven. They are not necessarily afraid of injury, but they are afraid of not being able to pull it off and be successful with the stunt, whereas a lot of American stunt gaffers are willing to take those chances. When I speak of taking chances, I'm not talking about taking chances of hurting somebody or getting somebody killed. I'm talking about committing a company to dealing with a particular stunt in a certain way, with the chance that it won't come off as originally planned. There are American stunt coordinators who will gamble, who will risk that possibility of failing, but if they are successful, they will have come up with something original—something unique. The English and European stuntmen do not have the aggressiveness to do that. They will sit back and more or less do those things that they know will be successful. That's why we are continually developing new techniques, new equipment, new gags, whereas they have lagged six or seven years behind us.

QUESTION: But how do they compare in terms of actual ability to do the stunts?

RANDALL: As far as ability goes, I found that the boys that I had would compare with some of the better stuntmen in America. They just need to be exposed to our way of doing things a little more. The year before *RAIDERS* I was in Libya for seven or eight months on a picture and, again, I had an international crew of stuntmen. I had stuntmen from Spain, from America, from England, from Italy, and that's one of

the reasons I was able to come up with the crew I had on *RAIDERS*. I'd had an opportunity to see and judge the better stuntmen over there and knew them well. They knew me well. So when *RAIDERS* came about I was able to get those people and put a cohesive team together that could get the work done.

QUESTION: Aside from the truck chase, what other sequences in the film did you find especially challenging in terms of your work??

RANDALL: Every time I think of another sequence I recall a different challenge that we had, but I think that the piece of action in the Well of The Souls sequence, when Indiana Jones was on top of that 30-foot statue and we took it through the breakaway wall, was a special challenge. It was a major feat in terms of the mechanics and some great technicians and the art department did a wonderful job. We were able to do that for real. We had a man on the head of that statue and took it through a huge breakaway wall, which was a considerable accomplishment. Originally when they looked at it, they thought they would have to use a dummy, but I felt that we could rig it and devise the proper safety measures so that we could actually use a real man and get a much more thrilling and believable piece of business. It was quite a challenge, but we were able to pull it off.

QUESTION: Didn't Harrison Ford do some of his own rope work in that sequence?

RANDALL: Harrison did all of his own rope work. We had an opportunity to work with him on that. He got very good at it and was able to do dialog while he was doing stunts. That's one thing a stuntman doesn't have to worry about. He can scream when he gets hurt and he can cuss just before he has a wreck, but an actor always has to stay in character and still go through the same heartache and trial that a stuntman does—so there is a double burden on him.

QUESTION: How often do you find an actor of star status who can do his own stunts and is willing to do them?

RANDALL: Not often, but I'm the last person to advocate having actors do their own stunt work. I think it's foolish for a production company to even consider letting them do it, but I think there is a fine line that can be drawn so that an actor can do

Continued on Page 1143



(LEFT) Stunt Coordinator Glenn Randall sets up a scene in which Harrison Ford, as Indiana Jones, astride a magnificent white stallion, takes off after a German truck on the set of the Tanis digs in Tunisia. (RIGHT) Ford has a go at it for the cameras. (BELOW LEFT) Jones runs for his life as a huge boulder, crushing everything in its path, rolls relentlessly toward him. Ford performed this action himself—about a dozen times. (RIGHT) Jones squares off to fight an Arab virtuoso swordsman with his whip, but takes a short cut by shooting him instead.



(LEFT) Director Steven Spielberg, always keen to be right in the middle of the action, spars with brawny Pat Roach, prior to the filming of Roach's big fight with Harrison Ford. (RIGHT) Ford moves in for the big fight scene with Roach under the Flying Wing. There was a near-disaster when Ford tripped and fell and the wheel began to move across his tibia. The only thing that saved his leg from being shattered in a hundred pieces was the fact that it was so hot that the rubber was soft and pliable, and the concrete pad was covered with two inches of sand.



**"OF NARROW MISSES
AND CLOSE CALLS"**

Continued from Page 1102

just rock your chairs at the steering bolts. I've always enjoyed flash and I always felt that if I could shoot RAIDERS quickly, there would be an implicit energy throughout the film and that, in fact, is what happened.

My girlfriend came down and spent a few days in Tunisia. She came at a time when we were averaging 35 set-ups a day, outside. She was just amazed that movies were made that way. I explained to her that this is the way they used to make movies in the silent days when they had a camera and a tripod with a crank and they would virtually put the camera down and start cranking and the minute they got what they needed, and no more, the camera would come out of the ground and go to the next position, where the cranking would resume.

It was virtually a relay race to accomplish as many exciting set-ups as possible before sundown made us stop shooting. And also to get the hell out of there, be-

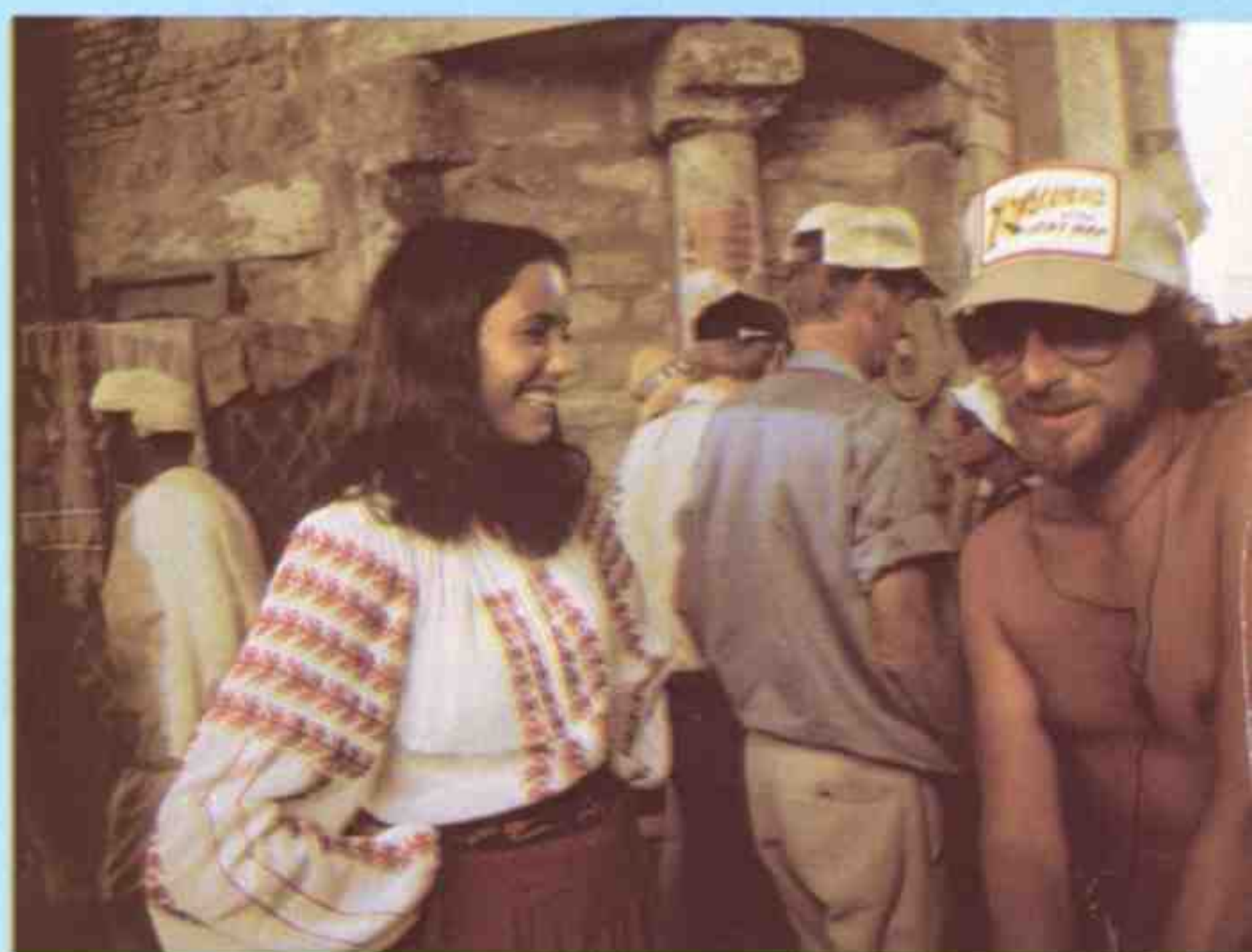
cause none of us liked it there. It was the least enjoyable location I think I've ever experienced. The desert was a furnace and some of the local food put a majority of the crew through gastric agony. George had enjoyed working there on STAR WARS, but that was before the Tunisian government became film conscious and before they realized that there was big foreign potential for outside movies inside North Africa.

Everybody worked very quickly. They just ran around. Dougie Slocombe, who is in his mid-sixties, ran faster than everybody. When I said, "I'd like the third camera on the hill,"—I'd turn around and Dougie would be on the hill with the third camera two minutes after I had spoken. I found that rather amazing. Dougie would walk around—he's never fallen off a cliff or off a camera car—but throughout the shooting of RAIDERS OF THE LOST ARK there were dozens of cliff-hangers all involving Dougie Slocombe and his sense of balance. Dougie would have his eye screwed into his contrast glass, looking up at the sun and the clouds, walking

backwards and, sure enough, there would be a 350-foot drop and, sure enough, Robin or Chic, who have worked with Dougie on an average of 25 years as a team, would reach a hand out and keep Dougie from falling into Roadrunner and Coyote oblivion. When Dougie has his eye to the camera, he is in another world. He is in the land of motion picture fantasy and he doesn't realize that he's a mere mortal. He's the perfect audience.

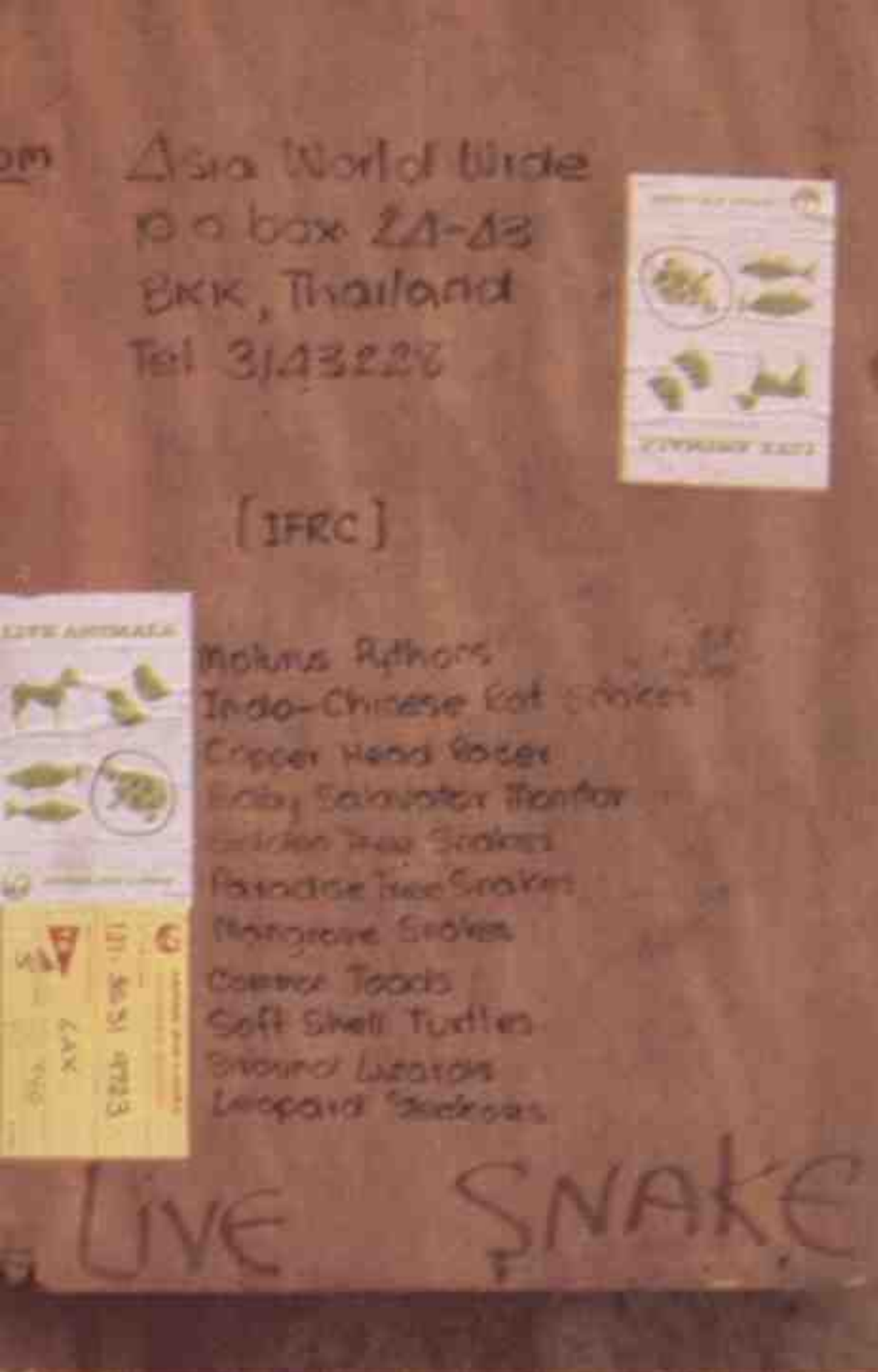
The rest of the company—and I say this as a compliment to the English—never lost their cool, even though the prevailing temperature in the shade of an umbrella was 130 degrees in the Sahara Desert. The only relief came when the wind would pick up at around 4 o'clock in the afternoon and cool the breeze to a mere 110 degrees.

I kept thinking of David Lean, and I think what kept us going was the thought that Lean, at 60, had done this every day for a year. David Lean was our criterion for survival. At least we had hotels in Nefta and Gafsa with air conditioning. David Lean slept in tents during the making



(LEFT) Spielberg leans on the friendly remains of an impaled model, while discussing a scene with his star, Harrison Ford. (RIGHT) Karen Allen and her director enjoy a brief break in the shooting of a hectic street scene that was filmed in Kalrouan, Tunisia. (BELOW LEFT) Indiana Jones (Harrison Ford) prepares to outwit the Ancients' plan to protect the gold idol. (RIGHT) Jones, in Lawrence of Arabia disguise, has a better vantage point to calculate the location of the Well of the Souls from atop the sand dunes of Tunisia.





ple who worked on my last four movies and the scale and size of production—which have been rather gargantuan—but technically it differed because it didn't involve anything that hadn't been done in movies. Nobody had ever made a movie with a 25-foot mechanized shark before *JAWS*. So, in a way, that was a state-of-the-art movie, in terms of its physical accomplishments on the water, in the actual ocean.

In *CLOSE ENCOUNTERS* we generated special optical effects that had not been done before. Only *STAR WARS*, up north in Marin County, was doing it at the same time that we were doing it down south in Hollywood. "1941" contained probably the most painstakingly genuine miniatures ever done in Hollywood and I'm not bragging when I say that I believe it's true that, with the probable exception of *IN OLD CHICAGO*, *RAIDERS* was a much more down-to-earth film rooted in something more attainable.



(ABOVE LEFT) The cover of the box, with its unusual contents listed, that was sent to EMI Elstree Studios in London from Bangkok. (ABOVE RIGHT) Harrison Ford and John Rhys-Davies (Sallah) get ready for a scene, while the animal handlers prepare the snakes for filming. (BELOW LEFT) Indiana Jones is lowered onto a clear space on the floor of the Well of the Souls, past gigantic statues and surrounded by a sea of hissing snakes. (RIGHT) Jones comes face to face with his greatest fear, a cobra, while trapped in the Well of the Souls.



of *LAWRENCE OF ARABIA*. They bivouacked right out in the Sahara. And look at Lean's movies. My God, they are spectaculars!

Nothing seems, on the surface, to ruffle the British. I'm very used to losing my head and watching everybody else follow, and I felt a little conspicuous jumping up and down and screaming, "We're losing the light! We're losing the light!" The rest of the British crew just sat there looking up at the sun and quite agreeing with me.

RAIDERS OF THE LOST ARK differed in certain ways from any of the other pictures I've made, although there are great similarities in terms of the amount of peo-

There were certainly some physical problems, like getting that 12-foot boulder to chase Harrison Ford many times, and the flying wing that was built not to fly, but to generate danger with its deadly propeller blades. That was new to me, but *RAIDERS* is much more of an earthy adventure and I kept saying, "This is great, but what if this had been on the water?" Then we would laugh and say, "Thank goodness we are doing impossible special effects on land." Another nice result was that the next day I could view the dailies without having to wait six months to see the optical composites.

But *RAIDERS* doesn't differ that much

from my other large productions, because logistics are logistics and large sets are large sets. It takes longer to light them—more units and more electricians—and I'm certainly used to that. And yet, a couple of years ago, in an article for *American Cinematographer*, I said that I never learned anything new after each picture that involved complicated effects, because each situation is new unexplored territory. I think I can say now, after four of these big monsters, that I have learned a lot, and I've learned so much from the preceding films that *RAIDERS* was much easier for me than it would have been in 1973, had this been ahead of



Director Spielberg gives instructions to Ford and Allen prior to filming the climactic sequence of *RAIDERS OF THE LOST ARK*. (BELOW) Ford and Spielberg take a break beside the tramp steamer *Bantu Wind*, in reality a trawler of Egyptian registry which was converted by the art department and sailed to the coast of France for actual filming aboard on the high seas.



SUGARLAND EXPRESS. I would have been in a helpless quandry had it not been for seven years of making movies at hard labor.

I really decided that the only way I could bring this movie in for the budget and on schedule, was to storyboard not only the sequences involving fights and chases, but also the sequences involving behavior, attitudes and dialogue. I wound up having to employ four artists instead of the usual one, starting with Ed Verreaux, who was my principal artist, and Dave Negron and

Michael Lloyd and Joe Johnson up at ILM.

It took at least four artists to complete my vision of the movie in the mere four months I had of production design prep. In the interest of saving money, we didn't start prep until very early in 1980, for a June start. Now, that's squeezing it pretty tight. I'm used to at least a one-year prep, and I only really had about six months to prepare the picture from production design to casting, through location selection.

By storyboarding everything, I was really able to rely on only 50% of the story-

boards for most of the movie. What I usually do, on most projects is prepare with drawings between 60% and 75% of the film. Yet I won't feel compelled to stick to every board, because I allow the boards to be my fall-back design. But if I'm inspired and some divine madness hits me and I think of a better way to do something, I try to be flexible enough to drop the homework and hear the inspiration.

Certainly, with *CLOSE ENCOUNTERS*, the whole last 25 minutes of the special effects were storyboarded and I had to stick to the storyboards almost maniacally, because a lot of the elements had been photographed before our production unit arrived in Mobile, Alabama, and certainly a lot of the elements had been shot to fit perfectly into those pre-concepts. So I couldn't do much changing there.

With "1941" there were a lot of changes made because the on-set ideas kept getting better and better. With *RAIDERS*, I felt that I needed every storyboard to stay on schedule. I probably stuck to the storyboards on *RAIDERS* generally more than I had in other situations, because I really felt that, in my head, I had directed a pretty good movie, way back in January, February, March—and why change it in June, July, August and September? I stuck to a lot of the storyboards, especially involving the truck chase which was 100% storyboarded, and Mickey Moore who substantially directed the master shots and the stunt work of the truck chase, pretty much stuck to 85% of the sketches and did a wonderful job. As a matter of fact, on each slate, they would first give the scene number and they would flip the slate around and there would be that sketch to compare it to the actual shot achieved by the second unit. That was a really good way to work. Of course, Mickey, who himself is a very creative individual, made the time to add two or three shots of his own to make the chase even more exciting.

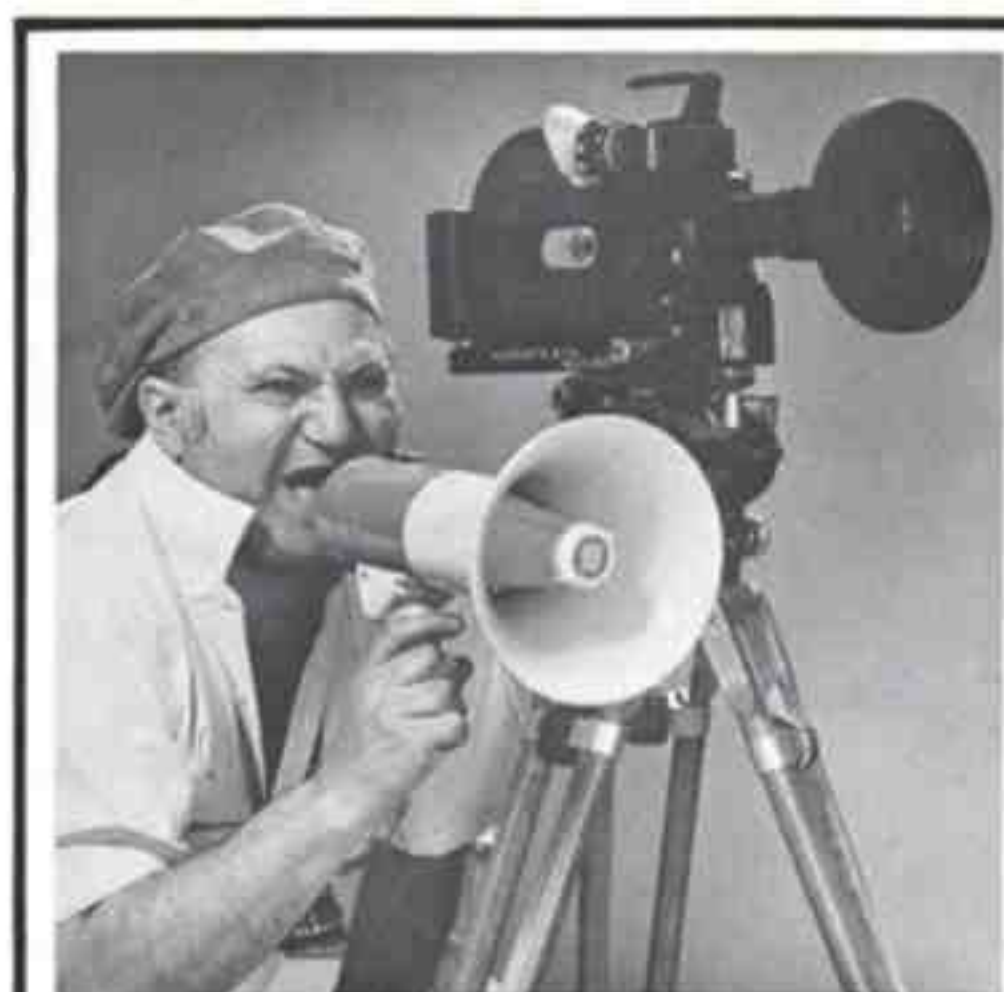
I had never used a second unit director before and I only agreed to use a second unit director for the truck chase because it was a very extensive pursuit and covered a lot of different locations. The second unit began shooting the truck chase a week before we came to Tunisia so they were well into it when we arrived at Nefta. I directed all the sequences involving principals in the truck chase, everything involving Harrison. Everything involving wider shots using doubles, Mickey did. It was really the only way to make the chase exciting without adding an extra 15 days to the 73 I scheduled.

As part of my pre-planning of the visual style of the picture, I would cut out pictures from different glossy color magazines on

fashion or art or photography and I would discuss them with Dougie Slocombe—especially in terms of the general “look” and such elements as cross-lighting. I’d say, “Dougie, I’d love to get them against the hot window and let them go real black against it.” And he would say, “That’s a lovely shot and very attainable.” We did that very early on.

I originally wanted a much moodier, almost neo-Brechtian style of light and shadow for this film. I wanted the film to resemble more, say, *THE INFORMER*—the film being more *film noir* than I eventually accomplished. But I found that the movie was beginning to paint itself out of the corner I put it in, by the kind of sketchy brightness which is Dougie’s *forte* and I began to see what Dougie was doing. He was giving it a fuller look. Not a flat look; he was giving it a very nice backlit look, but a very *full* backlit look and because of that he was getting amazing depth of field due to the number of lights he was using. In the dailies, of course, it looked very dark and moody and atmospheric, while on the set it looked very bright, but he was not shooting wide open, to say the least. He was stopping down. So between my original discussions with Dougie about *film noir* and the subsequent results from our collaboration, and seeing a couple of days’ dailies that looked kind of sketchy—very sketchy—perhaps *film noir*, and then seeing other scenes that were fatter and richer in contrast, I began to say, “Hey, this

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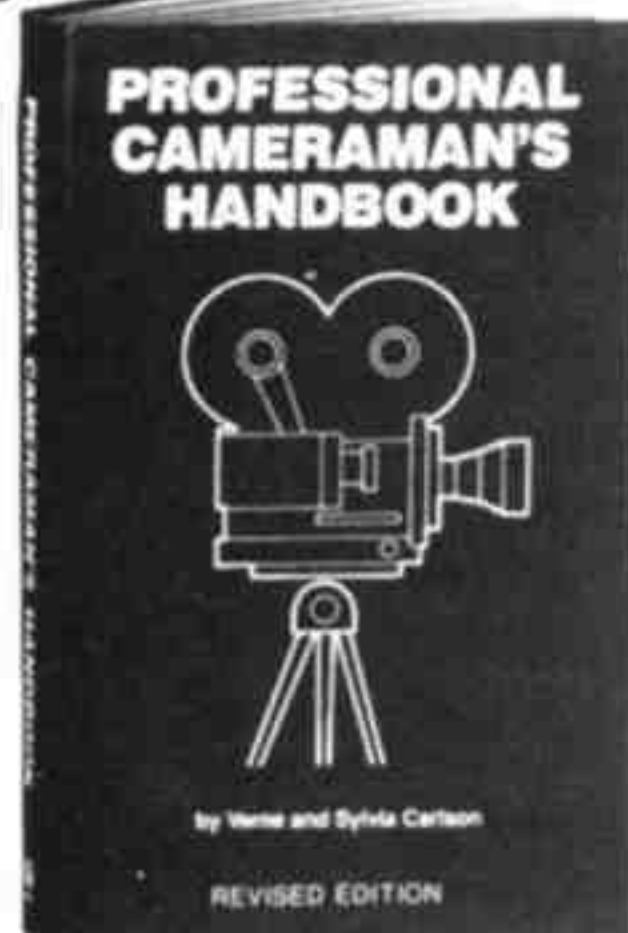
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movie is much prettier in color than it is in black and white."

I believe that the photographic style of this movie happened by itself through an interesting compromise between what Dougie loves to do and what I wanted from him. We each came half way and we found what will now be hopefully, the continuing style of the RAIDERS saga.

There are all sorts of things that we had to consider, like the Raven Bar. I wanted the Raven to have big shadows on the wall. So Dougie gave me these wonderful shadows on the wall, but I wanted *black* shadows and a good way to get black shadows is not to use any fill light. However, if you don't use any fill light, you can't see the eyes, and with the film as fast as it is today, one arc light, when directed against somebody, and continuing on and hitting anything other than black dubatine, is going to reflect back and fill in your shadows. The walls of the Raven Bar in RAIDERS OF THE LOST ARK were a kind of cream adobe sod color and they took a lot of the key light and just sent it right back and diffused the shadows against the wall, so I didn't exactly get my Brechtian black against white on the walls, but Dougie still achieved a very classy, moody look.

In the Peruvian sequence, which was actually shot on Kauai, in the Hawaiian Islands, I wanted a real jungle feeling—a walking into a kind of netherworld that we hadn't seen before. And I just loved the way the sun in the morning would come through the flora, so we used so much smoke outdoors in broad daylight just to get the sunbeams, those shards, to show that it became a running gag all through the film. We would be constantly saying, "Are any shards showing yet? No? Then more smoke, and Kit West, the effects man, would go running through with his hot smoker, chasing the wind. Of course, the wind would shift and Kit, who preferred to work alone, and weighed over 200 pounds, would suddenly double-time right across a meadow and he'd pump the smoke in. Sure enough, the smoke would get there and the wind would shift again and you'd see the little figure of Kit running 60 or 70 yards across the meadow, running like Earl Campbell. This happened constantly, but with a lot of patience in Hawaii and still staying ahead of schedule we were able to get some really nice atmospheres with smoke.

Dougie, more than any cameraman I've ever worked with, uses the sun as a key arc light, and lets essentially everything follow its route. I remember, in India on CLOSE ENCOUNTERS, where Dougie kept saying, "Can we choose the location

Continued on Page 1160

"RAIDERS ACTION"

Continued from Page 1136

enough of the action to be recognizable as actually having done it. I'd certainly hate to see a company put actors in the position of having to do their own stunts, because it's a highly specialized field. There are probably actors who would be more than willing to try a lot of things, but they would possibly not possess the physical attributes that it takes to do them. Harrison just happens to be capable of doing them. Yet, if you ask him, he'll say, "Not me! I'm the biggest coward in the world." But in actual fact, he is not. He will go for a lot of things, and he'll spend the time to learn what he has to do to get the job done, instead of just going out and trying it.

QUESTION: You've said that there was a great deal of pre-planning on this project, but to what extent did you have to improvise?

RANDALL: On RAIDERS the problems of improvising we faced occurred on a daily basis. We always had problems that we had to overcome by devising a way of doing things right now. Steven Spielberg is very creative, and just when you think you've got everything well in hand, he'll throw something at you that just shatters your game plan and you've got to be quick on your feet to come up with a solution for him. As well-planned as you try to be going into a film like this, you will always have unforeseen physical problems—whether it's having to back a truck down a half-mile because there is no place for the driver to turn it around, or the fact that a certain stunt didn't go according to the game plan. Problems like that you live with on a daily basis. It's a challenge. Even when everything is going smoothly, it's still a challenge to accomplish what you've set out to do.

QUESTION: In the sequence where the giant rock chases Harrison, I understand that he did that himself, but you still had to coordinate the action, didn't you?

RANDALL: We tested it. I had an opportunity to see it and time it and test the rate at which the rock would roll. A lot of people thought it was just a big phony ball. In fact, it was a phony ball, but it was made of plaster of Paris and I'm sure that it had to weigh several hundred pounds. So if it had hit Harrison, I'm sure he wouldn't have known the difference between a real rock and the phony one. It would still have

done great damage. Harrison was there while we tested it and ran it and timed it, and we played with it quite a bit before we felt comfortable in letting him do it. I remember that just prior to shooting the scene someone raised the question as to whether it would be safe for Harrison to do it. Steven looked me straight in the eye and said, "Glenn, is it safe?" It was a judgment call. I felt that he could do it; I felt that it was safe—and it was. We pulled it off and, obviously, nobody was hurt.

QUESTION: I gather from what you've just said that Steven Spielberg is not one of those directors who just throws caution (and safety) to the winds in the pursuit of the most spectacular effect. Is that true?

RANDALL: Yes. Steven is very safety conscious. In the filming of RAIDERS he relied on me to make sure that things were safe, and if I had any hesitation or doubts about something maybe not being safe, he would be the first to say, "Let's not do it then." A lot of directors would say, "If you can't do it, then I'll find somebody who can." Steven never took that attitude. His attitude was: "Glenn, you've had the experience and I'm going to trust in your judgment." I really didn't have to tell him something was unsafe very many times, and if I did, I always tried to have something to put in its place. I'd say, "Maybe we can't do it this way, Steven, but possibly, if you can accept it shot in a different way, we can make it safe so that you can get the same impact on film and maintain the story that you are trying to tell."

QUESTION: What elements do you consider when making a judgment as to whether a stunt is safe or unsafe?

RANDALL: You're called on to make those decisions a lot of times because you're the expert in the field. Quite often you're doing things that have not been done before—or that you've never done before—and these are judgment calls. You have to judge the person doing it; you have to judge the technicians handling the effects; you have to judge the capabilities of the people working in and around that particular sequence—and then, having weighed all those elements, you make up your mind whether it's safe or not. There are a lot of unknown variables involved. Fortunately (knock on wood!), I've been working at this for 20 years and have yet to get anybody hurt. That's not to say that it couldn't happen tomorrow, but I'm very, very conscious of safety—for actors,

Continued on Page 1152

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SPECIAL VISUAL EFFECTS

Continued from Page 1108

bulbs inside their clothes. The actual sequence was filmed mainly in long shots and all of this was done in London. We had only three days to shoot the entire end sequence, including all of the production material leading up to the devastation.

After shooting everything in long shots in London, I went around the set after it was all finished and marked off sections that I wanted. We shipped them back to Marin County in a sea container, where we rebuilt part of the set and shot all of the closeups—using similar materials, using our friends in the old harnesses again, using air cannons to affect the Nazis like a big blast of wind hitting them.

Then we tackled the problem of creating the ghosts. We had originally planned to "materialize" the ghosts by using an animating technique, but when we finally started getting into it, we discovered that we weren't achieving the look that we needed—to say nothing of the time that would be needed to produce as many ghosts as finally became necessary.

Also, the storyboards changed a little bit as we moved along, so we came up with a method of using our big tank, building armatures and flying the "ghosts" around in water, using forward and backward motions. Steve Gawley, one of our model shop experts, did the flying of the ghosts, while I watched through our EMPIRE camera. I would have a clip of the scene in the camera, so that I could watch the motion of the ghosts in relation to the scene. We shot enough footage to be sure that we had as much as we needed and the final ghost effects were put together optically by Conrad Buff. We would select and edit all of the ghosts separately. We had one shot in which we did about 50 passes through the camera in order to get a swirling vortex of ghosts.

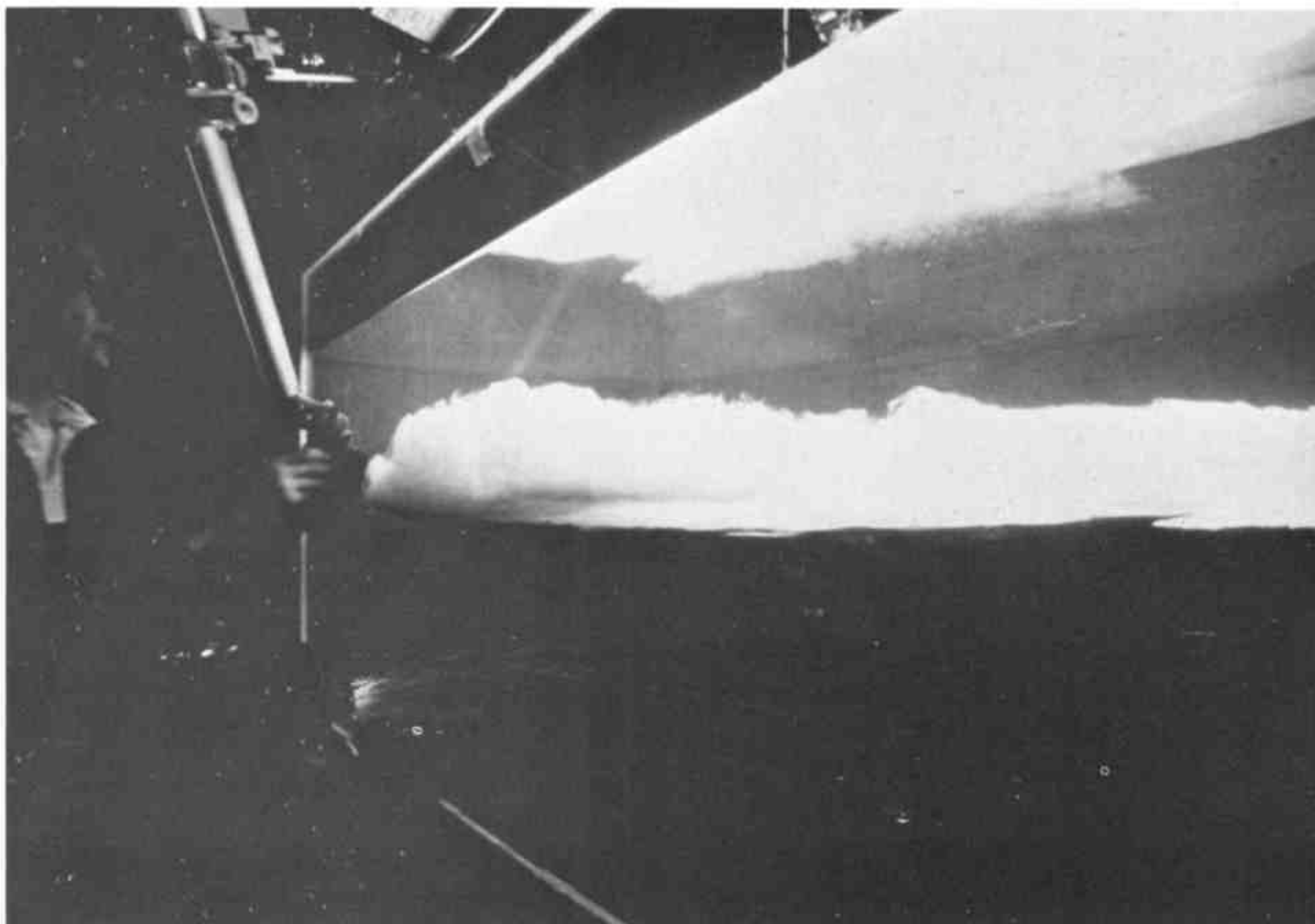
To refer back to what I said earlier about not giving the audience too much to see, and yet not cheating them—some of these shots were cut to go by very, very fast, on the screen and the amount of work that would go into each of these shots would seem out of proportion to the amount of time that it would be on the screen. However, if the impression is there, then you have succeeded and there is no point in leaving the scene on the screen any longer because, as I say, if you leave it on too long and your edges start showing, you begin to give yourself away.

We had a girl who was featured in only one of the shots. We made her up and flew her around on a wire rig. I shot the plates of her in sharp focus and then rear-pro-

Continued overleaf



The Nazi submarine was portrayed as hidden in a pen within a huge seaside cave, so this miniature was built to simulate the entrance to the cave. (BELOW) Special effects technician generates chemical clouds in a 7 x 7 x 4-foot water tank, in extension of the technique developed by Douglas Trumbull for CLOSE ENCOUNTERS OF THE THIRD KIND.



A miniature of the huge grotto set in which the climactic ("Wrath of God") sequence of RAIDERS takes place. (OPPOSITE PAGE) The full-size grotto set built on a sound stage at EMI-Elstree Studios, Borehamwood, England. The set had to be very carefully rigged for explosions and other special effects that contribute to the spectacular climactic action.







The villains in **RAIDERS** all meet horrible ends, as the Wrath of God strikes them. (LEFT) Life molds were made of the characters in the screaming attitudes they would finally assume. The actors had to hold their positions while plaster castings were made of their features, after which Makeup Artist Chris Walas had to rebuild their faces from the molds. (RIGHT) Belloq, the Frenchman, whose head was blown up by using a sort of plaster skull with a pliable substance over it. Another villain had his head shrink and a third got his head melted down—layer by layer.

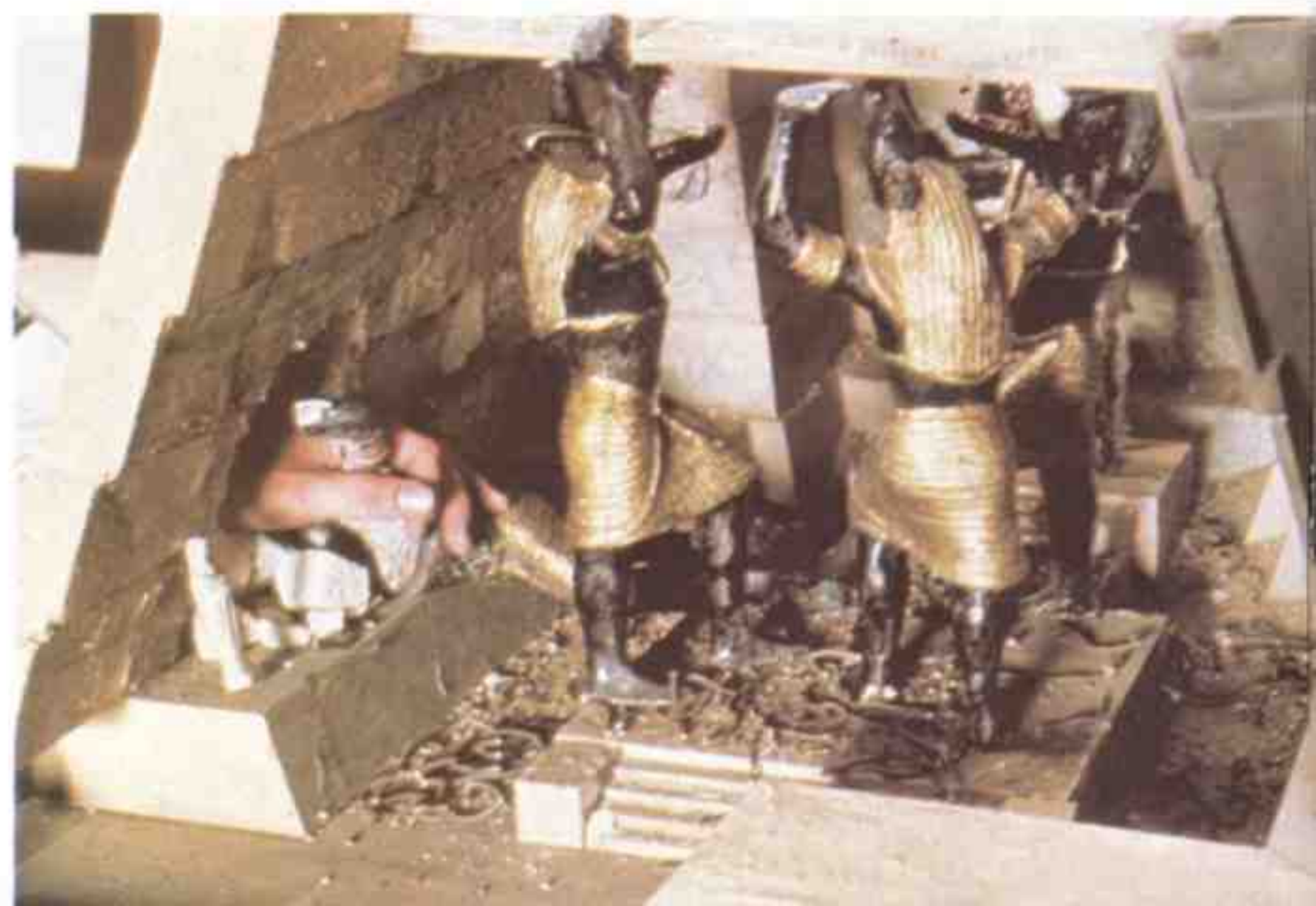
jected them through an inversion layer in a tank in order to achieve confusion and to break up the image, taking the sharpness away without losing the entire image. That was, again, the case of a great deal of work being devoted to a small bit of screen time.

At any rate, once I had her image, I shot a skeleton to match, lining it up by projection to get the effect of a "live" ghost turning into the face of Death. We then did a white-in optical and rear-projected that element through a tank that would distort the image and reduce it to just the right amount of information that we wanted to show. This was done using our motion-control camera and high-speed track, with a rear-projector in synchronization. It was all pre-programmed so that we could do a number of takes to get confusion at various levels, and then we would pick the best one at dailies.

I feel that the most successful of the grisly ends of the three lead "Bad Guys"



(ABOVE RIGHT) A miniature of the beautifully sculptured golden lid of the Ark of the Covenant. (BELOW LEFT) Indiana and Marion in the middle of the burning Raven Bar, early in the action. (RIGHT) Miniature of the interior of the Well of the Souls, with its supposedly huge statues of jackals. The statues were also built full-size on the studio sound stage and one of them was rigged to crash through a wall with Harrison Ford on top of it.

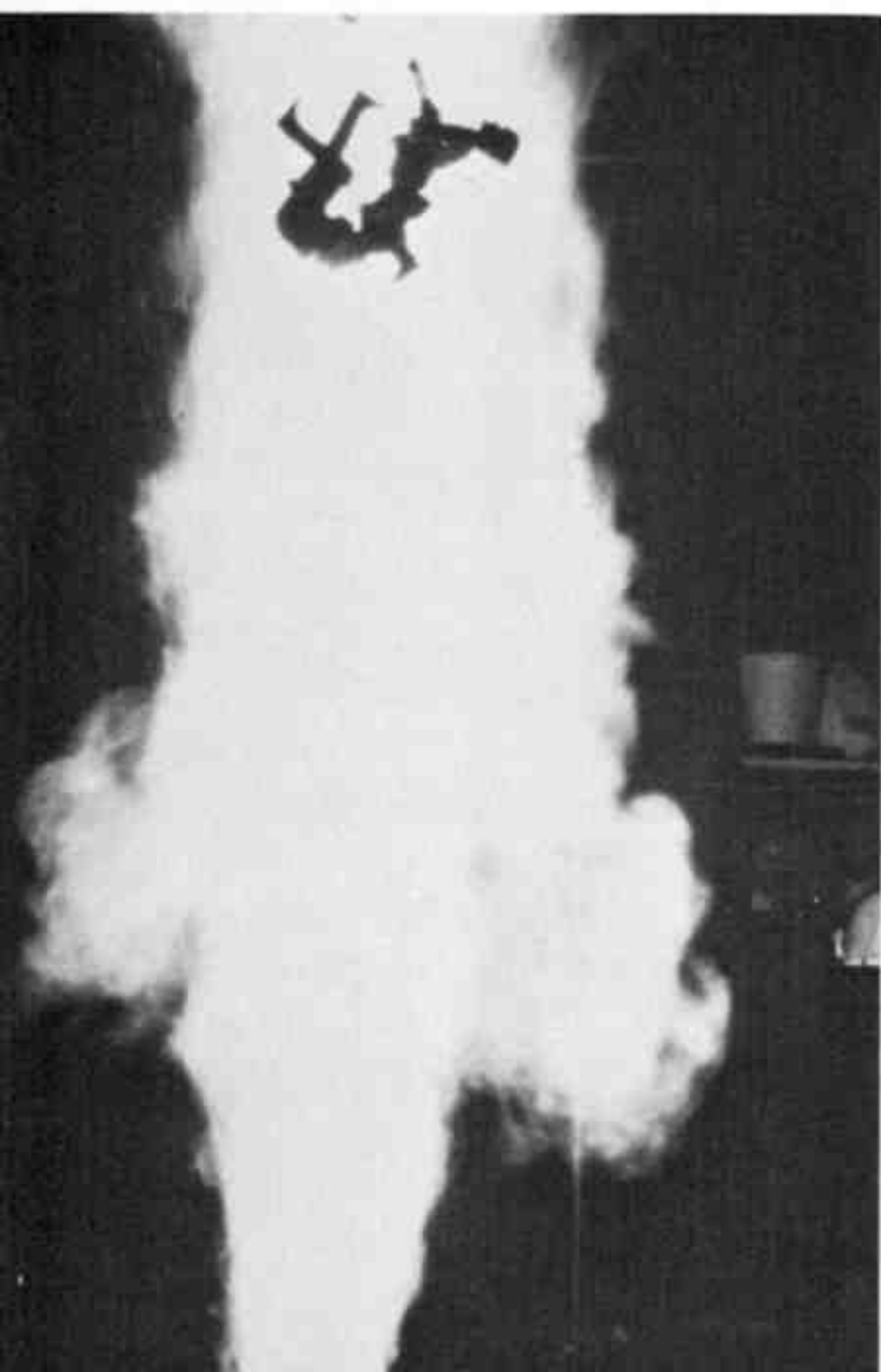


was the melting head of Toht. I liked that one the best (if "like" is the right word). That was actually done as a time-lapse shot and Special Make-up Effects artist Chris Walas did most of the work on that, preparing the sculpture from a life mold that was done on the lot in London while I was there. The time-lapse for the melting head was shot at a little less than a frame a second and a certain amount of optical work was done on the shot, which included matting fire in on one side of the frame. We did some other rather messy things to the face to get it the way we wanted it. We built the face and head out of gelatin and used heat to make it melt. Chris constructed it in layers, so that it would melt down in a certain way. A lot of people turn their heads when they see that shot, so I guess it was successful.

We took life molds of the characters in the screaming positions they would ultimately reach. We had them hold their positions while we took castings of their faces and then Chris Walas had to rebuild their faces from the molds.

In the case of Belloq, the Frenchman, we blew his head up by using a sort of plaster skull with a pliable substance over it to build the sculpture up. Then we took a little bit of primer cord, quite a bit of compressed air, two shotguns and a few blood bags—and it all got pretty grisly. The stage was an absolute mess after we got that shot. We had to blow his head up three times before we got what we wanted. Then, since he was standing behind the fire, we had to matte in the fire (shot separately) over his face. That cut

Miniature Nazi soldiers are supported by a jet of smoke for compositing into scene in which they will be shown tumbling out of a truck and over a cliff.



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was on the screen for maybe 30 frames—a little over a second.

The shrinking head—which was not my favorite shot in the picture—involved an awful lot of work, but it was one of those shots that we didn't have enough time to do again and again in order to get it right. However, George cut in just the right amount of that shot in just the right place—and it worked.

Incidentally, the shrinking head effect involved a vacuum and various exotic materials. It took eight or nine people to control the effect, manipulating different levers inside the head, all of which had to be done by hand.

During the pyrotechnics in the final sequence, when fire sweeps the Nazis, there are a couple of shots which I feel turned out quite well. One was the scene in which the fire from the Ark shot up off the island. It was a long shot with the fire shooting from the top of the island into a hole in the clouds (which was filmed in our cloud tank). The island was actually Marin Island, just a few miles from I.L.M. in San Francisco Bay. Michael Pangrazio painted in added detail for the island itself. We then shot the fire on a separate piece of film and controlled it through a tube. The clouds were also done as a separate item. All of this was then matted in with a reflection of the water.

We see the peak of the fire changing direction. It starts coming back down onto the island, then sweeps down through the altar set, over the Nazis, who are all lying dead on the ground. All of that was shot in miniature. The Nazis were only about 4½ inches long.

We shot it upside-down, so that the fire would actually rise toward the floor. We cut away to Indiana and Marion tied to the stake and then we cut back to a shot of the fire going around them. The original plate was done blue screen and I shot the fire in two pieces—a foreground fire and a background fire—to actually put them *into* the fire and show them in a situation of peril. Then we cut to the fire sweeping back in the other direction, revealing an empty set with all the Nazis swept away. One of them you see flying through the air burning up. We used a lot of gunpowder for that.

Before the crew went off for location shooting in Tunisia, I had discussed certain of the matte shots very carefully with Michael (Mickey) Moore, the second unit director, and he got pretty much the shots that we needed—for instance, for the truck-off-the-cliff shot. There was a matte painting involved, of course, and we built a miniature truck and used a few stop-motion puppet Nazis who flailed their arms around in the air when the truck went off the cliff.

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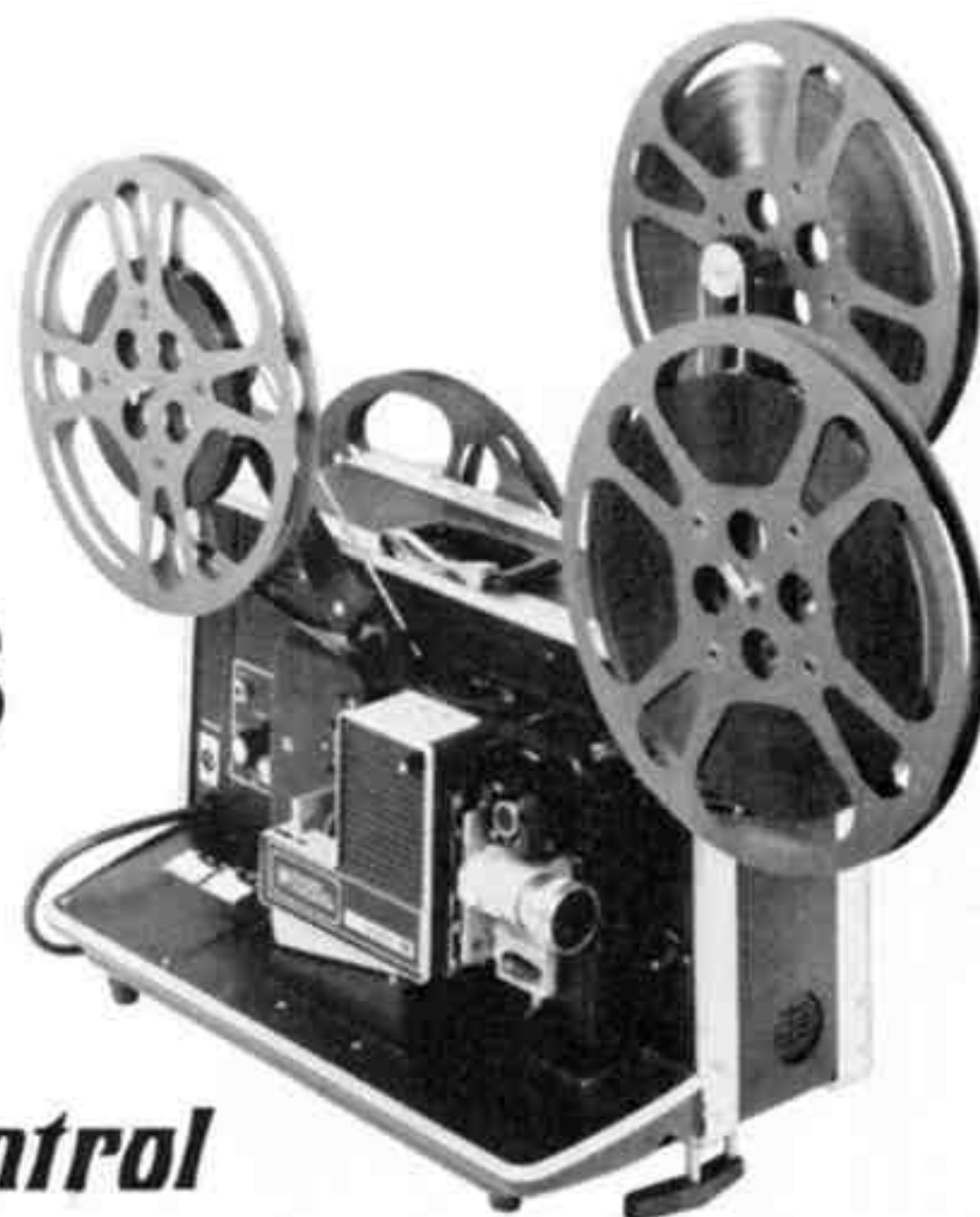
When the time came to shoot the Pan American "China Clipper" sequence we knew that there was apparently only one similar seaplane in the world that still flies. But that was in Puerto Rico and we didn't have the budget to go there and film it. We did discover, fortunately, that only about five miles from I.L.M. there was a flying boat of the required type in drydock. So we made a miniature of this flying boat that we found across the bay and did a helicopter plate to show it flying in front of the Golden Gate bridge. Then we matted that in to create the illusion of having the plane take off from San Francisco.

The actual full-size flying boat was not in the water. It was on dry land and could not float, so Jim Veilleux went over and made a helicopter shot of a pier I had found which would match the angle. We shot the flying boat being boarded by some people going up a ramp. The flying boat, which was a British-made four-engine seaplane, had one engine that worked, so we showed them getting aboard and then started up the engine. For added realism, we put down some pans of water to reflect light under the wings. We then shot the plate of the flying boat. We next went over to Treasure Island, which is a nearby Naval base, where we found a pier that looked pretty good and which we could then matte under the plate of the flying boat to put it into the water. With the addition of a matte painting to fill in the top part of the frame, we had ourselves a shot of people getting aboard the China Clipper.

We shot blue screen in London for the Well of the Souls sequence. The cameras were up on high rostrums against blue screens and we shot only the area where they were digging to find the entrance to the Well of the Souls. Later on, in our cloud tank, we put in a cloudy sky background. One of the shots had a big circular vortex appearing in the center of it and there were shots of Sallah commanding the Arabs to dig harder and faster. There were five or six shots like that. Then we animated in the lightning and the rest of the distance was taken care of by matte paintings.

The sets we had to work with in London were wonderful sets. They have great master plasterers in England. For example, in the Well of the Souls sequence, they used 60 tons of plaster—an incredible amount of material. The big altar set for the final sequence of the picture was all built on one stage. It was very carefully painted and detailed so that the rocks really looked like rocks, even though they were a combination of Styrofoam and plaster and pipe rigging. All of the shooting on that huge set was completed in 3½

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days. Then it was torn down and sections of it were shipped to I.L.M. to be rebuilt for us to film the closer shots.

We did a lot of inserts and pick-up shots—such as cuts of Marion in the cave with the skulls and skeletons, and Indiana under the truck during the chase—so we fulfilled not only the special effects requirements but certain second unit functions, as well.

In terms of special effects, THE EMPIRE STRIKES BACK was more of a controlled situation. We were concerned mainly with stop-motion and a lot of matte shots. RAIDERS was more of a shoot-from-the-hip type of effects picture. It was a different sort of challenge. It's fun to work on different projects, where one is a certain way and another is altogether different.

We expanded our techniques, picking up from CLOSE ENCOUNTERS OF THE THIRD KIND the cloud tank technique that Doug Trumbull and his associates developed and brought into our grammar. We used that technique and came up with others that could be executed in water. Our big tank, the CLOSE ENCOUNTERS tank, is 7 feet by 7 feet by 4 feet deep, and it is in use all the time now. It opened up some different avenues for us. In RAIDERS there were a lot of very tricky animated mattes involved in making the material we shot in the tank actually work. Sam Comstock and his crew did a great job in coordinating all that.

We used rotoscope mattes principally in what we called the altar sequence, the final devastation sequence, where all the ghosts are flying around the people and you have closeups of the ghosts in pretty close proximity to the Nazis. It required a lot of very deft animation work, especially where something would be crossing in front of something else at one point, but not at another. Not to forget the fact that a number of the ghosts in that sequence were animated.

Our Optical Photography Supervisor, Bruce Nicholson, deserves considerable praise for his contribution to RAIDERS. We didn't have our usual fancy rear-lighted blue screen in England. We had to make do with a painted blue background, the best blue that we could find. Bruce had to deal with the results when the film was sent back to I.L.M. He had to come up with very, very complex density mattes in order to put 20 or 30 ghost elements into one shot—all separately photographed, because every ghost that appeared in RAIDERS was on a separate piece of film. We never shot two or three at a time, with the exception of the ghost vortex scene, which required 50 passes through the camera. All of that was extremely tedious

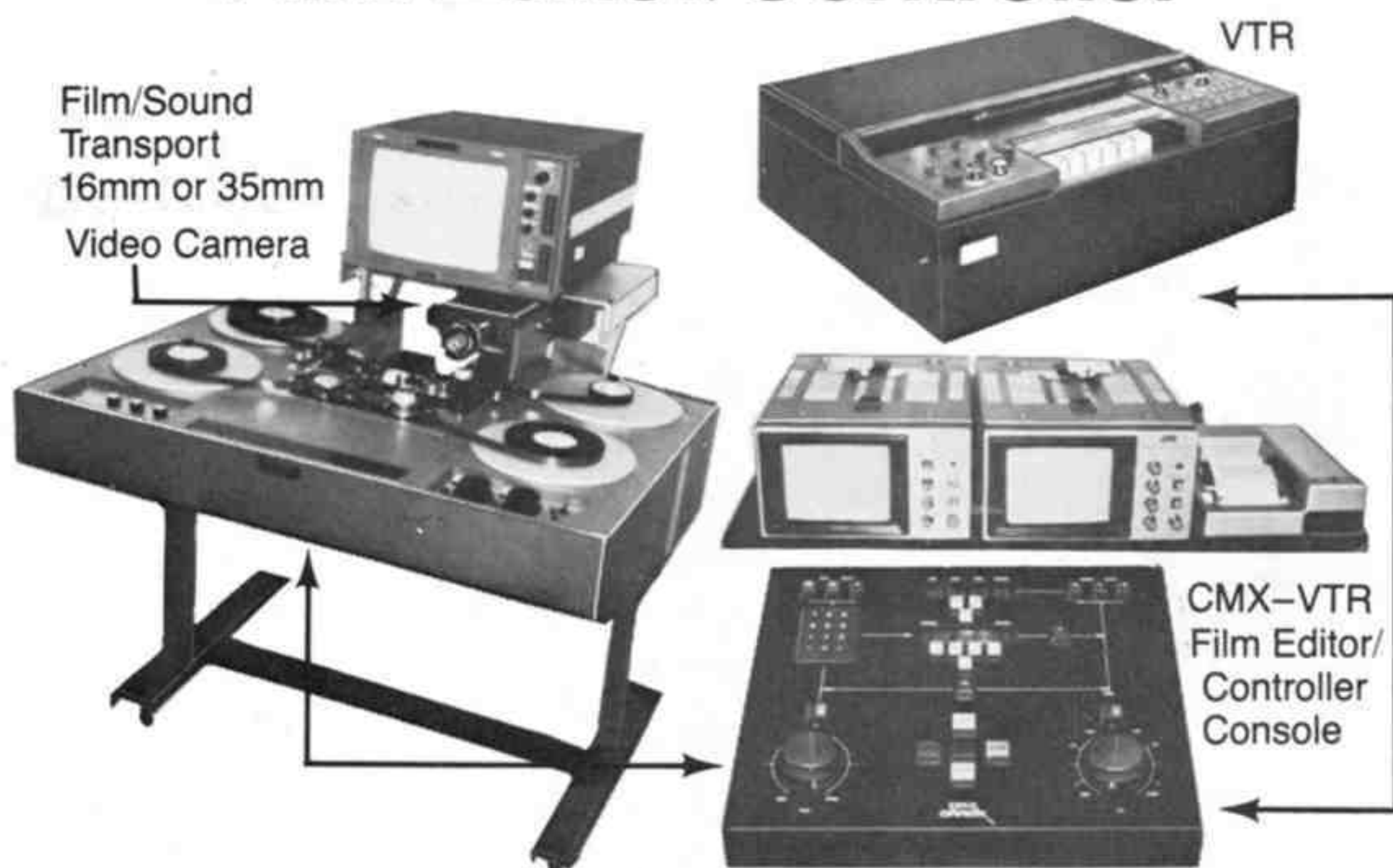
and there was some very expert optical matte work involved.

It was fun to work on RAIDERS, because there was a certain verve that was established early in production. The picture was regarded, in a kind of tongue-in-cheek way, as being a sort of "B" movie, in that it was not the kind of project that allowed you to make 10 or 12 takes on a scene in order to get it perfect. You would do two or three takes on a scene and then move on to the next shot. That kind of pacing of the production, which came in under schedule and under budget, lent a feeling of spontaneity to the picture which I believe shows on the screen.

The English crews have ways of working that are different from ours in the States, but they are definitely a wonderful work force, and very talented.

On RAIDERS I especially appreciated the opportunity of working with Steven Spielberg who, in my opinion, is one of the best directors around. He is never at a loss for an idea. He listens to advice and chooses the best advice. He knows how to set up a situation so that it flows incredibly well and can work on schedule. It was a great pleasure to work with him. ■

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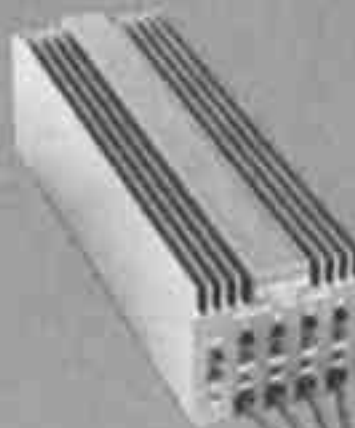


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RAIDERS ACTION

as well as stuntmen. I'm a firm believer that there is not a film that has ever been made—or will be made—that is worth anybody's life or limb. We have lost more stuntmen in the last seven or eight years than we lost in the previous 30 years and I believe it's because we are trying bigger and more dangerous stunts all the time.

QUESTION: Do you think anything can be done to cut down on these casualties?

RANDALL: There are hundreds of new people who are trying to get into our profession, due mainly to the publicity that it's gotten during the last three or four years. The competition is great and a lot of times these people don't have the background or experience to realize that the camera is a tool which can create illusions that produce the same thrill as doing a major stunt—but without taking the risk. A lot of kids new to the business have not been exposed to the oldtimers enough to learn the techniques to accomplish that. Instead of going at reckless speeds that are uncontrollable, let the camera work for you. Shoot at 18 frames per second instead of 24, so that you can do things at controlled speed. I feel that the mounting casualties have been due mainly to lack of experience—and, unfortunately, that lack of experience gets people killed. And not only stuntmen; it gets crew members killed, too. We've lost a lot of cameramen, for example. In my opinion, most of those casualties could have been avoided. I always say that there is no such thing as an accident. If a stunt is well thought out, well-planned and well-executed, you are not going to have accidents.

QUESTION: Aside from letting the camera work for you—which I feel is extremely important—what are some of the safety precautions that can be put into play to cut down accidents?

RANDALL: When you get into the technical aspects of executing stunts, it's not merely a matter of having the correct safety equipment, but putting the right people in charge of that equipment. You can have the safest piece of equipment in the world, but in the hands of somebody who is not qualified to handle that equipment, it can get people killed. So I feel that one of my biggest responsibilities is making sure that I put the right people in the right positions. We have a lot of tremendously talented stuntmen, but they don't all possess equal talent in every as-

pect of stunt work. For example, one man might have a special talent with motorcycles, but he might not be able to handle horses for a Western. Or maybe he can handle horses, but he can't handle cars. So, again, it's a judgment call as to who you put into those positions.

QUESTION: What are the problems attendant to doubling an actor?

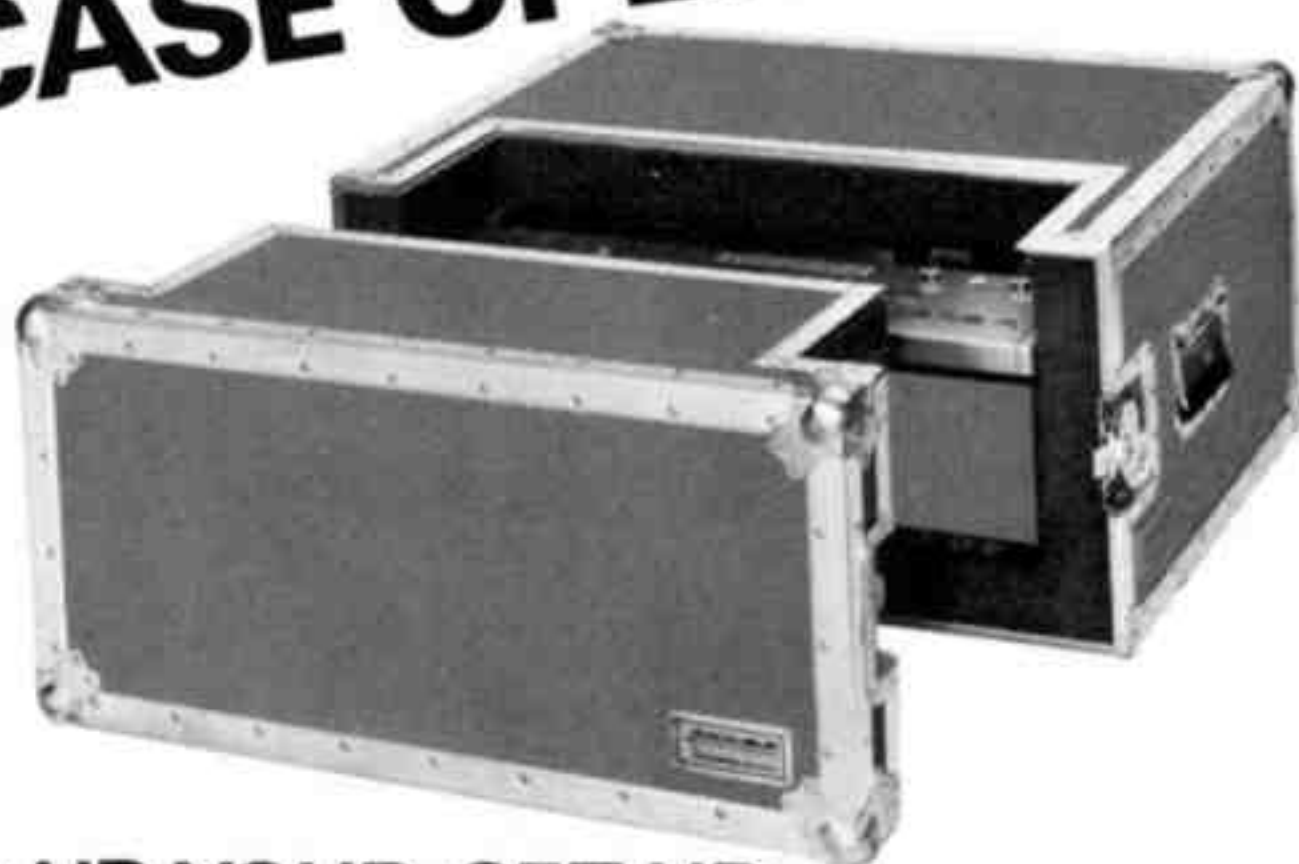
RANDALL: A lot of times you are locked into doubling an actor and you might find someone who can do that particular stunt, but he is not a good double for your actor. That's when it starts to get a little tricky in respect to getting it all accomplished without getting somebody hurt. We used four different people to double Harrison. They all possessed more or less equal talents, but some of them were more strongly suited for one thing than the other. So we used them in the areas where they could do the best jobs.

QUESTION: Are stuntmen rather rigidly specialized in terms of the types of stunts they can do—or prefer to do?

RANDALL: Years ago we used to be a profession of specialists, so if somebody were known as a "car man," chances are that's all he would be able to do. Or if he worked in Westerns, he would be able to drive horses or fall horses and teams and that's about all. Then the industry slowed down in general and the specialist could no longer make a livelihood doing just one thing. If production companies were not making his kind of film, he didn't survive. The generation in which I came into the industry was a more diversified generation. It was a generation of stuntmen who were capable of doing high falls, car work, motorcycle work and fire work. They trained themselves to be able to do all of those things. Now I find that, because of the size and scope of the stunts that are being attempted nowadays, they are kind of going back to being specialists. When I first came into the industry I was known as a very good high-fall man, and I went as high as anybody in the industry. In today's market I wouldn't even classify myself as a high-fall man. We used to fall 60 or 70 feet into boxes. Today they've got kids who jump 200 feet—incredible heights. I don't think I could look down from that height and even consider jumping. We are getting back into the age of the highly-specialized technician in a given field, but there will always be a demand for a good general, all-around stuntman.

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prised mainly of specialists?

RANDALL: When I'm preparing to do a show, wherever it might be, I'm going to surround myself with those people who do a number of things, because it makes me more versatile on a job. I don't have to tell a director, "No I can't do it, because I've got the wrong personnel. I've got to call back to Hollywood and have somebody sent out next week so that we can do it." If you surround yourself with people who are capable of doing all of the different kinds of stunts, you are going to be successful.

QUESTION: Getting back to RAIDERS OF THE LOST ARK, can you tell me more about that under-the-truck stunt in the chase sequence?

RANDALL: The basic stunt had been done years ago in John Ford's STAGE-COACH, as I'm sure you're well aware. We had problems with the truck that we wouldn't have had with a stagecoach, which is much higher off the ground. The ball housing in the back of the truck we used was, I think, only eight inches above the ground, so that to drag a man from the front of the truck all the way to the back of the truck was almost an impossibility. We looked at tires of various sizes to see if we could get added height off the ground that way. The only solution we could come up with was to dig a channel 150 or 200 yards long—wide enough so that a man could lie in it, yet narrow enough so that I could get a wheel on either side of it. We figured that would give us the additional four or five inches we would need to pass a man under the truck. We couldn't make the trench too deep, because then he would have gone out of sight and the audience would not have been able to see what was happening. So the depth was very critical; it had to be right on the money. It couldn't be too deep, but it had to be just deep enough. As far as the rigging to go under the truck was concerned, we used basically the same rigging that they used in STAGECOACH. It was an iron rod that allowed a man to hold onto it and keep straight so that, as the truck passed over him, he could stay between the wheels. Terry Leonard, one of the two Americans I brought over (Chuck Waters was the other), did this stunt and most of the truck sequence doubling for Harrison Ford.

QUESTION: Was Terry Leonard the one who did a similar stunt for LEGEND OF THE LONE RANGER?

RANDALL: Yes, and he had an accident

on the picture that could have been a crippling one for him. While he was attempting it, a horse stepped on him and pulled him off his rod and the stagecoach ran over him. When we got ready to do the truck sequence for us he was just recovering from a bad leg injury where the wheel had run over it and he had to get himself prepared, because he would be doing the same kind of stunt. But he did a fine job and, fortunately, things worked better for him this time than they did on *THE LONE RANGER*.

QUESTION: What is involved in psyching yourself up for an especially dangerous stunt?

RANDALL: It really depends upon how comfortable you feel with the stunt that you are doing, and how qualified you are to do that stunt. I'm sure that people who are attempting things that perhaps they've never attempted before have more anxieties than somebody who has already accomplished that particular stunt and knows all there is to know about it and exactly what is going to happen. Such anxiety could work for you and it could work against you. Sometimes you need that additional adrenalin to accomplish whatever you are attempting—and sometimes your problem could be having too much adrenalin and overshooting your mark—going faster than you should be going, jumping farther than you should have jumped, not having clear vision of what you're doing because there is too much adrenalin pumping through your system. It can work either way.

QUESTION: How do external personal problems that have nothing to do with the stunt affect a stuntman's proficiency—problems like a fight with his girlfriend or his wife leaving him—the usual?

RANDALL: We've all had our problems and woes in life, but when he's faced with a situation that can kill him, I don't think a normal man has anything on his mind other than what he's doing. He has his home life, his mortgage and whatever other problems there may be, but when he's confronted with that life-or-death situation, that's foremost in his mind. And if it's not, then he shouldn't do the stunt.

QUESTION: Have you ever had a stuntman say, "Look, I'm having problems. I just can't go through with this."?

RANDALL: I've had stuntmen say that they'd rather not do a particular stunt—and I respect them for it. I respect them

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because they have good common sense. They are not being forced into something. Their egos are not forcing them to do something that they are not capable of doing. So I respect the stuntman who says, "Glenn, maybe we ought to find someone else to do this particular stunt, because I don't feel comfortable with it." I think that, on the whole, most stuntmen are like that. I don't think that they are going to jeopardize life, limb or career attempting something that they know they shouldn't be attempting.

QUESTION: Aside from sheer inexperience, what do you feel is the main cause of accidents among stuntmen?

RANDALL: A lot of times good stuntmen - and I qualify them as "good stuntmen" because we have both kinds - good stuntmen normally get hurt on a stunt because they have become so familiarized with it that they have developed what I call a "contempt" for that particular stunt. They no longer take the added precaution. They no longer get as psyched up to do it. And then it catches them. All of a sudden something happens and they really aren't mentally prepared for it - only because they had contempt for it going in. I've seen that happen on quite a few occasions and I lost a dear friend who was doing a stunt that he had done for me in a large show situation maybe 150 times on a daily basis. A year later, after doing it that many times for a full season, he was killed doing the same stunt on a movie - because he didn't take the extra precaution. He was so familiar with that particular gag that, in his mind, nothing could go wrong. It was so cut and dried. But it isn't! Stunt work isn't cut and dried. There's always those variables which, if you don't pay strict attention to them, can get you maimed or killed or get somebody else injured.

QUESTION: What would you recommend by way of training for young men who are thrilled with the romantic idea of becoming stuntmen?

RANDALL: My first advice would be for them to stay in school and try to find another profession. Being a stuntman is not an easy profession. There are a lot of things that go into the making of a successful stuntman - first and foremost of which is a certain kind of athletic ability. If someone is totally dedicated and determined to come to Hollywood to be a stuntman, I would say that he should bring a particular talent with him. He should find an area in which he can excel and then excel in it before he tries to get into this

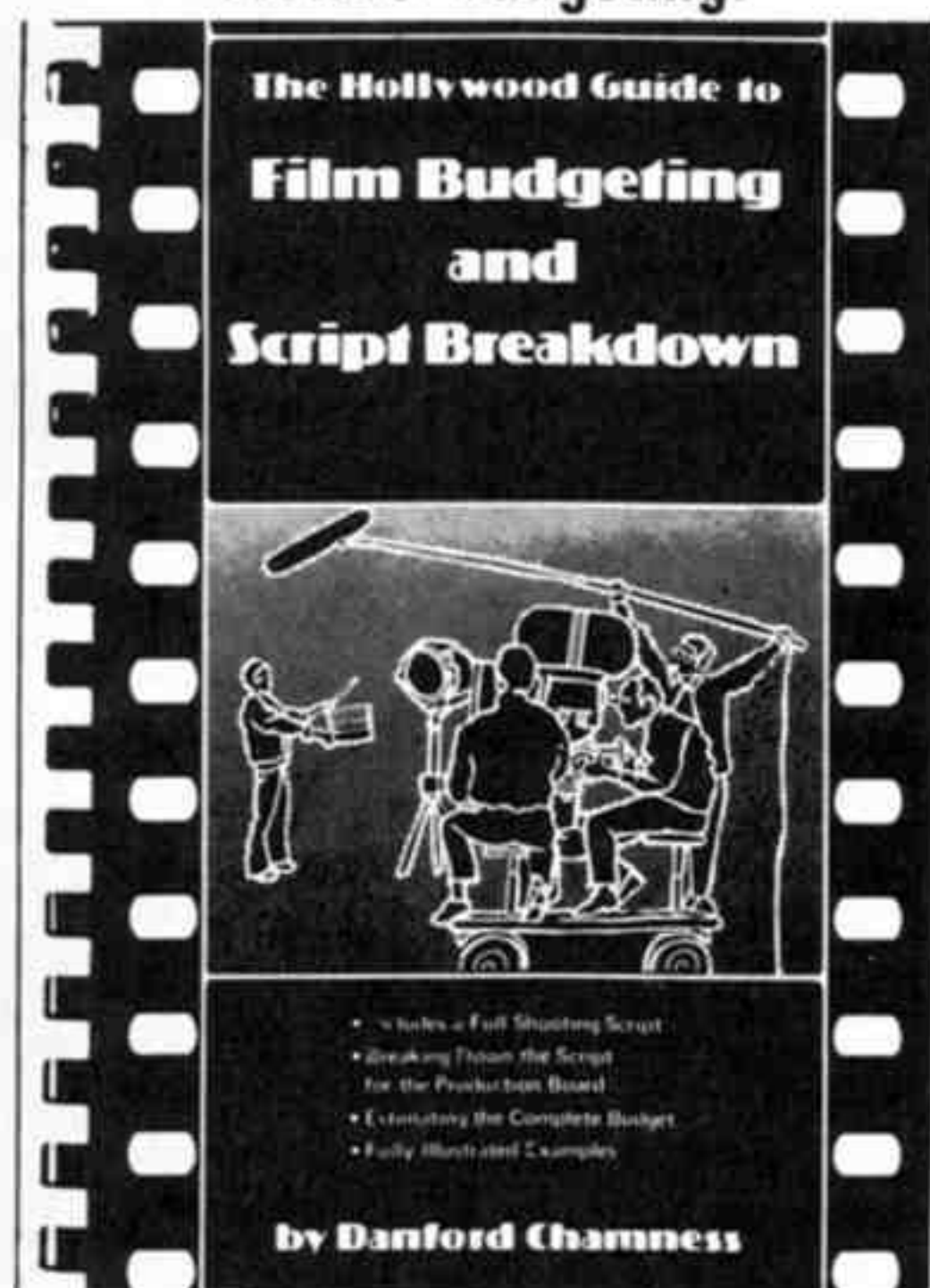
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industry. I've found in recent years that the boys who have become successful have been pulled into Hollywood for a given talent—whether it's skydiving or expert high work or championship motorcycle or car driving or whatever. You should have something special to offer Hollywood before thinking that you're just going to go out there and break the door down. I would say that it takes as much dedication, as much hard work to become a successful stuntman as it does to become a successful actor—and the chances are that you would be able to make a living more quickly as an actor than as a stuntman.

QUESTION: Assuming that a man has all the right attributes, how long do you think it would take him to become established as a professional stuntman in Hollywood?

RANDALL: I would say that it would take anywhere from seven to ten years to become established well enough to where he could make a living at it—and that's if he has the talent, gets the breaks and has the right attitude, the cooperative make-up to be able to join in with a society of people who are dedicated to doing stunts. They make you conform more to their patterns, as opposed to coming in with your own ideas, because their patterns and ideas have been developed over many years, after a high cost in injuries and lives. As a result, there is a certain attitude toward doing stunts that has been developed by the oldtimers and if you come in as a cocky, aggressive, brave young man, they really don't want you around them, because they don't want to be responsible for what's going to happen to you or what you might do to someone else. It's normally people who have that cocky attitude, that dare-devil, devil-may-care way about them that the experienced stuntmen want to stay completely away from. It is not a dare-devil business. It's a business that has been developed and tested and proven and they want to keep it safe.

QUESTION: Is there any specific sport that you feel would prepare someone especially well to become a stuntman?

RANDALL: I've always felt that football players possess a lot of the attributes that would be useful in doing stunt work. They are used to getting knocked down and getting up and having to run another play. They have learned that you have to play even when you're hurt. That kind of goes along with doing stunt work. There are a lot of times when you have to do a stunt—whether it be laying a motorcycle down or

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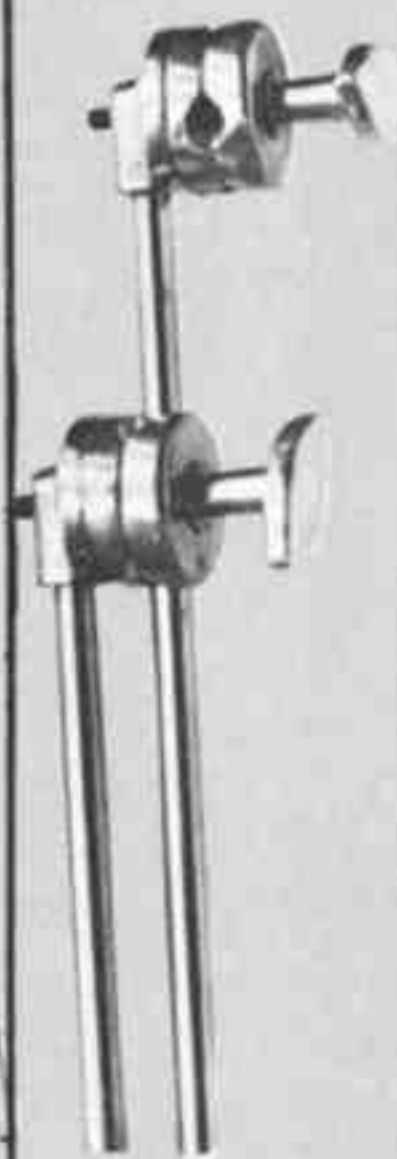
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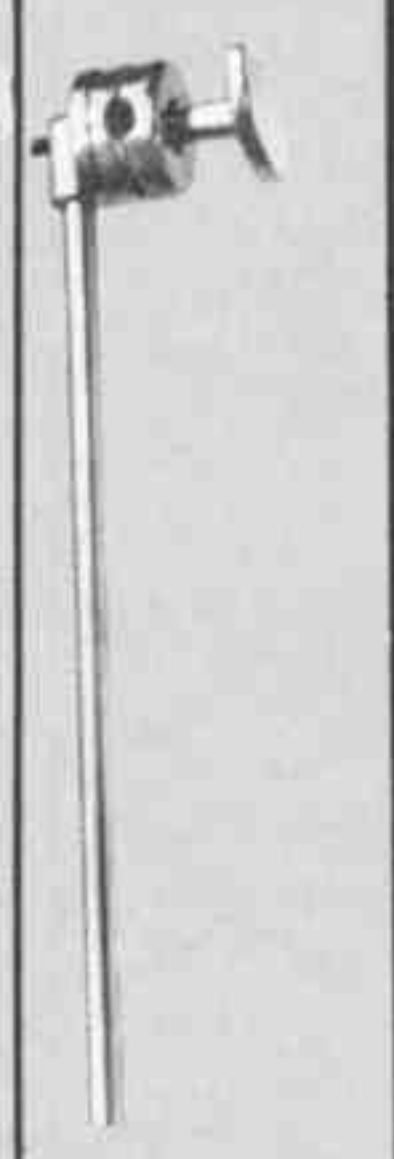
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falling off a horse—when you get thumped or rocked pretty good, and you have to be able to get back up and do it again. You've got to possess the inner strength to be able to do that. A lot of other sports—high diving, for example—do not provide the exposure to pain that is sometimes involved in doing stunts. That's not to say that a stuntman is a meathead who is only capable of getting hurt and getting up and doing it again, but there are those times and you've got to have the inner strength to get up and go again.

QUESTION: Would gymnastics be good preparation for becoming a stuntman?

RANDALL: Gymnastics would be good preparation for doing all of the fancy moves, but there are so many different areas of stunt work. Some of them involve dragging somebody behind a truck and bouncing him across a road. But the real bread and butter, the meat and potatoes of stunt work, is falling down on the ground—whether it's falling out of a car or off of a stagecoach or out of an airplane. When you hit the ground at speed or from any height, it hurts, and I don't care how good you are, you have to get up and do it again.

QUESTION: Thinking back to your experience in working on RAIDERS OF THE LOST ARK, what one particular thing sticks in your mind?

RANDALL: The stunt crew that we had. I'd had an opportunity to meet all of those stuntmen on various shows, but when I brought them all together they had not met each other. I knew what I was getting, but they were unknowns to each other, in a certain sense. However, great friendships developed between them. We had several boys who were our in-house clowns and they just got together and had great times. More important—there was total cooperation as a crew, as a group of guys all working together. They were not competing. It was not an international competition going on. It was total cooperation among all the guys, and I was pleased and happy that they worked together as hard as they did. No matter who was doing the stunt, everybody was there to help him, and it was a collective effort. I think that is one of the reasons that it came off as well as it did. We knew as a group, even though we were all foreign to each other in a lot of respects, that we had total support. There was a high degree of professionalism and brotherhood among the stuntmen. I found that very gratifying.



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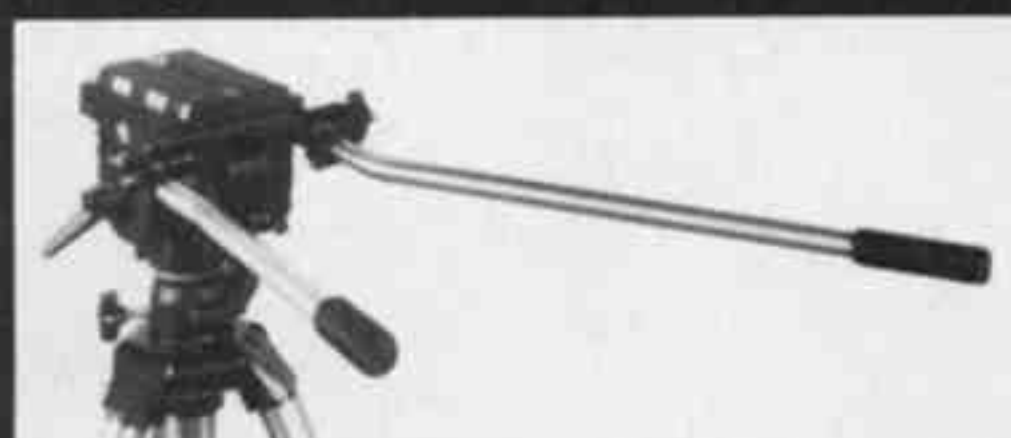
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INDEPENDENT FEATURES

Continued from Page 1114

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"OF NARROW MISSES AND CLOSE CALLS" *Continued from Page 1142*

according to the azimuth of the sun?" I remember picking the location that we eventually selected for CLOSE ENCOUNTERS based on where the sun was going to be, and when Dougie and I went on a recce, in Tunisia, we placed the stakes for the exterior sets according to Dougie's predictions of where the sun was going to be five months hence, which I had never really done before. In working with Vilmos Zsigmond on SUGARLAND EXPRESS, I found that he hated the sun. We always waited for the clouds to cover it. On JAWS the sun was the most taken-for-granted issue. It was always out and we didn't care whether it was front, side or back, as long as the shark worked. So really, for the first time, I became aware of how the sun could be used as a tool of great artistry and I think Slocombe used the sun on RAIDERS the way Vittorio Storaro uses his amber smokey units inside to such great effect.

Dougie Slocombe is an amazing connoisseur when it comes to photographing women. I took Karen Allen's freckles off with makeup and then Dougie took over from there and made her look just wonderful. She was marvelling in dailies how she had never appeared better in movies and, as far as she was concerned, real old-fashioned Hollywood photography. We were marvelling at how wonderful Karen looked, and didn't we wish that style would come back—not for all movies, but for films like RAIDERS.

Dougie would take at least twice the time lighting Karen as he would Harrison. Now, this is nothing against Harrison, because my image of Harrison was always Fred. C. Dobbs out of THE TREASURE OF THE SIERRA MADRE—five o'clock shadow and the kind of grumpy and grizzled view of everything. Where Harrison was concerned, Dougie would say, "We're ready." And I'd be amazed at how quickly I'd be back on the set shooting with Harrison, but where Karen was concerned, I would be on the set pacing for a long time, saying, "Dougie, how are we coming?" Dougie would smack his lips together—smack his tongue, which was characteristic of Dougie—and he would say, "Oh, ten minutes." I'd always hear 10 minutes for Karen—ten minutes meaning half-an-hour—and with Harrison it would be five minutes meaning 15, which I think was part of Dougie's charm.

Dougie always managed to be a little bit off on his estimates of lighting by saying ten minutes. Even on shots that I knew would take an hour, he would always say 10 minutes, because it would placate me

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I certify that the statements made by me above are correct and complete. Alfred Keller, Executive Director.

for ten minutes and he knew I would be sitting off in a corner somewhere leaving him alone to light and do his thing. I'd be off talking to the actors and preparing something else, and I'd come back in ten minutes and say, "Are we ready yet?" He'd say, "Ten minutes." Then I'd go away for ten more minutes and it was a ritual we shared all through the shooting that still brought us in 12 days ahead of schedule.

He is wonderful with photographing women. Then I recalled how well he made Vanessa Redgrave and Jane Fonda look in JULIA, and how marvelous he made everybody look in THE GREAT GATSBY. Of the remaining great British cinematographers Dougie is the greatest and at the rate he is going, he will be the greatest for many decades to come.

It's interesting that there are so many different schools of thought and philosophy about lighting. Dougie uses a lot of small units to light brightly and yet sketchily. He uses a fill light unit called the "Basher"—which I would walk around turning off and he would walk around turning on—and at times it became another running sight gag. At the last moment, Dougie, feeling a little bit insecure with the amount of fill light, would get the "Basher" and actually hold it and walk around the camera during a camera move with the "Basher" on everybody. He would put so much diffusion in front of the "Basher" that you could hardly see the difference in dailies, although it is there and that is the difference between a great artist and just another Director of Photography. He uses it to really wonderful effect, and yet it became a running gag with us because I love heavy backlighting with very little fill, especially when I am looking for a kind of heavy, down mood. Dougie likes his down moods a little on the lighter side.

It was just a fascinating experience working with one of the great British cinematographers for the second time. He's such an artist, such a *responsible* artist and yet he is such an eccentric at the same time. In a way that you would never imagine.

For the sequence with the snakes, in the Well of Souls, the big dilemma there was the torches. At first there is motivation for light because they take the great stone off the top, and they look down 50 feet to the floor covered with a carpet of snakes. I wanted a lightning storm to occur then so it would be easy to motivate some lightning mysteriously edging the snakes as they crawled and slithered and consumed each other and laid eggs and were generally acting horribly. But then what happens when Belloq, the French archeologist, seals their doom by sealing the tomb and they are trapped in this huge snake pit



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with torches going out one at a time until only one remains? Where does the light come from? It was a problem that Dougie and I dealt with over a period of a couple of weeks, trying to rationalize how we could still see the 30-foot jackal statues and the hieroglyphics on the walls when we were down to one torch. We decided together that we would just take license and provide an "invisible movie light" that Hollywood invented 40 or 50 years ago and that comes in handy for just such situations. It is what I call "nothing ambiance."

It was the kind of nothing ambiance that I think every director is faced with at one time or another when you have no point source motivation. You don't have windows, you don't have cracks in the doors, you don't even have a keyhole. You're trapped in a black room, so where does the light come from? It is a really interesting dilemma. Dougie chose to do it with very, very soft bounce light for overall ambiance, which gave it a no-light look. I'm specifically referring to the scene where the jackal statue falls over, where there is no light because Marion's torch goes out, and before the jackal statue breaks through the wall and allows the second source of soft light to filter through the catacombs, a very soft blue light.

Dougie is also one of the few cinematographers I've worked with who lights with hard and soft bounce at the same time. He really varies his light. Sometimes he'll soft bounce or hit with a Basher through about a half-inch of diffusion someone in the foreground who is in a softer part of the set, and yet something near a harder window in the background will come in with the full force of a direct arc. Just the contrast between those styles within the framework of also using warm light and cool light and mixing the two can be exquisite.

I know Storaro works this way, and I know that Derek Vanlint worked that way with Ridley Scott on certain portions of ALIEN, but I haven't seen that style used very often—mixing a whole variety of tones and atmospheres in one shot. Life is like that, but so often cinematographers find something that works successfully for them (as do directors) and use it again and again. I know that I have to concentrate on changing my style from film to film or often I'll be tempted to repeat techniques or approaches that have proved successful before.

The same thing holds true for cinematography. The cinematographers whom I admire most are the ones whose style I can't recognize from film to film. There are cinematographers who I could tell you in the first reel who it is without seeing the credits. There are others who remain full

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of surprises by always changing outward *persona* through allowing the story to suggest the visual style, not the other way around.

This is not dissimilar to the work of a great actor—Laurence Olivier, let's say—or an American actor like Di Niro, who really puts on disguises and doesn't want to be Jake La Motta when he is making *TRUE CONFESSIONS*—and certainly those two styles are as different as anything in the Di Niro repertoire. Among cinematographers there are some like Owen Roizman, whose visual approach to *THE FRENCH CONNECTION* appeared to be 180 degrees opposite to what he did in *RETURN OF A MAN CALLED HORSE*, which I feel is one of the best photographed outdoor productions I've seen in a long while.

On "1941" I used the Louma Crane very extensively throughout the production, but on *RAIDERS* I used it only twice—once in the Well of the Souls set in order to reach up over those 35-foot statues and look straight down at Indiana Jones climbing toward us. But I probably used the Louma Crane better than I've ever utilized it for one particular shot in *RAIDERS* that is, sadly, not in the picture. Only a portion of it remains. I had designed a drinking contest that takes a substantial amount of screen time. It went on for almost five minutes—which is the reason it now runs only two minutes in the movie. It didn't conform to the pacing of the rest of the picture and was really out of place. But it was the best use of the Louma Crane that I've ever experienced.

In that shot the Louma Crane begins at the top of the stairs in this Nepalese bar, Marion's tavern, and comes down past all the French climbers, Australian climbers and Sherpa guides, down through all the women and Mongolians, right to a closeup of a man who is drinking next to someone we have yet to see. He finishes his drink and the Louma pans with the empty glass, which joins 20 other empty shot glasses and you suddenly realize that this has been going on a long time. Then a rather delicate hand takes a full glass filled with liquor and reveals, for the first time, Marion Ravenswood, drunk and feisty. The Louma loosens to a two-shot as they have one more drink and the Louma continues to loosen as Madlo, who runs the bar with Marion, takes all the empty glasses to the bar. So the Louma then cranes 45 feet to the bar past at least 70 extras, all of whom have a stake in this contest—loud shouts, money flashing in the foreground, etc. He refills the drinks and the Louma slides in to a super-close tight shot of eight glasses being refilled. Then the Louma eases back and returns

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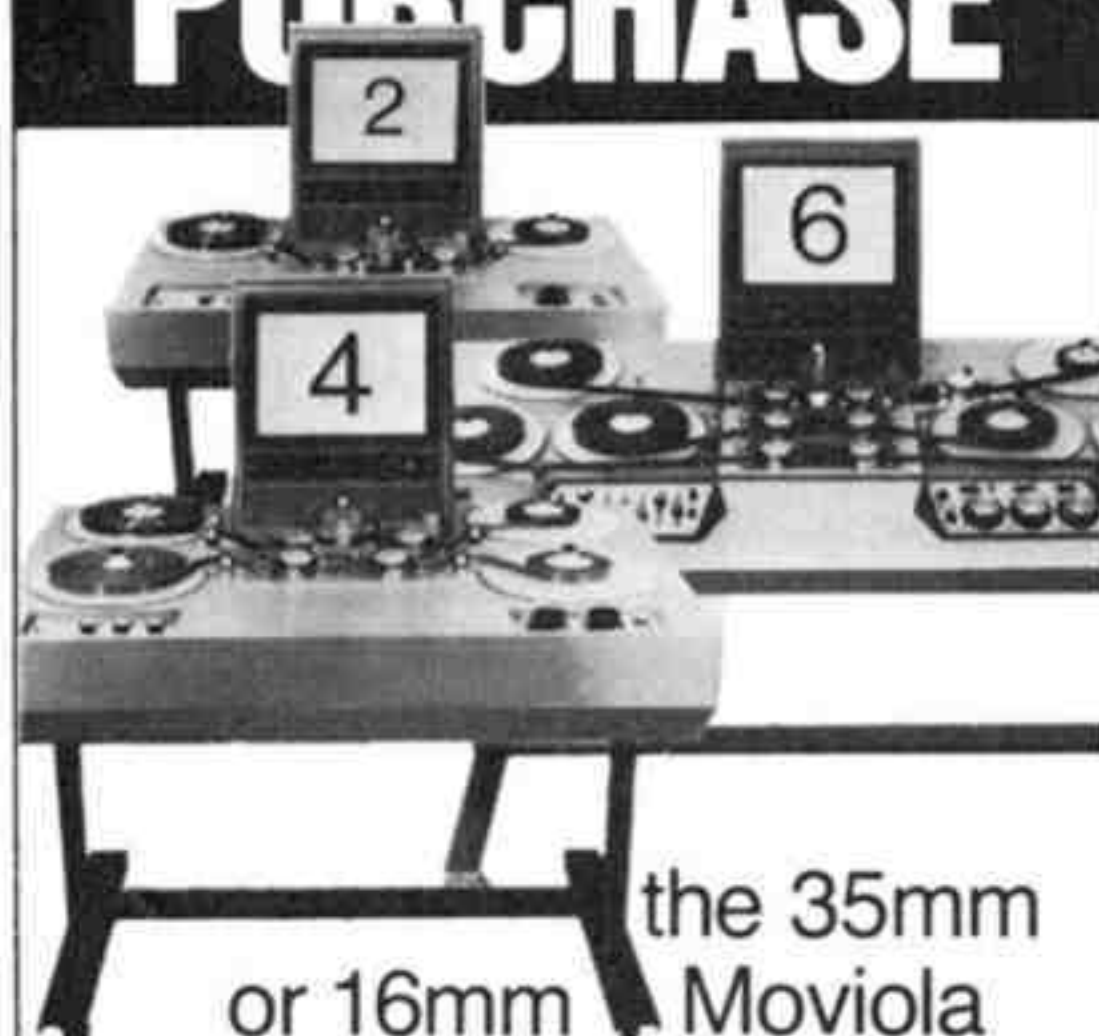
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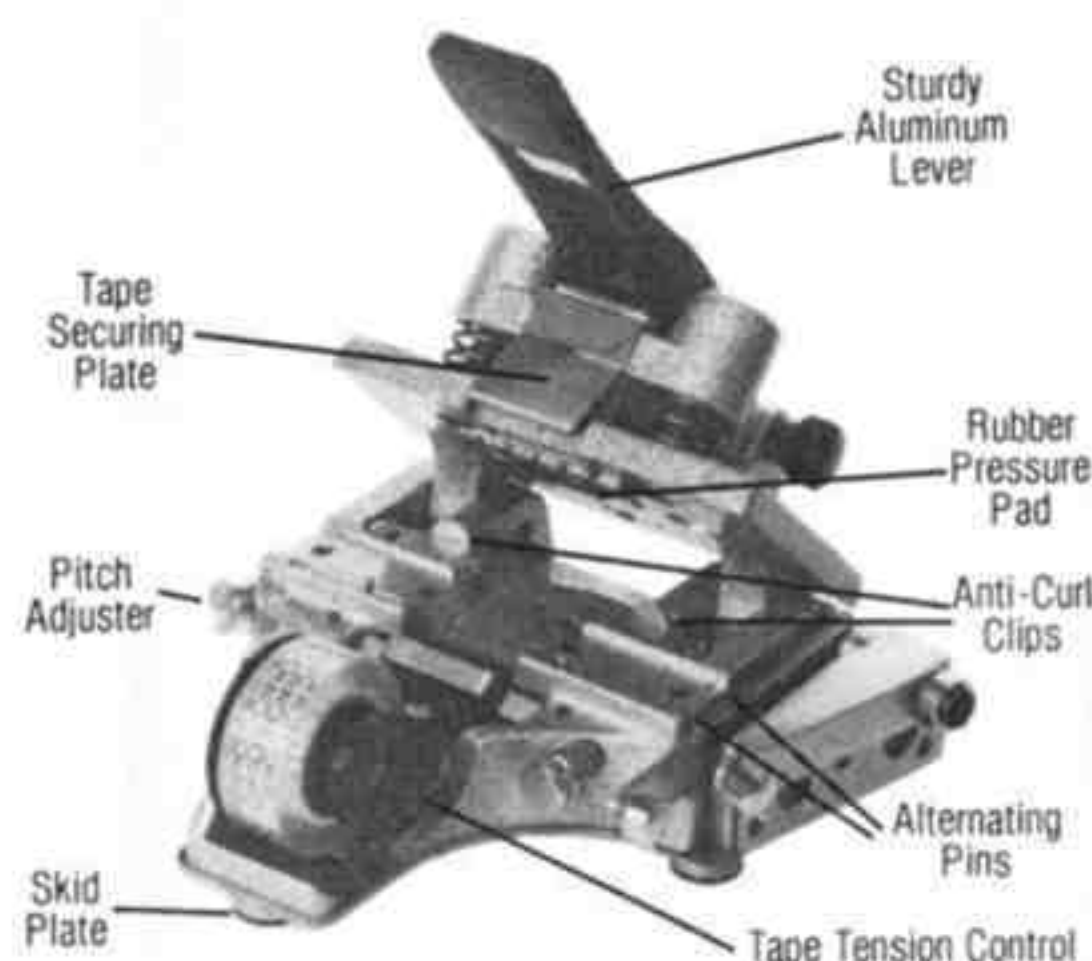
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to the table, but not to the close group shot at the table. Instead it angles to a high cluster shot of 100 people pressing in around the table for the final drinks. Then we make a complete push in—very slowly—as the final drinks are consumed, panning back and forth (like at a tennis match) and finally stopping on Marion for her last drink. She survives, the camera following her last empty glass to the challenger's full one. He drinks and falls off his chair, breaking it. The Louma goes back to Marion. The whole room erupts with cheers and applause. Marion stands. The Louma eases back and moves to the opposite side of the set, 90 degrees from where it began, and finishes the sequence.

The Louma people believe this was the most extensive use of that special camera crane, with the exception of the opening title shot in Roman Polanski's *THE TENANT*, where it crawls up the side of a building, goes through several windows, out a few doors, beyond a fire escape, and on and on and on... I gave Jean-Marie Lavalou, who is one of the Louma Crane's inventors, a print of that shot as an almost guilty apology for not using it in its entirety in *RAIDERS*.

Not only did I not have more need for the Louma Crane in filming *RAIDERS*, but I actually didn't have it in the budget. We were really cutting corners. One might complain: "You had \$20 million and you couldn't afford the Louma?" We couldn't even afford the Panaglide for the whole picture, because we were really pressed. We had almost \$4 million in sets alone, and when you multiply that against \$100,000 per shooting day on a distant location, and everybody's salaries, and what it costs today to shoot a movie internationally (whether it's a big picture or a small one), you start to see why the film cost \$20 million.

In order not to allow it to get away from us, devices such as the Louma and Panaglide had to be sacrificed. The same held true for extras. I wanted 2,000 Arab diggers. The costs would have been very high. The challenge became: making 600 diggers look like 2,000.

In the original script, Kasdan embroidered dozens of images to take us from one country to the next—huge montages from San Francisco to Nepal, from Nepal to Cairo, from Cairo to the Mysterious Island in the Mediterranean. To save money, I finally decided to show a map of the world with little animated travel lines tracing the route of our adventurers.

Another example of cost cutting (and upwards compromise) was a sequence in the script that called for Indiana Jones to fight a Black Arab swordsman. It was writ-



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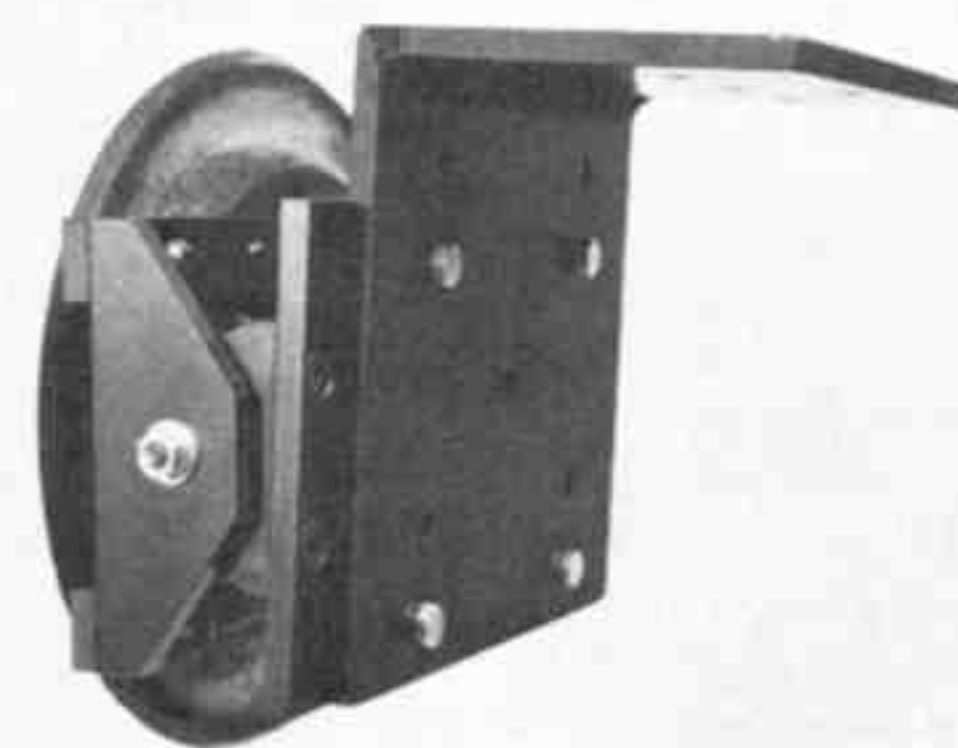
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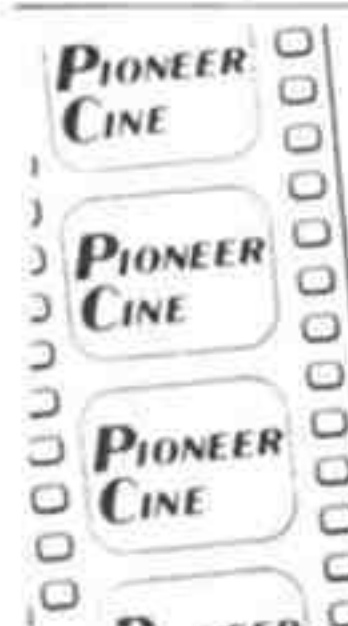
ten as the definitive whip vs. sword duel. It was two pages of prose scheduled for a day and a half of shooting, but Harrison Ford had a bad case of the local *turistas* that day. Instead of shooting what was in the script, I simply had Harrison pull out his service revolver and shoot the Arab. We were then another day ahead of schedule and that moment seems to be one of the real surprises in RAIDERS.

Our first week of shooting was on the water, which recalled many horrible memories. It was in La Rochelle, France, and it was the sequence in which the *Bantu Wind*, the pirate ship on board which Indiana Jones has secreted himself and his lady and the Ark of the Covenant, is overwhelmed by a Nazi sub and a lot of storm troopers who re-recover the Ark. That was shot in the open sea aboard a real tramp steamer of Egyptian registry. The submarine pen was a real World War II sub pen with faded Hitlerian inscriptions carved onto the walls. It was really like time-tripping backwards. The sub pen was pocked with tens of thousands of shrapnel chips and the ceilings had 12-foot craters from those 100-pound bombs that were dropped by the R.A.F. They never could penetrate the steel and concrete.

Those pens were also famous because the first allied skip bombs (torpedos) were used on the doors of the pens, which were in service all through World War II. There was an actual working scaffold and a train overhead that was used to off-load and on-load. Dougie put a bunch of 9-lights up there and we actually photographed it to look like a sort of twisted mother ship hovering over the U-boat to grapple and secure the Ark so that it could be hoisted out of there. That was quite an interesting location. I enjoyed it.

Probably the strangest experience I had in Tunisia was when, on the second to the last day of shooting, I had 200 extras lined up for a shot that really required them to be in specific places and hit their marks. We cut their marks (little crosses) out of wood. When we didn't get the shot before lunch, Robert Watts said, "Lunch—one hour." And all the Tunisians took their marks to lunch with them. When we came back 40 minutes later, we had 200 extras running around saying, "Where do I stand? What do I do with these little things?" Most of them thought they were souvenirs.

There are several matte paintings in RAIDERS, but the audience doesn't seem to notice them—which is good, because matte paintings fail when noticed. In this film they were only meant to be part of the experienced production value. The establishing shot of Nepal and the Raven Bar is a wonderful matte painting. My least favorite painting in the picture—a paint-



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ing that resulted from the rush to complete the movie—is a matte involving the Pan American China Clipper, parked at the harbor. That was a wonderful painting, but I thought that the background was a give-away. I just didn't feel that the background was compatible with the water that we shot. The plane was actually at drydock and the water and the harbor in the background (behind the plane) were added. More successfully, the painting of the staff car going off the cliff right in the middle of the chase is a wonderful combination of a matte painting and stop-motion photography of the little figures tumbling out of the plummeting staff car, their hands clawing the air as they fall to their doom—and on to Chapter 12 of our "feature serial".

The last four minutes of the picture is a combination of opticals. It certainly goes wild from that point on and that's where most of our effects money went.

Everything at the top of the Well of the Souls at night, when the storm is approaching, involved a combination of effects. They are digging and digging to get into the Well for the first time, with the torches and the German encampment in lights to screen left below. And there are those rather celestial clouds moving in, with forks of lightning hitting the horizon, zapping overhead. That involved some amazing matte painting work combined with the cloud tank photography invented for CLOSE ENCOUNTERS.

The 12-foot rock which chases Harrison Ford in the cave sequence would have killed whoever it ran over—if it ever had. We went to great lengths to make a 12-foot rock out of fiberglass and wood and plaster precisely so that it wouldn't weigh as much as a real 12-foot boulder. So whether it weighed 300 pounds, which it did, or whether it weighed 80 tons, as it would have, it could still have done bodily harm to anyone falling beneath it—and Harrison was not doubled in those scenes. Not only that, but the sequence was shot in the second week of principal photography in London. I mean, the absolute worst time to eliminate your leading man is in the second week, but because the rock was more effective chasing Harrison with Harrison running towards camera, it just didn't work as well having him doubled. A double would have cheated his head down, so Harrison volunteered to do it himself. He succeeded. There were five shots of the rock from five different angles—each one done separately, each one done twice—so Harrison had to race the rock ten times. He won ten times—and beat the odds. He was lucky—and I was an idiot for letting him try it.

There were no miniatures involved in that sequence. The Peruvian caves were

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full-size sets, with a full-size boulder. The rock was operated by a cam and rod, a steel rod that came out from the side of the set, disguised by rubber stalagmites and stalagmites, and very underlit. When the rubber was disturbed you couldn't see the stalagmites and stalagmites moving as the ram on rails guided the spinning rock from the beginning of its run to the end of its run—about 40 yards.

As for the Peruvian natives—they were Hawaiians who looked like Peruvians. We interviewed a lot of Hawaiians. A lot of them looked too Hawaiian, but all those who looked more South American we hired. They were heavily disguised in war paint.

Glen Randall was the stunt gaffer on the film. He assembled an international cast of stunt experts from Italy, Spain, and America, including Terry Leonard from the U.S. and Vic Armstrong who did a lot of the location doubling for Harrison. We also had Wendy Leach, Martin Grace, Jack Dearlove, Chuck Waters, Bill Weston, Paul Weston, Billy Horrigan, Rocky Taylor and Sergio Mione, a wonderful man who portrayed the last Nazi in the truck chase, the mean sergeant.

There were so many dangers to everyone involved, because the picture is all stunt work and spills and close calls and cliff-hangers, that we would just wear these guys out like "Wash 'n Dries." That, combined with the "Tunisian Revenge" from the hotel food, meant that they would lose their punch and have to go away for 12 hours to regenerate, while somebody else would step in.

Nobody was seriously hurt, but at one point we had a near-disaster when the flying wing actually started to run over Harrison Ford's right leg. He tripped and the wheel began to move across his tibia—before they could shut off the hydraulics. About 40 crew people were trying to rock the airplane off his leg and the only thing that saved his leg from shattering in a hundred pieces was the fact that it was so hot that the rubber was soft and pliable and the ground concrete pad was covered over with two inches of sand. Because of this there was enough give between the rubber and the sand that Harrison completely escaped any harm. That was our closest call on the picture—that and the real biplane that Harrison crashed in on the last day of shooting in Kauai, Hawaii.

Terry Leonard took some pretty nasty spills during the truck chase. He went out of the truck at least three or four times, as did Charles Waters. Waters took some very bad spills, landing on his head twice, but what broke his fall was the fact that every time somebody falls out of a truck the action is staged so that he falls down

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an incline. In those old serials, where you see the Good Guy jumping off his horse onto the Bad Guy's horse to drag the Bad Guy to the ground, they are almost always rolling down hills. You rarely see them hitting flat ground. This was the same in RAIDERS. The philosophy of the stunts was no different from the philosophy which Yakima Canutt used in pioneering so many of the stunts that we take for granted in movies today.

I must say that a lot of the credit has to go to Glenn Randall, who not only did a lot of the stunts himself (always making sure that safety came first), but Glenn personally invented a lot of the stunts that are so exciting in the movie—like the stunt where Terry goes under the truck hand-over-hand. That was Glenn Randall's invention. According to my storyboards, Indiana was merely to slip and find himself in danger of having the whole truck run over him. Then, as in the Yakima Canutt stunt in STAGE-COACH, in the last instant he was to grab hold of the tailpipe with his whip and climb back on. But Glenn's better idea—to let him crawl hand-over-hand underneath as the truck roared ahead at 45 miles an hour—is probably one of the show's best stoppers.

I loved the experience of filming RAIDERS. I don't know if it was the good fortune I enjoyed on this particular adventure, but I'm anxious to work again overseas.

I'm definitely going to direct the sequel to RAIDERS. I had such a good time making the first one that I would hate to let the second one slip through my fingers into somebody else's hands. I'll certainly not be involved in the third or fourth one, but I really want to do the follow-up, because the new story is even more spectacular than RAIDERS OF THE LOST ARK.

I've had to push back a few more years the promise to myself to make a number of small, Truffaut-esque pictures, although the one I'm currently doing, A BOY'S LIFE, is the smallest movie I've ever made—under \$10 million, and all with children. It's the kids' picture I've been anxious to do for several years.

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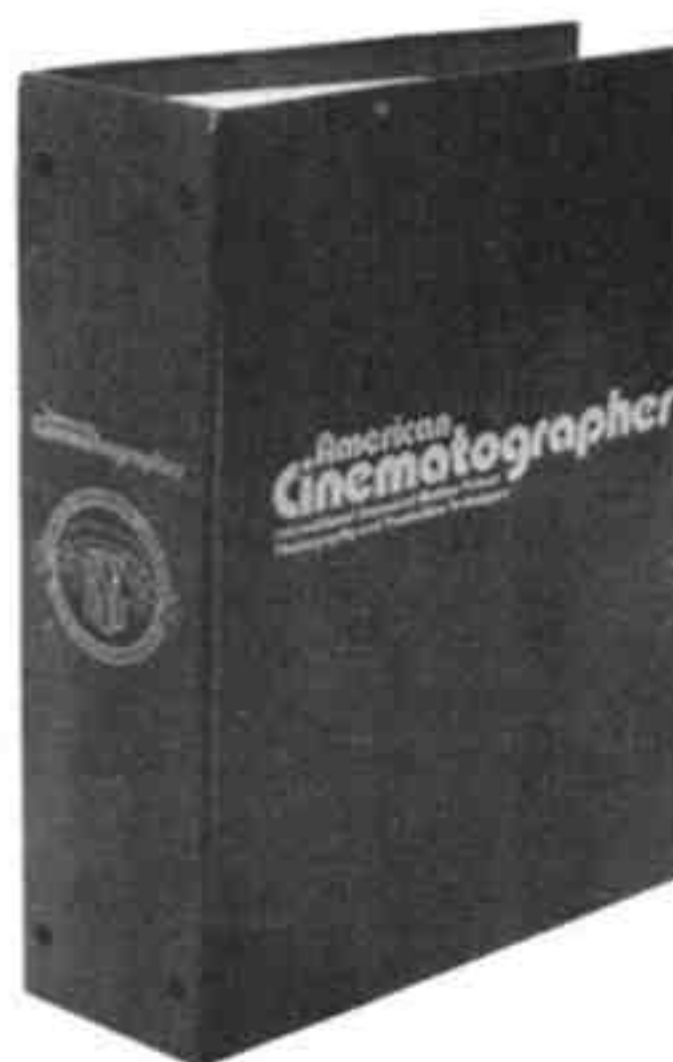
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