American Cinematographer
International Journal of Motion Picture Photography and Production Techniques

SEPTEMBER 1975/ONE DOLLAR

INTERNATIONAL TECHNOLOGY CONFERENCE AND EXHIBITION

IN LONDON

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16MM. CAMERAS

Eclair NPR 16mm., 400' magazine, crystal motor, motor cable, TV ground glass, & carrying case	Used	$ 5975.00
Eclair NPR Super 16, 400' magazine, 12V constant speed motor, motor cable, & hi-hat adapter	Used	6250.00
Eclair NPR Super 16, 400' magazine, crystal motor, & motor cable	Used	6900.00
Eclair ACL 16mm., 24 fps crystal motor, motor cable, 2-200' magazines, & carrying case	Used	5250.00
Eclair ACL 16mm., 24 fps crystal motor, motor cable, 2-400' magazines, & carrying case	Used	5995.00
Arriflex 16mm. BL, 400' magazine, 12V constant speed motor, motor cable, TV ground glass, 12 x 120 Angenieux zoom lens, matte box, & carrying case	Used	8500.00
Arriflex 16S, variable speed motor, motor cable, 1-400' magazine and torque motor, & carrying case	Used	3225.00
Arriflex 16S sync generator, variable speed motor, motor cable, 1-400' magazine and torque motor, & carrying case	Used	3300.00
Auricon Super 1200 magnetic, 12 x 120 Angenieux zoom lens w/10½" viewfinder, 2-1200' magazines, & carrying cases	Used	3500.00
Auricon SSII conversion (magnetic), 2-400' Mitchell magazines, 12 x 120 Angenieux zoom lens w/7½" viewfinder, & carrying case	Used	2000.00
Auricon SSII conversion (magnetic), 2-400' Mitchell magazines, & carrying case	Used	1100.00
General Camera SSIII (magnesium), 2-400' Mitchell magazines, 12 x 120 Angenieux zoom lens w/mini-finder, & carrying case	Used	2500.00
General Camera SSIII (magnesium), 2-400' Mitchell magazines, & carrying case New $2495.00	Used	1500.00
Milliken DBM 5A 16mm. High Speed camera, 24 fps variable speed (AC/DC), 12 x 120 Angenieux zoom lens w/7½" viewfinder, & carrying case	Used	3500.00
Locam 164-5DC 16mm. High Speed camera, 16-500 fps variable speed, 12 x 120 Angenieux zoom lens w/7½" viewfinder, & carrying case	Used	3650.00
Canon Scoopic 16mm., 13-76mm. zoom lens fl. 6, 2-rechargeable batteries, battery charger, & carrying case	Used	625.00
B & H Filmo 70DR camera body, filter slot, gel holder, & carrying case	Used	295.00

16MM. LENSES

12 x 120mm. Angenieux zoom Eclair mount	Used	$ 835.00
12 x 120mm. Angenieux zoom "C" mount New 1425.00	Used	785.00
12 x 120mm. Angenieux zoom Arri mount	Used	825.00
12 x 120mm. Angenieux w/7½" viewfinder New 1395.00	Used	895.00
12 x 120mm. Angenieux w/3" "mini" or "uni" viewfinder New $1400.00	Used	935.00
12 x 120mm. Angenieux w/AV-30 viewfinder	New	1495.00
9.5 x 57mm. Angenieux Eclair mount New 1990.00	Used	1300.00
9.5 x 57mm. Angenieux "C" mount	New	1795.00
9.5 x 57mm. Angenieux w/AV-30 viewfinder	New	2295.00
9.5 x 95mm. Angenieux Arri mount	Used	1600.00
9.5 x 95mm. Angenieux Eclair mount	Used	1620.00
9.5 x 95mm. Angenieux w/7½" viewfinder	Used	2150.00
9.5 x 95mm. Angenieux w/3" "mini" or "uni" viewfinder	Used	2200.00
12 x 240mm. Angenieux Eclair mount	Used	2500.00
12 x 240mm. Angenieux Arri mount	Used	2500.00
15 x 150mm. Canon Super 16 format "C" mount	Used	750.00
17 x 68mm. Angenieux zoom w/viewfinder	New	575.00
12.5 x 50mm. Angenieux zoom w/viewfinder	New	675.00
5.7mm. fl.8 Tegea Arri mount	Used	650.00
10mm. fl.6 Switar "C" mount	Used	125.00
10mm. fl.8 Angenieux "C" mount	Used	215.00
10mm. fl.8 Cinegon Arri mount	Used	325.00
16mm. f2 Cine-Xenon Arri mount	Used	195.00
25mm. fl.9 Cine-Ektar "C" mount	Used	75.00
25mm. fl.4 Cine-Xenon Arri mount	Used	275.00
50mm. fl.9 Cine-Ektar "C" mount	Used	75.00
75mm. fl.9 Switar "C" mount	Used	215.00
102mm. f2.7 Cine-Ektar "C" mount	Used	85.00
152mm. f4 Cine-Ektar "C" mount	Used	85.00

35MM. CAMERAS

Arriflex 35mm. 2C w/sync generator, 400' magazine, matte box, variable speed motor, motor cable, & carrying case	Used	$ 3950.00
Arriflex 35mm. 2C w/sync generator, 28, 50, 75mm. Cine-Xenon prime lenses, 400' magazine, matte box, variable speed motor, motor cable, & carrying case	Used	4600.00
Arriflex 35mm. 2B w/variable speed motor, motor cable, 3-lenses, 2-400' magazines, matte box, & carrying case	Used	2000.00
Bell & Howell single lens eyemo w/1-lens & carrying case	Used	325.00
Bell & Howell Reflex eyemo (MKII) w/carrying case	Used	525.00
Bell & Howell single frame reflex eyemo w/90mm. Macro lens, & carrying case	Used	615.00
Mitchell 35mm. Standard with AC/DC wild motor, 3-lenses, 2-1000' magazines, & all carrying cases	Used	2200.00
Mitchell 35mm. NC w/25, 35, 40, 50mm. Baltar lenses, 2-1000' magazines, 12V DC motor, motor cable, matte box, & all cases	Used	3800.00
Mitchell 35mm. BNC w/25, 35, 40, 50, 75, 100mm. Cooke lenses, 2-1000' magazines and magazine housing, 110V or 220V motor, motor cable, side finder, & all cases	Used	$ 16,500.00

35MM. LENSES

25 x 250mm. Angenieux zoom, Arri or MKII mount, w/sunshade, zoom rods, & carrying case	Used	$ 3650.00
35 x 140mm. Angenieux zoom, Arri mount	Used	1200.00
38 x 154mm. Berthiot anamorphic zoom, Arri mount, w/case	Used	1595.00
24 x 240mm. Angenieux zoom, BNC mount, w/finder & case	Used	950.00
9.8mm. fl.8 Tegea, Arri mount New $950.00	Used	725.00
14.5mm. f3.5 Angenieux, Arri mount	Used	395.00
18mm. fl.7 Cooke Speed Panchro, BNC mount	Used	260.00
18.5mm. f2.2 Angenieux, Arri mount	Used	250.00
24mm. f2.2 Angenieux, Arri mount	Used	260.00
25mm. f2.5 Baltar, BNC mount	Used	245.00
28mm. f2 Cine-Xenon, Arri mount	Used	195.00
28mm. f2 Cooke Speed Panchro, BNC mount	Used	240.00
30mm. f2.5 Baltar, BNC mount	Used	235.00
32mm. f2 Astro-Berlin, Arri mount	Used	180.00
35mm. f2.3 Baltar, Arri mount	Used	200.00
35mm. f2 Cooke Speed Panchro, BNC mount	Used	235.00
35mm. f2.5 Baltar, BNC mount	Used	230.00
40mm. f2.3 Baltar BNC mount	Used	230.00
40mm. f2 Cooke Speed Panchro, BNC mount	Used	235.00
40mm. fl.8 Angenieux, Arri mount	Used	250.00
40mm. f2.3 Baltar, Arri mount	Used	200.00
40mm. Macro-Kilar, Arri mount	Used	85.00
50mm. f2 Cooke Speed Panchro, BNC mount	Used	230.00
50mm. f2.3 Baltar, BNC mount	Used	225.00
50mm. f2 Cine-Xenon, Arri mount	Used	225.00
50mm. fl.3 Kinoptik, Arri mount	Used	475.00
75mm. f2 Cine-Xenon, Arri mount	Used	235.00
75mm. f2.3 Baltar, BNC mount	Used	220.00
75mm. f2 Cooke Speed Panchro, BNC mount	Used	230.00
90mm. Macro-Kilar, Arri mount	Used	139.00
100mm. f2.5 Cooke Speed Panchro, BNC mount	Used	230.00

SALE

GENERAL CAMERA CORPORATION
471 Eleventh Ave., N.Y., N.Y. 10018 (212) 594-8700
Telex: 14—7136

Gentlemen: I am interested in_____

_____

Name_____

Firm_____

Address_____

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Prices F.O.B. 471 Eleventh Ave., N.Y.C. All equipment offered subject to prior sale. Prices subject to change without notice. Add sales tax where applicable.

SALE

100mm. f2.2 Angenieux, MKII mount	Used	$ 395.00
100mm. f2.2 Angenieux, Arri mount	Used	450.00
100mm. f2 Kinoptik, Arri mount	Used	450.00
100mm. f2 Astro-Berlin, Arri mount	Used	325.00
100mm. f2.3 Baltar, BNC mount	Used	220.00
150mm. f3.5 Kilar, Arri mount	Used	125.00
300mm. f5.6 Tele-Kilar, Arri mount	Used	200.00
500mm. f5.6 Anastigmat, Arri mount	Used	375.00
500mm. Tele-Annalyt, Arri mount	Used	325.00

CAMERA BLIMPS

Arriflex 35mm. 120S steel blimp w/zoom port, DC constant speed motor, motor cable, matte box, & case	Used	$ 2495.00
Arriflex 35mm. 120S steel blimp w/120V AC motor, motor cable, matte box, & case	Used	1950.00
Arriflex 35mm. 400 steel blimp w/120V AC motor, motor cable, matte box, & case	Used	1500.00
Arriflex 16mm. steel blimp w/120V AC motor, motor cable, & case	Used	1500.00
Cine 60 35mm. plastic blimp w/2-power cables, matte box, & carrying case	Used	1100.00
Cine 60 35mm. plastic motorized zoom port for 25 x 250mm. w/zoom motor, control, follow focus device, & case	Used	875.00

MOTORS

Eclair NPR Beala crystal motor New $2495.00	Used	$ 1450.00
Eclair NPR Perfectone crystal motor	Used	1425.00
Arriflex 16S 8V constant speed motor	Used	295.00
Arriflex 16BL AC sync motor, w/transformer & cable	Used	250.00
Arriflex 16S AC sync motor w/power supply & frame counter	Used	350.00
Arriflex 35 constant speed motor	Used	365.00
Arriflex 35 variable speed motor	Used	220.00
Eclair NPR 115V Perfectone AC motor w/motor cable	Used	495.00
Arriflex 35 2C High Speed motor w/rheostat & cables	Used	495.00
Vicon Servo zoom motor (25 x 250mm.) w/control & cables	Used	175.00
Arriflex 16S torque motor	Used	215.00
Eurotechnica flat motor base (Arriflex 35) New 225.00	Used	149.00

MAGAZINES

400' x 16mm. Mitchell magnesium magazine New $125.00	Used	$ 75.00
400' x 16mm. Mitchell-type magnesium magazine New 98.00	Used	60.00
1200' x 16mm. Mitchell mag. New 425.00	Used	250.00
400' x 16mm. Arriflex 16S magazine	Used	220.00
400' x 16mm. Arriflex 16M magazine	Used	285.00
400' x 16mm. Arriflex 16 BL magazine	Used	475.00
200' x 16mm. Arriflex 16M magazine	Used	225.00
400' x 16mm. ACL magazine	Used	1400.00
400' x 16mm. NPR magazine	Used	1350.00
200' x 16mm. ACL magazine	Used	1050.00
1000' x 35mm. Mitchell standard magazine	Used	165.00
1000' x 35mm. Mitchell NC magazine	Used	315.00
400' x 35mm. Eyemo magazine	Used	25.00
400' x 35mm. Mitchell Standard magazine	Used	95.00

HEADS, TRIPODS, & MOUNTING EQUIPMENT

Akely Gyro Head w/Standard Legs	Used	$ 95.00
Akely Hi-Hat	Used	15.00
Arriflex Gyro Head w/Standard Legs	Used	175.00
Arriflex Friction Head w/Standard Legs	Used	150.00
Arriflex Baby Legs	Used	30.00
Cartoni Gyro Head w/Standard Legs	Used	150.00
Cartoni Metal Baby Legs	New	75.00
Cartoni Wood Baby Legs	New	75.00
Cartoni Wood Standard Legs	New	85.00
Pro-Jr. Friction Head w/Standard Legs New 175.00	Used	125.00
Pro-Jr. Hi-Hat New 35.00	Used	15.00
Pro-Jr. Baby Legs New 95.00	Used	65.00
NCE Fluid Head w/Standard Legs	Used	325.00
NCE Baby Legs	Used	75.00
NCE Hi-Hat	Used	20.00
Cinekad Body Brace New 65.00	Used	20.00
SSIII Rotating Shoulder Pod New 75.00	Used	30.00
3-Wheel Triangle Dolly w/Case	Used	40.00
Cine 60 Quick Release Plate	New	85.00
Eclair NPR Camera Barney	New	90.00

SOUND

Nagra 4L Recorder loaded, ATN unit, leather carrying case, Beyer headset, & heavy duty carrying case	Used	$ 2495.00
Nagra 3 Recorder, ATN unit, leather carrying case, Beyer headset, & heavy duty carrying case	Used	1500.00
Electrovoice 666 Mike	Used	40.00
Electrovoice 655 Mike	Used	35.00
Electrovoice 655C Mike	New	55.00
Electrovoice 642 Shotgun Mike, windscreen, shock mount, & cable New 315.00	Used	175.00
Electrovoice 635 Mike	Used	30.00
Electrovoice 635A Mike	New	45.00
Electrovoice 649B Lavalier New 55.00	Used	35.00
Electrovoice RE-15 Mike New 115.00	Used	65.00
Sony ECM-16 Lavalier	New	15.95
Sony ECM-22P Mike	New	75.00
Sony ECM-51 Mike	New	119.60
RCA BK6B Lavalier Mike	Used	30.00
Uher Report L Recorder w/carrying case	Used	75.00
Uher 4000 Report L Recorder	New	400.00
Shure M67 Professional Mixer	Used	115.00
Nagra ATN Power Supplies for 3 or 4	Used	60.00
Sennheiser 804 Shotgun Mike, battery adapter, cable, windscreen, shock mount, & carrying case	Used	425.00
Sennheiser 404 Condenser Mike, battery adapter, cable, windscreen, & carrying case	Used	325.00
Sennheiser R1010 Receiver/SK1007 Transmitter Wireless Mike w/cables & antennas	Used	450.00
Back-Auricon MA-11 Magnetic Amplifier, charger, rechargeable battery, E-7 Mike & cable, desk stand, headset, & carrying case	Used	750.00
MA-11 Carrying Case	New	50.00
General Camera GCA Magnetic Amplifier, carrying strap, belt clip, charger, rechargeable battery, & carrying case	New	450.00
General Camera Auto-Slate Box	New	95.00
EMB Blue Ribbon Magnetic Recording Head	New	425.00
Sony TC-110A Cassette Recorders	New	98.00
Sony TC-55 Cassette Recorders	New	119.00
Sony TC-142 Cassette Recorders	New	161.00
Bach-Auricon Magnetic Recording Head	New	500.00

EDITING EQUIPMENT

Moviola 35mm. UD20CS w/separate magnetic head	Used	$ 2150.00
Moviola 50-R 16mm. Viewer New $225.00	Used	165.00
Moviola SZA Synchronizer w/counter	New	88.00
Maier Hancock # 1635 Hot Splicer New 275.00	Used	225.00
Maier Hancock #816 Super 8 Hot Splicer	New	225.00
Maier Hancock #816 Hot Splicer	New	195.00
Moviola URS Amplifier	New	65.00
Moviscope 16mm. Viewer New 199.50	Used	115.00
Neumade Edit Table w/lamp well & film rack	Used	149.00
Editing Bin w/rack	Used	50.00
Griswold 16mm. Splicer	Used	25.00

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Telex: 14-7136

general camera corporation gc

Will Rogers never met Sy Cane.

What's to like?

Sy Cane is cheap. In fact, his prices on every conceivable piece of motion picture equipment are as cheap as anybody's.

Sy Cane is boring. He knows more about cameras and equipment than Euell Gibbons knows about wild hickory nuts. And he's surrounded by a staff of camera fanatics with a single-minded expertise that borders on tedium. The only other thing Sy knows is the time of day. But he won't give it to anyone.

Sy Cane is argumentative. He won't sell you equipment just because you *think* you need it. He thinks it's wrong to sell someone more camera than the job calls for (a character flaw, we suppose).

Sy Cane is fussy. Fussy enough to hire Eclair's Bernie O'Doherty to head up the Mobius service department. And heartless enough to guarantee 24 hour service in many cases, by threatening Bernie's life.

Sy Cane is impossible. Yet, through nobody's fault, a reality. He is, quite frankly, a man that only a customer could love.

MOBIUS CINE LTD.

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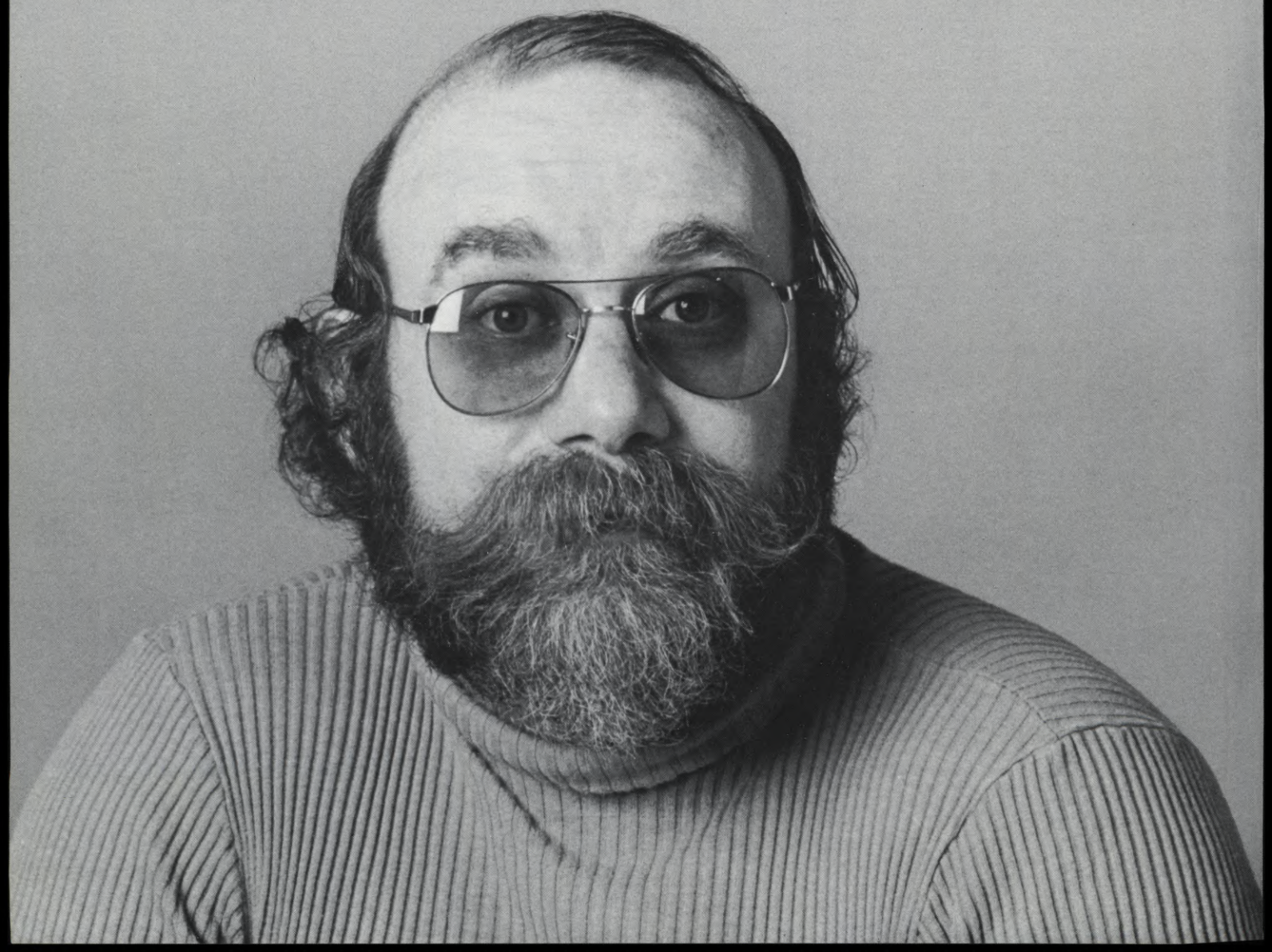

American Cinematographer

International Journal of Motion Picture Photography and Production Techniques

The American Society of Cinematographers is not a labor union nor a guild, but is an educational, cultural and professional organization. Membership is by invitation to those who are actively engaged as Directors of Photography and have demonstrated outstanding ability. Not all cinematographers can place the initial A.S.C. after their names. A.S.C. membership has become one of the highest honors that can be bestowed upon a professional cinematographer, a mark of prestige and distinction.

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ON THE COVER: Logo of FILM '75, the Fourth Biennial International Technology Conference and Exhibition, sponsored by the British Kinematograph, Sound and Television Society, and held at the Royal Lancaster Hotel in London, June 23-27, 1975. The logo design was achieved as the result of a competition by London art students.

AMERICAN CINEMATOGRAPHER, established 1920, in 56th year of publication, is published monthly in Hollywood by ASC Holding Corp., 1782 North Orange Drive, Hollywood, California 90028, U. S. A. **SUBSCRIPTIONS:** U. S. $9.00; Canada, foreign, including Pan-American Union, $10.00 a year (remit International Money Order or other exchange payable in U.S.). **ADVERTISING:** rate card on request to Hollywood office. **CHANGE OF ADDRESS:** notify Hollywood office promptly.

Second-class postage paid at Los Angeles, California.

New lenses—not still-camera conversions. All genuine T1.4s.

Floating and aspheric elements, multiple coatings—these are the most *advanced* lenses you can buy.

Every photographic lens ever made was designed originally for one purpose, one lens-to-film distance, one film format. If you adapt it for a *different* use, it'll work—but not as well.

Adaptation compromises

Some high-speed lenses now available for motion picture use are adapted still-camera designs—but not ours. The others are good lenses—but, used in this different way, they're compromised.

Remounting problems

For example: The typical 35mm SLR still camera has a back focal distance about ¾ inch shorter than one major studio camera. So to adapt it, you have to put the SLR lens into a new mount, or even a completely new barrel. *Or even move the glass elements!*

Critical back focus

And back focus is critical, of course. With a 50mm lens at f/2.8, the depth of focus behind the lens is plus or minus two thousandths of an inch. With a 25mm lens at f/1.4, *it's a quarter of that.*

Wasted trade-offs

Moreover, the SLR lens was designed to cover the Leica frame. To get even coverage over the bigger format, *with high speed*, the designer had to make certain trade-offs. On the SLR, they may have been worth it. For the motion-picture frame, they're wasted.

Doing it the hard way

To design a high-speed lens exclusively for motion picture use takes more time and costs more money, naturally. But, given a good designer, you get a better lens.

$350,000 investment

So we invested just over $350,000—and Zeiss designed a brand-new, no-compromise set of lenses. Specifically for Arriflex cameras.

New design parameter: "Make the *best* lenses."

The Zeiss designers had the unique advantage of starting from the beginning. We said: "Don't just make the best high-speed lenses. Make the best *motion-picture* lenses in the world." So they did.

Made for the 35BL and 352C

Most modern technology

Zeiss used aspherical elements, a floating element, and multi-layer coatings on every

The fastest *set* of lenses on the market—all with the standard Arri bayonet mount. The 25mm focusses down to 10 inches, the 35mm to 15 inches, the 50mm to 27.5 inches and the 85mm to 40 inches.

Designed by Zeiss for Arriflex.

glass-to-air surface. Up to *six* separate layers.

New spontaneity possible

These lenses are made for the new style of shooting encouraged by the 35BL.

Night-for-night: almost *no* flare. Distant detail

We've seen night-for-night footage. Wide open, on New York City streets—car headlights, neon signs. Incredible. Almost no flare at all, and astonishing penetration. You can see details on this block and for several blocks beyond—lit just by those signs and the street lamps!

With good lighting, too: best lenses you can buy

Naturally, these lenses perform just as well in daylight and on the soundstage. They're made by Zeiss, after all—using the latest design techniques, and sparing no expense. *We hope you'll run some comparison tests. We're confident of the results.*

ARRI

ARRIFLEX COMPANY OF AMERICA

PHONES: (212) 932-3403 AND (213) 845-7687
P.O. BOX 1050, WOODSIDE, N.Y. 11377; AND
1011 CHESTNUT ST., BURBANK, CALIF. 91502

WHAT'S NEW

IN PRODUCTS, SERVICES AND LITERATURE

A NEW CONCEPT IN SLATING OF SOUND AND SILENT FILM SCENES

DIGI-SLATE, a completely new concept in scene slating of sound and silent films, is announced by Pfeiffer Enterprises, Inc., P.O. Box 45, Richardson, Texas, 75080.

The exclusive mechanical digital display called "Digi-Digit" can be instantly adjusted to any numeral configuration and sixteen certain letter combinations. This completely eliminates the use of chalk, tape and poor hand lettering usually associated with other slates. A spring-loaded latched shutter, operated by the press of a button, visually displays a brilliantly colored sync. target from three black windows within a one frame time span for positive editorial sync/sound indication. This eliminates the need for any hand "clapper" sticks. An innovative feature consists of large, two-inch letters "M-O-S" displayed on the reverse side of the Digi-Slate for ease in identifying "Mit-Out-Sound" scenes! The unit measures 13"x12"x1½" and is made of heavy anodized aluminum plate with cast aluminum shutter housing.

The Digi-Slate sells for $59.95 plus $2.50 for postage, handling and insurance.

•

NEW 18 FPS GEAR SET FOR ARRIFLEX 16BL CAMERAS

More and more educational, training and sales films are shot in 16mm original and released in Super-8 prints. In response to this growing requirement, Arriflex Company of America has announced the availability of a new, 18 fps gear-set for the Arri 16BL. A simple change of gears now enables the cinematographer to run the camera at 18 fps, with the regular, standard 16BL crystal-controlled (3000 rpm) motor and battery drive system.

Identical, 18 fps framing rates in both formats make 16mm to Super-8 reductions a straightforward process. Synchronous sound is obtained without any other changes. The Arri crystal-regulated drive runs the camera at near perfect sync speed; a precision crystal-regulated oscillator at the Recorder develops the 60 Hz Pilotone signal. In the sound laboratory, tape recordings are transferred to Super-8 film driven at 18 fps. The result is perfect lip sync.

Gear-sets for 18 fps operation and additional information are available from all authorized Arriflex dealers, or by writing to Arriflex Company of America, Box 1060, Woodside, New York 11377; Telephone (213) 932-3403.

•

NEW COMPACT ALL FOCUSING LIGHTING KIT AVAILABLE FROM CINEMA PRODUCTS

Cinema Products Corporation announces the availability of a new line of compact quartz location-lighting kits. The new *Aero-Kit* is packaged in a sturdy aluminum carrying case which measures only 6½" X 12" X 26½". The *Aero-Kit* is compact enough to slide under an airplane seat or fit easily into the trunk of a small car.

The Aero-Kit, which weighs less than 31 lbs., includes two *focusing* 600-watt spots and two detachable rotating four-way barndoors, one *focusing* 600-watt fill-light with integral four-way barndoors, two scrims, three 10-feet-long three-wire cables (with in-line switch), three 15-feet-long three-wire extension cables, one gator grip, and three professional-type stainless-steel light stands. These light stands (10 ft. high when extended, and 24" high when telescoped) are especially designed with extendable legs which permit easy and stable placement of the light stand on uneven ground surfaces.

The Aero-Kit is ideal for motion picture documentary-type on-location photography, and for all still photographic purposes. Aero-Kit lighting fixtures each operate with 600-watt lamps at 120V AC/DC; each fixture can also be used with 250-watt lamps for 30V DC battery operation. The two focusing spots and focusing fill light are equipped with *new and improved* quartz lamp sockets which are especially heat resistant.

The Aero-Kit is priced at $425.00. For further information, please write to Cinema Products Corporation, 2037 Granville Avenue, Los Angeles, California 90025.

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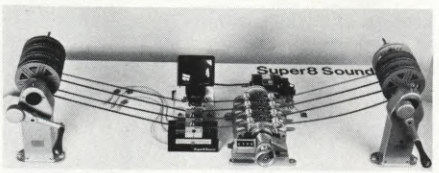


TWO NEW EDITING BENCHES FOR SUPER-8 SOUND NOW AVAILABLE

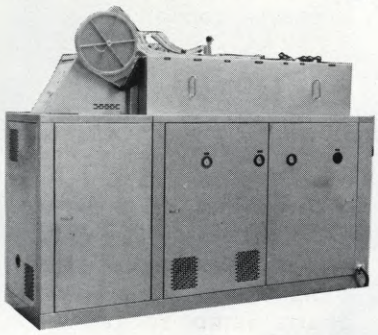
Super8 Sound, Inc. of Cambridge, Mass. has announced the introduction of two new Editing Benches. The Super8 Sound 3-gang Editing Bench has one Super-8 picture and two Super-8 fullcoat magnetic film sound tracks. It costs $1025. The Super8 Sound 4-gang Editing Bench has one picture and three sound tracks and costs $1090. The 3-gang and 4-gang Editing Benches operate like conventional 16mm multiple strand vertical benches with major improvements.

Both benches incorporate unique "Third Hand" rewind clutches that automatically hold back on the feed reel. The "Third Hand" rewinds and special smooth-acting reel spacer adapters facilitate moving just one strand while the others are held locked in the synchronizer.

The 3-gang and 4-gang Editing Benches incorporate the operating features of the popular 2-gang Super8 Sound Editing Bench ($795). Thsee features eliminated many of the problems usually encountered in editing with a synchronizer and rewinds, and have invited comparision with the per-

Continued on Page 1096

Wet and Dry
laboratory equipment



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The Model MC-16-ME-4 Mini-Color Processor is a proven performer among color processors. The unit handles 8mm and 16mm Ektachrome films in the ME-4 process. The Mini-Color is ideal where smaller volumes of film must be processed on a minimum budget. Mini-Color is fully automatic and has advanced demand drive system. Wiper blade squeegees at all cross-over points and box squeegees at final exit minimize contamination of solutions. Sold new for $7500.00.
Used, excellent $5400.00

HOUSTON A-11 PROCESSOR

A fully automatic processor for reversal and negative-positive 16 and 35mm films, producing exceptionally fine quality work. Daylight loading feature makes special partitions unnecessary. Casters allow for convenient placement of the machine. Can be operated wherever power, water and drain facilities are available. Rebuilt, in excellent condition and offered at a fraction of the original cost of $8000.00.
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Morse A-8 Ansco Color Processing Machine, 50 fpm, complete, used, as is $3900.00

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Fulton Tube Machine, 16mm B&W, used, good . . . . . $ 795.00

Fonda 16mm negative-positive, 100 fpm, as is $1995.00

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Used, as is $4250.00

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Herrnfeld model 35mm printer, with shotgun color filter changer, used, as is . . . . . $ 795.00

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Kodak 35-16mm optical sound track reduction printer, rebuilt . . . $5200.00

B&H 35-32 contact printer, needs work, as is $2950.00

Depue 35-32 Reduction printer, as is $1850.00

Depue 35-16, rebuilt, excellent $5800.00

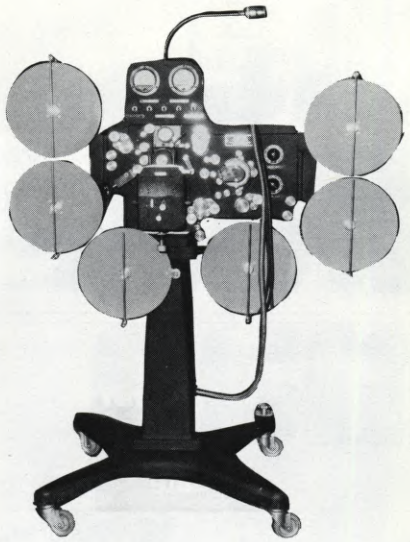
PRINTER ACCESSORIES

Deluxe additive type lamphouse, used, as is $1850.00

Depue 35-32 Fish-Schurman additive lamphouse w/DC power supply, as is $2500.00

Depue light control board for use w/ Depue optical reduction printers. Provides 22 light changes, 75 or 150 scend changes, used . . . . $ 450.00

Edge numbering light for B&H Model J printers, w/DC power supply. Customer installed on your printer in less than 5 minutes. NEW . $ 325.00



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QUESTIONS & ANSWERS

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

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

Q Every now and then I spot some really hot used item in your want ads; most of them are in New York, Florida or other far places. How do I know the merchandise is good?

A The buyer must make evaluations himself and contact the advertiser directly regarding conditions, etc. The magazine tries to accept only bonafide advertisers.

Q Most of the books I have read concerning filmmaking state that a (color) temperature meter is unnecessary. Is this true, because I would like to purchase a temperature meter in the near future?

A A color temperature meter can be very useful on occasion. However, a great percentage of photography (probably most of it) is accomplished without using one on a set. Generally, the cinematographer works with light sources of known color temperatures and can modify them with filters whose performances are known.

If close color matching is required day by day or from one area to another such as is required in split screen work and/or cinematog-raphy where scene-by-scene and day-by-day color corrections are important and the film stock and processing are consistent, a color temperature meter is most desirable, although it does add to the many other details of the cinematographers' procedures. However, differences in camera lenses, camera film stocks, print film stocks and printing machines can affect overall scene-by-scene and/or day-by-day changes in apparent color temperature response in spite of carefully matched photography with a color temperature meter.

Q Since many film labs advise against pushing ECN II more than one stop, is there any way to do night-for-night filming in available light (such as streetlamps) and still get properly exposed film in good detail?

A Use every other advantage that you can, such as very fast coated lenses, a shutter opening as wide as possible, reduce camera speed as much as possible, consider flashing if a reduction in contrast is acceptable and the laboratory is equipped to do this. If you are ingenious, you might run some tests on flashing, yourself, but be consistent and use the same lab for developing.

Q Can an anamorphic 16mm negative be satisfactorily blown up to a 35mm anamorphic negative, as it would differ little from an anamorphic negative from a ½-frame unsqueezed Techniscope film?

A The key question here is what is satisfactory and that must remain an open question between you and your audience or customers. Film grain and image definition which are a factor of both film resolution and lens definition and resolution are all most important. Your comparison of a 16mm blowup to Techniscope is not really valid because your 16mm usable film area is only about 32 percent of the film area of the Techniscope image. This is quite a difference and could be a determining factor.

Q I am a student studying photography and would like to make a career as a cinematographer. Can you recommend a school where such instruction may be obtained?

A There are many schools offering courses in motion picture production and cinematography. The American Film Institute publishes a book listing all the schools providing such study. It is called "Guide to College Courses in Film and Television" and can be obtained from Acropolis Books, Ltd., Colortone Building, 2400 17th St., Washington, D.C. 20009. Price $5.95. ■

Carl Porcello talks about angenieux quality...

Carl Porcello, President
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..."In each facet of the professional motion picture equipment business there is always one company that manufactures products of such outstanding quality that they become the standard of the industry. When it comes to zoom lenses, there is one name that stands above them all—there can be no question—Angenieux is that standard of the Cine industry.

During the 1960's practically every television station in the country had a F & B / CECO Auricon camera equipped with an Angenieux 12 to 120. At that time, we probably sold more Angenieux lenses than anyone else in the U.S. Now there are new cameras on the market and frankly, even though most of our customers have traded them in to F & B / CECO for the newer cameras, many have retained their Angenieux zooms by converting to the shorter V30 viewfinder. When a lens can last that long it must be a quality item.

F & B / CECO was the first in the country to stock the Angenieux 20-120. The feature film industry immediately learned from us that very valuable time could be saved by employing only one lens to shoot an entire feature. Naturally, that lens has to be of the highest quality in order to match the fine prime lenses, which were previously utilized. The quality of the 20 to 120 matched the individual prime lenses so well in fact, that we called this lens, "THE VARIABLE PRIME." F & B / CECO will continue to offer all of its customers the highest quality motion picture equipment: that's why we will always offer Angenieux, we know the quality is there."

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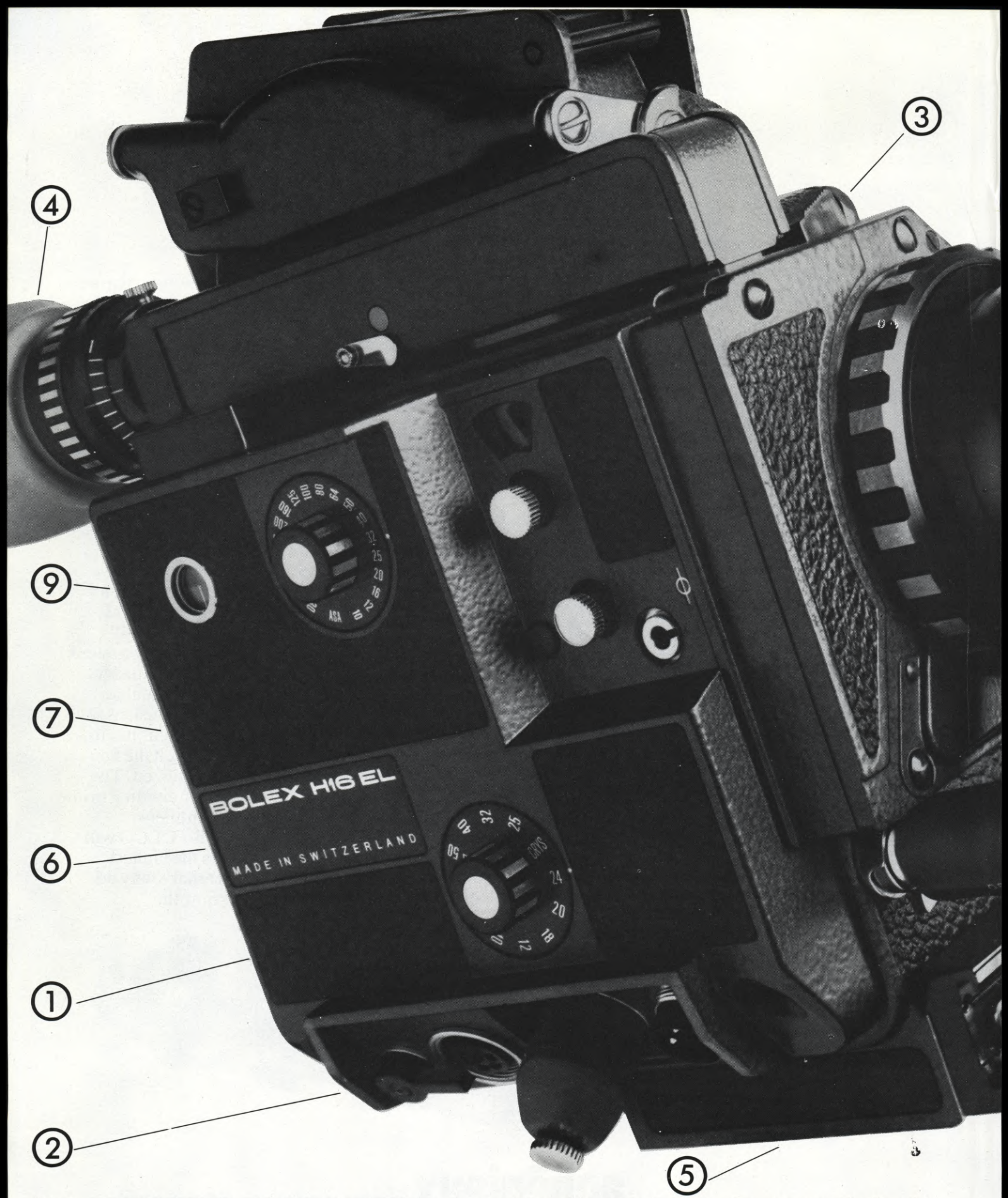

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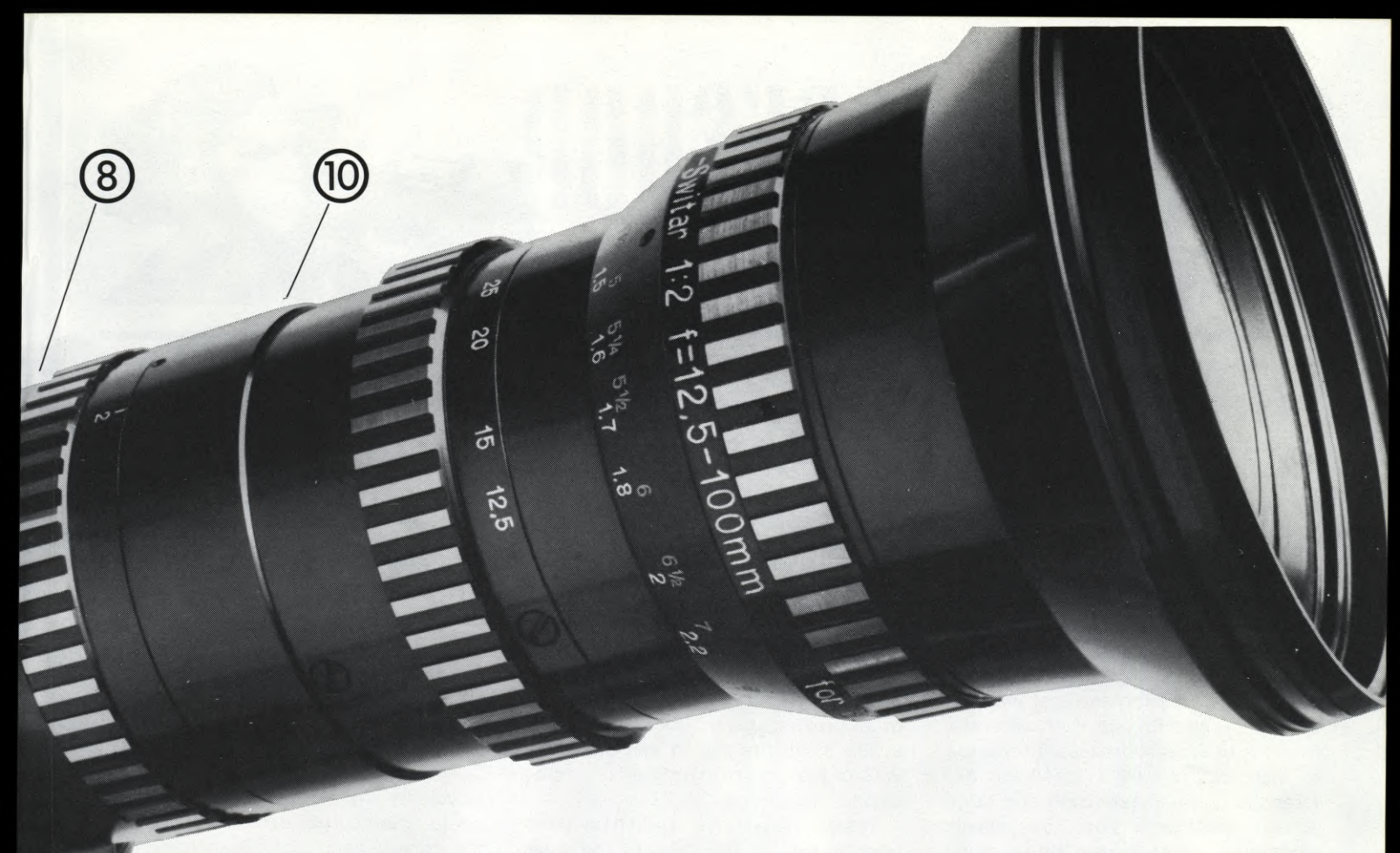

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CINEMA WORKSHOP

By ANTON WILSON

TV FORMAT

The aspect ratio of television is 1.33:1, the same as 16mm and Academy 35mm motion picture formats. This is no coincidence, the television format was obviously designed to be compatible with the existing motion picture standards. This fact may give a cameraman the impression that anything he shoots with a standard 1.33:1 ratio will work as well for a television transmission as for a direct screen projection. Not true.

In most cases footage that was not specifically shot for television will suffer from the broadcast process. This is due to technical as well as aesthetic differences between television and large screen direct projection. The specific techniques for exploiting the dramatic capabilities of television could easily form a complete discussion in itself. We may explore that subject in the future; however, for the present we will look at the technical considerations.

What the cameraman sees is not what the audience gets. The viewfinder image (camera aperture) is shaved away as it passes through the film chain. By the time it reaches the home receiver, the image may be reduced to as little as ½ of its original area. While this may be a worst case figure, the received image rarely represents more than 75% of the original composition, with a figure of 65% to 75% being average. In other words, the TV audience gets to see only ½ to 3/4 of what the cameraman put on the film. This is, of course, assuming the original footage was shot 1.33:1. If an anamorphic screen format was employed during the original filming, the TV image will represent an even smaller percentage of the original scene. Would you believe that the TV audience may be viewing as little as ¼ of an original scene filmed in Cinemascope, never getting to see the other 75% of the cinematographer's composition?

What happens to this lost information? In the case of the wide screen formats, it should be obvious that a bulk of the image is lost by cropping the sides off the original scene to re-establish the 1.33:1 aspect ratio. However, once the 1.33:1 ratio is established, the image is further cropped as it makes its way through each process in the tele-cine chain.

The film records the full image as the cameraman sees it. This is called the camera aperture. (See FIGURE #1.) When the film is projected, a small portion of the image is cropped by the "Projection Aperture", which is specifically designed to be smaller than the camera aperture. This will insure that the frame lines and the side boundaries of the original image will not appear on the screen. The smaller projection aperture will also cover up any misalignment that may have existed between camera and projector centerlines.

FIGURE 2

APERTURE	DIMENSIONS (35mm)	AREA	% of CAMERA APERTURE
Camera	0.868 x 0.631	0.5477	100 %
Projection	0.816 x 0.612	0.4993	91 %
Transmission	0.792 x 0.594	0.4704	85 %
Safe Action	0.713 x 0.535	0.380	70 %
Safe Title	0.633 x 0.475	0.300	50 % — 55 %

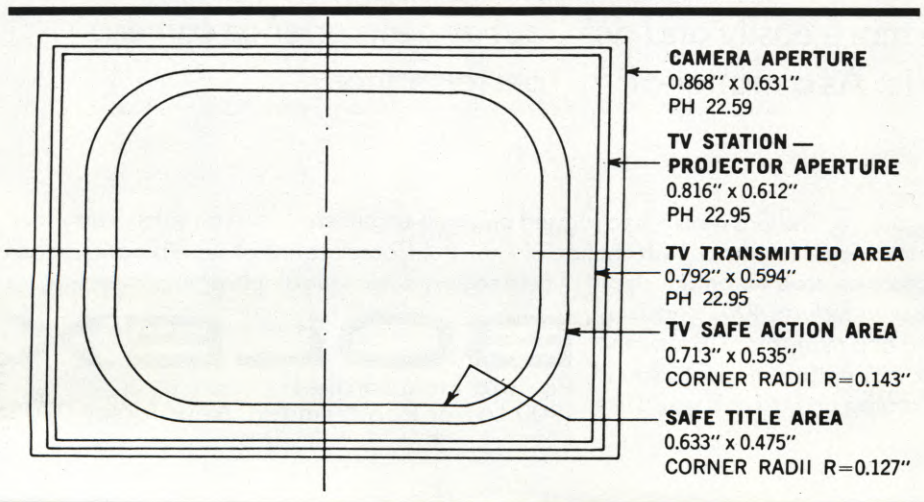
Next along the line is the TV camera or scanner which picks up the projected image. The TV camera aperture crops the projector image for similar reasons: to compensate for slight component misalignment, etc.

The final and most heinous blow is struck by the home receiver. Firstly, some of the corner detail is lost due to the curved nature of the cathode ray tube (minimized in recent years by the newer rectangular tubes). Most of the loss is due to "over-scan". The home receiver is designed to spread the transmitted image larger than the actual face of the tube. The tube thus crops the image, insuring that those "ugly black areas" will not appear on the sides of the screen. While most of the cropping done at the projection and transmission stages is controlled by SMPTE standards, and held to a minimum, the loss at the home receiver due to over-scan is a function of individual set adjustment. Unfortunately the over-scan is usually quite excessive. To insure that the image will not vignette during low voltage or "brown-out" situations, (where the image usually shrinks), TV servicemen will crank in gobs of over-scan. Better to have the customer lose a little image (which he probably won't even notice), than to have him complain about those black areas on the side of the screen.

FIGURE 1 tells the whole story. FIGURE 2 gives the statistics. Read them and weep. The "TV safe action area" represents the average home receiver image area. While the cameraman should consider the full camera aperture in terms of keeping unwanted details (microphones, etc.) out of the scene, he should keep all pertinent action and composition within the limits of the "safe action area".

Continued on Page 1092

FIGURE 1 — TELEVISION APERTURES AND SAFE AREAS



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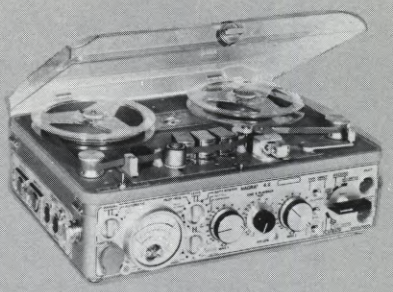

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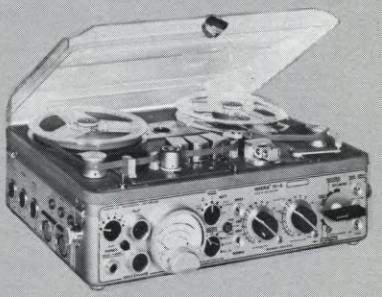

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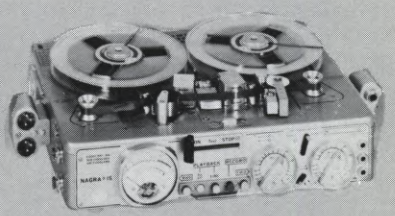

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Steve Spielberg

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"Now I'm twenty-seven, I've been directing or wanting to direct more than half my life, and the end result of any early success I've enjoyed is that I will spend the second half of my life giving interviews about how young I was when I started. So, forget along with me, and pretend that all those 'boy wonder' assignments were directed by old studio pros wearing short pants and beanies and pretending to be me.

"The only thing I remember for sure (besides that part about going into profits) is that I began by shooting with Eastman film, shooting eight millimeter, and moving up to super 8 and sixteen millimeter as I got older and could afford the technology. I still own a Kodak Ektasound

movie camera which I enjoy using for personal films.

"When I was shooting JAWS for Universal Pictures, Eastman film always came through. Even when a boat sank into the depths of Nantucket Sound, carrying a cast, crew, and Panavision camera. The magazine was recovered by divers, retrieved from the salt water, and hand-carried to a lab in New York in a bucket of fresh water. It was subsequently developed without incident into perfect negative material.

"After four months of shooting on open water, I only wish somebody would've carried Steve Spielberg to New York in a bucket of fresh water. It would've given me a new perspective on the film. I have never been seasick, but I have been sick of the sea.

"JAWS is a film about survival, and shooting on location at sea is a practical lesson in that complex art. Between winds and weather, tides, and complex special effects, we all learned about what it is to struggle against the immovable forces of nature. Sometimes nature would win; sometimes we would. The battle is recorded in the more than half-million feet of exposed film.

"It's more than letting the camera tell the story. It's letting the story tell the camera. It's my own desire to let the filming experience bring out aspects of my personality that I can put back into the picture to make it better.

"It's how I became a director—by wanting to be one, and by making movies. I've always wanted to do that, I started young, kept at it, showed my work, eventually was accepted on the strength of what I did. It's the basis of my advice to anyone who wants to be a film director—make home movies, learn from mistakes, ask, be judged on your ability; and when you're hired, it'll be on the basis of what you know, and what you've shown you know.

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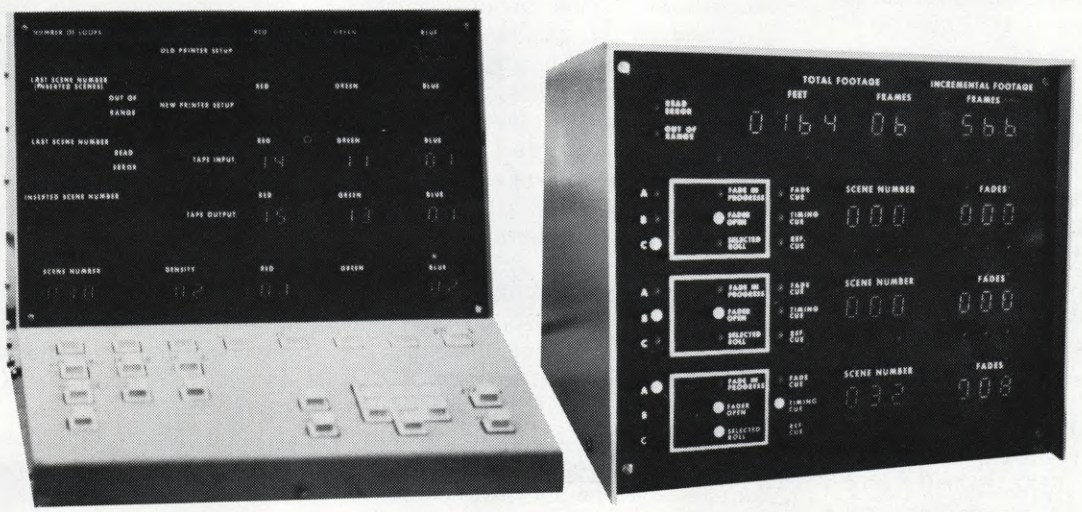

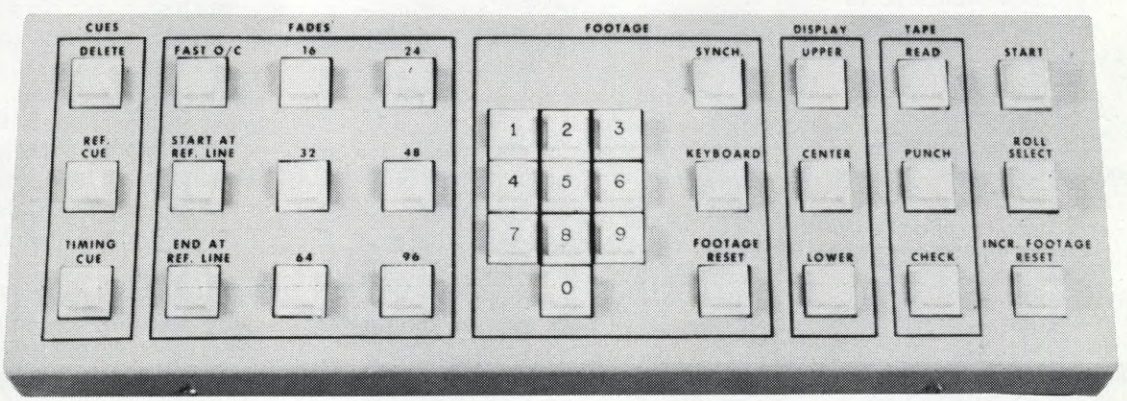

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THE BOOKSHELF

By GEORGE L. GEORGE

THE FILMMAKERS' TOOLS

Today's filmmaking spreads over an ever-broadening field of technical knowledge, and it is not rare to see competently made movies that are essentially the creation of one man serving in multiple capacities, including camera work. For these latter-day Renaissance people, here are some recent books.

A new edition of Emil E. Brodbeck's classical HANDBOOK OF BASIC MOTION PICTURE TECHNIQUES, covering the whole field and specifically TV/videotape camera work, is an established manual in use for many years. Fully updated, it continues as practical, clearly written and convenient as ever. (Amphoto/Prentice Hall $10.95)

Doug Crawford's TAPE RECORDING FROM A TO Z expertly describes tape and cassette equipment and utilization, enhanced by many diagrams. (Barnes $7.95)

The proliferating use of closed circuit TV in industry, schools and community cable systems lends immediacy to Oliver Berliner's COLOR TV STUDIO DESIGN AND OPERATION, an expertly condensed text for professional-type, network-quality production on minimum budgets. (TABooks $9.95)

The availability of "open access" public TV channels gives topical interest to new additions to the Hastings House "Media Manuals" series, Gerald Millerson's TV LIGHTING METHODS and Glyn Alkin's TV SOUND OPERATIONS. They offer expert discussions of their respective subjects, covering comprehensively the craftsmen's skills, techniques, equipment, terminology, and particularly the know-how essential in a professional job. ($10.95/7.95 ea.).

William Collins, in THE AMATEUR FILMMAKER'S HANDBOOK OF SYNC SOUND AND RECORDING, offers practical advice on setting up a complete home sound lab for direct recording or post-synchronization. (TABooks ($8.95/5.95.)

Thoroughly updated and revised, PROFESSIONAL 16/35mm CAMERAMAN'S HANDBOOK by Verne and Sylvia Carlson reviews new camera equipment and techniques in a practical, well organized text. (Amphoto $19.95.)

* * *

CELEBRITIES PLUS

Penelope Gilliatt's JEAN RENOIR is undoubtedly among the very best studies of the brilliant director. Expanding her New Yorker profile with essays and reviews, Ms. Gilliatt offers an exceptionally sensitive appraisal of the artist's complex nature. (McGraw-Hill $2.95)

Concerned mainly with the shooting of *The Ballad of Cable Hogue,* Max Evans examines the personality and motivations of its director in SAM PECKINPAH: MASTER OF VIOLENCE, focusing on the events that surrounded the filming and the movie's controlled savagery. (U. of S. Dakota Press $4.95)

In DIRECTORS AND DIRECTIONS, John Russell Taylor discusses intelligently the techniques and philosophies of 8 outstanding filmmakers: Anderson, Chabrol, Jancso, Kubrick, Makavejev, Pasolini, Ray and Warhol. (Hill & Wang $10./5.95)

Mack Sennett's out-of-print autobiography KING OF COMEDY (as told to Cameron Shipp) is now available in paperback, a joyous evocation of Keystone Kops, bathing beauties, custard pies and all the zaniness of the old Hollywood days. (Pinnacle $1.75)

The cinematic style of four outstanding and widely differing directors (Hitchcock, Bergman, Penn and Godard) is perceptively analyzed by Louis D. Giannetti in GODARD AND OTHERS, with emphasis on form and texture to convey symbolic ideas. (Fairley Dickinson U. $10.)

The Humphrey Bogart cult has spawned no less than three current books. Nathaniel Benchley's HUMPHREY BOGART is a well-written, thoughtful and enlightening biography, explaining in human terms a complex and often abrasive personality. (Little, Brown $15.)

Allen Eyles' BOGART is an attractive work, highlighting the actor's private life and his films in a smooth narrative that should please his legions of admirers. (Doubleday $7.50)

A lifelong friend of the couple, Joe Hyams dubs "A Love Story" his affectionate and informative biography BOGART AND BACALL. As a familiar of the household, Hyams paints a truly intimate picture of a menage and of their respective backgrounds. (McKay $14.95)

Product of a film industry family, Max Wilke spills his first-hand knowledge of show biz greats onto a broad and colorful fresco of the entertainment world, EVERY DAY'S A MATINEE. Warmhearted and witty, his chronicle adroitly mixes tears and laughter. (Norton $8.50)

* * *

FACTS INTO FICTION

Will Jackie Collins duplicate Jacqueline Susann's impact on the movies? Her novel, THE HOLLYWOOD ZOO, makes a strong bid for the crown and will conceivably delight those who like their movie characters sexy and successful. (Pinnacle $1.75)

Quite different is comedian Woody Allen's WITHOUT FEATHERS. This collection of pieces from the New Yorker and other magazines reveals the range of the sources of his humor, from Kafka and Dostoevsky to the insecurity of a Brooklyn youth. (Random House $7.95)

* * *

THE COMMUNICATIONS BUSINESS

A historic survey by Rochelle Larkin, HAIL, COLUMBIA, sweeping rather than scholarly, recaps the evolution of the studio from its "Gower Gulch" era to its later, more respectable, status. Naturally Harry Cohn looms large in this story, but so do directors Capra and Kazan, and a long list of famous stars and great films that marked Columbia's more than 50-year life span. (Arlington $17.95)

William Kuhn's theme in MOVIES IN AMERICA is the symbiotic relationship of film and society, and the reciprocal shaping of one by the other. This approach is thoughtfully carried out through a perceptive and articulate analysis of cinema's ever increasing sophistication as social critic and its steady refinenent as an art form. (Barnes $12.)

What Robert Metz deservedly calls "The greatest entertainment industry", CBS: REFLECTIONS IN A BLOODSHOT EYE is a fascinating account of corporate history and personalities in a leader of mass communications media. (Playboy Press $13.50)

With Hollywood the main source of videofare, editor Robert H. Stanley's THE BROADCAST INDUSTRY: AN EXAMINATION OF MAJOR ISSUES is right on target when dealing with programming and audience impact in a lively and open discussion of the object. (Hastings House $13.50/7.95)

Handy as a reference and amply illustrated, HISTORY OF THE ACADEMY AWARD WINNERS (1974 edition), compiled by Nathalie Fredrik and Auriel Douglas, surveys the imposing procession of Oscar laureates since 1927. (Ace $1.50) ■

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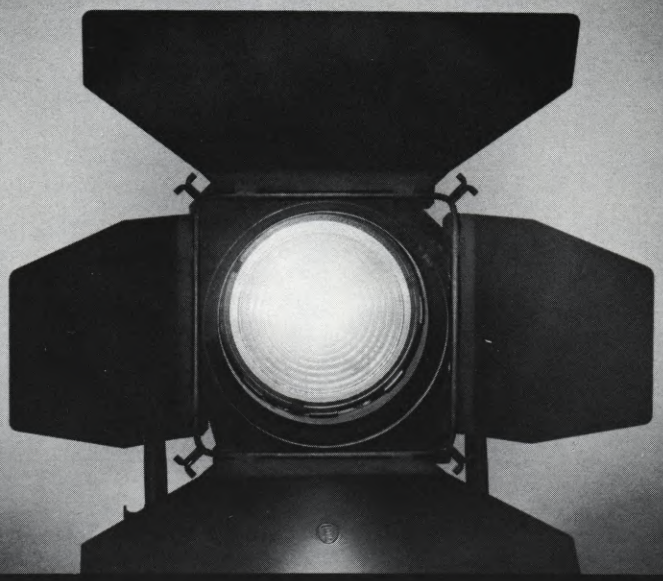

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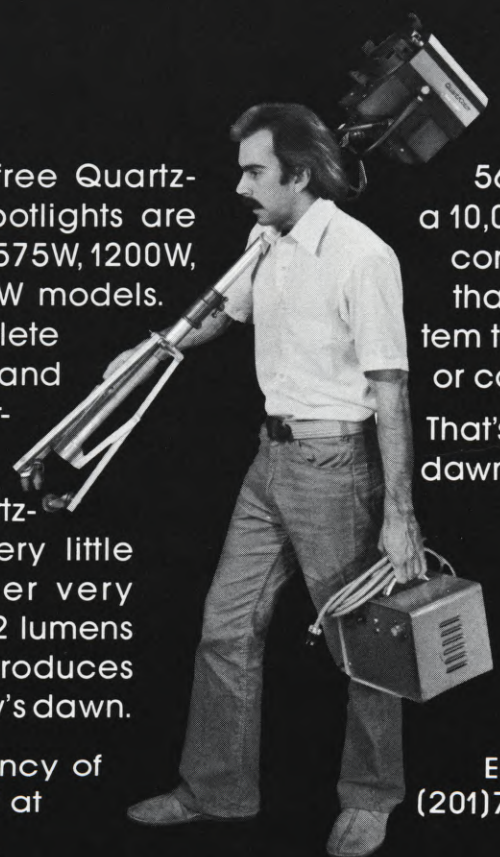

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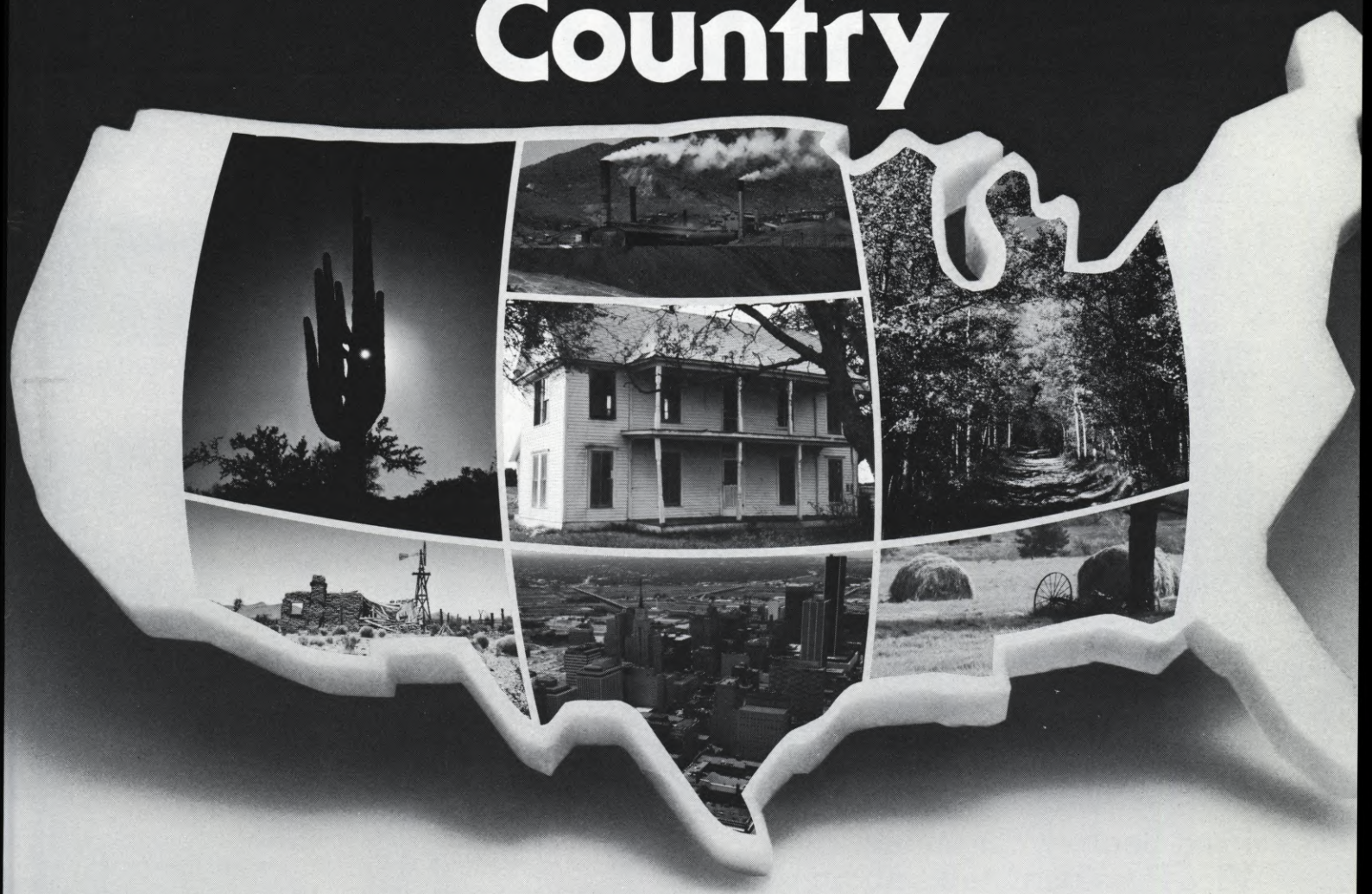

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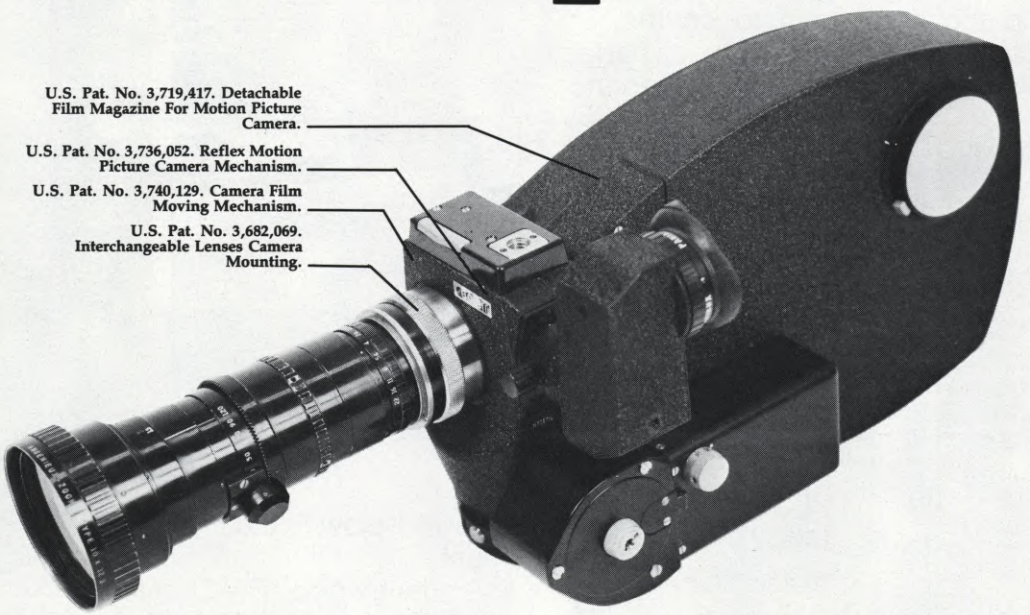

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In fact, the French Eclair ACL is protected by four separate U.S. and International patents held by Eclair International of France.

There is one patent on the reflex mechanism and another on the film pull-down claw. These two features make the ACL quieter and simpler. And the simplicity makes the ACL reliable, quick to service and lightweight.

There is also a patent on the interchangeable lens mount. This feature allows you to use lenses with any of the well-known professional mounts. Including, of course, the heavy-duty Eclair bayonet mount. Since the bayonet mount is both precise and rugged, you can use zooms and other long or heavy lenses without any other lens support. There is also the added versatility of a "C" mount. So, instead of mere adaptors, the ACL has a true universal lens mount.

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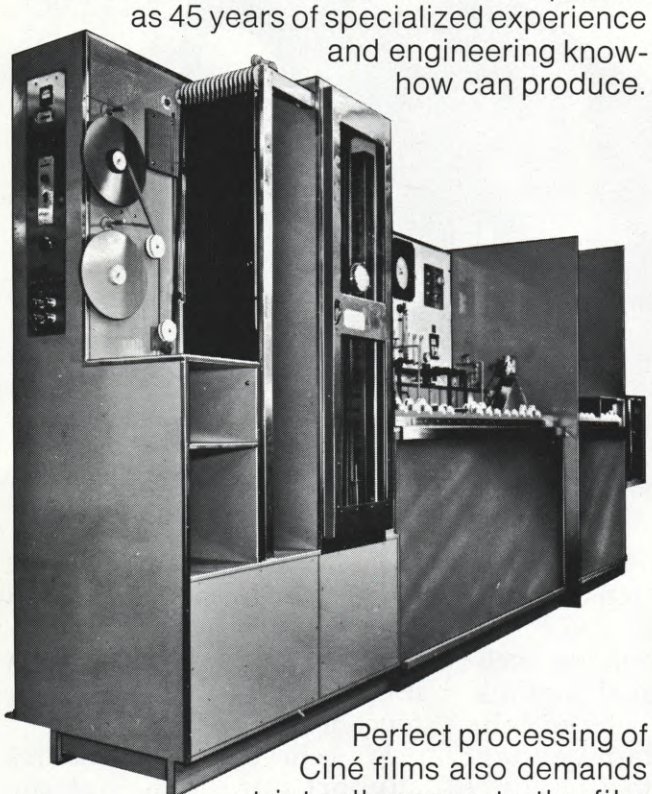

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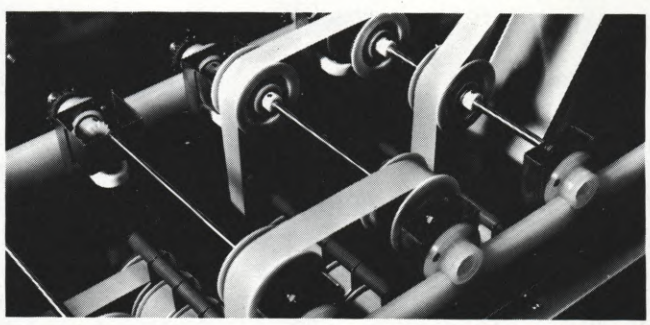

Houston builds a processor for every type and size of color or B&W film. Write or call us regarding your requirements: Houston Photo Products, Inc., 655 E. 20th St., Yuma, Arizona 85364. (602) 782-3677. Telex: 699-450.

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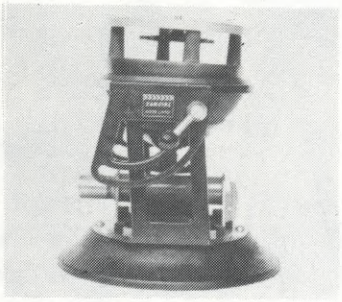

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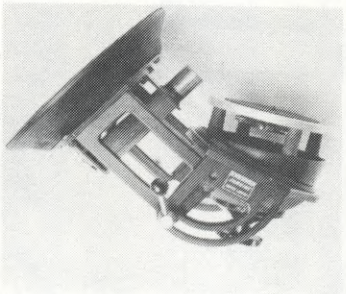

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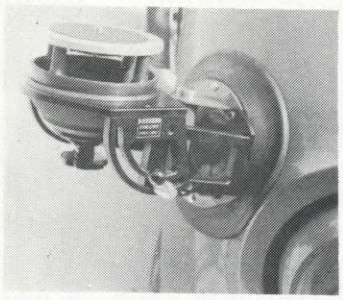

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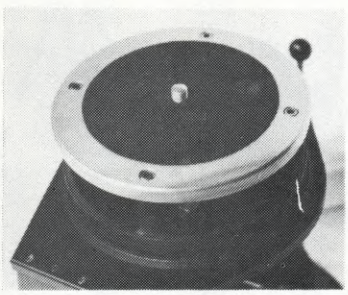

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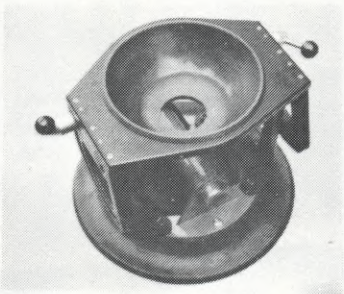

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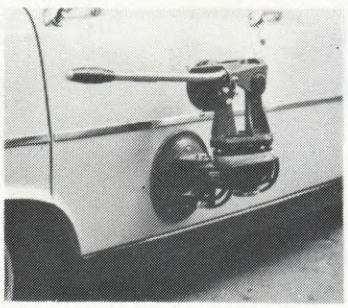
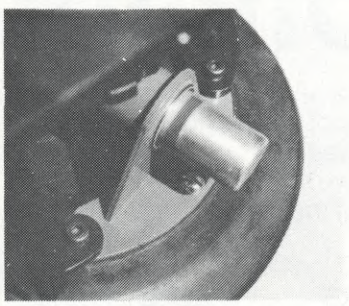
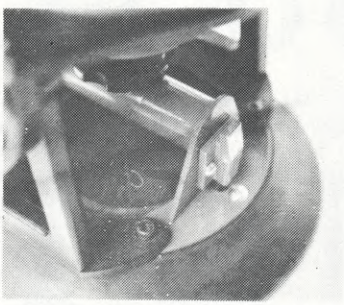


like so, and with enough off-set to clear the widest camera . . . . . .



It has a safety indicator which warns if the suction is low . . . . . .



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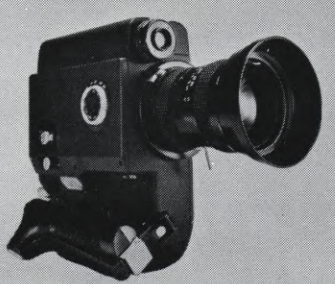

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If you're in the news, documentary or industrial field, chances are you've already become attached to our camera. (After all, 8 out of 10 TV stations and literally thousands of producers and cameramen own them.) But now that the original Scoopic 16's performance and reliability have convinced you what a good camera it is, we'd like to *un*-convince you. With something better.

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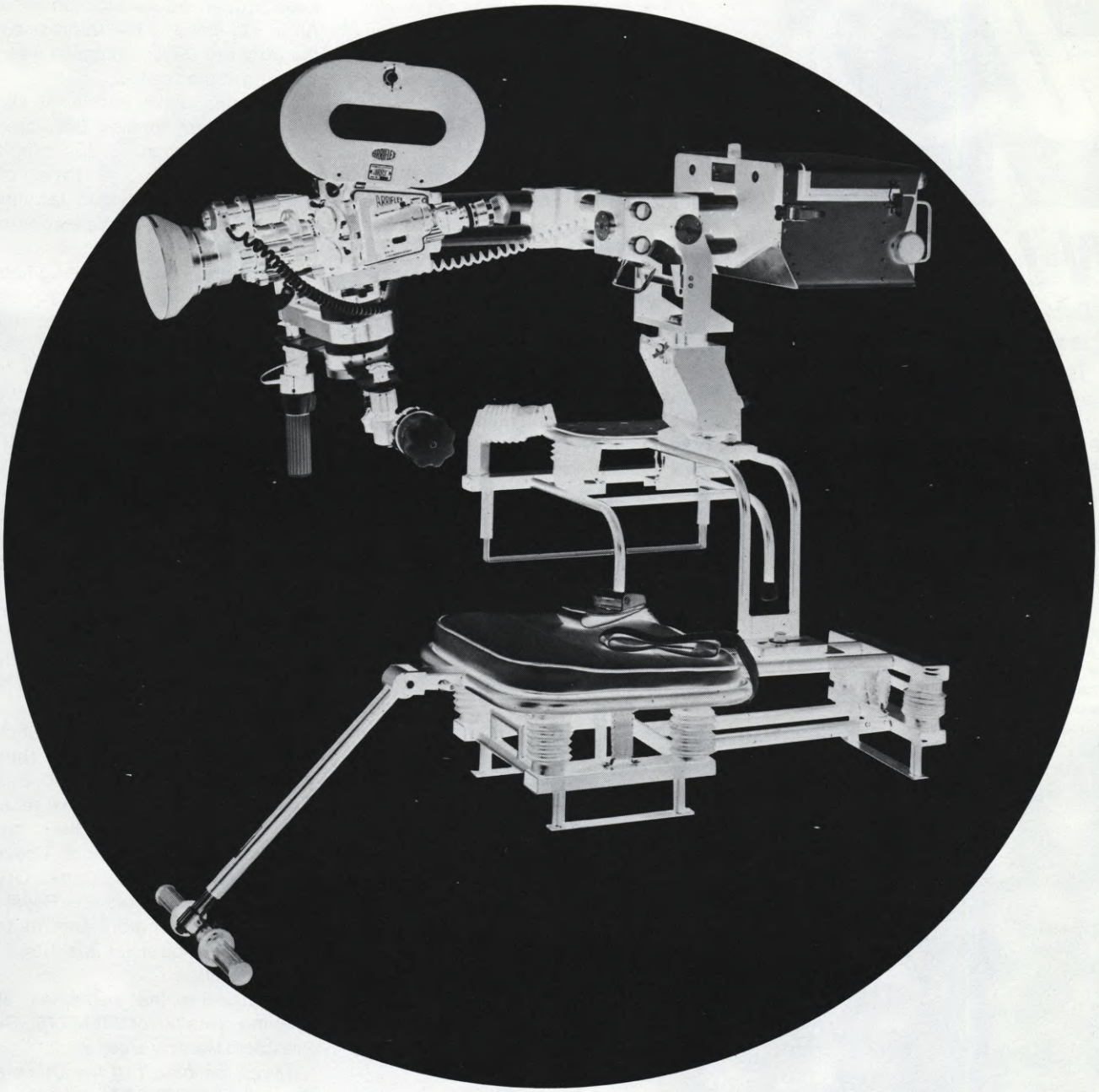

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FILM '75 IN LONDON

Once again, the BKSTS plays host to a highly successful Technology Conference/Exhibition

"Bigger and better than ever!"

That was the key slogan used in the advance publicity releases for FILM '75, the fourth biennial International Technology Conference and Exhibition, sponsored by the British Kinematograph, Sound and Television Society, and held at London's Royal Lancaster Hotel June 23 through 27, 1975.

The slogan did not exaggerate. Bigger it certainly was — and if more of a good thing adds up to *better,* then it was that, too.

Looking back at the event now, one finds the statistics quite impressive. Whereas, in this year of Recession, the BKSTS sponsors had rather nervously hoped that the number of registered delegates to FILM '75 would equal the 1,000 that attended FILM '73, the actual final total was very close to 1,300 — an increase of 30% over the last stanza. But the record-breaking didn't stop there. The delegates came from 48 different countries (with visitors to the exhibition pushing country representation to well over 50).

The number of members attending on a weekly basis remained constant, whereas an astonishing 44% increase in non-member delegates reflected improved promotional techniques regarding the 1975 Conference and the effects of successful reporting of the 1973 meeting.

More exhibitors than ever before were represented this year, with 94 companies demonstrating their products and services — some for the first time. In former years the large lower-level Westbourne Suite of the hotel had sufficed to house the exhibits, but this year equipment displays occupied the Bolingbroke Room as well. Even so, we're told that more than 20 would-be eager exhibitors had to be denied space because there simply wasn't any more available. A few of these were able to save the situation by displaying their wares in rooms or suites of the hotel proper, booked for the occasion. All in all, one got the impression that the poor old Royal Lancaster was fairly bursting at the seams.

Delegates taking part in the Outside Visits program totalled 600, breaking all previous records for this Conference feature. A total of 16 companies had provided facilities for these visits, which took place throughout the week.

Registered ladies for the Ladies Program also broke previous records with a total of 112 registered, as compared to 55 in 1973.

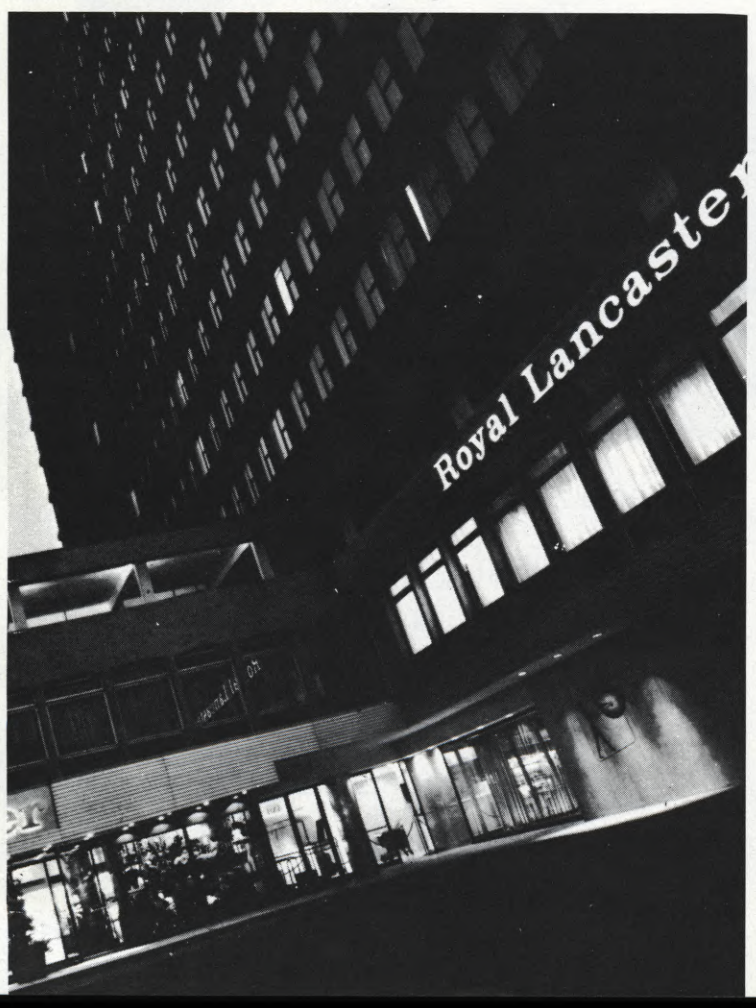
For the first time members of the public were invited to attend an evening of entertainment as part of the Conference program. This was "ExtrAVaganza", described as "an audio visual happening" which used all forms of audio visual aids and techniques to transform the hotel's Nine Kings Suite into one of the most sophisticated discotheques ever. The electronic cabaret, relieved with live music provided by something called "THE BIG ELBOW" pop group, was enjoyed by some 1,000 delegates, guests and members of the general public.

Evening social affairs also included the President's reception (held at Banqueting House, Whitehall), Samuelson Film Service's traditional reception for foreign visitors (held at the company's Cricklewood Broadway headquarters), the Rank Organisation's reception (at the Royal Garden Hotel, Kensington) and the formal FILM '75 Banquet (at the Royal Lancaster Hotel).

In greeting the delegates at the opening session of FILM '75, BKSTS President Harry Manley said:

May I, on behalf of the Officers and Council of the BKSTS, welcome you to FILM '75 and particularly to welcome the delegates who have travelled from overseas. It is particularly pleasing to note that we have here today delegates from some 48 countries. At a time when many economic commentators use the term "world-wide recession" with monotonous regularity, it is seeing a group of people like those gathered here today, that makes one optimistic of the state of the Industry that we all serve on a world-wide basis and perhaps goes to suggest that the

London's Royal Lancaster Hotel was headquarters for FILM '75, just as, during the past six years, it has served the BKSTS in this capacity, providing conference halls, exhibition halls, banquet facilities, hospitality suites and rooms for visiting delegates. This time the hostelry's amenities were strained to the limit to accommodate the record crowd attending.



situation may not be as bad as the television pundits would have us believe.

It is impossible to estimate the value of people coming together in this way to exchange ideas, to sample new techniques, to investigate and evaluate new equipment and to bring themselves up to date on the state of the Industry in the different countries. Advances in technology are inhibited if there is no exchange of ideas and the drawing together of technicians from all over the world will provide a forum where such ideas may be exchanged. It was Alice who said "What is the use of a book without pictures or conversations?" I believe that Lewis Carroll would have approved of our meeting here this week.

The Companies within British Film, Television and Audio Visual Industries have been enthusiastic in their support of FILM '75, providing facilities, equipment and personnel unstintingly. I hope that you will have a valuable week and at the end will leave London with the feeling that your journey was well worthwhile, and that this visit is merely the prelude of many more to this country . . .

Mr. Manley then introduced Lord Goronwy-Roberts, Under Secretary of State at the Foreign Office, who officially opened FILM '75.

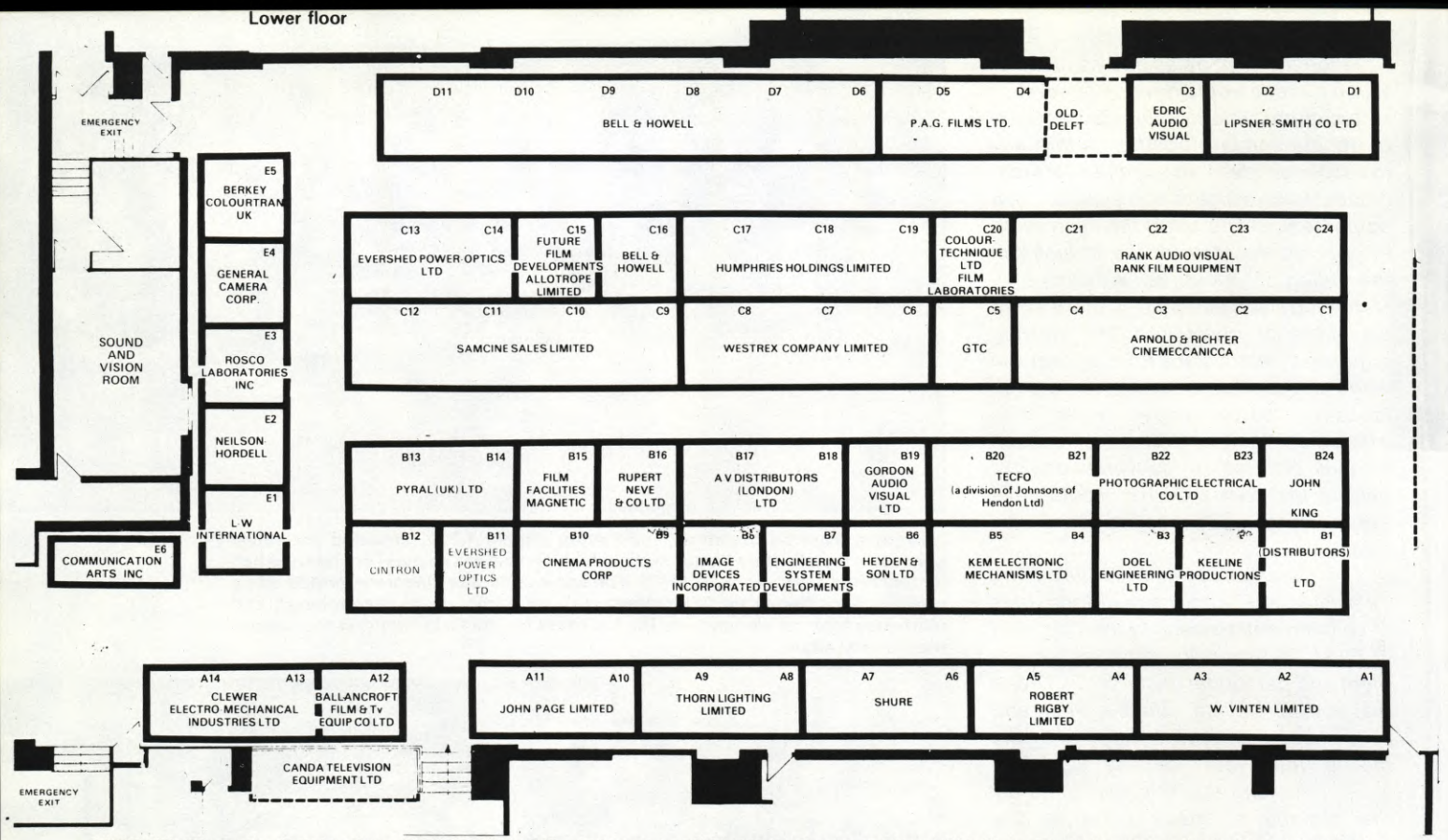
Lord Goronwy-Roberts revealed himself to be most knowledgeable in regard to the communications media in general and the film and television industries in particular. He commented very favorably on the broad scope of the papers program planned for the FILM '75 Conference and expressed special praise for its international character.

Session I of the Conference, subtitled "THE STATE OF THE ART", was chaired by L.B.K. Happé and consisted of a series of reports from five different countries outlining the state of the art in their local film and television industries. Represented were Czechoslovakia, Italy, India, Rumania and Sweden. From the latter country, Lars Swanberg, Technical Director of the Swedish Film Institute, presented as part of his report a 35mm blow-up of a scene from Ingmar Bergman's 16mm television film of Mozart's opera, "THE MAGIC FLUTE" (see *American Cinematographer,* August 1975).

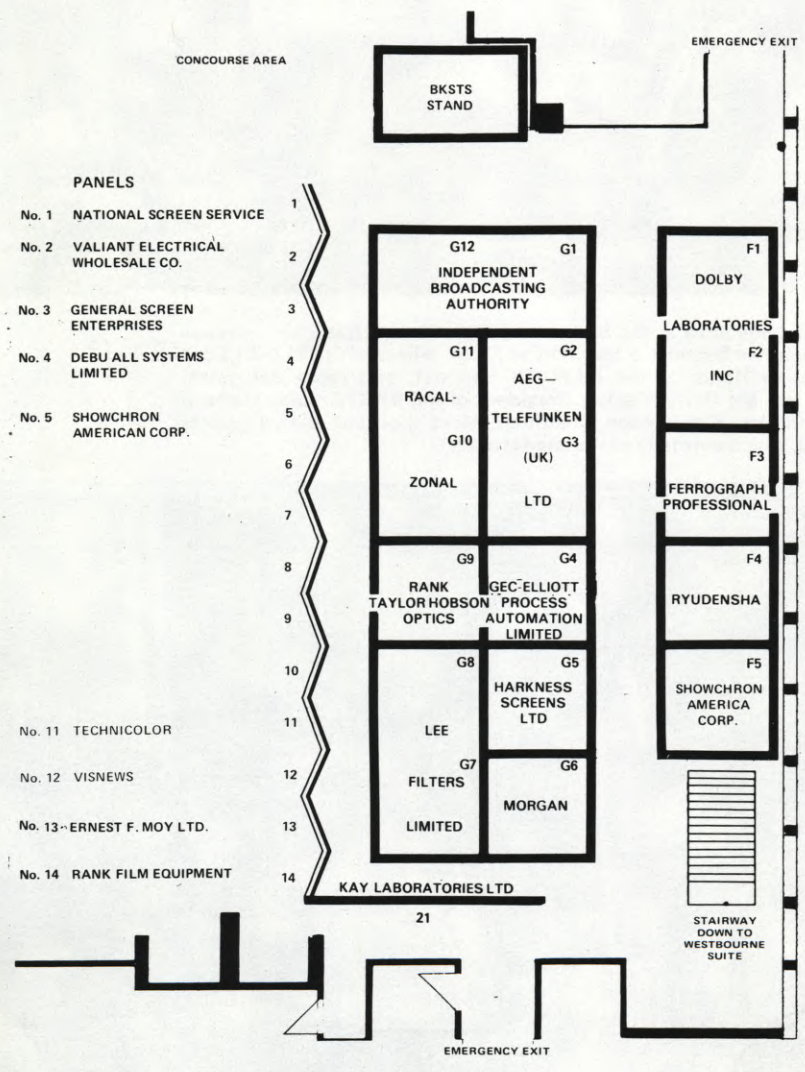
During the next five days of the Conference, a total of 54 papers were presented at sessions variously subtitled: "SOUND RECORDING AND REPRODUCTION", "PRODUCTION TECHNIQUES — TELEVISION", "FILM PRODUCTION TECHNOLOGY", "VIDEO TAPE IN BROADCAST TELEVISION", "ELECTRONIC REPRO-

Delegates from 48 countries, numbering almost 1,300, crowded the Royal Lancaster Hotel's Nine Kings Suite, which served as the main conference hall for technical sessions of FILM '75. The same suite was also transformed into a rocking discotheque for "ExtrAVaganza", an audio visual "happening", and ultimately took on elegance as the ballroom for the Gala Banquet that closed the biennial affair.

(ABOVE) Guests socialize at the Samuelson Film Service bash for overseas delegates, which has become a tradition of FILM Whatever. (BELOW) Lord Harlech, Guest of Honor at the FILM '75 Banquet, addresses delegates. Seated on his left are Harry Manley, President of the BKSTS, Lady Harlech and Dennis Kimbley, Conference Chairman. More than 800 dinner guests packed the hall, which normally accommodates 700.



(ABOVE) Diagram showing locations of FILM '75 equipment exhibitors in the lower level Westbourne Suite of London's Royal Lancaster Hotel. During the last three biennial editions of this event, the Westbourne Suite has been sufficient to house all of the exhibitions, but this year they overflowed into the ground floor Bolingbroke Room (BELOW LEFT), as well. Even so, some 20 additional would-be exhibitors had to be turned away due to lack of space.

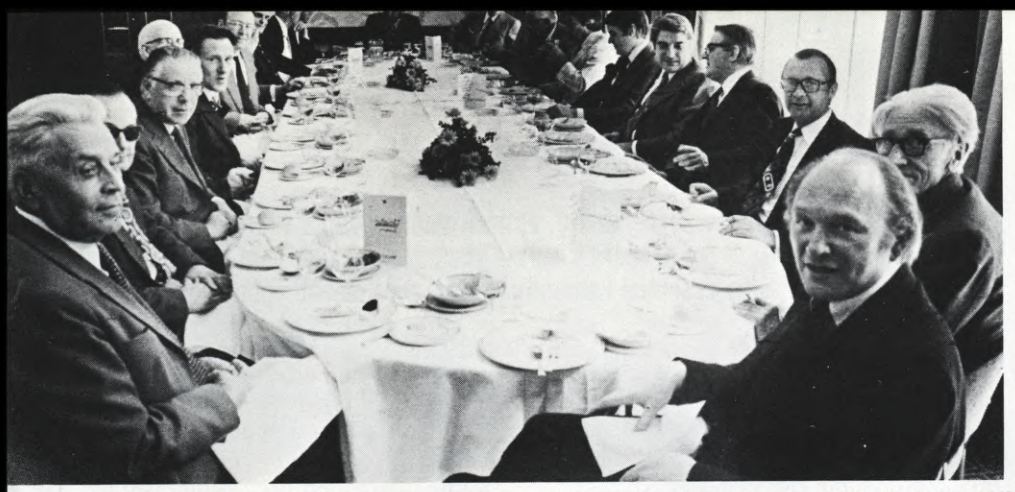


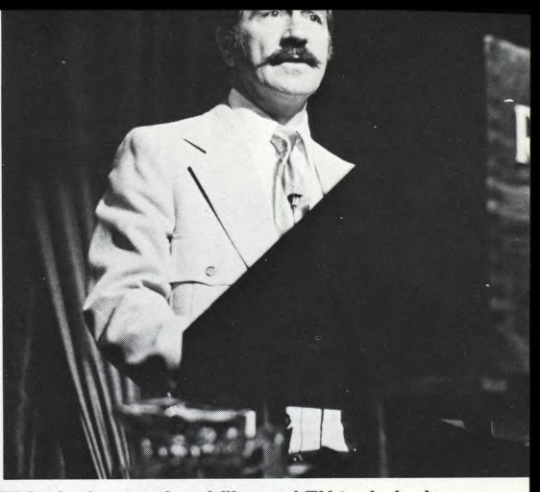
BOLINGBROKE ROOM—
Ground floor

DUCTION OF FILM", "LABORATORY TECHNIQUES", "AUDIO VISUAL COMMUNICATIONS BY DISC AND TAPE" and "AUDIO VISUAL PRESENTATION".

In the session devoted to "PRODUCTION TECHNIQUES — TELEVISION", just as at FILM '73, several papers were devoted to the "Film vs.

Lord Goronwy-Roberts (Left), Parliamentary Under-Secretary in Britain's Foreign and Commonwealth Office, not only officially opened FILM '75, but spent several hours at the Equipment Exhibition.





(LEFT) FILM '75 served as a convenient occasion for a luncheon meeting of the Bureau of UNIATEC, the international film and TV technical society. The Bureau is composed of UNIATEC Vice Presidents, each representing a separate country. In foreground left, David Samuelson (Great Britain). Opposite him, Prof. Boris Konoplev (USSR). (RIGHT) Edmund DiGiulio, President of Cinema Products Corporation tells the FILM '75 delegates about his company's amazing new camera stabilizing device, the film demonstration of which boggled some minds.

Tape" issue, presenting both sides. It was all very civilized this time. The arguments were calm and intelligent. There was none of the colorful, knock-down-and-drag-out atmosphere that prevailed during FILM '73, when representatives of opposing camps good-naturedly went after each other hammer and tongs, turning the whole scene into great fun.

Notable among the papers read during the conference was one by Dr. Kugler (Osram GmbH Munich GDR), entitled: "Halogen — HMI Lamps — A Reliable Daylight Source for Television and Film", detailing the development by Osram of their Metallogen lamps for the TV and film industries, a subject of intense interest in those quarters currently. The paper promised an early solution to the flicker problem (for filming) by means of high frequency and square wave techniques, as well as

Continued on Page 1078

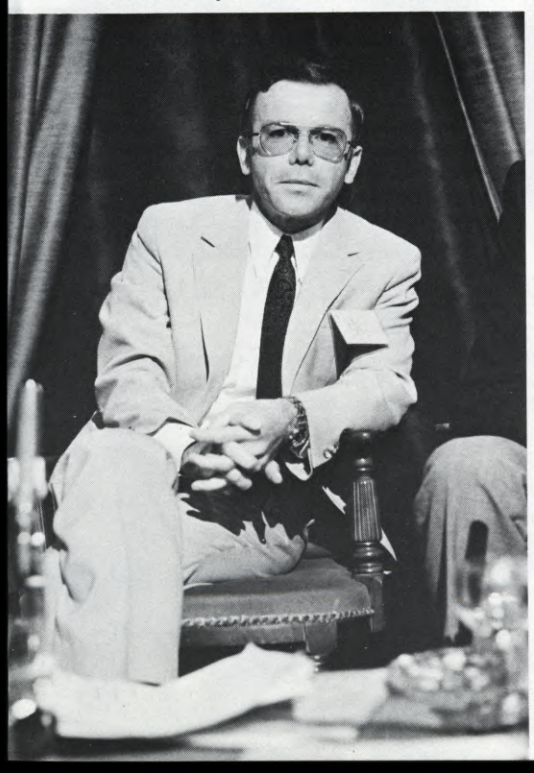
FILM '75 — COMPARISON OF STATISTICS WITH 1973

Registration (number of persons)	1975	1973	% Change
Weekly: Member	509	520	- 0.02
Non-Member	407	283	+ 43.82
Daily	339	199	+ 100.50
Ladies	112	44	+ 154.55
Cancelled Registrations	52	28	
COUNTRY OF RESIDENCE			
U.K.	737	577	+ 27.73
Overseas	518	425	+ 21.88
Total Delegates	1255	1002	+ 25.24

FILM '75 — OVERSEAS DELEGATES

COUNTRY	NUMBER	COUNTRY	NUMBER	COUNTRY	NUMBER
Australia	13	Hungary	7	Poland	5
Austria		India	2	Rumania	3
Belgium	11	Iran	4	Sierra Leone	1
Brazil	1	Italy	25	South Africa	11
Bulgaria	3	Jamaica	1	Spain	10
Canada	27	Japan	7	Sweden	39
Czechoslovakia	8	Jersey C.I.	2	Switzerland	7
Denmark	22	Kenya	1	Tasmania	1
Eire	6	Leichtenstein	1	Turkey	1
Finland	12	Malaysia	3	U.K.	77
France	5	Mexico	4	U.S.A.	89
Germany (East)	4	Nigeria	28	U.S.S.R.	7
Germany (West)	44	New Zealand	3	Venezuela	1
Greece	2	Norway	15	Yugoslavia	16
Holland	20	Oman	4	Zambia	3
Hong Kong	3	Pakistan	2	Syria	1

(LEFT) Horst Bergmann, of Arnold and Richter (Munich), presented a paper on his company's unique Arriflex 16SR camera. (RIGHT) Ashley Hopkins, who acted as tour guide to more than 120 FILM '75 delegates at Rank Film Laboratories, here directs attention to the newly installed CRI processing line at the company's principal plant at Denham. The Rank Reception was one of several evening social events sponsored by various companies to welcome and enlighten FILM '75 visitors.



A NEW PHOTO-OPTICAL MULTI-CHANNEL SOUND SYSTEM FOR THEATRES

A unique new high-fidelity, optical, multi-channel sound system that provides three or more discrete channels at lower cost than magnetic track, plus essential immunity to dirt, scratch and splice noises

PART I
By WILTON R. HOLM

From 1928 until after World War II, the best sound reproduction to be heard anywhere was on film — in movie theatres.

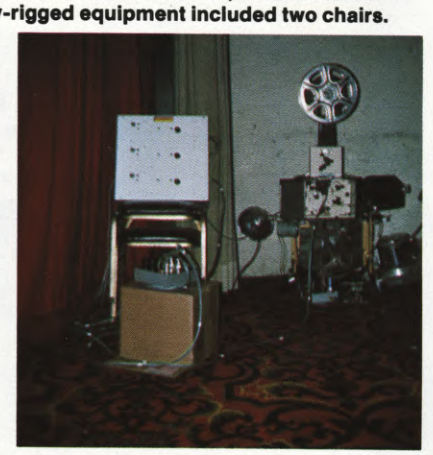
The motion-picture sound tracks of that era were recorded and reproduced photo-optically, much as the pictures themselves were photographed and projected — using light, lenses, photocells, and photographic film. And just as the picture image on the film controlled the amount of light reaching the screen, so as to faithfully reproduce the scene photographed, so did the sound track control the amount of light reaching a photocell, so as to faithfully reproduce the original sound. This photo-optical sound soon became known as "optical" sound — a name which still identifies it today.

The mid-1950's brought magnetic sound to theatres, and with it came stereophonic sound — the 4-channel 35mm Cinemascope system and the 6-channel 70mm Todd-AO system. The use of magnetic sound tracks provided a significant improvement in sound quality, and, compared with the old, monophonic optical sound, the multiple-channel stereo systems added a new dimension to sound reproduction. The best sound to be heard anywhere was *still* in movie theatres.

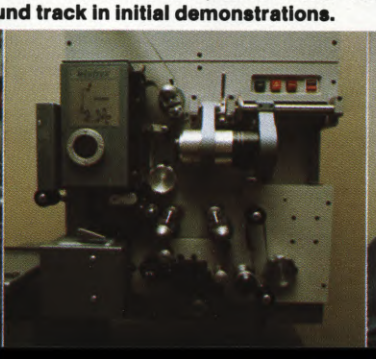
But today, some 20 years later, magnetic stereo sound has all but disappeared. More than 90% of all pictures released carry the same mono optical track we started with back in 1928. Occasionally some 35mm pictures will have a few 3 or 4-channel magnetic stereo prints included in their predominantly monophonic release. And even 70mm, 6-channel magnetic-stereo prints are still released now and then. But interestingly enough, these 70mm prints are usually "blow-ups" from 35mm originals ("GONE WITH THE WIND") or even from 16mm originals ("BANGLADESH"), and are made because of a desire for the 6-channel stereo sound, which can only be had on 70mm film. At present, practically no pictures are being photographed in the large 70mm format, even though it provides the best image and sound quality generally available to theatres.

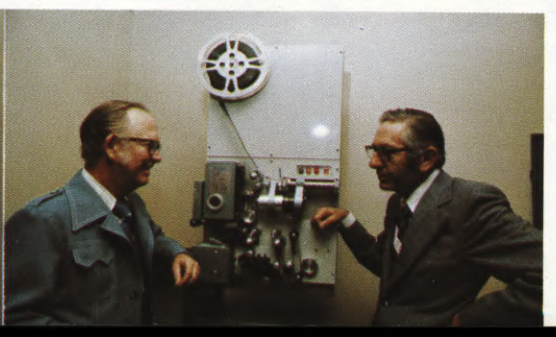
Some interesting deductions can be made from these facts. Obviously, the visual image generated from a 35mm, or even a 16mm original camera film, is considered "good enough" at times when monophonic sound is not. Or, putting it another way, sound can be important as an entity, and not just as an adjunct to the visual image. Sound not only enhances the dramatic value of the picture on the screen, but it can have a charisma and a dramatic value of its own. And this is especially true of multi-channel sound. Remember in "THE ROBE" how the marching Centurions seemed to come from the back of the theatre, march right past you and onto the edge of the screen? Or the magnificent surround-sound of "AROUND THE WORLD IN 80 DAYS"? Or the beautiful stereo scores of "OKLAHOMA", "SOUTH PACIFIC" and "THE SOUND OF MUSIC"? These are dramatic dimensions which cannot be

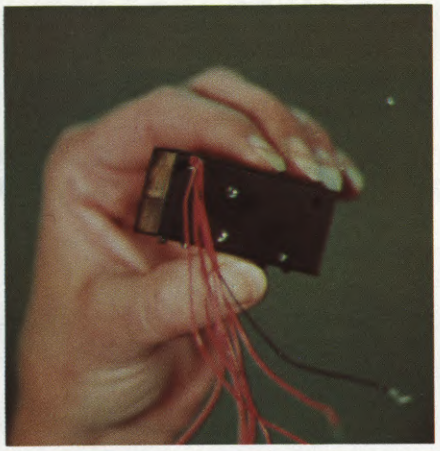
(LEFT) When the new variable-hue sound track was demonstrated at the 116th SMPTE Conference last year, experimental equipment was hooked to this projector. Since no reproducer was yet available, the three tracks were played monophonically. (CENTER) Experimental light-valve recorder adapted by Westrex to record variable-hue stereo sound track. (RIGHT) When the AMPTP Research Center, Westrex and N-T Audio Visual Supply demonstrated the new sound system at the NATO convention in Atlanta, the jury-rigged equipment included two chairs.



(LEFT) Petro Vlahos, Chief Scientist of the AMPTP Research Center in Hollywood, and inventor of the new variable-hue multi-channel optical sound system, discusses the development with Research Center Executive Director Wilton R. Holm. (CENTER) The 35mm sound projector used for testing the new system. (RIGHT) Frank Pontius, of Westrex, shown with Vlahos. Westrex adapted the experimental light-valve recorder used to record the variable-hue stereo sound track in initial demonstrations.







This tiny device is the resolver which might be called the "heart" of the new system. It is part of a simple, low-cost conversion kit which fits onto the theatre projector.

mono track which had been included on 4-track "mag" prints, instead of replacing the magnetic playback heads.

There was no question in our minds as to the desirability of multi-channel sound in theatres. The question was how to make high-fidelity, multi-channel sound cost-effective — how to devise a system that would provide high-quality sound like multi-channel *magnetic* sound, yet would be essentially as economical as the old *optical* system. In effect, we needed a high-fidelity, optical, multi-channel system which would provide three or more discrete channels.

For a multitude of technological reasons, this goal was not an easy one to attain. A new optical system had to be confined to the same area as that occupied by the old mono track. It should provide at least three discrete channels of sound behind the screen, with provision for surround sound. And, like mag sound, it should be essentially immune to the dirt, scratch and splice noises that have plagued optical tracks since the inception of sound-on-film.

Our first and obvious consideration was to make two stereo tracks out of the dual-bilateral, variable-area mono track, and obtain a third channel behind the screen either by creating a phantom channel, or by "deriving" a center channel — that is, by feeding a center speaker with information "derived" from two discrete side channels. This technology, known as the Haas Effect, was the subject of a paper by Dr. John Frayne of Westrex many years ago. It was never adopted by our motion picture industry because the discrete center channel of the magnetic system was considered a must by our sound directors, and because the magnetic system had other technological advantages, not the least of which was an immunity to dirt, scratches, splices and abrasions which produced noise on an optical track.

To make a long story short, we were forced to conclude that what was needed was a totally new concept — one which would provide a discrete center channel, and one which would not permit dirt, scratches, abrasions and splices to modulate the program sound and so produce noise. Petro Vlahos, the inventor of our variable-hue system, provided that concept — vary the *color* of the light, not the *amount* of light transmitted to a photo-receptor.

On October 9, 1974, for the first time anywhere, true 3-channel optical stereo sound on 35mm film was demonstrated in Atlanta, Georgia, at the Convention of our National Association of Theatre Owners (NATO). The demonstration was greeted by spontaneous applause, both for the system's stereo reproduction and for its rejection of noise. Let me repeat here what I told the NATO audience about the cost of this new color sound system:

For the Producer — very little per picture, the cost depending upon whether only the music is stereo on the release print, whether the effects are stereo or directional, whether the dialogue stays on the center speaker or is also directional (to follow action), and to what extent surround sound is programmed. I would expect any or all of these options to be exercised, depending upon the picture, and its budget.

For the Distributor — no additional cost. The color sound tracks are printed photographically, just as the present-day optical tracks are.

Continued on Page 1069

Two more views of the reproducer unit. Light shining through the variable-hue stereo sound track into this reproducer unit, when mounted onto the theatre projector, will create multi-channel sound up to six channels, including "surround" in the theatre. Up until now the Research Center team has been working with three side-by-side tracks to produce three discrete, independent sound channels. However, before tying off the system, they will evaluate the need for four-track and five-track systems, recognizing the fact that some pictures might benefit from such systems. The extra channels add very little to the cost.

created by monophonic sound. And still other dimensions are possible, such as true quadraphonic or quintaphonic sound, using respectively four or five *discrete* audio channels.

Why, then, if multi-channel sound has much more dramatic potential than mono sound, has it practically disappeared from theatres? The answer, of course, is cost. It costs distributors about $400 or more per release print (depending upon length) to have magnetic stripes applied to the film and to record sound on them. This can mean an extra expense of $160,000 or more for 400 release prints. And the magnetic sound stripes on the film wear grooves in the playback heads of a theatre's projectors. These grooves worsen the sound quality, and make it necessary for the playback heads to be replaced at least every six months to maintain top-quality sound. As a result, theatre owners who operate on tight budgets elected to play the optical

THE USE OF HAND-HELD VIDEO CAMERAS IN TELEVISION BROADCASTING

A state-of-the-art review of portable TV cameras — past, present and future—in competition with compact film cameras, indicates that they are making steady progress, but still have some distance to go

By LES ROWORTH
Head of Production Engineering, London Weekend Television

The hand-held or portable video camera is now becoming a common sight amongst the normal O.B. cameras. Various manufacturers produce their own versions and these are often modified by the users. The first thing I think we should do is to look back and see how and why video cameras came out from the studio.

The first studio camera in Great Britain which ventured outside was at Alexandra Palace in about 1937. This was an EMITRON camera which was a normal studio camera and was used for an afternoon programme introduced by Joan Gilbert. Then followed the coronation of George VI which saw the use of the first O.B. van. These early cameras were very insensitive and the vehicle was very big.

After the war, with the advent of the IMAGE ORTHICON tube, cameras became lighter and more sensitive. But outside broadcasts were still thought of as actuality events, sports and great occasions. The main problem was that there was no good way of recording the output of the camera. Telerecording existed but the results were very variable.

In about 1956 the first portable cameras built round the VIDICON tube became available. These were the "Peepie-Creepies", or as our Japanese friends called them "Handee-Lookees". They were originally designed for use in the American Political Conventions. These conventions were covered exclusively on Network Television but with the existing Image Orthicon cameras there was no way of getting into the middle of the delegates. Here the "Peepie-Creepie" with its radio transmitter and battery packs succeeded.

The cameraman would be put into the middle of the delegates and left to wander round listening to radio talkback. When anything interesting happened he was there producing close-up pictures. These cameras then began to be used on other shows as well. In early 1958 Associated Rediffusion took delivery of the CSF radio camera. This was used on outside broadcasts, mounted in a car at Brands Hatch and at the Dorchester Hotel at a Light Entertainment Show. The camera was also used without its radio unit with a video cable on "Cool for Cats". Here it was used to get interesting shots of the dancers which the normal studio cameras could not get. One minor problem on the show was that by 10:30 at night the studio was very hot. The hand-held was meant for an outside environment and so would get rather unstable. This meant the cameraman and engineer could be seen walking up and down Kingsway at 10:30 at night cooling the camera off before transmission at 11:30.

These cameras were portable but their picture quality did not match the 4½ Image Orthicon Cameras. When they were used on live programmes for special shots this was no problem. But then in 1958 came the video tape recorder and programme making changed. Before this anything recorded had to be telerecorded and if quality was required film cameras were used. Inserts into drama programmes were filmed using 35mm cameras.

The possibility of using television cameras throughout a production including the inserts was then available even if the pictures had to be relayed back from the O.B. site. The next stage was to place the VTR unit in a vehicle and this was available by 1959.

The hand-held was being developed at the same time and the Japanese produced a camera built round the 3" Image Orthicon. This overcame the sensitivity problem but was rather bulky.

Broadcasts in this country continued using the normal O.B. cameras, like the Marconi Mark III, for location work. They were cumbersome but once rigged could produce pictures matching the studio pictures.

The Americans were the first to use a colour hand-held camera and this was the PCP 70 which was based on the PC 70 introduced in 1967. The PCP 70 was first used on-air by N.B.C. in May 1968. CBC had been working on a radio version and this became the PCP 90 Minicam. These two camera types were used in America mainly for sport or news work.

The next development was the replacement of the normal plumbicon tubes with the 5/8" version and this became the LDK-13. This camera again was primarily introduced for sport and news work but has now moved into drama work and commercials. The first use of the LDK-13 at London Weekend away from the normal sports actuality work was on a Light Entertainment series *"The Train Now Standing . . . . ."* This programme was based on the day-to-day life of people working on a railway station. The majority of the series was to be recorded in the studio with a mock-up of the station. But there was a four-day sequence at a real station which would be used as cutaways. The original plan was to use 16mm film for the location work. This would have been alright if the location work had been complete sequences. But there were a lot of shots which were inter-cut between studio and location and back again. In the end it was decided to use the LDK-13 hand-held camera for the location. The recording took place from the 4th-7th April 1972.

This proved very successful, the shots on location matched very well with the studio shots. There were problems at first because of only one hand-held camera, which meant that extra editing was required. We obtained a second LDK-13 in November 1972. An O.B. unit was then built to accommodate both cameras. The unit also has sound and vision mixing facilities so that complete multicamera sections can be recorded.

This unit is normally used to provide inserts for drama programmes and drama series like *"Upstairs Downstairs", "Helen A Woman of Today"*, etc. The inserts for these programmes normally run for about 3-6 minutes, although in the case of one *"Upstairs Downstairs"*, there was an 18-minute insert. In the case of *"Helen A Woman of Today"* the inserts varied. The extract you will see at the end comes from a complete O.B. programme.

Why do we use hand-held or portable cameras instead of film cameras? We are limited to 16mm inserts which are played back on Flying Spot Telecine machines. The quality is very good but does not match the studio plumbicon cameras. The video hand-helds are normally mounted on tripods or a crane but they can be used as a hand-

held in some locations. The original requirement was for matching in a fast-cutting comedy shot. In drama it is to retain the mood. If somebody comes to you and asks if you saw those fabulous inserts on tape or film in a production the mood has been lost.

Another reason is that the director can see his recording played back without waiting for the rushes. He can also use more than one camera and see the final cut copy. The film world has moved to television cameras fitted onto film cameras, but the director only sees the black and white material, perhaps played back from VTR. In the case of the video cameras the playback is in colour and is the tape he will use for transmission.

Of course the present day cameras are not perfect; the LDK-13 suffers at times with lag and requires power for its equipment. We have used an invertor in a helicopter to provide power but the batteries are larger than an Arri battery belt. The other limitation to our LDK-13 is that there are only two lenses available, a 6-1 and a 10-1. The later range of portable cameras have a much better selection of lenses.

Our attitude to the video camera is that where the 16mm Arri will go so will a video camera. So far we have succeeded. There have been some tight spots but there are normally ways round these. We have not dropped a camera by parachute yet but have flown in a variety of helicopters. What you do need is a sympathetic director and a cameraman. Not to listen to the excuses as to why not, but to see how to get round the problems. A film stock has a limitation on sensitivity and contrast range; so have plumbicon cameras. The advantage of a video camera is that you can adjust the colour balance on location till it is right. With film, answer prints are required and if the shoot was no good, nothing can be done about it. With a video camera the director is very aware of the problems whilst still on location.

We now use a single 2001 EMI camera as well as the hand-held LDK-13's on some locations to cover for the bigger lenses. We can fit the 18-1 Angenieux zoom into the EMI 2001. The *"Helen"* you will see has a 2001 as well as hand-helds and it is impossible to tell which is which.

This is an example of how we have progressed from a normal O.B. van with four studio type cameras to a two camera hand-held unit supported with a single studio camera unit.

The latest portable video cameras have technically moved a long way from the LDK-13 camera. They use 1" Plumbicons with light bias and anti comet tail as standard. Because of the bigger tube and its accessories pictures are improved. The low light high contrast conditions beloved by some drama directors can now be handled without too many problems. The range of lenses has improved and this makes the whole operation more flexible. The Phillips LDK-15 has facilities for recording at the camera head or transmitting back to a base station.

As with all great strides of technical progress there is good news and bad news. The good news is that the camera is more reliable, produces better pictures, has a range of lenses, is interchangeable with the studio camera control units. The bad news is that the camera head is much bigger. The viewfinder is meant for news work and talkback facilities on one camera is a loudspeaker.

Although the camera manufacturers call their cameras portable, they seem to be thinking only of news and sport. They also seem to think only of the large ex-American football players as being suitable to operate these new cameras.

Unlike news when the camera may be operated for about half an hour, a drama might take hours. If the camera is not being used on a tripod the cameraman will slowly sink to the floor. By the end of the day he will be tired and his work will suffer. When the camera is mounted on a tripod most of the viewfinders are not in the normal working plane. Larger viewfinders are available sometimes bigger than the camera.

With the LDK-13, it was possible on some street locations to work without too much attention being paid to the camera by the bystanders. The newer cameras give the game away; they can see you coming. The snag, of course, is that the drama use is very small at present. Although one of the new portables could still be a handful on a battlefield.

I think this is a very good point to look at the present design of portables and what we really want in the future. Those of us who have used the LDK-13 have been spoilt. Although they have had their problems, like viewfinders failing, they were lightweight and compact. The cameraman could run backwards down a golf course without too much trouble. He could also see where he was going in the crowd at the Cup Final. The cameras, when used on a tripod, could be fitted with a small external monitor which allowed the cameraman to stand back. Our own LDK-13's are now being modified for motorized control of zoom and focus, which again allows the cameraman to stand back.

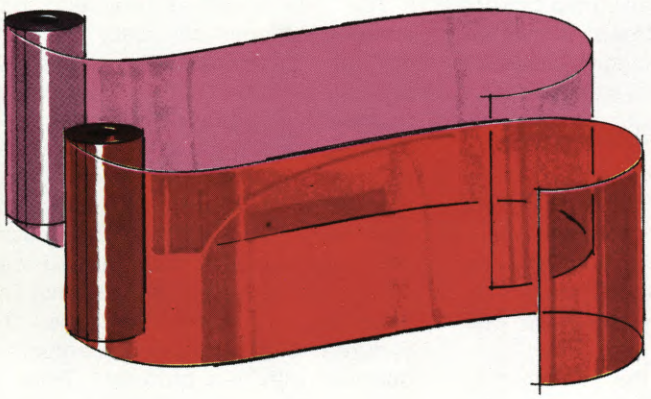
The new cameras are with one exception bigger physically than the 5/8" plumbicon type. The one that is still reasonably small has other problems with its viewfinder and talkback facilities. Because these cameras are made for the American news market, they are designed round the cameraman standing up. This means that if he has to lie down for a shot or sit in a tree he has great problems. The technical wizards have improved the picture quality but have presented the operator with new problems. How do you carry the camera if it is not on its shoulder mounting? Or, how do you put it on the ground? These are two baffling problems. If you want to run quickly with the camera you might want to carry it in one hand. When you climb up a ladder, most people require to use one hand for themselves. While you are waiting for the director, it is nice to put the camera on the ground. With some models they fall over.

At present there are portables produced by Marconi, Phillips, Fernseh, and RCA in PAL versions. There are other Japanese and American cameras but these are normally NTSC only. The manufacturers have consulted some users as to their requirements, but of course we are all different. What we all require is a lightweight small practical video camera. This would have a set of interchangeable lenses including a

Continued on Page 1091

SHOOTING UNDER FLUORESCENTS

TWO WAYS TO KILL THE GREEN

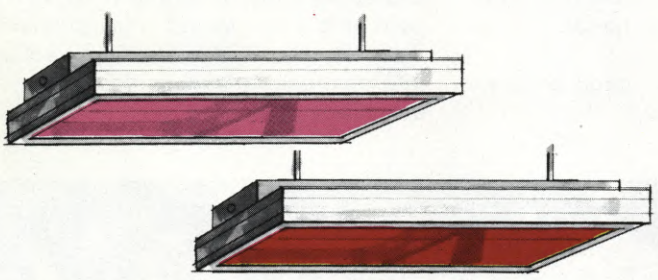


The light source most often specified for commercial buildings is and has been the fluorescent tube. The pervasive green tint associated with these lights, makes the rendering of normal flesh tones on film impossible without filtering.

When the only light source used is fluorescent lighting, then the filtering is best accomplished at the camera. When you want to mix fluorescent with daylight or incandescent light there are two ways to "get the green out."

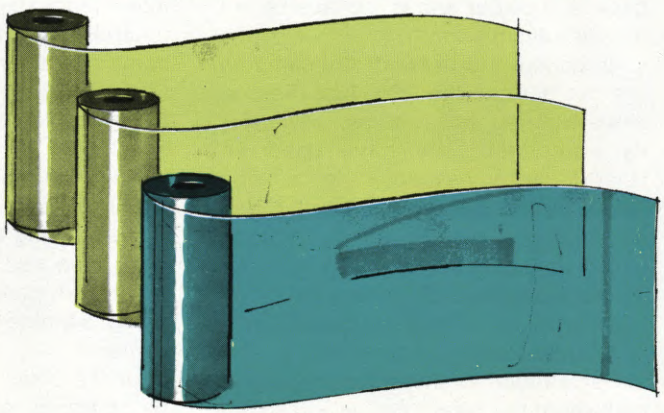
1. TOUGH MINUSGREEN applied to Cool White or Daylight tubes converts fluorescent to a light compatible with "daylight".
2. FLUOROFILTER corrects fluorescent to 3200 K.

Both are available in 27″ or 54″ rolls as well as 48″ and 96″ sleeves.



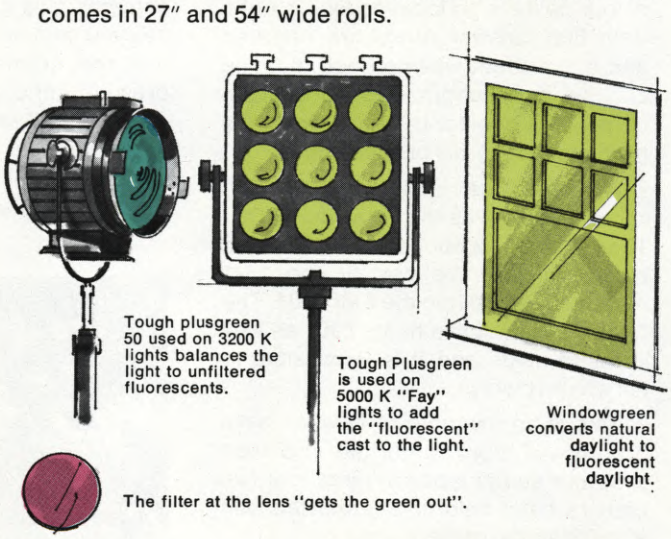
Sleeves are applied directly to the tube.

AND THREE WAYS TO LIVE WITH IT



If you can't kill the green at the source, here are three ways to add green to your other light sources, and then remove ALL of it by filtering at the lens.

1. WINDOWGREEN converts incident natural daylight to "fluorescent daylight". Available in 58″ wide rolls.
2. TOUGH PLUSGREEN is a heat-resistant polyester material used on "FAY" type lamps and other 5000 K. light sources to add the "fluorescent green". Available in 27″ and 58″ wide rolls.
3. TOUGH PLUSGREEN 50 adds both green and blue to 3200 K. light sources to convert them to "Fluorescent daylight". It is also a heat resistant polyester and comes in 27″ and 54″ wide rolls.



Tough plusgreen 50 used on 3200 K lights balances the light to unfiltered fluorescents.

Tough Plusgreen is used on 5000 K "Fay" lights to add the "fluorescent" cast to the light.

Windowgreen converts natural daylight to fluorescent daylight.

The filter at the lens "gets the green out".

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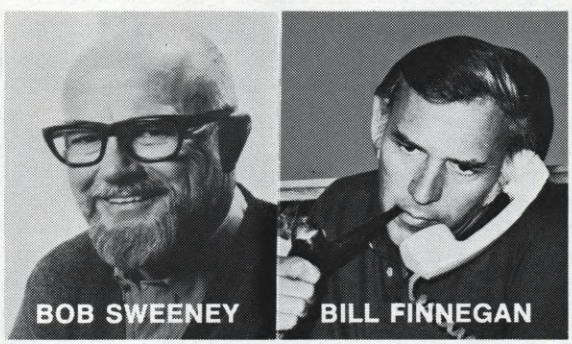
JOE MANDUKE, Director of "Cornbread, Earl and Me."



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BILL FINNEGAN, Sweeney/Finnegan Productions, Inc., Producers of "New Orleans Unit."

It's one thing when we talk about the Cecomobile. But when filmmakers like yourself write to thank us for it, you know it's really something special.

Joe Manduke's letter raved about Cecomobile's total mobility. The way it adapts for interior as well as exterior shooting and for its facilities.

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FILM IS DIFFERENT

For those who insist that electronic cameras should and *will* take over from film cameras, a voice of reason pointing out that film and video are two distinct art forms that can co-exist quite comfortably

By JOHN LANT
TV Film Service Director
Canadian Broadcasting Corporation, Toronto

Almost exactly four years ago, at FILM '71, I stood here presenting a paper on 16mm film production for television. A few weeks ago, when I was preparing this paper, I recalled the closing paragraphs of that 1971 presentation. I would like to read them to you . . . . .

"Taking everything into consideration, I think we who are in 16mm film production are pretty well satisfied with the standard of our product. But I would like to leave you with a final thought:

"It seems to me that we must not lose sight of the very real competition to film operations for television of the increasingly portable, comparatively inexpensive, fast, convenient, electronic recording equipment which is making its appearance on the market.

"Today, more than ever, rising costs for performers, writers, craft services, equipment, place an even greater emphasis on economy in the physical, comparatively stable and controllable factors of television program making. This is why I believe that we who are involved in the making of film programs for television must be actively pressing for and cooperating with manufacturers for even further innovation in film, such as the immediate development of *eight* millimetre production equipment, film stocks and transmission facilities . . . ."

Those are some of the reasons I am here today. We are *still* satisfied with the standards of 16mm film production for television. We *are* entering the serious phase of competition from portable electronic equipment, and we *are* making tentative headway in the improvement of Super-8 equipment and facilities . . . . .

Some of us here can remember, almost twenty years ago, when the first Ampex quad-head VTR machines came onto the market. To many, this heralded the end of film in television. Yet film and tape have coexisted and the use of both has steadily increased.

For the past several months I have been reading and hearing that videotape finally overtook film about a year ago. I don't know quite what is meant by that statement . . . . when did radio overtake newspapers; when did television overtake radio; and when did the quarter-inch audio tape or cassette overtake the record or disc market? All are still very much alive. All are still developing. All are still making inestimable contributions to the world of information and entertainment. All have a continuing role to play. And indications are that they will continue to develop and to play an even more significant role — in a more sophisticated format — by the time we enter the twenty-first century.

Why the Controversy?

So what is all the controversy about? Why do the electronic-oriented people find it so necessary to try to convince us of the virtues of videotape, arguing its versatility, demonstrating its flexibility, persuading us of its economy? When I listen to and read such expositions, I am reminded of Bertrand Russell's comment that he had never heard any argument attempting to prove the existence of God that was not put forward by a person who was not already *convinced* of God's existence . . . . but, I am not so convinced of the purity of the motives of the electronic proponents. The loudest noises seem to be coming from those who, by either vocation or conviction, are wedded to the electronic medium, and only slightly less vociferously from the electronics industry and hardware manufacturers.

The almost unbelievable strides made in the past ten years in videotape technology — and particularly the fantastic development of miniaturized equipment in the last two years — are what have made discussions of this sort necessary. But technology is not of itself a production mode. It has been necessary to develop techniques of use, patterns of feasibility, in fact a whole new art form. This is being done. And it is largely being developed or borrowed, from the art of film-making which has been more than seventy-five years in the making.

There is no question, of course, about the quality or the total suitability of the major electronic recording systems using studio cameras recording onto two-inch video tape. But is this the system we refer to when we discuss the comparative merits of videotape and film?

I think not. How can the portability, flexibility, end economy of a four-man film crew with thirty or forty thousand dollars worth of equipment with a total weight of some 650 pounds be compared with the large, cumbersome, power-demanding Electronic equipment costing many hundreds of thousands of dollars and weighing several tons, not to mention the size of the crew required to operate and maintain the system on location?

Distribution

Then there is the distribution aspect to consider. Film is fairly light in weight and is the only standardized method by which television programs can be distributed throughout the world with universal play-back application. Against this is the much greater cost of shipping tape, the possible necessity for conversion, or the costly transfer to film. There are some excellent tape-to-film transfer systems, but I haven't seen one yet which can compare with the quality of an original film production.

But now, a new generation of miniaturized electronic cameras and recorders are being manufactured which can — almost — go where film cameras can go, record what film can record and have the material ready for air quicker and, we are told, at less cost than film.

For about three-quarters of a century the film industry has been developing methods of operation, ways of creating, recording, expressing the various art forms — ways of capturing dramatic or real-life activity in the most realistic and expressive fashion. At the same time, manufacturers have developed more sophisticated, better engineered, lightweight equipment, and lower-contrast, finer-grained film stocks. These have helped us to capture these images and reproduce them for television without intrusion of the medium, with a minimum of effort and with the highest possible quality in the end product.

Since the technology is adequate, or soon will be, to give the quality

demanded, it is in these directions, it seems to me, that the electronic devotees must now direct their talents, for they have a long way to go. I think that right now, it is *not* enough to make the big noises about fantastic time savings and to quote cost benefits which are, at best, of most doubtful validity.

Fail to Cite Real Costs

We in the television business consistently fail to cite real costs. Once we have acquired an expensive piece of equipment we tend to tuck it away out of sight. We fail to cost it out to its ultimate usefulness with the explanation that we have it anyway, and any additional use is a bonus.

Film stock *is* costly, and processing *does* take time and has a cost factor, both of which have to be paid for immediately — and with hard cash. This is one of the reasons it is so easy to make unfavourable comparisons with film — particularly when some of the accent is put on the re-usability of videotape. But how many times can tape be re-used, maintaining original quality? And what happens if you need to retain an item recorded on videotape? Presumably it stays there, tying up an expensive commodity, or it is transferred to film. Either way it would add considerably to the cost factor, which is not always a part of any comparative presentation.

Certain "creative" methods of accounting have been used in attempting to demonstrate that one method of production is cheaper than the other. But it might be said that the convictions of the enthusiasts have led to somewhat less than rigorous methods of determining relative costs. As far as I can ascertain, no adequate analysis, based on the *total* life cycle requirements of programs has yet been made — or at least published.

Be that as it may, and so that our considerations should not be based upon the purely commercial aspects of the case, some advocates of the new generation of portable electronic equipment are suggesting that it will help restore the feeling of excitement and immediacy felt by everyone in the earlier days of television, which videotape removed. This cannot be denied; it is being proven today in areas where 16mm film was being used yesterday — mainly for news. It is known as electronic journalism, or E.N.G., electronic news gathering.

Electronic Journalism

No one could possibly dispute the fact that to record a news item on videotape and send the tape back to base, or transmit it by micro-wave directly back to the station is faster, much faster, than shooting on film, sending the exposed footage to a laboratory, and then getting it to the station so that it can be seen for the first time. Taking into account the realistic frequency of events when such a time advantage would be crucial to meeting telecast deadlines, and considering the quality of the material, can we afford it?

Estimates for a single, completely miniaturized news-gathering unit in North America range from $350,000 to $600,000 — about half of which is for the base installation of VTR recorders, etc. A few years ago we might have shuddered at such figures for results which, at the moment, are considered by many to be only marginally beneficial. But today, costs of this magnitude are acceptable to many companies, conscious of their reputation as leaders in the broadcasting field, or to gain a status or commercial advantage over the competition. And this, perhaps, is where the big advantage lies.

In North America, at least, where two or three, or more stations serve a large industrial area, each makes every effort to gain a program rating or advertising revenue advantage over the others. This is where the sophistication, the impression of immediacy, the "presence" of the station on location and the actual broadcasting of certain news events as they are happening, would certainly create a psychological advantage . . . But for how long? For no longer than it would take for the other stations to be forced into purchasing the same — or better — equipment. And then, once again, as it was before any of them had the electronic news gathering facilities, the quality and the reality of news would be the only criteria — as they should be.

Electronic news gathering certainly has great merit from the presentation time element point of view, but at a very high initial capital outlay. To determine the economic viability of the system one would have to estimate the extent of use, calculate the possible cost-savings against using film, for example, and weigh this against the amortization of the capital cost, throwing in the intangible benefits of immediacy of presentation for good measure. Some studies today suggest that it will take five or six years to recover the cost of the new equipment through savings in manpower, film stock and processing charges. However, with the rate of development of more efficient, lighter-weight electronic equipment, it is likely that any bought today will be obsolescent within a year or two at most.

Complementary Media

But however we look at these two media, we must all be on guard against asserting, or even assuming, that the one is superior to the other. They are, in fact, complementary and television would be much poorer without the film element. And to go a step further: the attitude that there is less and less difference between the two could be positively harmful to the development of each as a creative production medium. The two must become fully reconciled to each other — as I know they are already to many in this room — because each one is too valuable to have its full potential limited by overemphasizing the other.

Continued on Page 1085

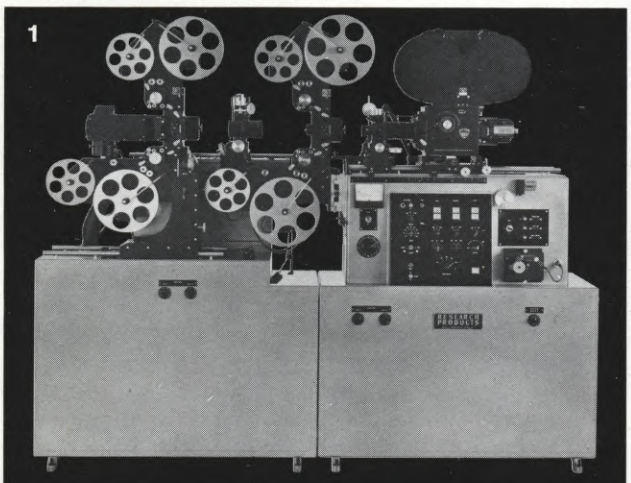
Representatives of three film camera manufacturing companies (CINEMA PRODUCTS CORP., ARNOLD RICHTER, and BEAUVIALA, S.A.) await their respective turns to present papers on the latest film camera developments, during the FILM '75 session devoted to "FILM PRODUCTION TECHNOLOGY". They do not appear to be too worried over the continuing assertion that electronic cameras will soon take over the industry and render their companies' products obsolete.

Exhibiting 1, 2, 3, 5 and 6

Booths 50-51

SMPTE CONFERENCE

1



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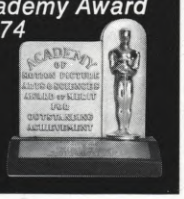

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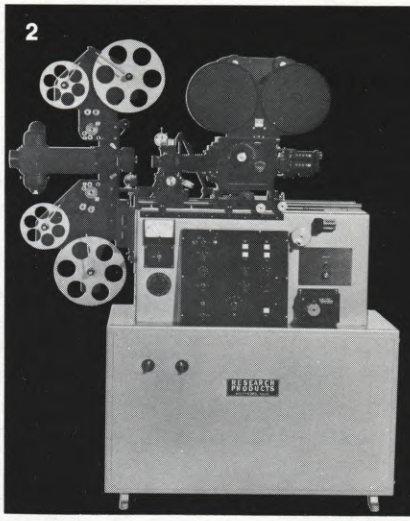
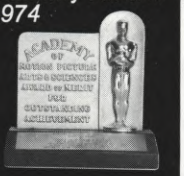


OPTICAL PRINTER Model 2102

- Basic professional special effects printer.
- Can be expanded into Model 2101.

Academy Award 1974



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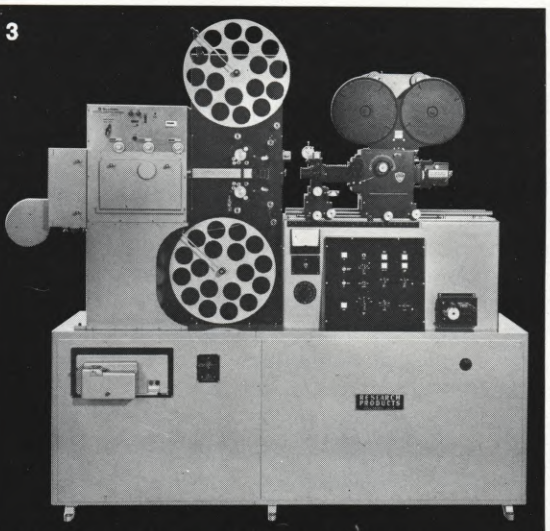

OPTICAL PRINTER, Model 2103C

NEW! "Solid State Liquid Gate"—the light source* that removes film scratches!

- B&H additive lamp house.
- Basic laboratory printer for film format conversion.

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the foremost family of four... is now six!

5 . . . a **NEW** low cost 16mm animation/optical printer for laboratories, TV stations, in-plant producers and universities. It features RPI camera and projector heads with registration movements, a scratch removal light source, and art work aerial image board.

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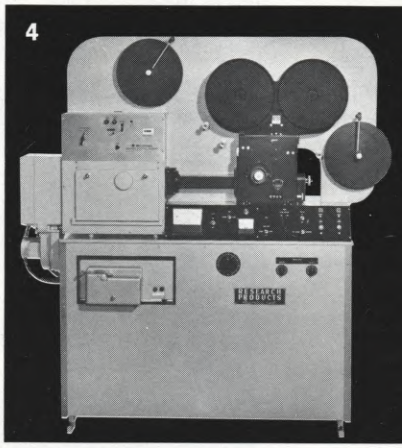

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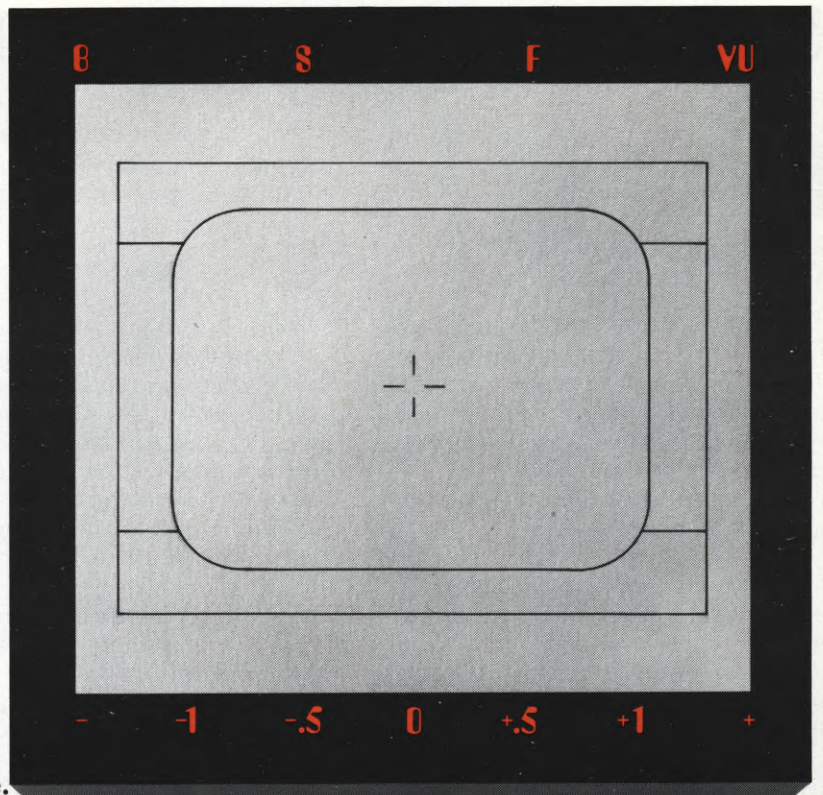
NEW! "Solid State Liquid Gate"—the light source* that removes film scratches!

- B&H additive lamp house.
- 40 and 20 feet per min., single frame.

*U.S. Patent No. 3,367,299. Other Patents Pending.

In world-wide use . . . Sweden, Italy, Japan, Hong Kong, China, Turkey, India, Canada, Mexico, Brazil and U.S.A.

INTRODUCING THE NEW CP-16R INFORMATION DISPLAY



Our *information display* system for CP-16R reflex cameras keeps you posted at all times about critical camera operating conditions. It is logically organized, easy to interpret, reliable and dependable in performance.

This is how it works.

Advanced solid state circuitry permits the use of dependable light emitting diodes (LEDs) as monitoring devices, rather than the usual delicate metering needles which are so susceptible to damage.

Above and below our unique CP-16R fiber optics viewing screen, various LEDs light up or change in intensity as they monitor vital camera functions. You get all the information you need, *only* when you need it. Most of the time, no more than two LEDs will be on at any given moment. So you can concentrate on your prime objective: filming the scene!

The following indicators are standard equipment on all 1975 CP-16R reflex camera models:

B — for "Battery." It lights up *only* when your battery is low.

S — for "Sync." It lights up *only* when your camera is running out-of-sync.

F — for "Footage." It lights up *only* when you're about to run out of film (whether you're shooting with 200 ft. or 400 ft. film loads).

VU — for "VU Meter," of course. Here, the varying intensity of illumination indicates modulation levels in the CP-16R/A camera with built-in Crystasound amplifier.

The exposure information (at the bottom of the display) is featured only in CP-16R reflex cameras equipped with our *optional* semi-automatic or fully automatic exposure control system. In which case, the illuminated **0** represents "Correct Exposure." And the symbols to the right and to the left, progressing in ASA half-stop increments, light up to indicate over- or underexposure.

Our CP-16R *information display* truly informs, without distracting. Without cluttering up the viewfinder. Sure, 1975 CP-16R camera models cost more. But the *information display* alone is well worth the increase. And it is but one of the many new innovative design features that make the CP-16R reflex the most outstanding 16mm camera system ever!

CP-16R/A reflex camera shown with *optional* fully automatic exposure control system.

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SINGLE SYSTEM IN THE Aäton 7 16mm CAMERA

A highly sophisticated 16mm camera incorporates a new patented method (SAGA) to overcome basic weaknesses inherent in any single-system configuration, aiming toward a more professional quality of sound

By J.P. BEAUVIALA
Aäton S.A., Grenoble, France

Sound recording simultaneous with film shooting on magnetically-striped 16mm film is a well-known process; yet, it has undergone no major improvements since the fifties. The recent introduction of single system in S-8 has brought new interest and technical solutions to this process.

Most cameras impose an intermittent movement to the film at the aperture gate level; however, to record and/or play back sound on film or tape, it must run as smoothly as possible over the recording and playback heads.

To obtain smooth tape transport, a length of film is isolated in a calm loop, in which the erratic and periodic film movements can be absorbed and evened out. In this loop, the film is held in close contact against a capstan rotating at a constant speed, the recording and playback heads are located in the immediate vicinity of the capstan.

There are two types of capstans: passive, used most commonly for 16mm equipment, and active capstans, most used in Super-8.

In a *passive* capstan, a flywheel is driven by the film itself, taking the average peripheral speed of the film, draining off energy during accelerations, and restoring it during deceleration. The main advantage of such a system is that it is simple and inexpensive, but flywheels are sensitive to the gyroscopic effect and produce wow. To be efficient, a flywheel must be heavy which means that it takes a long time to start running and weights the structure of the camera itself. Another disadvantage is created by the complex and awkward film threading system necessary to maintain good film / capstan contact. Nearly all professional 16mm single system cameras use this passive rotation principle, which is generally sufficient for speech recording.

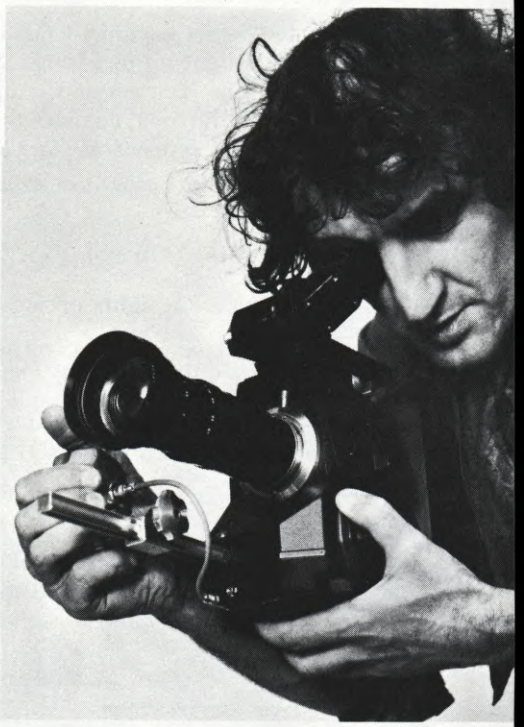
In an *active* capstan system, a servo motor imposes a steady rotation on the capstan; the regulating power now comes from a battery, and the film transport is similar to that of a tape recorder. The possibility of high quality transport, and low sensitivity to gyroscopic effect are definite advantages of such a system. However, to achieve high quality, the capstan must be an integral part of a slow rotating motor; to be reliable, this can result in rather costly equipment. An additional difficulty is the necessity to control the loop length so that the average film speed can be imposed on the capstan.

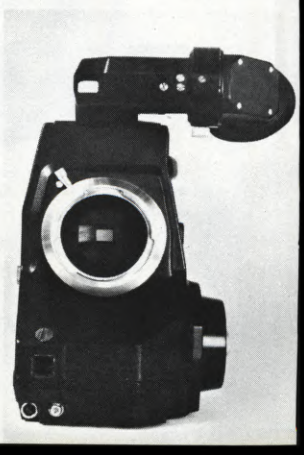
To date, no high-quality professional set-up using this principle has been produced. The only examples of it are the amateur Ektasound Super-8, Beaulieu and Chinon cameras, and the Technicolor Super-8 projector. But these do not respect professional standards, given that considerations such as low cost and size are determining factors for many of the practical choices made by the manufacturers. This amateur equipment, therefore, does not provide a good example of the professional potential of the active system.

Aäton has a radically different proposal: neither active nor passive. No effort should be made to even out the film transport speed over the recording / playback heads; on the contrary, the instant speed of the film should be measured, and then used to conform the sound time scale to be recorded and played back to that of the film transport (This system, called Aäton SAGA, is patented in the U.S. and most other countries).

In that no effort is made to impose a

The highly sophisticated and very distinctive Aäton 7 16mm camera was introduced at the 1972 Photokina in Cologne and has undergone several refinements since then.





constant speed on the film, no regulating energy is needed: flywheel or servo-motor are eliminated. This means an economy of weight, and no gyroscopic effect. The problem of the film detaching itself from the tachometer roller is eliminated, as the film is no longer forced to follow the steady movement of a capstan, but instead its movement is measured by an extremely light tachometer. The film clings to the tachometer roller without high and constant pressure (dashpots become superfluous). Tape-head contact is easily ensured on a film which no longer tends to buckle.

The audio signal must be processed by a complex electronic device before being sent to the recording head; i.e., the sound must be sampled at a regular 30 KHz frequency, and then fed into a silo memory, after which it is taken out to be recorded at a variable frequency determined by the instant tape speed.

One disadvantage of single system in general is that the sound cannot be recorded at the same place as the image; a certain length of film is necessary to form the calm loop. In 16mm this amounts to 28 frames, in Super-8, 18; an approximate 1-second time lag.

The Aäton sound processing system (SAIL) allows the sound to be recorded at image level, greatly simplifying the editing of single system films. Once the sound is digitalized, an entire second can be stored (this represents 300,000 bits in a semi-conductor memory) until its corresponding image passes alongside the recording head. Aäton looked into the 16mm field to find out whether users would be willing to simplify single-system editing by leaving off the 28 frame distance in favour of sound at image level. It would appear that the response is negative; the weight of the enormous investments already made, and of old habits is too great. However, in Super-8, a new and developing field, there are no such hindrances.

If Super 8 is to be edited at image level, three main methods can be identified:

First: A system which uses existent equipment (camera and projector) without accessories, at both ends, but leaves sound degrading operations in the middle.

Camera: A standard camera is used, leaving 18 frames between sound and picture.

Editing: In the editing room, the first transfer is made to get the sound back to image level. The film is edited on a table with sound head at image level. The sound is then transferred once again, this time 18 frames ahead.

Projection: This phase can be performed with standard equipment. The necessity of re-recording the sound twice leads to a degradation pile-up: intermodulation, the worst defect; drop out; high frequency weakening; hiss introduction; and poor signal-to-noise ratio. The risk of total destruction of the document is twofold because the master is erased each time to leave the tape clean for the copy 18 frames away.

Second: Though it is the best system for sound quality, with no in-between transfer during editing, the ends (camera, and worse, the projector) must be modified. Such equipment does not as yet exist.

Camera: A commercially available Super-8 camera is used; its sound section is totally modified, incorporating tachometric capstan and time stretcher, and adding a memory.

Editing: Editing and mixing at image level are done on a table with sound head at the viewing gate.

Projection: The projector is equipped to deal with sound at image level, i.e. the playback head is ahead of the projecting gate, and a memory is incorporated using the same principle in the camera.

This system is not feasible today for several reasons. The philosophy of Super-8 is such that it would be disproportionate to have excellent quality sound for fair image quality. Portable colour video cameras are rapidly taking over news coverage, where Super-8 can best be used. And finally, the projector: unless the manufacturer remade it from the inside out, it would be much too complicated to modify.

Third: A more realistic system which is already operational. A compromise between price and sound quality.

Camera: An ordinary Super-8 camera (with little or no modification) is used to record sound at image level. An '18 frame' sound memory links the microphone to the original recording amplifier. The camera's wow and flutter are not dealt with. A remote control connection is added to make the camera automatically run 18 frames after the "off" switch has been actuated; this allows the sound in the memory to be recorded in its entirety alongside the last frame taken and wanted.

Editing: Editing on a sound at image level table. The playback head must be as near the projecting gate as possible. A 1-frame trailing distance is used — enough to let the light enter the optical system, yet not enough in fact to hamper the editor's synchronization perception. The sound is then transferred 18 frames ahead on a simple bench. There is only one re-recording, which is done after editing.

Projection: with a standard projector.

This system, the most plausible and practicable today, has been chosen by Aäton. Such a system, incorporating the Aäton SAIL (Sound At Image Level) is presently being tested on location by the French National Scientific Research Centre's Ethnological Team in Africa. For the first time, the film maker can edit raw documents containing image and sound just as he did sound tapes in the past.

Digital memories, therefore, have found a new application in the professional cinematographic industry. In the 16mm field, the mechanical problem of the smoothness of the film's movement over the recording and playback heads is solved by the use of a lightweight tachometer in conjunction with a digital memory which stocks the audio signal samples. The samples are then retrieved to be recorded at a variable rhythm indicated by the tachometer. This is the principle of SAGA, incorporated in the Aäton 7 16mm camera.

In the field of Super-8, where editing at image level should become a rule of thumb, a digital memory is used in association with a Super-8 camera to solve the problem of moving the sound 18 frames back for editing purposes. This is the principle of SAIL (Sound At Image Level) which can be adjoined to any Super-8 single-system camera.

A few technical details concerning SAIL:

For its '18 frame' memory, Aäton chose a purely digital 10-bit memory instead of the bucket brigade analog memory, found unsuitable because of its poor signal-to-noise ratio and high intermodulation.

The SAIL is composed as follows: — microphone pre-amplifier — filters and 30 KHz sampler — 10-bit low-power analog digital converter specially designed by Aäton — 1-second memory (temporarily using MOS shift registers; in the future to be replaced by less power-consuming smaller RAM and CCD memories) — digital analog converter, filters, and output amplifier.

The signal-to-noise ratio is 70 dB on open input, and 40 dB with modulation. The MOS memory consumes 150 mA, the circuitry 35 mA. Autonomy of 6 hours on a 1.2 Ah power supply. Weight 0.9 kg; dimensions: 16 x 18 x 4.5 cm. The 30 KHz sampling frequency which corresponds to filming at 18 fps (1-second delay) can be switched to 40 KHz for filming at 24 fps (0.75 second delay). ■

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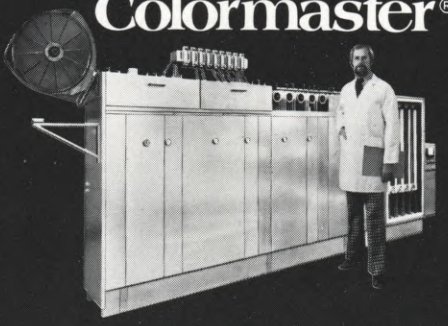

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DOLBY ENCODED HIGH-FIDELITY STEREO OPTICAL SOUND TRACKS

The objective: To create a stereophonic system to improve motion picture sound to a level comparable with that of other entertainment media — and to do so using low-cost optical tracks

Making a most impressive debut at FILM '75 was Dolby Laboratories' new Encoded High-Fidelity Stereo Optical Sound Track System.

The system is the result of a long search — and much research — to develop a method of bringing high-quality stereophonic sound to motion picture theatres, while avoiding the high costs of the magnetic prints which, up until now, have been requisite to the realization of such presentation.

That the Dolby people have succeeded in their objective was evident in the stunning demonstration of the system staged for FILM '75 delegates at London's Odeon Marble Arch Theatre.

The demonstration commenced with a short introductory film explaining in terms approaching layman's language the reasons why such a system was developed and how it works. There then followed a series of four film clips calculated to demonstrate in practical terms that the proof of this particular pudding was in the listening. The clips included excerpts from such recent feature film releases as: "BRANNIGAN" (especially remixed by Gerry Humphries, Twickenham Studios, and processed by Humphries Film Laboratories, London), Ken Russell's "MAHLER" (especially remixed by Bill Rowe, EMI Studios, Elstree, and processed by Technicolor Laboratories, West Drayton), the latest 007 epic, "THE MAN WITH THE GOLDEN GUN" (especially remixed by Gordon McCallum, Pinewood Studios, and processed by Rank Film Laboratories, Denham) and Ken Russell's current release, "TOMMY" (mixed by Bill Rowe, EMI Studios, Elstree, and processed by Rank Film Laboratories, Denham).

The latter film was the first to be commercially released in the new Dolby stereo optical format (in certain selected cinemas) and a Dolby stereo optical print of it had been selected for the Gala Film Performance at the 1975 Cannes Film Festival.

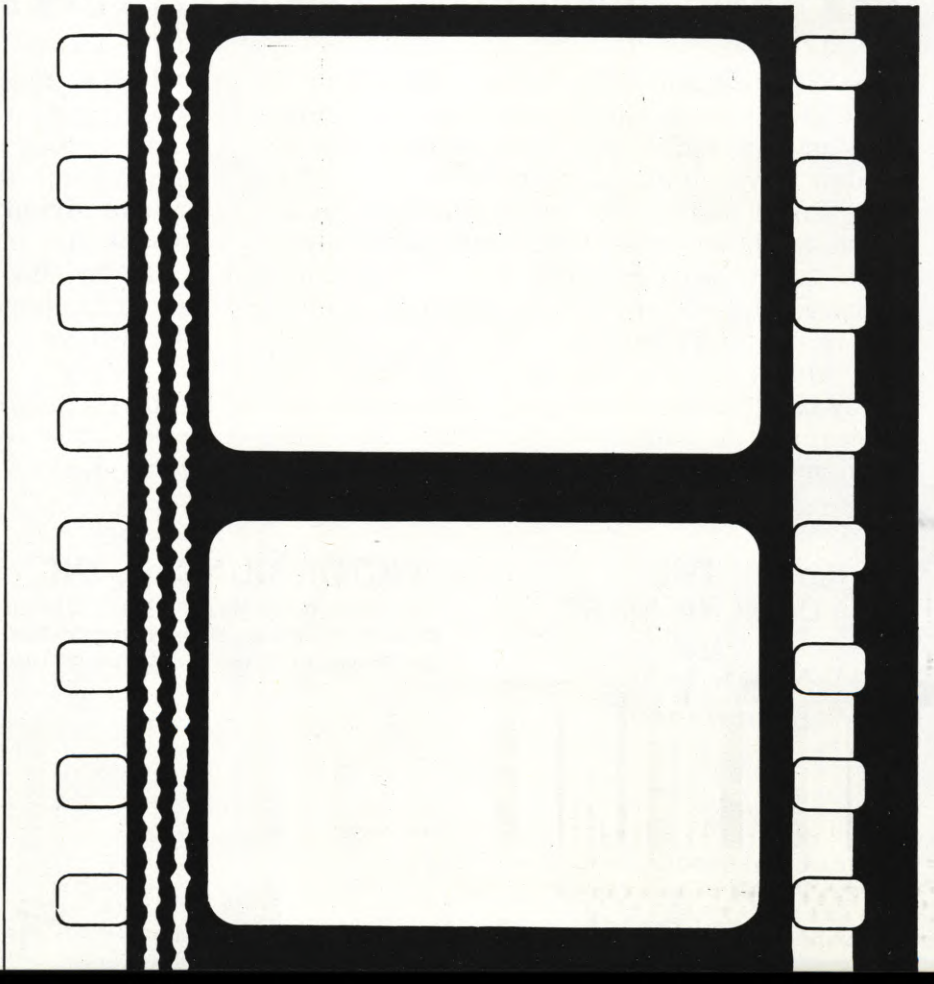
To repeat, the demonstration was most impressive, even though the sound for the first three clips shown had originally been recorded for "flat" presentation. The track from "TOMMY", recorded from the start with stereo presentation in mind, went down especially well with the technically critical demonstration audience.

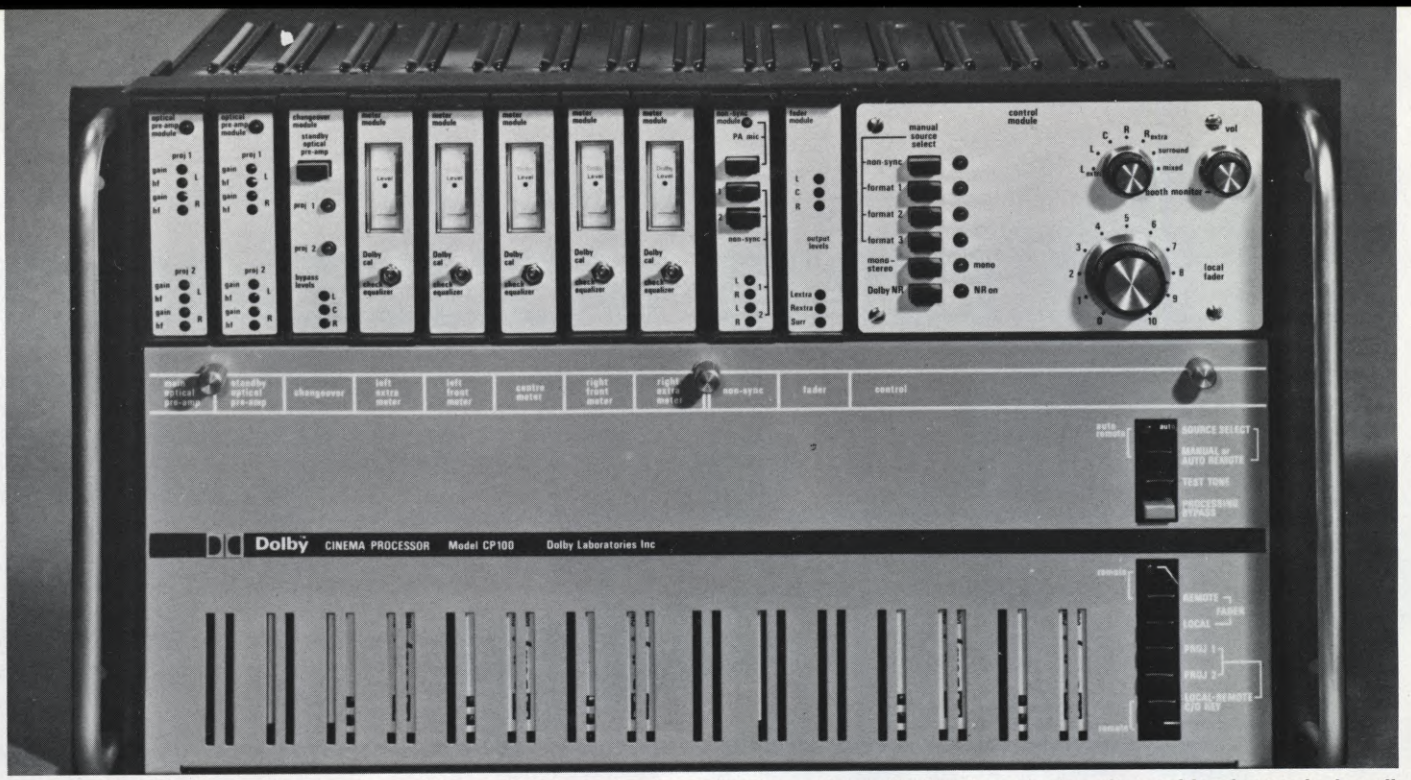
The genesis of the Dolby stereo optical sound track springs from the fact that for many years, motion picture scientists and engineers have been striving to improve the quality of both the picture and the sound. While they have achieved brilliant success in terms of picture quality, improvement in the sound aspect has lagged quite noticeably. This is evidenced by the fact that while most people can listen to high-fidelity stereo sound in their homes, in most theatres the wide-screen, high-definition picture has been paired with a colorless mono sound track.

Two years ago, Eastman Kodak and RCA carried out research and built equipment to ascertain the possibility of recording stereo variable area (SVA) optical sound-tracks of a type originally proposed by Dr. John Frayne. After discussion with these companies, it was decided to determine whether the extended range techniques already developed and applied by Dolby Laboratories to 35mm monaural tracks could also be applied to the stereo format. Since then, a detailed investigation has been carried out, with the assistance of Technicolor, Rank Film Laboratories, Denham, and EMI Elstree studio staff.

The resultant joint research indicated that not only could the fidelity of motion picture sound be improved to a level comparable with that of other entertainment media, but that it was also possible to generate this improved quality from an optical track. Whereas, previously, stereophonic sound in motion picture theatres could be achieved only through the use of magnetic prints (manufactured at a substantial cost premium), the new optical stereo sound tracks cost no more to make than conventional "mono" optical prints. They are made with conventional black-and-white sound processing techniques, utilizing two tracks side by side on the film, in the same location as the conventional monaural track.

Oversize diagram showing stereo variable area (SVA) optical sound tracks which fit into the conventional monaural track area adjacent to the 35mm frame. EAstman Kodak and RCA started research two years ago on such tracks, originally proposed by Dr. John Frayne. Further research was carried out with the aid of Technicolor, Rank Film Laboratories, Denham and the EMI Elstree Studio staff. The new stereo mode is the result of this joint effort.





The new CP-100 Cinema Processor combines multi-channel noise reduction and equalization in a single unit capable of reproducing all current and anticipated sound formats, including the new wide-range, high-fidelity Dolby encoded stereo optical sound tracks. The unit contains comprehensive provision for the playback of conventional optical tracks and, when required, magnetic tracks. It also contains a non-sync capability for playing tapes and records with high-fidelity in the auditorium, using existing theatre loudspeaker units.

While the techniques employed by Dolby for the stereo optical tracks can be applied to any sound-track format (magnetic stripe, monaural optical, color optical, multi-track optical), the SVA format currently demonstrated is an especially attractive one both commercially and technically.

These are the main characteristics of the Dolby SVA track:

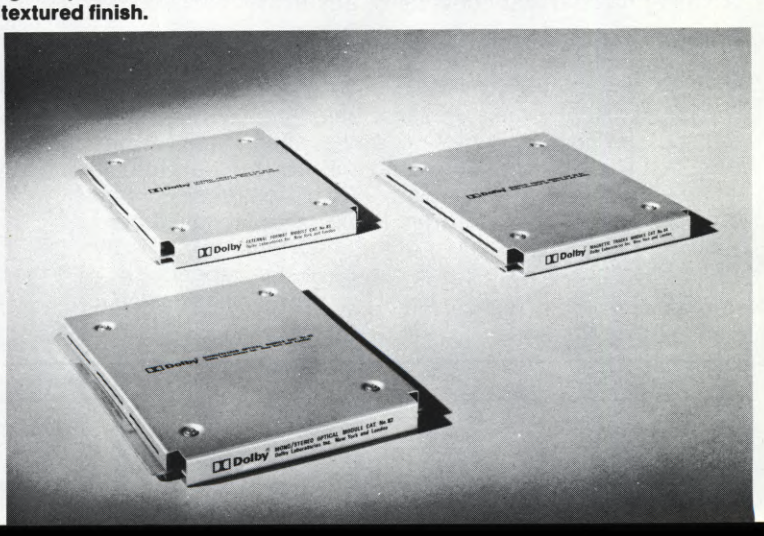
1. It can be played
   a) in unconverted theatres.
   b) in theatres equipped to play monaural Dolby optical sound-tracks; although not in stereo, the wide-range high fidelity sound of the Dolby encoded track will be heard.
   c) in theatres equipped with Dolby stereo playback electronics (the Dolby CP100 Cinema Processor).
2. A specially developed circuit provides secure centre-screen information, requiring only two channels on the actual SVA track, thus improving mono compatibility.
3. The Dolby stereo optical track has an excellent signal-to-noise ratio, exceeded, in fact, on a print in good condition only by monaural Dolby tracks.
4. Because conventional variable area techniques are used to make and project the stereo track, there is no premium print cost (as for magnetic stripe) and no new laboratory technology. Recording, print processing, quality control procedures, and projection in the theatre are all the same for SVA as for conventional optical release prints.
5. The Dolby SVA track has a usable audio bandwidth of 10 kHz, which is easily obtained in actual exhibition by use of the Dolby equipment designed for this purpose.

Cameras for recording the new stereo tracks are available from RCA and Picot. Theatre playback equipment for the format is available from Dolby Laboratories.

Playback of the new high-fidelity optical stereo tracks requires Dolby noise reduction decoding of the two signal elements, circuitry to derive centre-channel information for three-loudspeaker systems, and third-octave equalization for accurate matching of the loudspeaker characteristics to the existing theatre acoustics. These facilities form the basis of the new Dolby CP100 Cinema Processor.

Continued on Page 1088

The CP-100 Cinema Processor consists of a 19-inch main frame into which 16 different modules are plugged on two levels. Plug-in modules throughout are accessible through the main front panel. Fibreglass printed circuits and solid state devices are used throughout. There is a precision cast aluminum frame with steel panels, black stoved textured finish.



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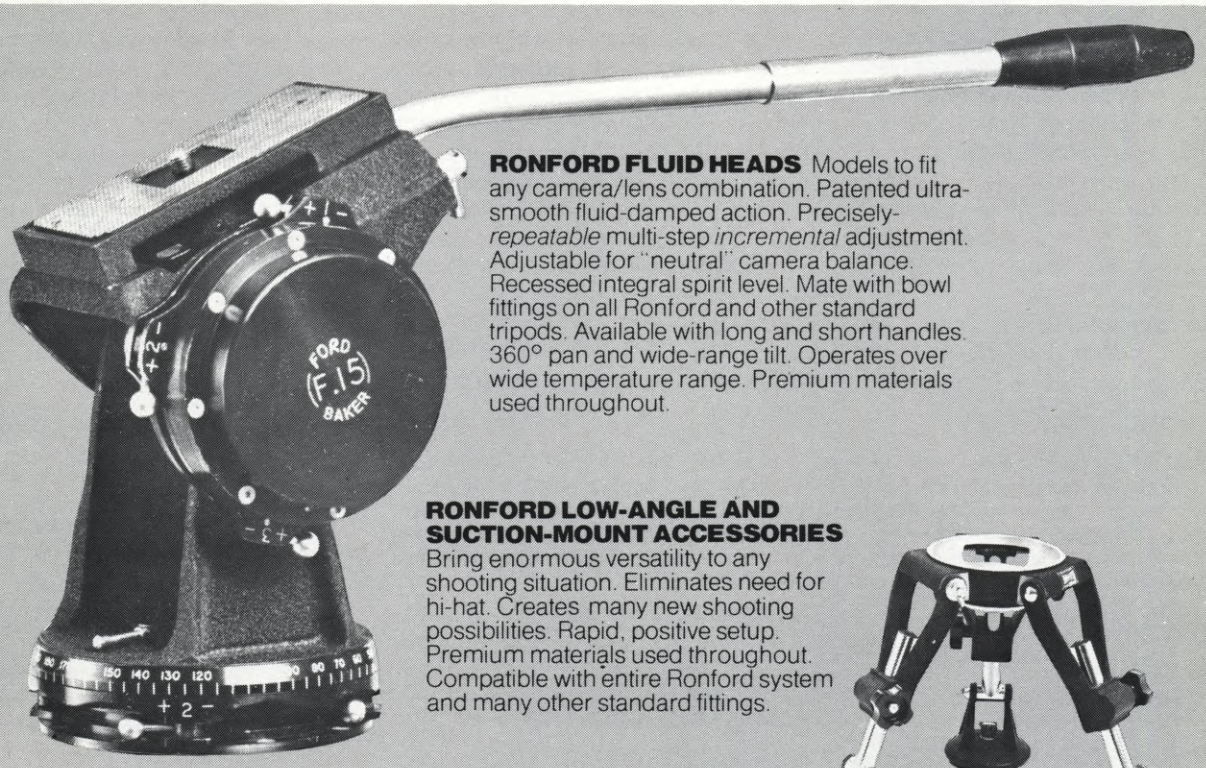

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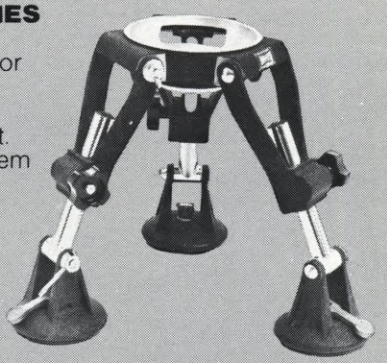

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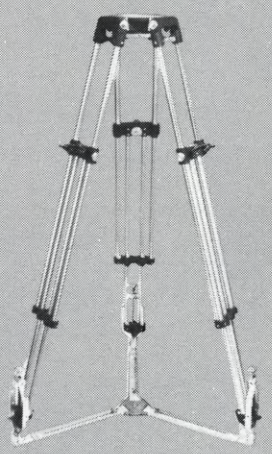

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SKYMOUNT LIGHTWEIGHT AERIAL CAMERA MOUNTING

To fill a need — a new helicopter camera mount that is easy to rig, light in weight, simple to operate and affordable to film-makers on restricted budgets

By MERVYN WILSON
Cameraman/Designer

Aerial cinematography has currently reached a high degree of sophistication. Today's aerial cameraman has a wide choice of some remarkably ingenious camera mounts. Most of them are equipped with not only devices to ensure vibration-free filming, but with delicate touch control systems with servo-assisted electronic zoom and focus.

So the cameraman has much to thank to the design and ingenuity of their designers with some clever engineering.

Among the more exotic systems available are those having cameras mounted in Plexiglass bubbles, or cameras separated from the lens by a snorkel poking out of the aircraft. These systems are remotely controlled by joy-stick type controls and closed-circuit TV and there is sometimes even a fluid lens device to cancel out the aircraft vibration.

However — one has to pay for these imaginative systems both from the financial angle and the time taken to set the system up in the aircraft.

The compact SKYMOUNT, shown set up inside helicopter, was inspired by the FLEXIMOUNT, a previous development of the author's, which is a sophisticated body-mount having anti-vibration characteristics. The new device was designed to compete with more sophisticated — but much more expensive — aerial camera mount systems. The vibration of the aircraft is eliminated from the main support column by means of a compression mount on the small base-plate.

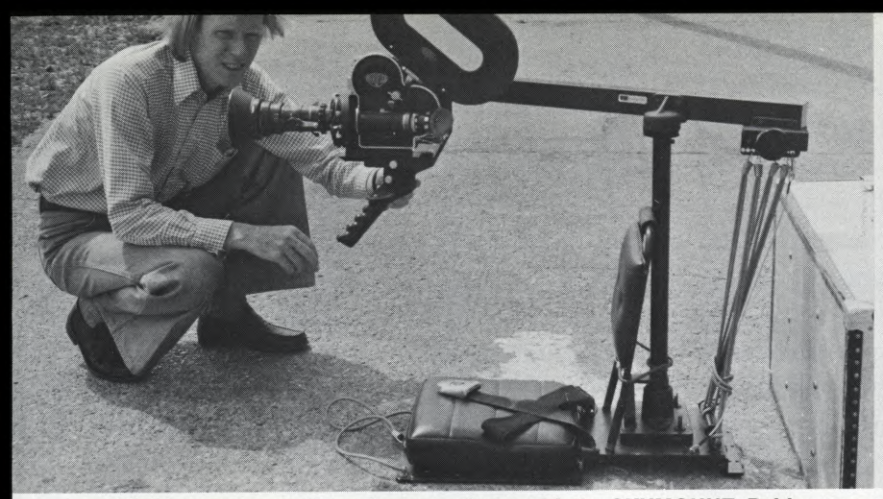
Tony Coggans, a friend and colleague of mine who had collaborated with me on other projects of camera equipment design, met and discussed with me existing chopper mounts and the facilities for aerial filming. It did not take us long to notice the lack of a really low-cost, lightweight camera mounting. On low-budget shoots the cameraman had little choice but to hand-hold the camera or at best use the FLEXIMOUNT camera sling and harness (see *American Cinematographer*, Sept. '73).

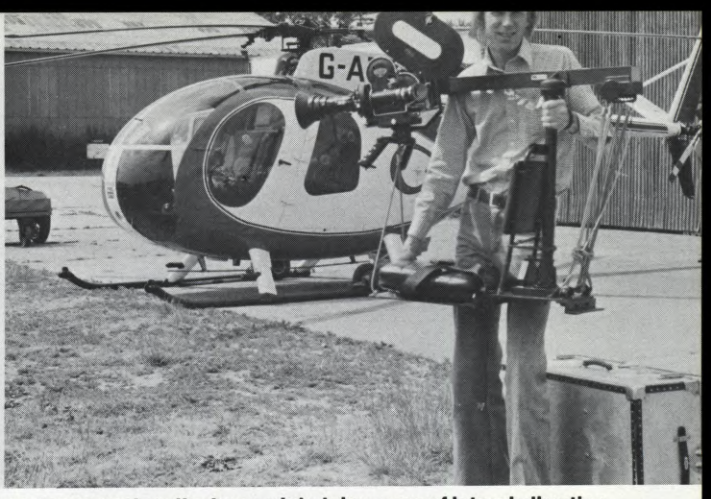
There was obviously a need for a camera mounting that had to be low-cost, easy to rig and light in weight and moreover simple to operate and affordable to filmakers on a restricted budget. Primary users would be TV newsreel units, documentary production houses and others who hitherto could not afford the more elaborate and sophisticated systems. So the SKYMOUNT began to take shape.

The basic design for the SKYMOUNT was taken in principle from the already mentioned FLEXIMOUNT, using the same arrangement of support system to give it a "floating" action, but utilising only one support arm instead of two.

This square section tubed arm rests on a ball and socket and acts as the main fulcrum which gives the camera end of the arm the three planes of movement — traverse, up or down and roll or horizon correction. At the camera end also are the more normal pan and tilt bearings with friction controls, so giving the cameraman a total of five separate movements. Enough latitude to allow him to execute all camera moves in complete freedom.

The vibration of the aircraft is taken out from the main support column via a rubber compression mount on the small base-plate. This takes care of the lateral vibration, whilst the vertical disturbance is dampened and isolated by the main support springs. The vibration of most helicopters and fixed-wing aircraft is generally of a consistent nature and when this movement is understood it is relatively easy to dampen or isolate for filming purposes. The predominantly high amplitude disturbances are low frequency — approxi-





(LEFT) Cameraman Tony Coggans shown with the SKYMOUNT. Rubber compression mount on the base-plate takes care of lateral vibration, while the vertical disturbance is isolated and dampened by the main support springs. The predominantly high amplitude disturbances of most helicopters and fixed-wing aircraft are low-frequency — approximately 3Hz to 15Hz. (RIGHT) The total weight of the SKYMOUNT, as installed in the aircraft (excluding camera weight) is only 35 lbs., so that even with the camera mounted it can be easily lifted and carried by one man.

(LEFT) The original one-piece base-plate of the mount has been replaced by a two-part plate which enables the SKYMOUNT to fit into the floor of the Jet Ranger 206A and B, as well as smaller helicopters, such as the Hughes 269 and 300. (RIGHT) To be comfortable with the SKY-MOUNT, the cameraman is seated on a foam-filled seat pad, complete with backrest, seat belt and footrest. (BELOW) Cameraman/Designer Mervyn Wilson installs Arriflex camera on the SKYMOUNT. Assembly of the mount takes only a few minutes, including installation in the aircraft.

mately 3Hz to 15Hz.

In designing the FLEXIMOUNT harness it was realised that the cameraman must be comfortable to be able to shoot efficiently and so with the SKYMOUNT. The cameraman is seated comfortably on a foam-filled seat pad with backrest, complete with seatbelt and footrest.

The original baseplate of the SKY-MOUNT was a one-piece item. This has been replaced by a two-part plate, so enabling the mount to fit into the floor of the Jet-Ranger 206A and B as well as smaller helicopters, such as the Hughes 269 and 300.

So there we have it. The SKY-MOUNT can arrive at an airfield in its transit case, carried by one man to the aircraft. Assembly takes only a few

Continued on Page 1082

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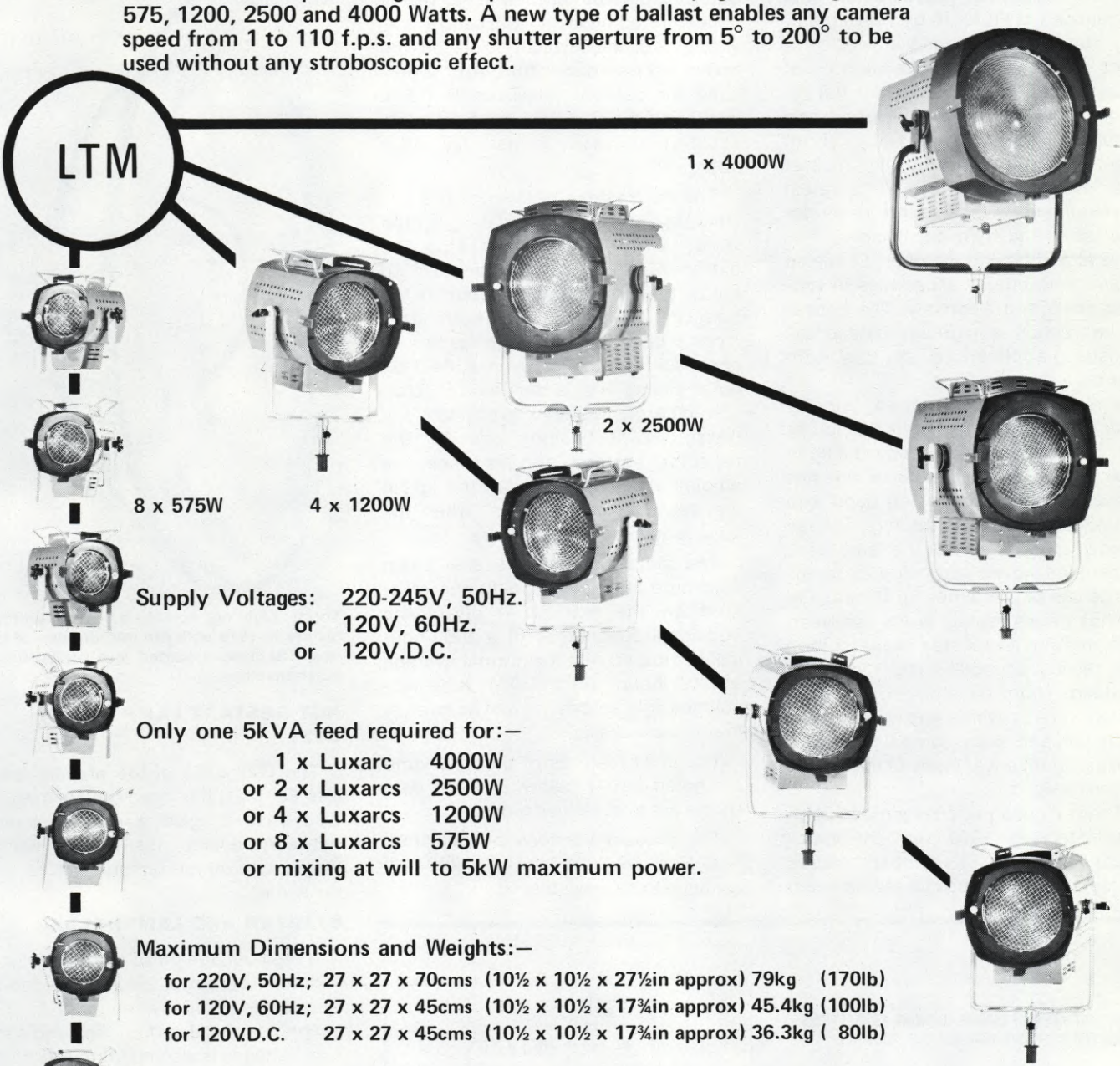

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THORN LIGHTING INTRODUCES HOT RESTRIKE CSI LAMPS

A breakthrough in technology eliminates a previously significant disadvantage of compact source iodide lighting — that of having to wait for relatively long periods before restriking of lamps

A significant new development was announced at FILM '75 by Thorn Lighting who have developed a 1kW compact source iodide lamp capable of withstanding a 25 kV pulse for hot restrike. The CSI lamp developed and manufactured exclusively by Thorn Lighting is claimed to be the smallest arc lamp in the world. The latest development will be good news for television and film technicians who have already found that the CSI sealed beam lamp effects economies in running costs and electricity. The hot restrike version will greatly extend the possible applications of this light source.

The convenient, rugged, single-ended design of the Thorn CSI lamps has been a major factor contributing to their rapid adoption. Hitherto, this has prevented the lamps being used with hot restart circuits as the high voltage needed tracked across the lamp base rather than the arc gap inside the lamp.

The use of CSI lamps for filming and TV has grown rapidly in the last year, bringing with it repeated requests for a hot restart capability. To meet this demand, Thorn have developed a hot restart version which has much better insulation and at the same time retains the important advantages of the single-ended design.

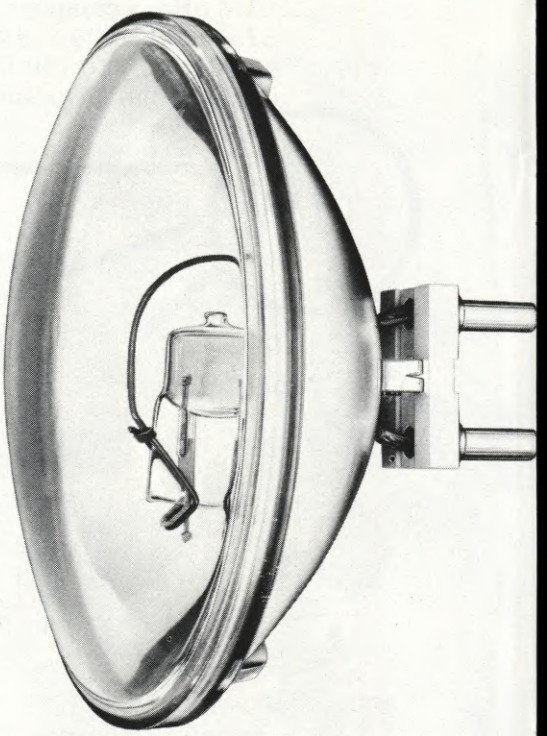
Thorn Lighting scientists made lighting history in 1970 with the introduction of the CSI (compact source iodide) lamp mounted in a sealed beam outer bulb. This lamp with its highly concentrated beam of light, used in a 4-way group, successfully replaced the bulky and unwieldy "Brute Arc" widely used for outdoor television and film work. But the CSI, like the Brute Arc, could not restrike immediately after switch-off.

The hot restrike version of the CSI lamp has specially insulated lead-in wires which will withstand the extremely high voltage needed to ionize the hot metallic vapour in the bulb and strike the arc. Thorn technicians have gone a stage further by encapsulating the lamp in a PAR 64 outer casing with a dichroic reflector. The dichroic material precludes any possibility of flashing over to the reflector surface and reduces the amount of heat radiated with the light in the beam, a useful "plus" when the lamp is used at close quarters.

The factory focussed sealed beam discharge lamp — the only one of its kind on the market — offers the additional advantages of a 1000-hour life, compared with the normal average of 200 hours of a 1 kW tungsten-halogen light source, as well as three to four times more light.

The chief features of the new lamp are noted briefly below. Detailed data sheets are available on request.

The present versions of the lamp, Ref. Nos. 99-0221 and 99-1222 will continue to be available.



Thorn Lighting scientists made lighting history in 1970 with the introduction of the new CSI lamp mounted in a sealed beam outer envelope.

HOT RESTART LAMP REF. 99-0421

The G22 base of the present lamp (ref. 99-0221) has been replaced with a G38 base to give a wider distance between the lamp pins. The light centre length and other dimensions remain the same.

STARTER AND LAMPHOLDER

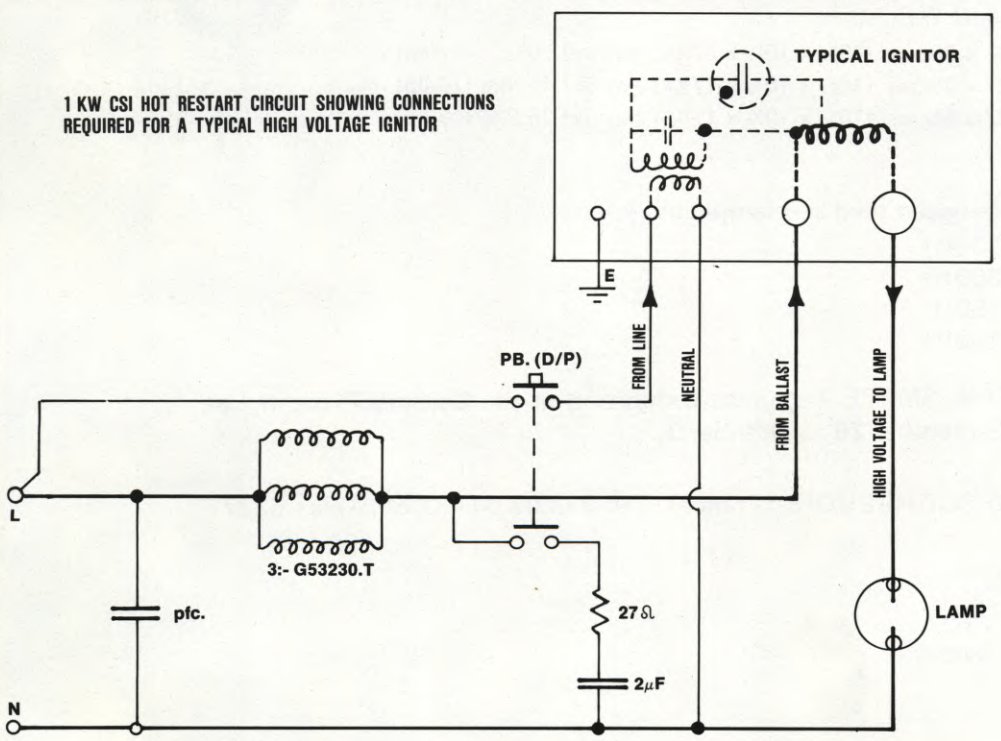
A high-voltage pulse starter having a minimum output of 25kV is needed to restart the lamps when hot. A G38 lampholder insulated to withstand such high voltages is also needed. Advice on the design of these items and information on sources of supply is available on request.

HOT RESTART CSI SEALED BEAM LAMP

Shortly to become available is a hot restart version of the 1KW Sealed Beam CSI lamp ref. 99-1222. This lamp will have a G38 base and the dimensions of the lamp will remain unchanged. The internal aluminium reflector will be replaced by a dichroic reflector giving advantages of a cool beam.

Continued on Page 1084

1 KW CSI HOT RESTART CIRCUIT SHOWING CONNECTIONS REQUIRED FOR A TYPICAL HIGH VOLTAGE IGNITOR



THE NEW COOKE VARO-KINETAL 16mm ZOOM LENS

A new 16mm zoom lens with no externally moving front element, which, its manufacturer claims, attains standards of quality, resolution and contrast normally associated with 35mm lenses

A new lens for 16mm cinematography, which its manufacturer describes as "the world's first 16mm motion picture zoom lens capable of producing the higher standards of image quality, resolution and contrast normally associated with 35mm lenses, but at a much reduced cost" was unveiled at FILM '75 by Rank Optics Taylor Hobson, part of the Rank Organisation.

Designed by Rank Optics in their Leicester headquarters, the lens is called the Cooke Varo-Kinetal and Rank Optics claims that new optical design principles make it technically superior to any other 16mm zoom lens available in the world today.

Weighing only one kilogram and with an overall length of 220mm, the lens is designed around a three-moving-member optical system instead of the conventional two. Unlike lenses currently available, the Cooke Varo-Kinetal is a sealed unit with no externally moving front element. This is said to result in improved resolution and contrast and high image quality throughout the entire zoom range of 9mm to 50mm, even focusing at distances as low as 230mm (9 inches) away from the front of the lens. The lens achieves a high resolution value of 100 line pairs per millimeter on axis and in the corners of the picture, and this performance can be held throughout the zoom range. The resolution and contrast matches the modulation transfer function of the new film emulsions, such as Kodak EK7247, which, according to the manufacturer, means that film-makers will now be able to use 16mm cameras fitted with this new lens and achieve the high standards of quality previously associated with 35mm filming for showing on the 'big screen'. It also means lighter equipment, less capital outlay and cheaper running costs.

The new lens is the latest development of the range of Cooke zoom lenses now in use all over the world. The Cooke Varo-Kinetal lens has the same high optical quality associated with other Cooke lenses but can be focused closer to the subject and its wide angle ability is increased by 2 degrees to 60 degrees. The lens is also 130mm shorter in length, one quarter of the weight and only one third of the

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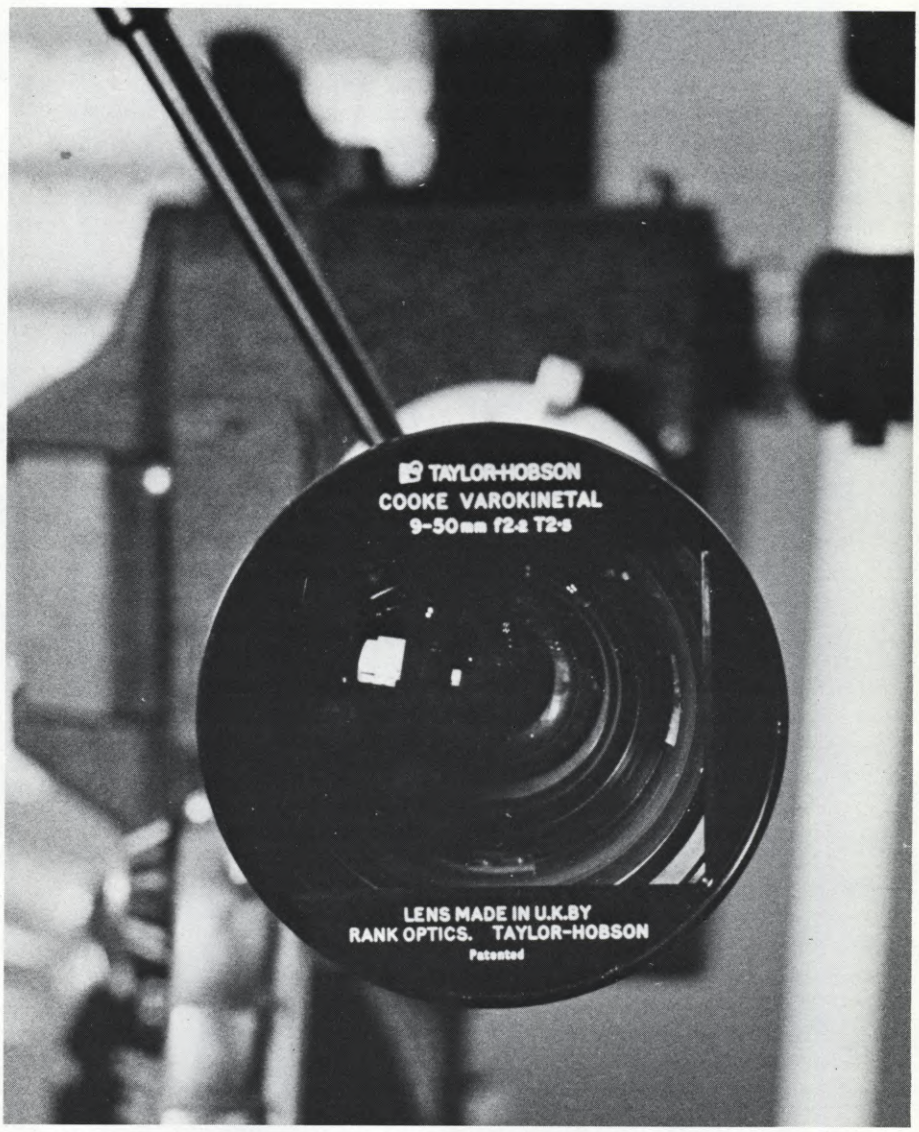
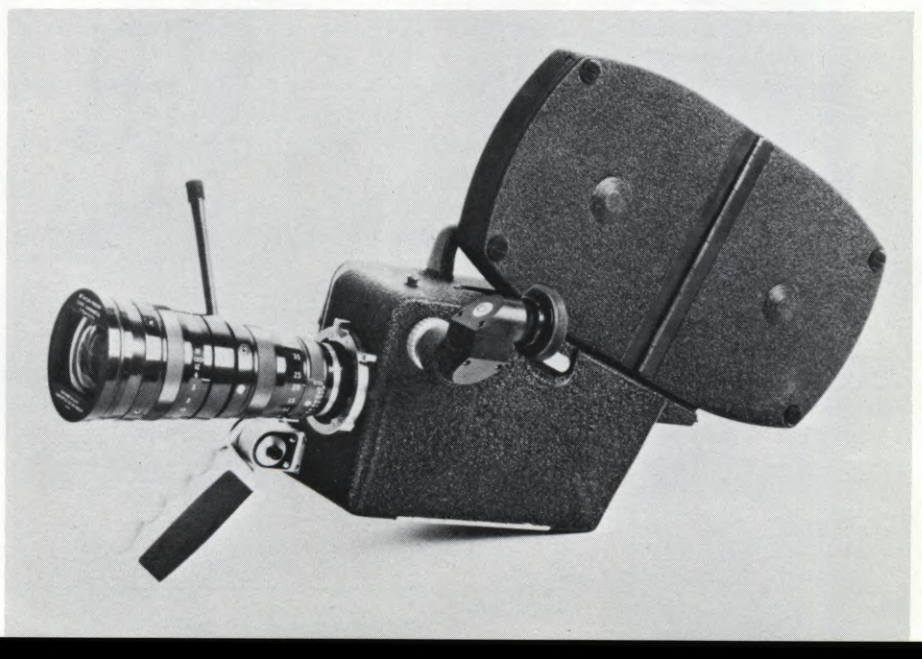


Weighing only one kilogram, the new Cooke Varo-Kinetal 16mm zoom lens has an overall length of 220mm and is designed around a three-moving member optical system, instead of the conventional two. It is designed to hold resolution and high image quality throughout its range of 9mm to 50mm, focusing at distances as low as 230mm (9 inches) away from the front of the lens. (BELOW) The Cooke Varo-Kinetal, shown here mounted on the CP16 camera, is adaptable to all standard professional 16mm cameras.



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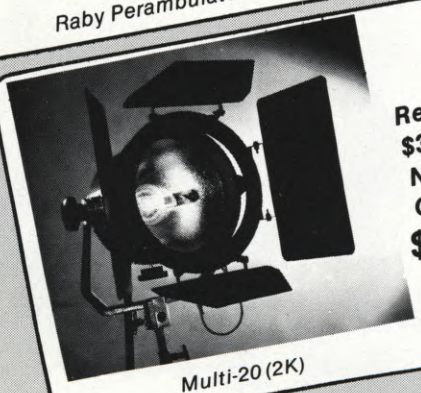

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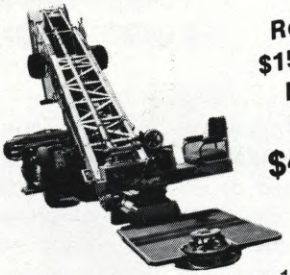

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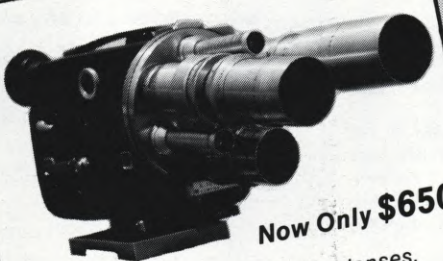

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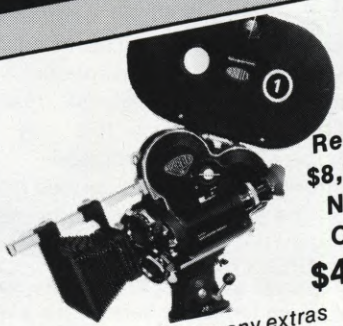

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elf DIGITAL INTERLOCK

An extremely versatile and ingenious new system for interlocking a 16mm projector in perfect synchronization with a cassette recorder, a sprocketed tape recorder or any number of additional projectors

Demonstrated at FILM '75, a simple low-cost interlock system which permits sound on conventional tape cassettes to be perfectly synchronised with virtually any standard 16mm or 35mm film projector has been developed by *Elf Audio-Visual Ltd.,* Slough, England. Known as the Elf Digital Interlock, it has particular advantages in the production of television news programmes where it allows accurate editing and preparation of news film to be accomplished at high speed. The system can also be used with sprocketed sound tapes, using two standard film projectors, one for sound and the other for film projection.

Basically, the system uses a step-drive motor driven from a power unit within an electronic control console which generates pulses or signals. The step-drive motor is fitted within the casing of the ELF projector (sold as EIKI in the United States) to undertake the function of the existing drive motor. Any ELF projector modified in this way can still be used for showing films in the conventional way.

With this drive system the projector operates only from a synchronisation signal and in this way any number of projectors can be exactly synchronised.

If the synchronisation signal is derived from one track of a tape recorder, the film projector will be held in exact synchronisation with the moving tape. Changes in the tape speed will not lose synchronisation and the tape may be stopped, started and reversed without loss of synchronisation.

With a multi-track tape, several languages can be synchronised to one mute film. Using two projectors, double-band operation can be obtained without increases in the wow and flutter specification of the original projector design.

A key is provided on the console to advance or retard the film during running should this be desired. Where two or more projectors are synchronised, the film speed can be varied up to 50 frames/second.

The accuracy of synchronisation is better than *0.01%* and this is maintained even when the system is continually started or stopped in forward or reverse directions. Projection speeds are infinitely variable up to 50 frames/second, forward or reverse, simply by altering the frequency of the control signal. Alternatively, the system can operate on mains supply frequency for a film speed of 24 or 25 frames/second.

One of twelve models of the ELF Projector (sold as EIKI in the United States) which forms the basis of the ELF Digital Interlock System. The step-drive motor is fitted within the casing of the projector to undertake the function of the existing drive motor. Any ELF projector modified in this way can still be used for showing films in the conventional way.

Sound added to any silent film

The Elf Digital Interlock system is so accurate the lip synchronisation can be obtained using an ordinary cassette tape recorder, so that synchronised sound can be added to a silent film without first having to put a magnetic stripe on the film. Stereophonic or quadrophonic sound can also be produced.

Because the system is so simple and so low in cost, sound films can now be produced for many purposes by companies and organisations for whom normal sound films would be too costly; this includes schools, colleges and universities. For example, a single training film or sales film can have separate commentaries in any number of languages, simply by recording each language on an inexpensive cassette. One of the first organisations to use the system in this way is a missionary society which is able to show one film with an infinite number of commentaries, one for each language or dialect as required.

If required, a number of projectors can be run synchronously.

How It Works

The Elf Digital Interlock relies on a signal pulse to operate the drive motor. This signal pulse is provided by a generator unit which is housed in a separate case.

The drive motor is mounted inside the Elf projector main casing and is connected to the main shaft by a toothed belt drive. Whilst stationary the motor shaft is held to within a fraction of a degree by a holding pulse.

The actual running speed of the motor can be varied, merely by altering the frequency of the control signal. It also lends itself to an interlock with the mains supply frequency, and speed selection by electronic control.

Standard of Accuracy

Accuracy of interlock between two or more projectors or tape systems is better than 0.01 per cent. This accuracy is maintained with the system being continuously stopped and

started, both in forward and reverse modes of operation.

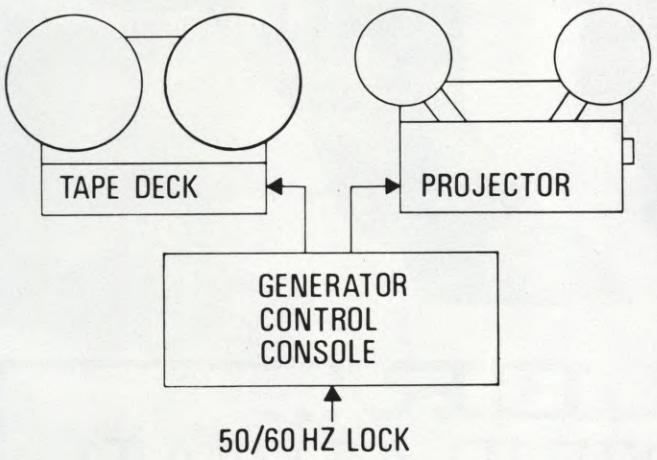
Installation Cost

Because of the fundamental simplicity of the whole system the Elf Digital Interlock installation cost is very much lower than existing interlock systems, yet giving greater accuracy and more flexibility. It does not require a special power supply for synchronous operation, as it uses a single phase standard input. It is also possible to operate the system from 15 volt d.c. supply for use in the field.

Applications

16mm Projector Sprocketed Tape Interlock

Using Digital drive motors in the projector and on the Tape decks the whole of the studio equipment can be controlled from a single generator, giving absolute interlock. Projection speeds can be varied up to 50 F.P.S. both in forward and reverse, or brought into lock with the mains frequency for 25 or 24 F.P.S. In addition the individual pieces of equipment can be moved in or out of lock whilst the whole system is running.



16mm Projector — Unsprocketed tape Interlock

The sound track on a tape recorder using unsprocketed tape can be interlocked with a 16mm projector to give absolute synchronism. So accurate is the system that lip synchronisation can be obtained using an ordinary stereo cassette tape recorder.

This means that synchronised sound can be added to a mute film print without having to resort to a magnetic stripe being put onto the film first.

One sound track on multi-track unsprocketed tape is used to provide a synchronisation signal to the projector. This signal is used also to control the tape speed of a number of other unsprocketed tape recorders driven by stepped drive motors. The equipment is designed to ensure that the tape speed of all the tape recorders is exactly the same as the tape speed of the master control tape recorder.

Using the multi track tape-recorder only one track is required for synchronisation, and the remaining tracks may be recorded in different languages, each separate language retaining synchronisation with the film. Alternatively the additional tracks may be used for stereophonic, quadraphonic sound or for the control of other 16mm or slide projectors.

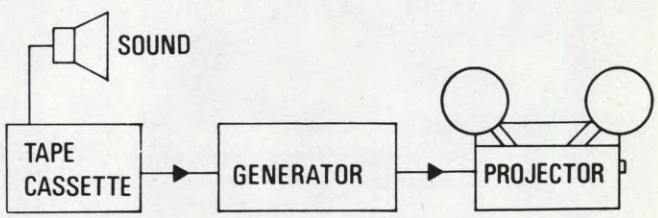
Double Play

These facilities can be obtained in two ways. The first uses a tape-recorder in conjunction with a digital interlock magnetic play-back projector. Using this projector the magnetic film track is recorded onto the tape with the recorder interlocked with the projector. Magnetic film is replaced by a mute copy. The projector is then run synchronously by the tape-recorder and will provide lip-synch to the film.

The second method is by using two interlocked 16mm projectors. Magnetic track film is threaded on one projector and mute film on the other. Both films are then set on their cue-marks, the control unit switched to interlock and lip synchronisation will be maintained throughout the run.

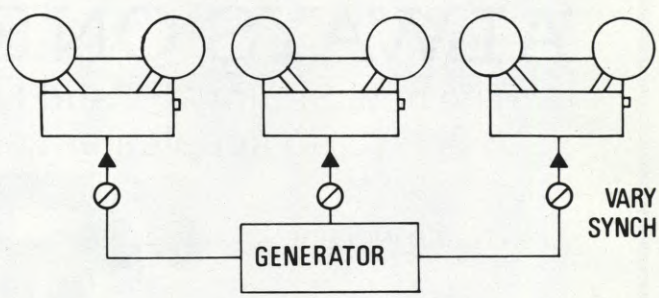
Synchronisation of a 16mm Projector and a Multi track recorder

By using a multi track tape recorder a very low cost and simple methods are available for multilingual presentations of films or for stereophonic and quadrophonic sound.



Synchronisation of two or more 16mm projectors

Two or more projectors can be run in synchronism from a central control generator, and at the same time there is a built-in facility for taking any one machine in or out of synchronism whilst the system is operating. This lends itself to special presentation effects or for carrying out side by side comparison of film prints.

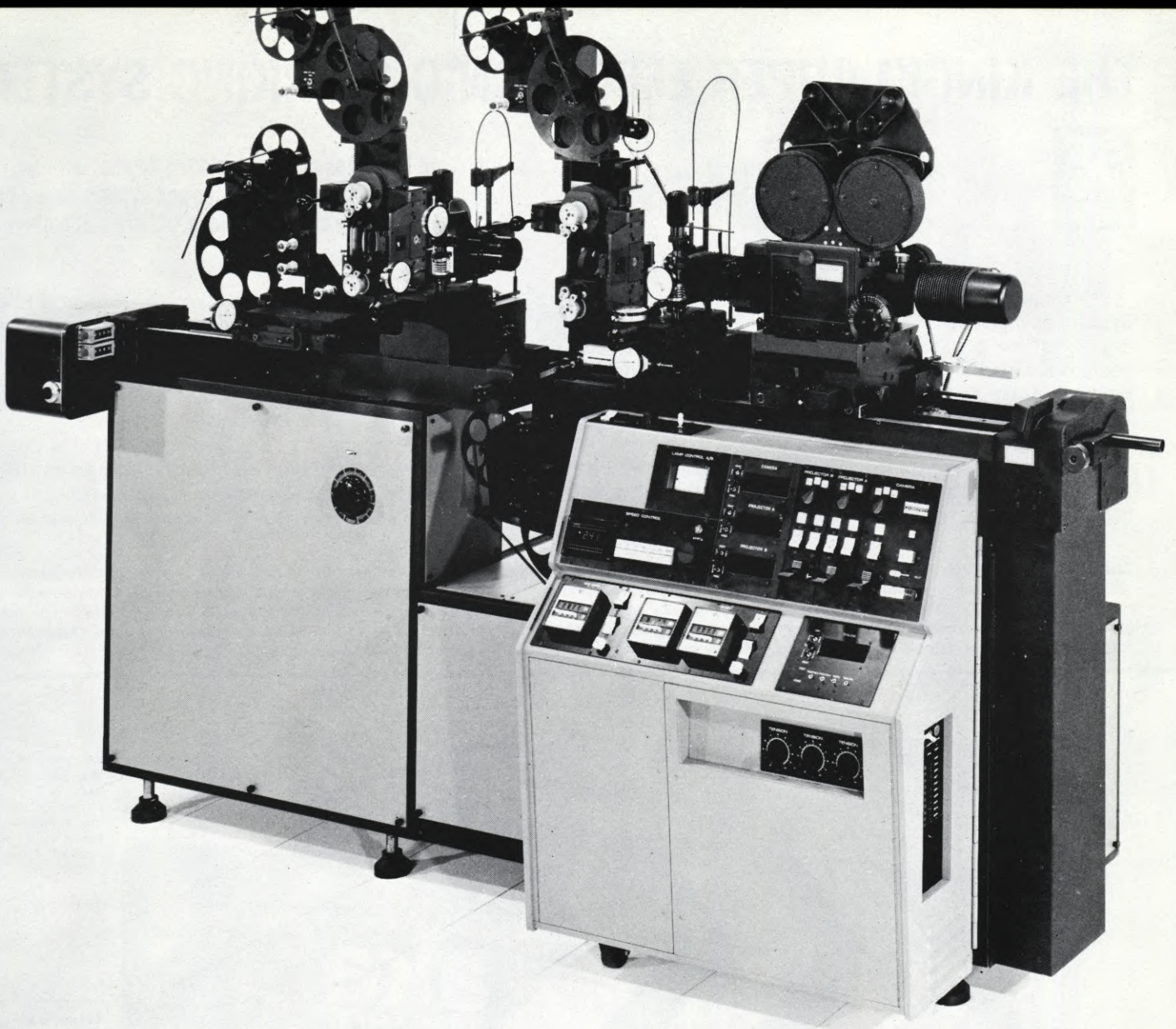


SPECIFICATION

Signal generator

Power supply	50 or 60 HZ available for 110 or 240 volt
Internal frequency	24 or 25 FPS operation or variable
Controls	Remote/Internal Signal 4% speed variation fast or slow Reverse/forward Power on/off
Inputs	Sine wave 300 M. Volts
Output	6 core cable to Digital Drive motor (1 cable per motor)
Size	Production size of generator unit: 14 x 9 x 4 inches.

For further information, contact: ELF A.V. LTD., 936 Yeovil Road, Trading Estate, Slough, Berks., England. Telephone: Slough 36123/4/5. ■



New Oxberry Special Effects, Step Optical Printer

With solid state technology

Oxberry has expanded its family of fine optical printing equipment. Using space age electronics the Electro-Sync Models have added new dimensions of precision and performance to the well-known Oxberry reputation for quality and reliability.

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- Independent high performance, servo motors mounted directly on the camera and projectors.
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- Revolutionary synchronization method between camera and projectors is less critical, requires no mechanical linkages and stops in the viewing position.
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- 100% modular construction and reliable plug-in components minimize down time.
- Solid state, high reliability skip frame device usable at all shooting speeds.
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THE KINGKLAPPER ELECTRONIC MARKING SYSTEM

An ingenious miniature slating device, with an integrated signal generator and synchronizing light, powered by an internal long-life dry cell battery

The Kingklapper Electronic Marking System, an ingenious miniature slating device, is not precisely new, having been on the market for some time now. However, it was "reintroduced" at FILM '75 with several significant improvements which, it is felt, make it worthy of re-examination in these pages.

The following updated description of the device has been provided by its manufacturer:

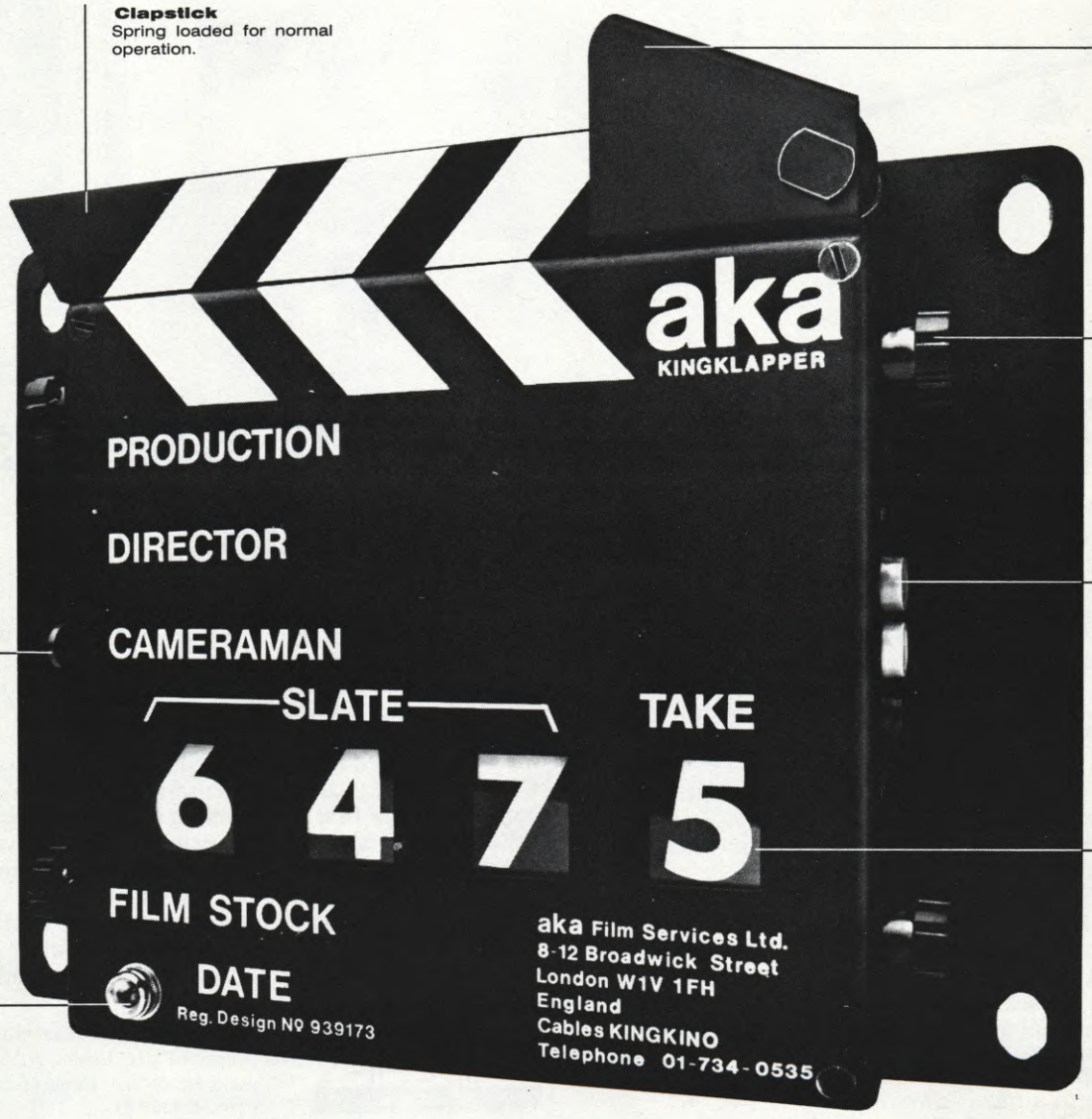
The Kingklapper is a compact aural and visual clapperboard with an integrated signal generator and synchronising light. The generator and light, both of a low current consumption, are powered by an internal long life dry cell battery.

Measuring less than 10 in x 8½ in, the backplate of the Kingklapper has provision for simple turnbuckle fixings (supplied) to be used to secure it neatly to the casing of a Nagra or similar recorder.

The Kingklapper comes complete with two leads:

1. KXTL 4 pin male Tuchel plug to green/red 4mm banana plugs. Designed to trigger the built-in synchronising generator found in the

The Kingklapper Electronic Marking System is a very handy slating device of special significance to two-man newsreel and documentary crews. It is fully electronic with its own built-in battery power supply. The clapstick is spring-loaded and the strong hinge contains a simple clutch to prevent clapstick bounce. The Kingklapper was originally designed by two A.K.A. sound mixers to facilitate the normally understood method of recording sequence start marks for the documentary film. With the advent of hand-held crystal-controlled cameras, the traditional method of using a third person to slate the scene became unwieldy in fast-shooting "cinema verité" situations.



Clapstick
Spring loaded for normal operation.

Hinge
Strong and robust, the hinge contains a simple clutch to prevent clapstick bounce.

Number change knob
One to each roll of numbers 0 — 9. Sprocketed drive ensures accurate number positioning.

Sync button
Actuates sync light and pulse simultaneously for easy aural and visual identification.

Output sockets (see text)
Standard 4mm banana sockets.
Red — 9 volts + ve
Green — common
Black — internal oscillator o/p

Sync light
Internal heavy duty battery illuminates lamp which is easily observable on film even under the brightest filming conditions.

Number windows
Showing large clear white numbers silk-screened on matt black polyester film.

Measuring less than 10 inches x 8 1/2 inches, the backplate of the Kingklapper has provision for simple turnbuckle fittings (supplied) to be used to secure it neatly to the casing of a Nagra or similar recorder. It has provision for triggering the built-in synchronizing generator found in the Nagra IV, 4.2, Stereo and IS-L series of recorders.

Nagra IV, 4.2, Stereo and IS-L series of recorders. When this lead is connected between the corresponding colour-coded 4mm banana sockets on the Kingklapper and the 4 pin female pulse socket of the above recorders, and the sync light button is actuated, a nominal 8v signal triggers the Nagra clapper oscillator. This lead is also wired for crystal control operation. The advantage of using this lead with the above recorders is that the synchronising signal is independent of the line input control.

2. KLIN Black/red 4mm banana plugs both ends. This lead carries the Kingklapper internal oscillator signal to the line input of the recorder. (Nagra III, etc).

Specification

Weight: 1 lb 15½ oz (0.9 kg).
Finish: black anodised.
Dimensions: height 8½ ins (21.5 cm).
width 10 ins (25.5 cm).
Oscillator output level: 12 dBm.
Frequency: 800 Hz nominal.
Clapper triggering voltage: 8v nominal.
Battery supplied: Mallory Duracell® MN 1604.

The Kingklapper was originally designed by two A.K.A. sound mixers to facilitate the normally understood method of recording sequence start-marks for the documentary film. With the advent of hand-held crystal-controlled cameras, the traditional method using a third person became cumbersome and often unwieldy in fast-shooting 'cinema verite' situations. This often meant that (1) the slate was forgotten completely (2) 'mic taps' were used resulting in no numbered ident (3) much film was wasted while waiting for a slate. The result was that synchronising rushes became a difficult and expensive process.

Experience showed that even a small clap was at times disconcerting to the subject being filmed, and the need was for an unobtrusive slating system retaining the freedom of crystal synchronisation. The object then, was to produce a simple, lightweight, rugged and compact slating system that gave the editor a different number every shot, that also incorporated a 'silent-turnover' start mark.

The latest version of the Kingklapper incorporates a number of improvements over earlier production models.

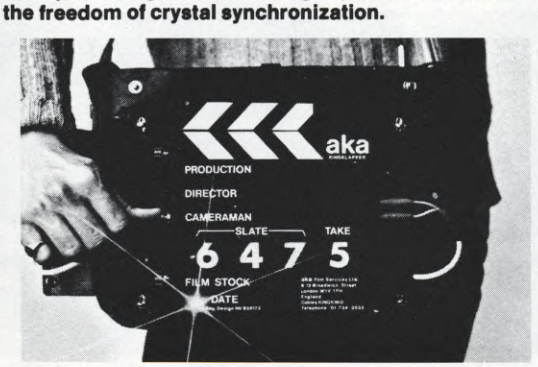
1. The numbered bands are printed on a polyester base.

2. Greatly improved hinge mechanism incorporating a simple clutch to prevent clapstick bounce.

3. An output provided for the latest Nagra clapper oscillator.

For further information, contact: INDEPENDENT CAMERA AND EQUIPMENT CO. LTD., 8-12 Broadwick Street, London W1V 1FH, England. Telephone 01-734 0535. ■

The Kingklapper can be operated using the clapperstick (left) or synchronizing light (right). The latter method can be very useful because experience has shown that even a small clap can, at times, be disconcerting to the subject being filmed. The light provides an unobtrusive slating system, while retaining the freedom of crystal synchronization.



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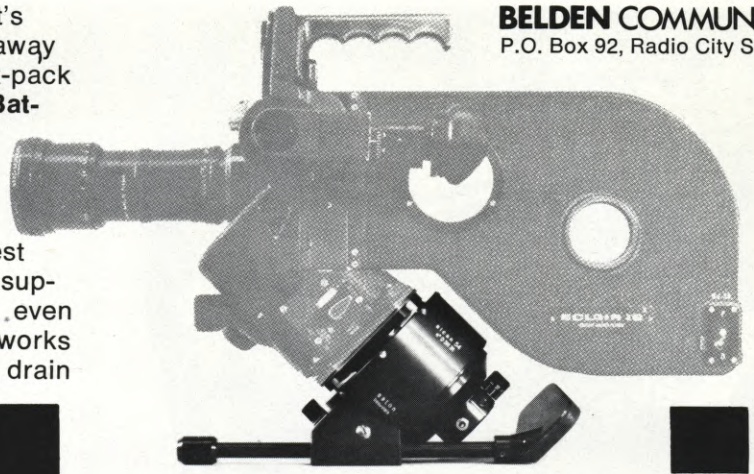
This offer is more bait than rebate, but it's still a damned good deal. We're giving away absolutely **free,** an **Anton/Bauer** quick-pack package: the **Model QP-3 Quick Pack Battery,** the **QC-3 Quick Charger** and the **Uni-Pack Model UP-M with Zener Meter.** You get them all by purchasing **the** compact, lightweight crystal motor **— Alcan 54.** It's the lightest and smallest available for the Eclair NPR, its shoulder support rod keeps the camera horizontal even with zoom on and magazine off — and it works on a standard 12 volt power supply at a drain of 1.5 amps at 72F. Get your **Alcan 54** and **free Anton/Bauer** package while they last, at dealers listed below.



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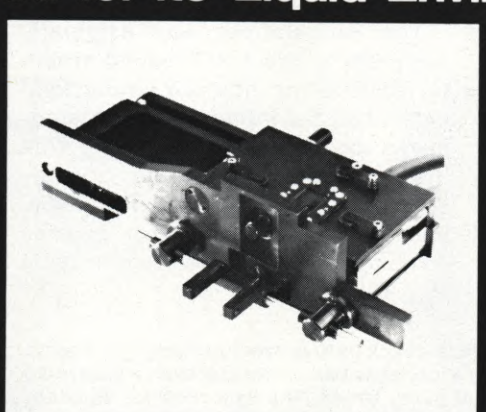
Conceived by John Lewis to meet the critical standards of optical effects printing, "LIQUITECH" is the first wet gate with a film movement designed specifically for the fluid environment. Its patented registration system passes film vertically through the wet chamber thereby preventing the creation of turbulence common to modified fixed pin wet gate film movements. "LIQUITECH" guarantees accurate registration for color separation and matte work.



"LIQUITECH" accommodates stop motion speeds, high speed (when run dry), freeze and skip framing, forward, reverse and splices without damage to film or crown glass.

The film movement is hinged to provide wide area access to load film and easily clean.

Available for 35mm, 16mm, Super 8 and 8mm. It is easily interchangeable with dry shuttles. Super 8 and 8mm operate from existing 16mm cams.

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MKM MODEL 824 SUPER-8 HORIZONTAL EDITING TABLE

A thoroughly professional flatbed console for Super-8 picture and sound synchronous editing that incorporates many of the features found in much larger, heavier and more costly 16mm and 35mm models

In general, professional Super-8 equipment was rather sparsely represented at FILM '75. An outstanding exception to that statement, however, was the Model 824 Super-8 Horizontal Editing Table, manufactured by MKM Industries in the United States.

Displayed at FILM '75, it is an extremely compact, lightweight "table top" flatbed editing console having many of the sophisticated characteristics of much larger, heavier and more expensive 16mm and 35mm horizontal editing tables.

STANDARD MODEL

The MODEL 824 is a horizontal editing table with one Super-8 picture and one Super-8 full coat sound track. It permits straight-forward editing since picture and sound correspond frame for frame and in length.

The table has four independent winding motors, and an inching knob for manual operation is also provided. The film head is equipped with an eight-sided prism and the picture is rear projected onto a daylight ground glass. The sound is reproduced through a built-in front-facing speaker. Jacks for earphones or a remote speaker are provided. The film and sound tracks can be uncoupled and moved independently.

FILM CAPACITY

750-foot reels capacity.

SPEEDS

Forward and reverse speed is continuously adjustable from zero to approximately 62 frames per second.

TECHNICAL DATA

Power supply 240V 50Hz

Dimensions

Width	Depth	Height	Weight
26.5 in.	21.75 in.	14.0 in.	65 lbs.

MISCELLANEOUS FEATURES

Push button controlled forward, reverse and rewind modes.

High speed search facility for picture and sound (400 feet in 30 seconds).

Bright picture display area of 3.75 in. by 5 in. 150 watt/21 volt halogen lamp with dichroic reflector. Light path contains an additional dichroic mirror in order to keep the film cool. Lamp and film are air cooled.

High Fidelity solid state audio amplifier. Heavy 4 in. diameter flywheel for good sound reproduction.

Push button controlled synchronous motor for accurate 24 fps speed (25 fps can be supplied).

ACCESSORIES

Two channel amplifier with head

Remote speaker

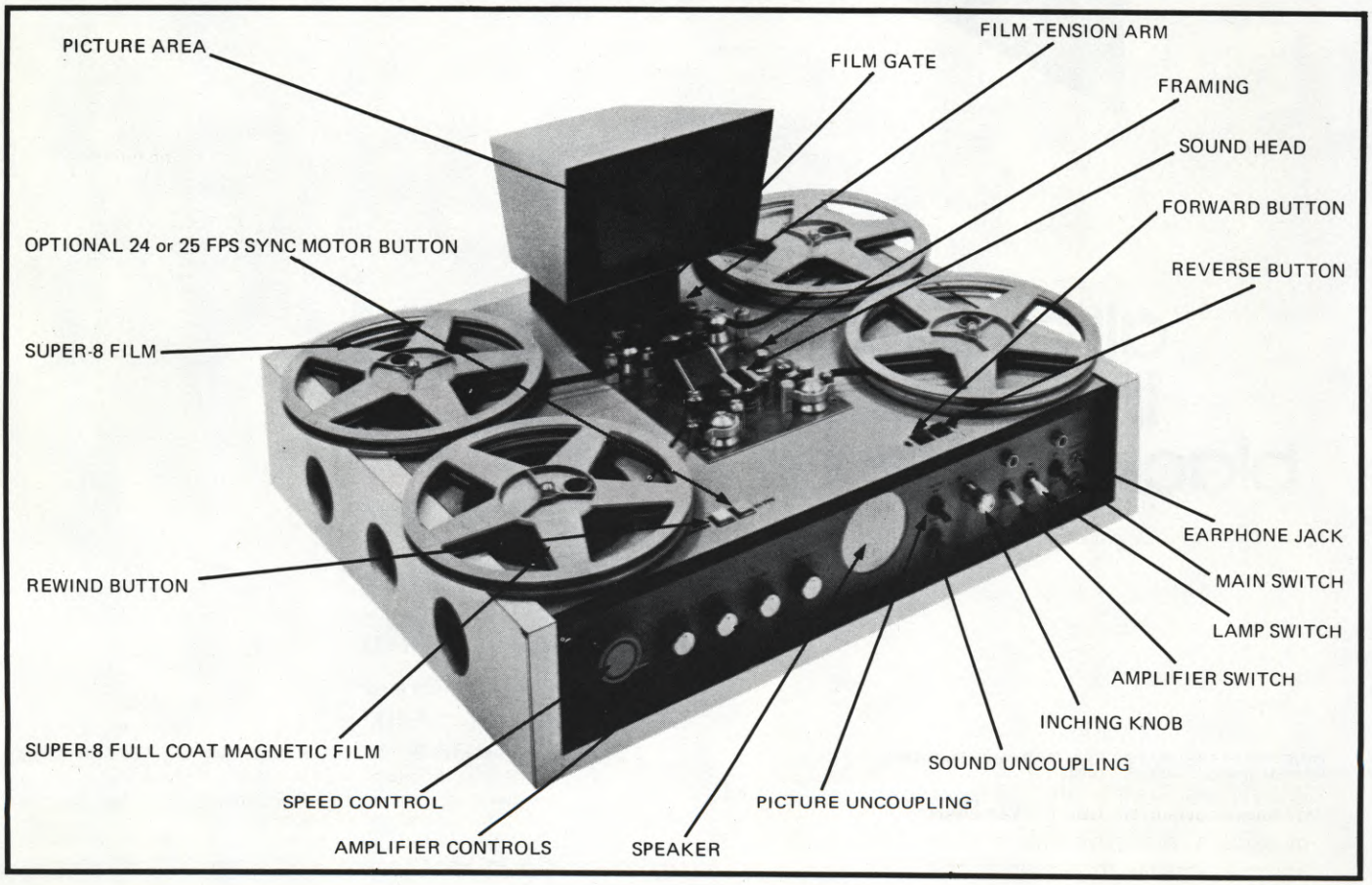
Matching work table 28 in. by 48 in. with sturdy legs

MODEL 825

Identical to the Model 824, except that it runs at 25 fps synchronous speed.

For further information, contact: KEM ELECTRONIC MECHANISMS LTD., 24 Vivian Avenue, Hendon, LONDON NW4 3XP, Tel: 01-202 0244, Telex: 28303. ■

THE NEW COMPACT MKM MODEL 824 SUPER-8 HORIZONTAL EDITING CONSOLE



PRICE (Delivered London) £1.250 (plus VAT)

DELNOCTA 3-STAGE IMAGE INTENSIFIER SYSTEM

A universal image intensifying unit that can be used with any TV camera, single-lens-reflex 35mm still camera or 16mm reflex cinema camera to photograph scenes with only clouded moonlight or starlight

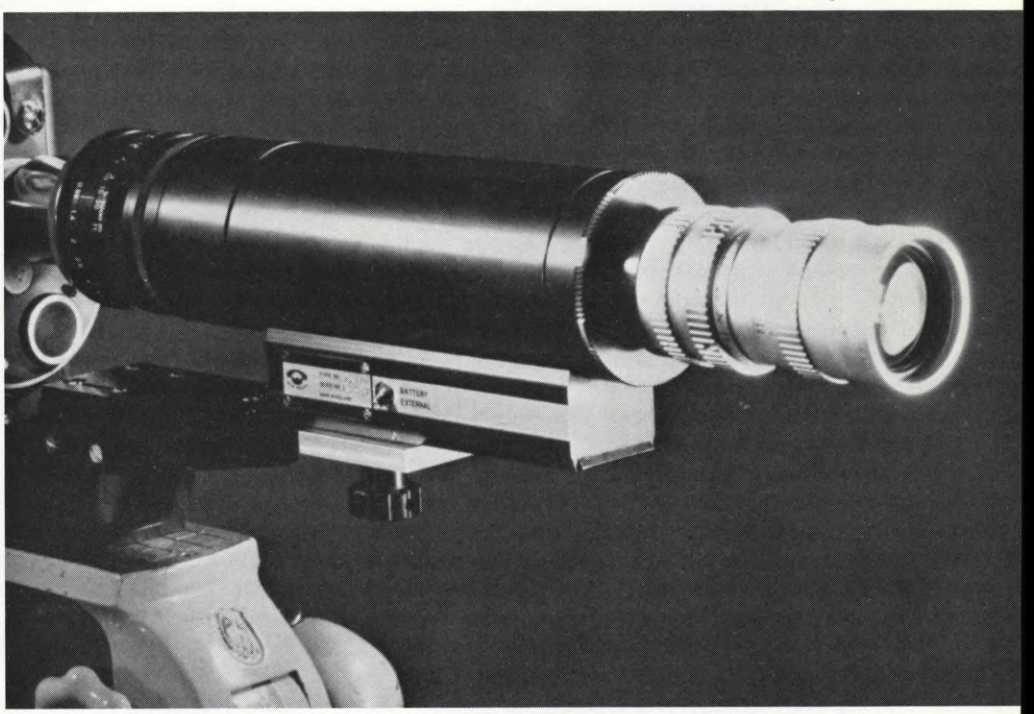
Registration of events at night with no illumination other than clouded moon and starlight has now become possible thanks to the Delnocta TS system developed and manufactured by "Old Delft".

Basically the system consists of three image intensifier tubes between which the image is relayed by fiber optics. The very faint luminance collected by the front optics on the first tube is intensified electron-optically and cascaded to the second and third tubes, resulting in a bright and luminous image on the anode screen of the last tube. This image is relayed on a 1:1 scale by a collimating lens and camera lens on to 16mm film, ½" videotape or 35mm film. The intensification obtained in the imaging plane is 12 camera stops. The intensification of the tube itself is approx. x 30,000. Consequently, the Delnocta TS permits registration under low light level conditions which, even with the fastest cine lens, the cinematographer would consider impossible. The Delnocta only needs the ambient light level normally available from starlight.

Further characteristics and features

- The Delnocta TS is a *universal* unit which can be used in combination with any 16mm cine camera with through-the-lens reflex viewfinding and its own objective f = 50mm, or in combination with a TV camera or a single lens reflex 35mm still camera.
- For adaptation the Delnocta TS has a Whitworth 3/8" screw thread which fits any optical bench for a 16mm cine camera, a TV camera or a 35mm photocamera.
- The Delnocta system supplies an *intensified* image. The larger the aperture of the front lens the lower the light level at which registration can be made.
- Two normal simple 1.5-volt penlight batteries provide power for the intensifier system which is therefore independent of local electrical mains.
- Automatic brightness control (A.B.C.) is incorporated in the intensifier system in order to prevent burn-in of tubes in the case of sudden, excessive light and to make it possible to film up to the

Continued on Page 1092



The Delnocta Three-Stage Image Intensifier System consists basically of three image intensifier tubes between which the image is relayed by fiber optics. The very faint luminance collected by the front optics on the first tube is intensified electron-optically and cascaded to the second and third tubes, resulting in a bright and luminous image on the anode screen of the last tube.

Technical specification Delnocta TS

Delnocta type TS	: 3-stage "Old Delft" image intensifier system including HT supply, fiber intertube relay optics, automatic brightness control and image distortion compensation to less than 3%.
Power supply	: Two 1.5 volts penlight batteries
Used diameter of anode image	: 12 mm for unity magnification with 16 mm film
Resolving power on anode screen	: approx. 30 lp/mm
Collimating lens	: "Rayxon" f = 50 mm, f/1.4, included in the unit and provided with soft rubber sleeve for coupling to camera lens
Carrying case with grip	: shock resistant ABS hard plastic
Weight of Delnocta TS	: 1.3 kg
Weight of carrying case	: 0.6 kg

Items recommended

The professional cinematographer already owns complete cine equipment. Hence, the following specification only serves as a guide for items which are not included in the Delnocta TS unit, but are recommended to obtain optimum results:

Front objective	: The front of the Delnocta TS housing is made to fit cine objectives with C-mount. Other mounts on request.
Coupling to cine camera	: By normal suitable optical bench (as available for heavy zoom lenses) for exact alignment of camera and collimating lens.
Cine camera	: Any 16 mm cine camera, with through-the-lens reflex viewfinding and light metering system.
Objective of cine camera	: The same focal length – 50 mm – as the collimating lens to obtain unity magnification. Aperture: largest aperture available. Lens set at "infinity" for operation with Delnocta.
Photocamera	: Any 35 mm single lens reflex camera, preferably with TTL exposure meter; camera lens 100 mm f/2.8 to obtain an image of 25 mm diam. on the negative.
T.V. camera	: Standard vidicon camera with $^2/_3$" or 1" tube diameter. Camera lens 50 mm f/1.4 or 65 mm f/1.5 respectively.

Optional accessories

COMBILABOR 16/35 daylight cine processing machine
ANALECTOR 16 mm *motion analysis* projector
Cinematic 16 mm cine projector
Please apply for available detail information.

MAGNASYNC/MOVIOLA'S NEW FLICKERLESS IMAGE HOLLOW PRISM

A prism for horizontal editing consoles which makes one image seem to flow smoothly into the next without flicker, and even at the slowest operating speeds, can now be offered at low cost

Magnasync/Moviola's Hollow Prism addition to their flatbed editors gives an absolutely flickerless image on a projection screen and has been designed to be offered in a price range film editors can afford.

Introduced at FILM '75 in London, it elicited considerable positive comment because this was the first time flickerless editing was exhibited for sale at what is considered a reasonable figure, according to L.S. Wayman, president of Magnasync/Moviola Corporation.

Up until now the cost has been prohibitive, but Moviola's engineers were able to design the hollow prism package in a manner that makes it practical to produce on a mass scale at a price roughly one-third less expensive than heretofore.

The original Moviola flatbed design had been planned and programmed to adapt to advancements in the system, making the hollow prism application a natural progression. Wayman suggested there were several more changes on their drawing boards in future editing machines the company will manufacture.

The editing picture using the hollow prism is flickerless fully lighted. The previous method of reducing editing flicker using solid prisms was by cutting the light source, or by using shading techniques which vary light intensity on selected areas of the viewing screen.

With the hollow prism and the flickerless image the editor now has full concentration which makes for better editing in shorter time. Eye strain is minimized, there is less fatigue and the assurance of a perfectly focused picture at any operating speed.

The editor can very precisely examine frame-to-frame relationship without loss of resolution. Present editing systems use a 12-sided prism; the new hollow prism is 24-sided.

Following experiments, Wayman stated that now the editing device can be used as a projector. Moviola expects to start delivery around the first of November. The exposure at FILM '75 has drawn inquiries from all over the world from editors seeking flickerless images at a price they can afford.

The hollow prism is adaptable to any of the firm's flatbed editors which have manual inching for picture and sound transports. With crystal-controlled sound speed, variable speeds of less than one frame per second to ten times sound speed can be obtained.

Sound transports may be run separately from the picture transport for any variable speed or direction, or crystal sound speed forward, or in interlock sync with picture transport or external master unit.

The picture transport has a modular dual sprocket, with synchronous hollow prism optical intermittent. Film capacity is 1,200 ft. (365 cm) lab core, or 2,000 ft. (610) standard projection reel with-torque motors mounted in the extended position. The editor may also run the machine with the lab core in extended position.

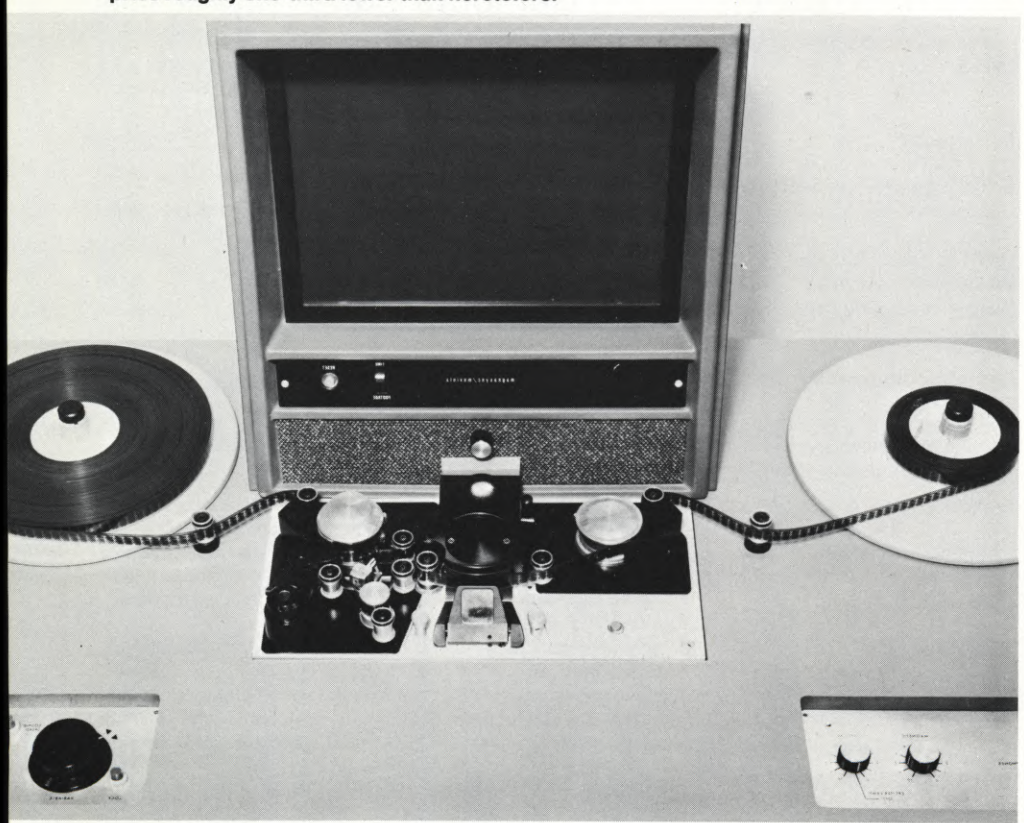
The flickerless image remains even with variable speed of from less than one frame per second to ten times sound speed (240 fps or 250 fps) in both forward and reverse directions, with forward and reverse sound speed detent. It has controlled acceleration and deceleration.

Input power is 1200 watts, with input voltage 115/230 VAC 50/60 Hz. Because of its quiet operation with no distracting gear noise, coupled with the now available flickerless image, the editor may now concentrate on doing his job.

Moviola's new hollow prism is adaptable to their M-77, M-84A, M-85A and M-86A console editors. The factor the company stresses is that hollow ground prisms have been around for a long time, but the price was absolutely prohibitive. Through their unique engineering department, plus their original design concept of the flatbed editor, an engineering breakthrough was achieved whereby they can now offer the hollow prism addition at an economical price.

For further information, contact: MAGNASYNC/MOVIOLA INC., 5539 Riverton Ave., No. Hollywood, Calif. 91601, Tel. (213) 877-2791. ■

Introduced at FILM '75 was Magnasync/Moviola's new hollow prism for addition to its editing consoles in order to produce an absolutely flickerless image on a projection screen. Up until now the cost of such prisms has been prohibitive, but Moviola's engineers were able to design the new prism in a manner that makes it possible to produce on a mass scale at a price roughly one-third lower than heretofore.



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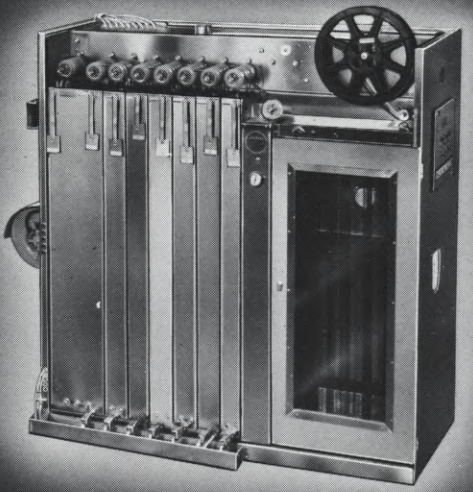

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UNIQUE SONDOR LIBRA 16mm DUBBING EQUIPMENT

A compact dubbing unit that can accommodate one full hour of recording material, can run forward or reverse at speeds up to ten times normal in sync, and is adaptable to time code systems

Shown at FILM '75 was the new Sondor Libra MO3 16mm Stereo Dubbing Recorder. The compact unit was presented in what appeared to be a portable console (see accompanying photograph) and also mounted in a conventional rack with multiple, identical units.

To summarize the unit's outstanding features: It is small and compact, yet can accommodate one full hour of recording material. The sprocketed tape does not need to be threaded; it just drops into a slot, and everything else is automatic. The unit uses a capstan motor to maintain extremely good wow and flutter performance, as well as a sprocket wheel for accurate synchronization.

The interlock possibility to almost all equipment exists because of stepping motor drive systems. Built-in crystal pilots or external pilotone may be used. The head assembly consists of three individual heads conforming to the latest EBU standard 3908 for two identical 4mm (150 mils) soundtracks and one U track for 16mm magnetic film. The recorder provides symmetric and asymmetric inputs and outputs; stereo LED VU-meters; three monitor amplifiers and each with its own speaker; up to ten times sound speed in sync; high speed wind and rewind at thirty times sound speed (threaded).

Demonstrating the machine on the spot at FILM '75, a representative of the distributor described its characteristics in greater detail, as follows:

"The unit has three input modes: 'PILOT', which is forward in synchronization with either an internal crystal or a 1-volt power signal from the camera; 'FORWARD', which is forward in sync with the mains frequency; and 'EXTERNAL', which is forward or backward in sync with a rotary pulse generator.

"The equipment runs forward or reverse in sync up to ten times normal speed in either of the three normal program conditions, and during that operation there is a control signal available to drive in other machines, also at ten times normal speed in sync. It performs three-track recording — two main quality channels and one edge track cue.

"The VU meters are LED's. This is purely for size reasons. The fader controls are of fairly reasonable quality, but not particularly good quality. They have only DC on them, which drives a lamp inside the machine, and the lamp sets the level on a light-dependent resistor, so that any clicks or bumps or noises you get on the cables or the VU meter are ironed out by the thermal delay of the bulb. The spool size is 1200 feet of acetate, or 2400 feet of the new thin 2-mil-thick polyester.

"The counter system can be programmed to search frame 'zero', so that in the dub you can roll forward, do your normal dub and then make the unit fast-search zero. In other words, you do the first part of your dub, then go on a bit and reset the unit to zero on the next section of the dub. You can always come back to the beginning of that section every time. You simply keep resetting the counter to zero and keep coming up at the beginning of that section.

"You can expand the system later, if you wish. We have time-code generators and time-code readers to go with it, which will pre-program the machine to fast-search any given frame number in hours, minutes, seconds and frames. This means that you can interlock it with a VTR or any other machine that has a time code. The unit just brings the two time codes together by driving this machine at normal or high speed in either direction, selecting the fastest way possible to get the two time codes to coincide. This gives you the possibility of programming in time codes with a calculator-type cable.

The Sondor Libra M03 dubbing unit does not need to be threaded. The magnetic film is simply dropped into a straightline path, and everything else is automatic. The unit uses a capstan motor to maintain extremely good wow and flutter performance, as well as a sprocket wheel for accurate synchronization. It can be set up for use on a table, in a console or in a 19-inch rack.

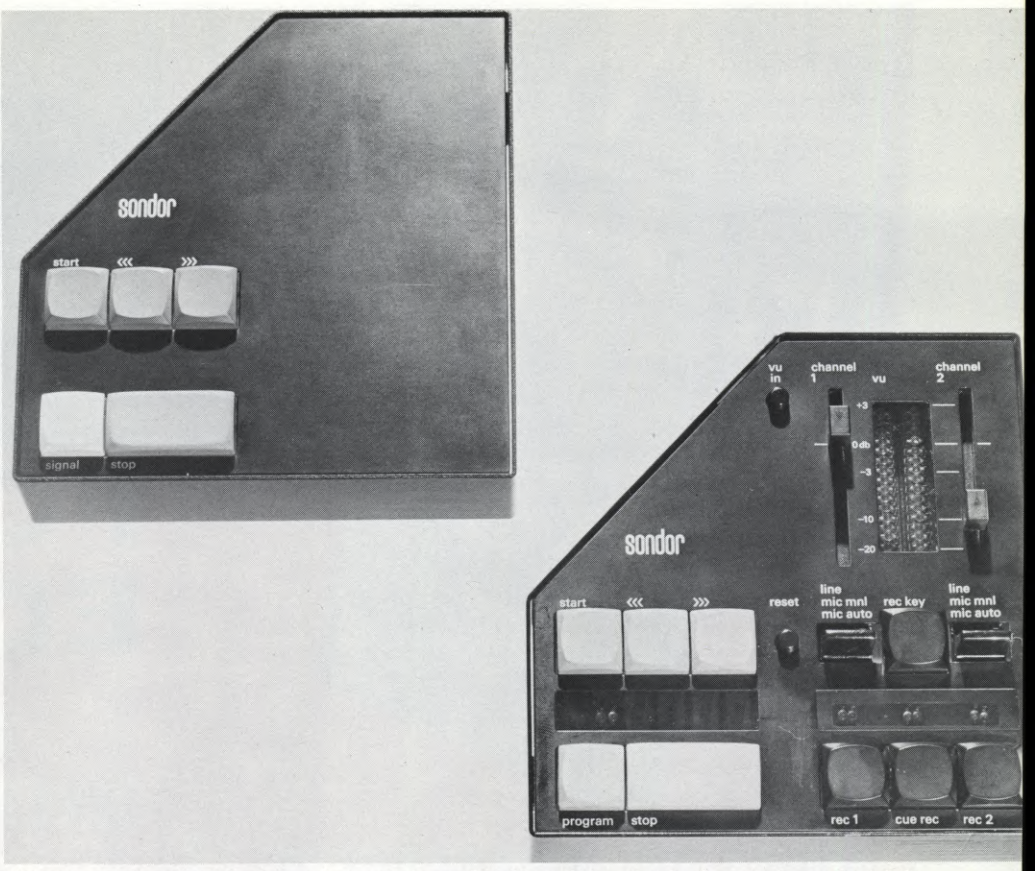
You just dash in a few numbers and the machine will instantly see that there is a great difference between those numbers and its own code numbers, and zoom off at a high speed to bring the two down to zero.

"This opens up the possibility of dubbing without cutting. Instead of cutting in long lengths of leader between each insert, you just program the machine to stop and wait until it's called up. Then it starts again and runs on and you open up the fader at the appropriate moment. You have all your music and effects and dialogue end-to-end on a bit of tape, uncut. When you finish your dub you just put them through a bulk eraser and use the stock again on the next dub. So it cuts down on recording stock. We reckon you can get 20 passes on the machine before there is any even slightly measurable degradation of quality. Audible degradation would occur at probably 50 passes, so you can use the same piece of stock 20 to 50 times, which should reduce the cost of stock considerably. The high-speed fast-search, forward and reverse, should reduce dubbing time to 60% or 70% of conventional dubbing time, as well — so the savings in time and running costs should be very extensive with this machine.

"The machine, as it stands here, will work as a perfectly ordinary, standard, conventional dubbing machine, but the extra add-on bits — these coding devices — will enable you to work at higher speeds. Of course, when working at such high speeds, you've got to be able to drive the picture at the same high speeds. With this in mind, we are making a transport with a picture head that uses a hologram picture device of a new sort. It is being developed in Germany at the moment, and will have a light output sufficient to project on a screen about five meters across. The picture can be driven at the same speed as the sound film, so you can wind back with the picture in sync also at ten times normal speed.

"For use in conjunction with different kinds of film transports or projectors or what have you, we have a generator which produces two square waves with a 90° phase between them for sensing. Obviously, the frequency gives you its speed. In this hemisphere we talk about 50 cycles. In the United States it would have to be 60 cycles, which may present a few problems, but I think that's already been sorted out by the manufacturer.

"The shaft goes around and produces a train of pulses which directly drive the sprocket motor. It's a stepping motor — so that every time it gets a pulse, it steps one position. If it gets two pulses, it steps two. If it gets one pulse in the opposite direction, it immediately steps back. There is no possibility of the motor not following the pulses, unless you really load it up hard.



Closeups of the simplified remote control panel (left) and the standard control panel (right) which are used to operate the Sondor Libra equipment. These sound and logic control panels are purely switching boxes, with all of the memories and logic inside the machine. Because these control boxes are "pluggable", they can be taken out and swapped, even while the recorder is in operation.

"Locking the unit up with other Sondor machines requires just three wires and the two phase controls. You can add on machines *ad infinitum.* The signal comes from the master machine into the input of the second machine, and back out to what we call a 'sync-link output', which goes to the third machine, the fourth, the fifth, and so on. It just ripples through and the theory is that there is no limit to the number of machines you can link together.

"The sound and logic control panel simply unplugs from the machine. All of the memories and logic are inside. What is outside is purely a switching box. There is a DC which operates the light inside, so that the unit can remote control not only the record and transport logic functions, but also the audio level from the remote system. A simplified control box switch can be plugged into this position. Because the control boxes are pluggable, you can take them out and swap them even while the recorder is in operation. You can program any mode you like, unplug the control unit, take it away to the far end and plug it in, and you get no stray pulses triggering any of the logic mechanisms. The only problem is that while you've got the remote control in your hand, you can't stop the machine — but that's a minor detail.

"There is one more logic function which, I believe, is standard with most machines — namely, that when you are working with the projector running forward and backwards, if you've got 'Record' located in, you can run forward with no trouble. However, as soon as you try to run backwards it will knock itself out of the 'Record' mode and 'Record' must be re-programmed. That's just an extra safety interlock to stop you from rolling back and accidentally erasing what you've just recorded."

Features of SONDOR LIBRA:

- Threading difficulties are eliminated — the film is dropped into a straight-line path.
- Synchronous operation up to ten times normal speed.
- Rock and roll, touch-button controlled, at any speed up to ten times normal.
- Opto-electronic LED counter with resettable zero for film metering.
- Automatic fast return to zero.

Continued on Page 1093

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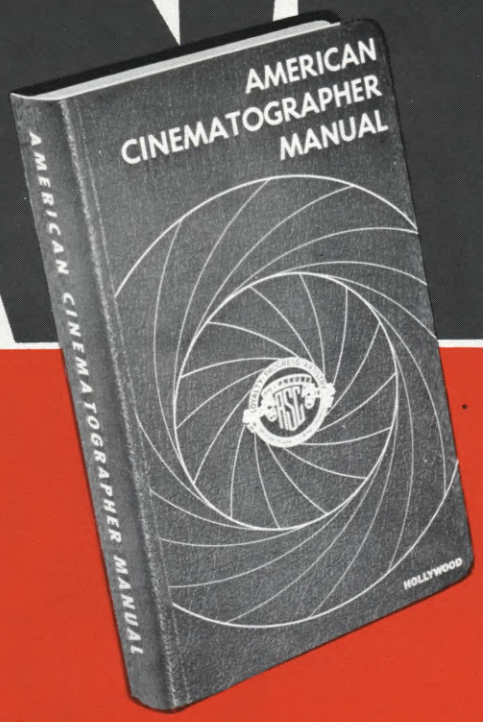

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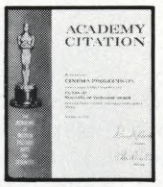

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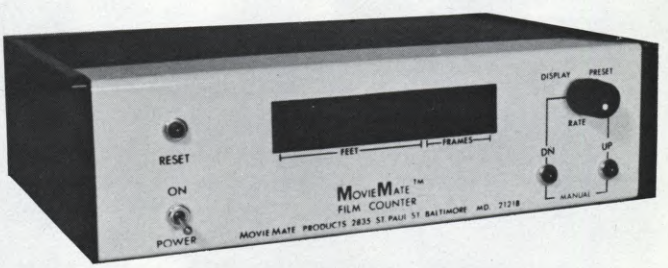

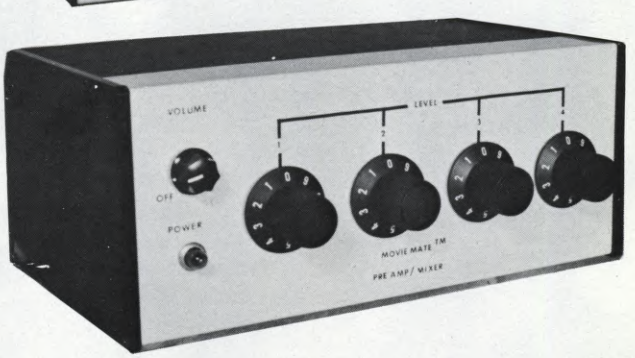

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"THE PLATINUM YEARS"

All about a castle in Ireland, a world-famous photographer, a fascinating book and Hollywood the way that it used to be

By HERB A. LIGHTMAN

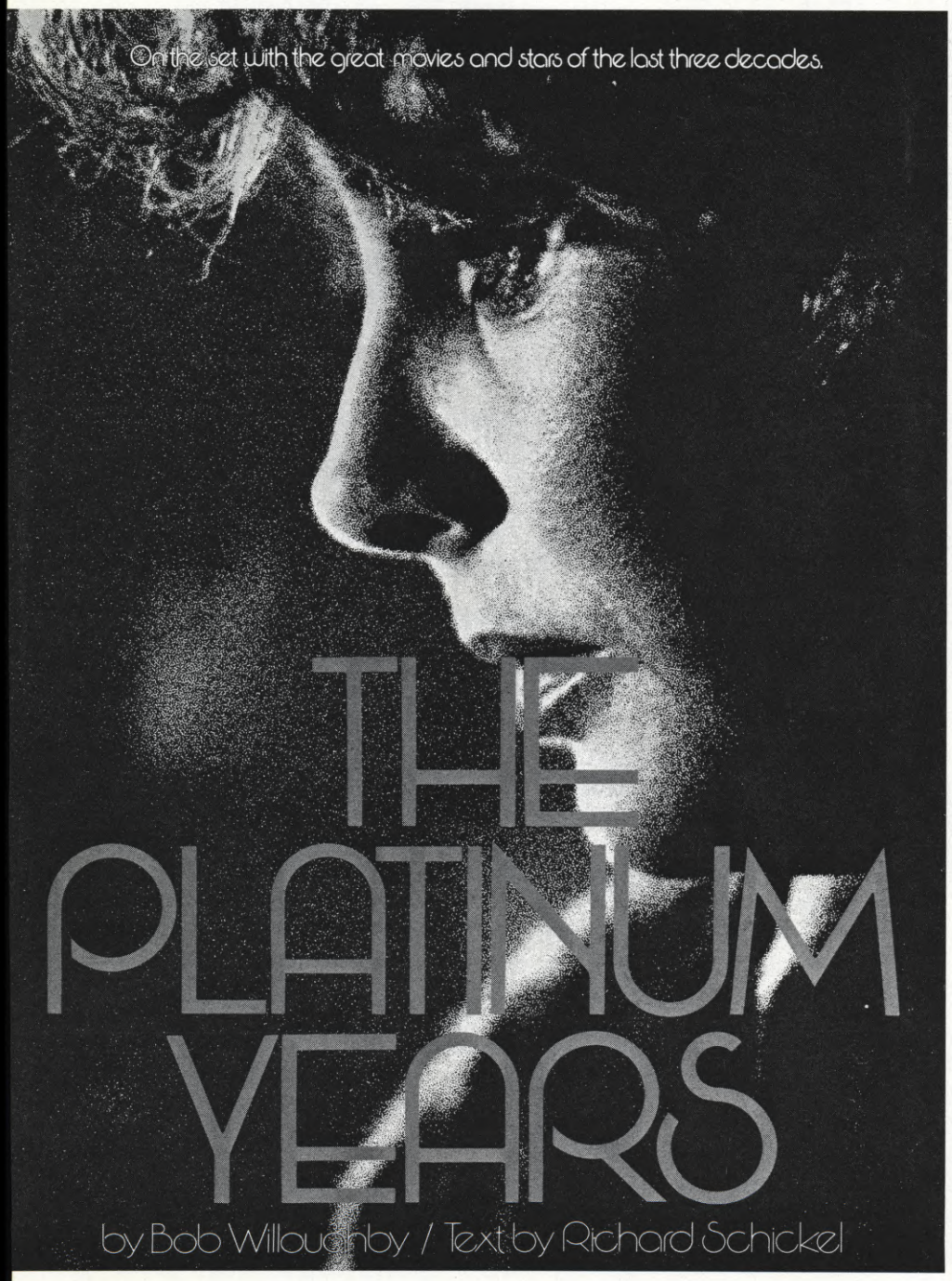
Coolmaine Castle, County Cork, Ireland

What do you do if you're a castle freak like I am and a friend invites you to be house guest in his very own castle?

You go! Especially if the friend is famed American photographer Bob Willoughby who, with his wonderful family, has been gone from Malibu Canyon these last two years, living the life of a country squire in his Coolmaine Castle, County Cork, Ireland.

It doesn't take much arm-twisting to get me to Ireland, that lovely emerald land, but I hadn't been there since my visit to the filming location of "RYAN'S DAUGHTER" five or six years ago. My present visit has come about because of a book, a most wondrous book — but more of that later.

First had come a Christmas card from the Willoughby clan, showing them all happily gathered about the Christmas tree in the drawing room of their castle. Then, by and by, came a letter from Bob announcing that a book of his photographs had been published by Ridge Press and Random House. He was having the publisher send me a copy.



It arrived — "THE PLATINUM YEARS" — a high (12½ inches), wide (9¼ inches) and extremely handsome volume stuffed with a couple of hundred of Bob's stunning behind-the-scenes still photographs from 22 major motion pictures, and a most interesting text by film critic Richard Schickel.

I holed up with "THE PLATINUM YEARS" and had myself a quiet orgy of movie nostalgia. The book is obviously a labor of love — beautifully designed by Albert Squillace and printed and bound with rare craftsmanship in Italy by Mondadori Editore, Verona. But it is the photographs — most of them full-page or double-spread, in black-and-white and color — that almost literally take your breath away. Aside from the fact that each shot is, in its own right, a work of photographic art, they add up collectively to a document of the very essence of Hollywood at its best — not the phony "dream factory" with its mindless worship of movie stars, but the *atelier* of inspired artists and artisans energized by the creative fires that have annealed the only original art form of the Twentieth Century.

Bob Willoughby has captured it all through his incisive lens. There is a treasury of stills from such film classics as: "FROM HERE TO ETERNITY", "THE CAINE MUTINY", "A STAR IS BORN", "REBEL WITHOUT A CAUSE", "GUYS AND DOLLS", "THE MAN WITH THE GOLDEN ARM", "RAINTREE COUNTY", "OCEANS 11", "MY FAIR LADY", "MARNIE", "THE GREAT RACE", "WHO'S AFRAID OF VIRGINIA WOOLF?", "A MAN FOR ALL SEASONS", "DR. DOLITTLE",

Continued overleaf

ETULIA

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"THEY SHOOT HORSES, DON'T THEY?"

"WHO'S AFRAID OF VIRGINIA WOOLF?"

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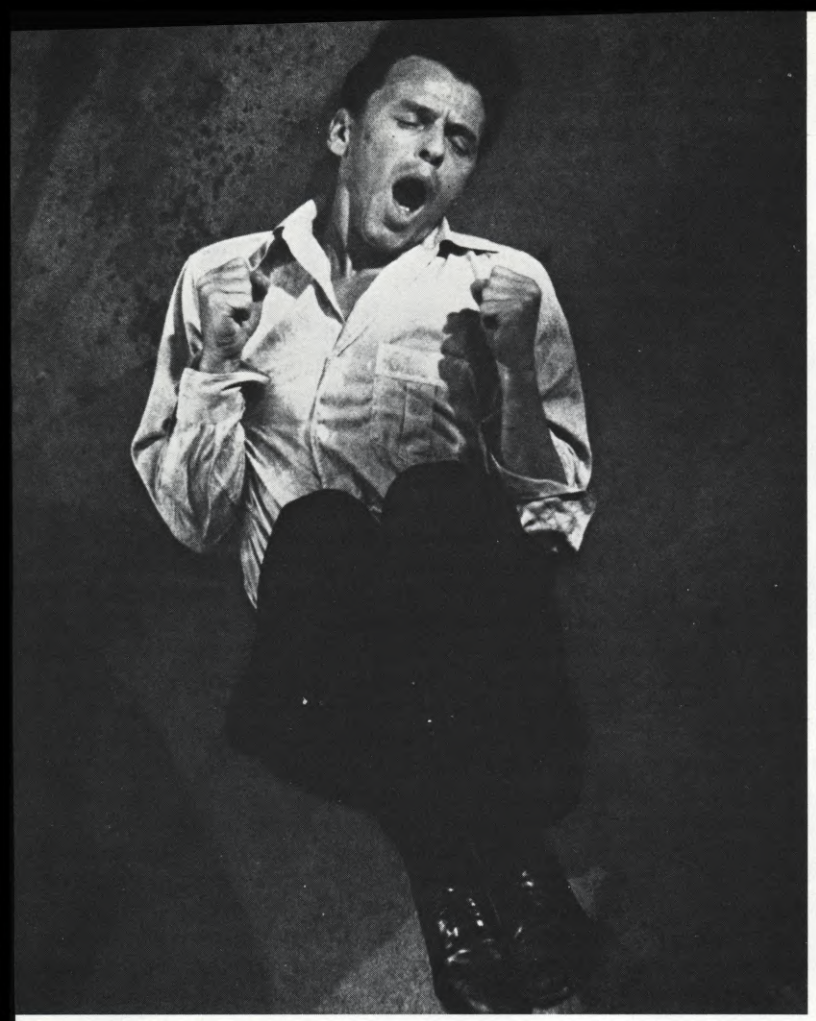
"THE LION IN WINTER"



"THE MAN WITH THE GOLDEN ARM"

"THE GRADUATE", "PETULIA", "ROSEMARY'S BABY", "THE LION IN WINTER", "THEY SHOOT HORSES, DON'T THEY?", "CATCH 22" and "THE COWBOYS".

"THE PLATINUM YEARS" is Bob Willoughby's homage to his home town, Hollywood. It clearly shows why, for more than 20 years, he stood at the top of the heap among that tiny elite corps of "special" photographers brought in by the major studios to document their most important productions. The book is much, much more than a collector's item, or an impressive piece of coffee table decor. It is something for everyone who loves not only the art of the motion picture, but its unique excitement, as well.

Thus turned on by "THE PLATINUM YEARS", I was too impatient to write Bob a letter to tell him how much I had enjoyed it. I called him up instead, at Coolmaine Castle, and told him face-to-face — or phone-to-phone, to be more exact. It was then that he said: "Why don't you come and stay with us at the Castle?"

That's all it took — and here I am.

I first met Bob Willoughby aboard an airplane when, as it turned out, we were both headed for the same destination: the Arizona filming location of Blake

"THE GRADUATE"

"CATCH 22"

"A STAR IS BORN"

Edwards' "THE WILD ROVERS". It was instant affinity, for not only was Bob one of the most genial and intelligent men I'd ever met, but it didn't take long for me to perceive that he is also one of the great artists of the camera. That is a designation which he would consider high-flown and which, I'm sure, would embarrass him if I used it directly in conversation — but it is, nevertheless, apt.

That fact was brought out most forcefully one day when the two of us were standing side by side, using the same camera equipment and shooting the identical subject matter — namely William Holden and Ryan O'Neal mounted sort of piggyback on the same horse. We were both clicking away at the same time and, while my photographs were competent enough, it was Willoughby who sensed the exact split seconds in which to click his shutter, so that his shots became works of art.

When I land at Cork airport, he is waiting, looking healthy, happy and slightly larger than life — a cross between the aforementioned country squire and a leprechaun. We drive the 30 miles through lush Irish countryside, trying to catch each other up on what has been happening during the

Continued on Page 1071

THE CHEM-TONE FILM SPEED ENHANCEMENT PROCESS

A chemical modification to color film processing that not only increases film speed, but, according to cinematographers who have used it, "reaches into the shadows and gives scenes a special look"

By ANTON WILSON

"We had between 4 and 10 foot candles . . . we could hardly get a reading and we were using Super Baltars — T/2.3, not fast lenses." Did it come out? "We had to print *down,* it was actually *over*exposed!"

"I use it inside, outside, day, night — doesn't matter; it flattens it all out and keeps everything within the limits of the film."

"Number one with me is the overall quality of the 'look' . . . I shot the entire feature film with this process."

These cinematographers are all talking about *Chem-Tone,* a very intriguing process for enhancing the speed of Eastman Color Neg. 5247/7247.

The story begins several years ago at TVC Labs in New York City with Dan Sandberg and his associates, Bernie Newson and John Conicella. These three men were determined to bring more film production into New York City. The bulk of studio production is firmly entrenched on the west coast, but New York City has a great allure as a colorful location. These New York boys reasoned that if they could develop a process that would make location filming faster, better and cheaper, producers would begin to come out of the studios and make more use of New York as a location. This was the motivation and the design goal of the *Chem-Tone* project. The TVC boys have succeeded beyond their original goal. It appears that *Chem-Tone* is promoting location work not only in New York, but all over the world from Nashville to Africa.

So what is *Chem-Tone* and how does it help the location cinematographer? My first step was to contact Dan Sandberg at TVC to find out what the process was *supposed* to do and how it did it. My next step was contacting various cinematographers who had used *Chem-Tone,* in order to get an objective view of how the process really measured up. From Dan I learned that there are three forms of *Chem-Tone:* Normal *Chem-Tone* (125 ASA). *Chem-Tone* Push One (250 ASA) and *Chem-Tone* Push Two (500 ASA). *Chem-Tone* is designed to increase latitude, decrease contrast, even out color balance (mixtures of light), bring out shadow details, minimize flare and allow the one and two-stop pushes with little or no degradation.

"Is that all?" I asked.

"Well, actually the *Chem-Tone* also has a superior 'look' to it but that is hard to explain in quantitative terms; you'll have to see that for yourself."

I was shown a demo reel of *Chem-Tone* that was shot around New York City with nothing but available light. Interiors, exteriors, day, night, subway station, stores, and even St. Patrick's Cathedral by candlelight! My skepticism was beginning to turn into amazement.

My next step was to contact cinematographers who had used the process. I spent a day on location with Jack Priestley and Sol Negrin, ASC, while they were shooting a pilot for TV called "STRIKE FORCE". The 90-minute show was being shot entirely on location in New York City. The crew zipped from one location to the next with a minimum of set-up time. The biggest problem they encountered was a sequence in New York's Pennsylvania Railroad Station. Jack Priestley explained, "You know how black it is down on those train platforms, you can't even see half the people. We had between 4 and 10 foot-candles . . . we could hardly get a reading and we were using Super Baltars, not fast lenses."

So they shot wide open (T/2.3) and counted on the *Chem-Tone* at 500 ASA to pull it through. How did the scene come out? "It looked like a painting, beautiful. As a matter of fact, we had to print it *down,* it was actually overexposed!"

Sol Negrin had also used *Chem-Tone* for some subway sequences for "RHODA". "When shooting in the subway, you can film under the mixed fluorescent lights without any correction filters or gels. They can pull the color out with the *Chem-Tone."*

Both Jack and Sol stressed that under extremely low levels of illumination there should be some hard light in the scene to set up contrast.

(LEFT) A scene from the 90-minute television pilot film, "STRIKE FORCE", starring Cliff Gorman, Don Blakely and Richard Gere. The entire film was shot on location in New York City, using the Chem-Tone process, originated by TVC Laboratories in New York to gain film speed in low light level situations. (RIGHT) A scene from Robert Altman's smash hit feature film, "NASHVILLE", which also benefitted from the use of the Chem-Tone process.

Film clips of scenes from the feature film "RANCHO DELUXE", starring Jeff Bridges, which made use of the Chem-Tone process. Cinematographers who have used the new process speak of added "luminosity" in shadow areas and a desirable "look". They claim that it is superior to flashing because it can be controlled more accurately and does not impart to the print the overall gray haze which some find objectionable in scenes which have been flashed.

This is usually satisfied at night by street lights, headlights and neon signs. Interiors should also have some hard light in the scene such as a lamp.

Volker Bahnemann, Vice President of Arriflex Company of America and an associate member of ASC, had been making some extensive tests with *Chem-Tone* in conjunction with Arri's new Zeiss Fast Lenses. Like Jack and Sol, he was impressed with the performance of *Chem-Tone* at night. "There is nothing more difficult in a night scene in the City than to re-establish a natural look by using a lot of lights. By employing a lot of extra light, the foreground may be properly exposed, but the background falls off into darkness. We used the *Chem-Tone* with no additional lighting at all. The color retention and penetration into the background are remarkable. The background continues almost as far as the naked eye can see. These scenes looked so well lit and natural that it would seem almost impossible to get as natural an effect by adding lights. You add lights, you add problems."

"The most dramatic scenes with *Chem-Tone* were shot with the Zeiss Fast Lenses. These lenses are designed to be used wide open (T/1.4) without flaring." Jack Priestley had told me that *Chem-Tone* has amazing flare control, as he had shot right into neon signs, headlights, streetlights, etc., with excellent results. Volker explained that most lenses used wide open will cause some flare and loss of definition, expecially in the blacks. The combination of *Chem-Tone* and the Zeiss Fast Lenses seemed like the perfect marriage. "We shot right into the headlights of a car and could see the detail in the car's grille!" The blacks stay velvet black, yet there is amazing shadow detail.

Volker had taken only half his footage to TVC. The other half he took unprocessed on a trip to Germany to see how the European technology compared with that of TVC. The footage was given to one of the top labs in Germany. They were told that the footage was two stops under and they were to develop it and make the best print they could. How did the German print come out? "I would be ashamed to show it. It was terrible compared to what I get from Danny (TVC)."

What about the quality of *Chem-Tone* at the one and two-stop pushes? "Except for a pro lab man who is constantly inspecting prints, the first push from 125 to 250 ASA is almost unnoticeable. I would challenge anybody, even a cameraman, to distinguish between the normal process and *Chem-Tone* Push One. At the second stop push, however, I think a lot of people could tell that the film was pushed."

Volker would not hesitate at all to use the *Chem-Tone* Push One when extra speed was necessary. "I would use it (Push One) like an extra stop on my lens." The two-stop push would require some deliberation.

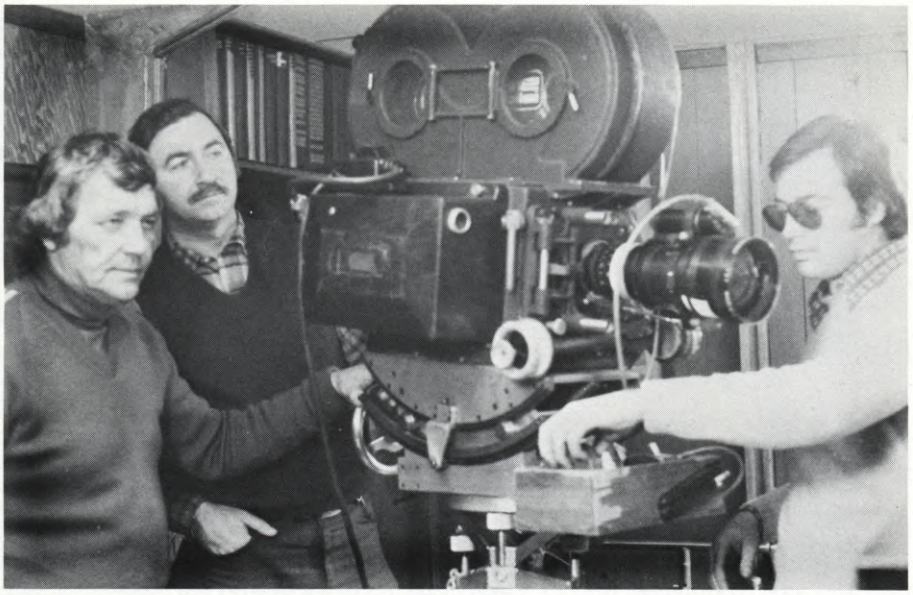
Volker, Jack and Sol seemed to be most impressed with *Chem-Tone* at the higher speeds. Andrew Laszlo, ASC, is even more impressed with *Chem-Tone* at the normal 125 ASA. "To me the ability of the film to be pushed without the usual penalties is not the most important aspect of the *Chem-Tone* process. Number one with me is the overall quality of the 'look'."

Andrew Laszlo had just completed shooting "COUNTDOWN AT KOSSINI" on location in Africa. The entire feature was shot with *Chem-Tone.*

"I think this film in Africa was the most severe test the *Chem-Tone* process has seen 'til now, simply because the African sun is so much more intense than the sunlight in the states. Combine this with predominantly black actors and you have quite a challenge as far as contrast is concerned."

Picture a dim interior with black actors and large open windows with the blazing African sun outside. "It is a large order for any cinematographer to pump enough light into the faces to balance the bright daylight that is coming through the windows. With the use of *Chem-Tone,* we were able to not only hold onto the details in the faces and the interior of the room, but maintain details of the exterior to such an extent that it didn't look burnt out at all. It increases latitude tremendously.

"In another scene Greg Morris comes through this dark alley that is totally in the shade. He then come into this bright sunlit courtyard, plays part of the scene, and then, in the same take continues to walk to a table under a roof that is again totally shaded. Normally you'd be hard pressed to do this because you would have to pump enough booster light into the shaded area so he would not disappear in the shade or be overexposed in the sun. We didn't have to do that — we didn't have to correct in any way. We didn't play with the iris, or the shutter or add lights. So, in one take we went from deep shade to bright direct sunlight



Director of Photography Jack Priestley, Operator Sol Negrin, ASC, and Assistant Cameraman James Contner, shown preparing to shoot a scene with BNCR camera for "STRIKE FORCE", filmed inside an actual New York Police Department office on City Island. It was claimed that, aided by Chem-Tone, they could keep lighting in such locations simple and move in and out fast.

and back into deep shade and the *Chem-Tone* evened it up!"

What does Laszlo like best about *Chem-Tone*? "Those aspects that give you a little extension as an artist, as opposed to a little extension as a technician." Even though he stresses the artistic qualities of normal *Chem-Tone,* he admits that *Chem-Tone* at the higher speeds can prove helpful.

"One day we had to shoot an interior without any lights. Outisde it was raining and overcast, about an f/4.5 light. Inside there was no measurable light and the actors were all black. I shot it 'as is' with no lights and sent it to the lab. I couldn't even tell them how much to push it because I couldn't read the light accurately. I would estimate I was 4 to 5 stops under.

"Because I really didn't expect the scene to be usable, I reshot the scene with lighting. As it is, the *unlit* version will be used in the film. The unlit version was so much better. This is where the *Chem-Tone* is such an outstanding tool. Before *Chem-Tone* you could not realistically reproduce natural lighting."

Probably the greatest plaudit for *Chem-Tone* came from cinematographer Mike Butler. Mike has used *Chem-Tone* on almost all his recent films, including "HARRY AND TONTO" and "92 IN THE SHADE". He feels that *Chem-Tone* is such an important tool that he has a clause in all his contracts that guarantees his right to use TVC *Chem-Tone* processing. He agrees with Andrew Laszlo. "I use it inside, outside, day, night — doesn't matter; if flattens it all out and keeps everything within the limits of the film."

All the cinematographers stressed how *Chem-Tone* "digs into the shadows" or "brings out shadow detail." Isn't this similar to flashing? Mike Butler: "The effect of *Chem-Tone* is similar to post or pre-flashing in that it reaches down into the heel of the exposure curve, but without the undesirable side effects. When you pre or post-flash you get a slight white haze: you won't keep the contrast in your blacks at all. The *Chem-Tone* doesn't have this side effect. It is visually superior to flashing — reaches into the shadows, increases latitude, but without the washed-out haze. Flashing is done by percentages — it's difficult to be accurate and consistent. *Chem-Tone,* on the other hand, is a chemical process and a lot easier to control."

Andrew Laszlo: "I don't like to post-flash or pre-flash. I can depend on very consistent performance with *Chem-Tone.* I expose the film, send it to the lab and I know what I'm going to get back — which is not always the case with flashing. Mechanically the *Chem-Tone* is no different from normal processing. It passes through the processor and comes out the other end ready for printing. The point is, once the negative is exposed, I don't want to play with it, especially if I'm in Africa. I don't want to find out three weeks later that the flashing didn't come out exactly as I expected or the negative got scratched in the process or something happened during the extra handling."

Jack Priestley: "The end result is similar to flashing but I think the *Chem-Tone* digs into the shadows more than flashing. It seems to bring up the shadows by more than a full stop. Flashing also mutes the colors more than *Chem-Tone.* With *Chem-Tone* you don't have to take any chances — you know what you're going to get. With flashing you could be picking up static marks or scratches (in the extra handling of the second exposure) and you don't know if you're getting a true value from every roll."

Even if the flashing technique were executed perfectly?

"I still prefer the *Chem-Tone* process; the 'look' is better; I really think the 'look' is fantastic." ■

(LEFT) Cinematographer Priestley discusses with "STRIKE FORCE" Director Barry Shear an upcoming scene involving a suitcase full of money. (RIGHT) Priestley takes a meter reading while preparing to shoot inside the New York Police Dept. office. Of Chem-Tone he says: "The end result is similar to flashing, but I think the Chem-Tone digs into the shadows more than flashing. It seems to bring up the shadows by more than a full stop. Flashing also mutes the colors more than Chem-Tone does."

VARIABLE-HUE STEREO
Continued from Page 1019

For the Exhibitor — there will be a conversion kit required for each projector, in order that color sound tracks may be played. We visualize two conversions — one for monophonic and one for multichannel sound. A theatre with only a single-sound channel would use a mono adapter; a theatre equipped with stereo or quad amplifiers and speakers would use a multi-channel adapter, which will also play mono sound.

Either of these adapters will be an easy, modular replacement of the present optical photocell unit. As to price, we anticipate that the multi-channel conversion could be available for about $300 to $400 per projector. The monophonic conversion we estimate at about $75 to $100 per projector. These are one-time costs, and once the color kit is installed, both black-and-white and color prints can be played.

We had planned to demonstrate variable-hue sound here at FILM 75, despite the many strange, derogatory rumors and assertions about our system that have come to me from here in London. One of these assertions, namely, that whatever was demonstrated at FILM 75 would be the best that variable-hue sound could ever be, troubled me very much. And because we are still two to three months away from commercial-prototype hardware, I had no choice but to cancel the demonstration.

I want to thank John Mosely for his kindness in reading this paper by Pete Vlahos and myself. John knows our variable-hue system and understands its capabilities. Both Pete and I regret that time will not permit us the pleasure of being with you here today. But we do intend to bring the variable-hue system to London later this year, when we can demonstrate it with commercial-prototype hardware and an appropriate selection of program material. ■

PART II
By PETRO VLAHOS

The Association of Motion Picture and Television Producers (AMPTP) is concerned with the technological aspects as well as with other aspects of motion picture production. The Motion Picture and Television Research Center is the technological arm of the AMPTP. One of the ongoing objectives of the Research Center is to utilize new technology in order to reduce cost and to improve the quality of the motion-picture image and sound.

The Research Center has long been aware of the need for better quality in motion-picture sound. The problem, however, is not one of technology alone; it also involves economics. If it were not for costs, high-quality sound could be obtained by releasing all pictures in the six-track 70mm format, or in the four-track, magnetic 35mm format.

The real problem was to find a way to duplicate the performance of the high-quality multi-channel magnetic tracks, while retaining the simplicity and low cost of the photographic track.

There was no question that the photographic track is the least expensive way of applying sound to a motion picture print. Experience has shown that the photographic track requires a minimum of maintenance in the theatre.

Assuming that a theatre has a good sound system, a new clean 35mm print, properly printed and processed, can produce excellent sound. Of course these are ideal conditions.

Unfortunately, photographic film is a soft, plastic material that is easily scratched; and like most plastics, it attracts dirt particles. As the film continues through many runnings, the dirt and scratches continue to accumulate and may reach a level that competes with the dialog. Since dirt and scratches both alter the transmission of light through the film, they represent modulation and are transmitted as noise. When a scratch has removed a bit of the emulsion in the sound track area, the scratch becomes a permanent part of the track's modulation. It might as well have been part of the original recording because it varies the amount of light transmitted to the photocell.

Obviously, if one were to record noise upon the sound track at high level, and over most of the audio spectrum, then noise is what one will reproduce. Unlike low-level grain or tape-hiss, there is no way that any of the noise-reduction schemes can operate on this type of noise. Photographic tracks are unique in this respect.

It became apparent that if a noise-immune photographic track was to exist, its modulation must operate on some new principle in which variations in the amount of transmitted light do not represent modulation. As one begins to examine alternative methods of modulation, it is almost obvious that one would consider digital schemes, a variety of pulse-width techniques, frequency modulation, phase modulation, coincidence logic schemes and even holography. Each possible scheme differs in its complexity and cost. There is one inescapable conclusion however: if one is to achieve a major improvement in sound recording and reproduction, *something* must change. What had to be done was to find a method that requires the least amount of change, and at the least cost that would accomplish the objective. We believe our objective has been met by employing hue-modulation.

Most pictures today are released on color film. With the introduction of the multi-layer color film systems, the sound track presented a problem. Exciter lamps and photo-cells used in motion picture projectors operate primarily with infrared radiation. Color film dyes, although they may appear to be visually black, are quite transparent to infrared. It therefore became necessary either to change the photocells in theatres, or to make the sound track opaque to infrared by adding metalic silver, which is opaque to both the visible and infrared wavelengths. The latter solution was adopted, and laboratories were required to go through the extra operations required to put silver into the sound-track area. The unique property of color film was not used. That unique property is the ability of controlling density essentially independently in the three regions of the visual spectrum; namely, red, green and blue. By varying the relative ratio of these density regions, all colors of the spectrum may be recorded and reproduced.

If one considers a blue sky being projected onto the theatre screen, it is apparent that even if half the frame were covered up or cut away, the half that still remained would still be blue. Further, it wouldn't matter if the projection light was turned up or down, the particular shade of blue remains the same.

It was therefore recognized that a sound track could be devised in which the modulation consisted only of a change of color. If the photocell could be made to read only the color of the track without regard to the amount of track present, or without regard to the amount of light transmitted by the track, then it would be immune to such effects as dirt, scratches, exciter-lamp hum, etc.

Since color film divides the visual spectrum into three components, any pair offers an axis for modulation. Furthermore any pair, in conjunction with the remaining color, offers another modulation axis. Theoretically, a hue-modulated track could use any one of the following six axes: red to green, red

Continued on Page 1075

In the drawing room of Coolmaine Castle, in Ireland, the Willoughby family poses for a Christmas portrait. The group includes the four Willoughby children (Christopher, Stephen, David and Catherine), Bob's jolly mother-in-law, Quig, Bob and his wife, Dorothy and (at right) the furry members of the clan, Jings and Polly.

(LEFT) In his home town of Hollywood, Bob Willoughby was for 20 "Platinum Years" a member of that very small and elite corps of "special" still photographers who were called in to shoot exceptional photographic layouts behind the scenes of the biggest pictures made by the major studios. During the 1950's and 60's, the collapse of the studio system, the emergency of the independently-produced film, the rise of television and the gradual demise of the large-circulation national magazines created a much smaller demand for such special photography. Moving his family to Ireland two years ago, Willoughby still accepts unusual photographic assignments, but spends much time refurbishing his magnificent estate and translating ancient Irish poetry for an upcoming book he will illustrate with his own photographs.

(LEFT) Bob Willoughby, who has taken quite naturally to the role of the Irish country squire (though a native of Hollywood), strolls outside the walls of Coolmaine Castle. (RIGHT) Inside the courtyard of the Castle, which is located on a picturesque bay in the County Cork countryside. The Willoughbys have carefully preserved and restored the Castle's ancient exterior, and have refurbished the interior in beautiful taste, while adding all the conveniences of a modern American home.

two years since he and the clan split from Malibu Canyon for the Emerald Isle.

Ultimately, in the open country, we turn into an avenue of tall trees, at the end of which is a stone wall-enclosed fiefdom with the towers of Coolmaine Castle rising above it. The rambling stone edifice fronts on a beautiful bay of the Atlantic, and it is surrounded by 36 acres of lush land — one of those places you dream about.

Then I am in the midst of a whole pack of Willoughbys — four absolutely super kids (ranging in age from about eight to fifteen), Bob's lovely wife, Dorothy, and her mother, Quig, a wonderfully droll Scottish lady with a mischievous twinkle in her eye. There are also a couple of dogs that are real characters.

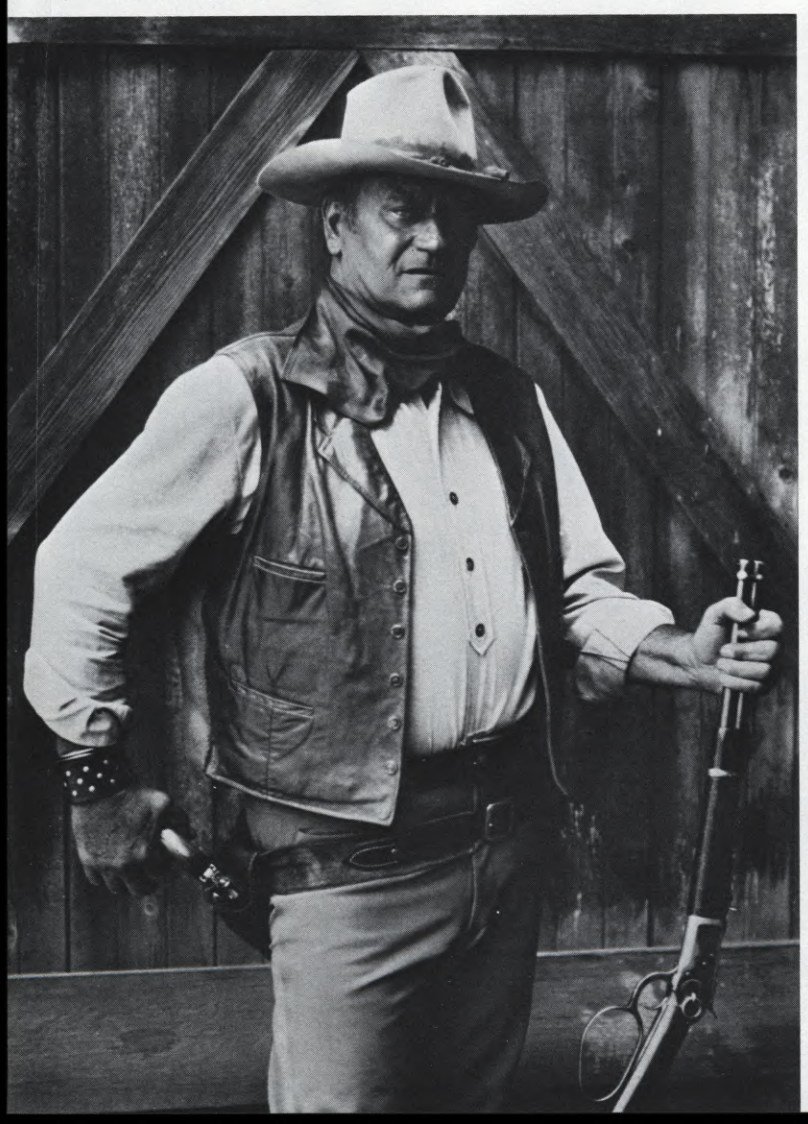
Coolmaine Castle is a stately stone manor house built around a walled courtyard. It has towers and castellated "battlements" and all of the other standard castle accoutrements, but the Willoughbys have spent the past two years turning it into a most comfortable home. They have carefully restored the antique charm of the exterior — erecting a scaffold and, with their own hands, chipping off the plaster applied by a former brutish owner to cover up the magnificent stonework. The interior has been refurbished with warmth and in excellent taste. The woodwork, which had been painted a ghastly white, has been painstakingly restored to its natural wood grain elegance. The period charm of the interior has been preserved, but all the comforts of a modern American home have been unobtrusively added — such amenities as central heating (an horrendous project of installation!), modern bathrooms and an all-electric kitchen (with an extra wood-burning stove for nostalgia and back-up). The decor is enhanced with works of modern and primitive art collected from all over the world.

The kids love the idea of living in a castle — and so do I. There are "secret" tower rooms and all sorts of fascinating nooks and crannies. Malibu was never like this! Above all, there is space, with each of the children having his or her own suite and several spacious playrooms scattered about the place.

Bob has a beautifully set up study and darkroom and has taken to the country squire role without missing a

"THE GRADUATE"

"THE COWBOYS"



"THEY SHOOT HORSES, DON'T THEY?"

beat. The Hollywood of which he was so much a part for so many years has changed drastically. The major studios, for the most part, have become bases of operation for independent production. The demise of such national magazines as *LOOK* and *LIFE* has narrowed the market for his very special kind of photography, but he still keeps his hand in, accepting the occasional photographic assignments that intrigue him. Mostly, though, he'd rather stay close to Coolmaine Castle (and who can blame him?), where he can work on his books and finish getting the place into the shape he wants it to be in. It's a great lifestyle.

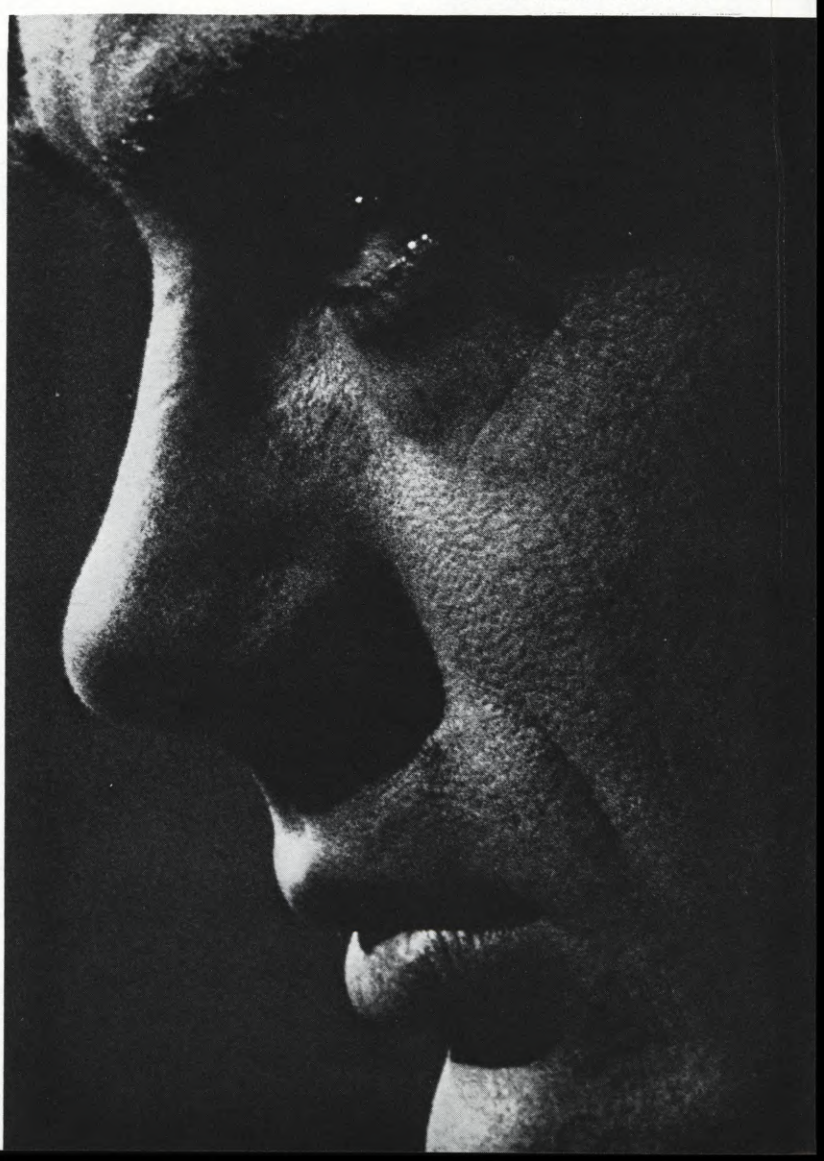
My stay at Coolmaine Castle, alas, is all too short, for I must move on to other climes and countries, but before I take my leave of this lovely place and its delightful inhabitants Bob and I have a chance to talk — and our conversation runs something like this:

QUESTION: Bob, tell me a little bit about "THE PLATINUM YEARS". How and why did it evolve?

WILLOUGHBY: It was a project that some of the people at Ridge Press in New York worked out — they being "fans" of mine, which is nice to know at

Continued on Page 1099

"REBEL WITHOUT A CAUSE"



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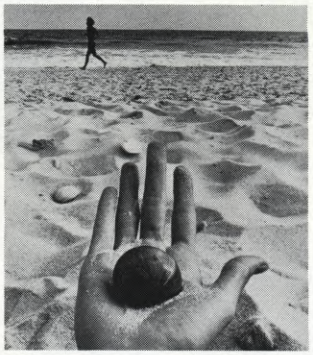

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VARIABLE-HUE STEREO
Continued from Page 1069

to blue, blue to green, red to cyan (blue-green), green to magenta (blue-red), and blue to yellow (green-red).

As a practical matter, the dyes used in color film are not as perfect as one might desire, and as a consequence one dye may offer density or cross-talk in some other color region. It has been found that of the six possibilities, only the red/cyan axis offers equally large spectral windows essentially free of cross-talk. Our original tests employed the red/green axis, but we have recently moved to the red/cyan axis and gained 6db in signal level.

Any color may be expressed in terms of its additive primary components. It may be measured or identified by photocells that compare the relative values of these components. Red/cyan (blue-green) modulation is demodulated by simply using two photocells, one reading the red component and the other cell reading the cyan component. Their difference is determined either by feeding the cells to a differential amplifier or simply into a push-pull input transformer.

Conceptually, hue-modulation is a modulation of the dominant wavelength. On a red/cyan axis, 100% modulation swings the dominant wavelength from 500 nanometers (cyan) to 650 nanometers (red). At the positive and negative excursion-peaks represented by 100% modulation, the track is all cyan for one peak, and all red for the other peak. At lesser levels of modulation, the dominant wavelength swings over a lesser wavelength range.

As one examines the hardware, two photocells feeding a push-pull input transformer represents a push-pull system. Push-pull photographic systems were used by the motion picture industry for original dialogue and music recording before the advent of magnetic tape. Those familiar with these early push-pull systems will realize that they were essentially free of cross-modulation distortion and of second-harmonic distortion. The push-pull input also offered high common-mode rejection for such common-mode inputs as an unblooped splice, or exciter-lamp hum.

The virtue of the hue-modulation is that the two halves of the push-pull system are fully superimposed; the red and cyan layers are not side-by-side, but one is directly over the other. Therefore all inputs except hue changes are common-mode inputs and are cancelled. Scratches and dirt particles increase or decrease transmission to both cells simultaneously, and

are therefore cancelled. Even exciter-lamp hum is cancelled.

(At an early demonstration of the hue-modulation principle at an SMPTE conference in Los Angeles, the exciter lamp was powered by raw A-C.)

The degree of cancellation is a function of color fringing provided by the scratch or dirt particle. Even on a makeshift breadboard of the photocell assembly, we have consistently achieved a 30db rejection of dirt and scratch noise, and an even greater rejection of negative print-through noise.

Since noise rejection of this magnitude is possible, it is also possible to reduce the width of the sound track. We have been working with three side-by-side tracks to provide three discrete, independent, sound channels. However, before tying-off the system we will evaluate the need for four-track and five-track discrete-channel systems. There are some pictures that would benefit from a four or five-channel system. The extra channels add very little to the cost. (This evaluation is now in progress, and should be completed well before the SMPTE conference to be held in Los Angeles in September.)

The progress of the development of the hue-modulation system is determined in part by the progress of its components. One of those components is a new recorder. Such a recorder is being developed by Westrex. At this time, our test recordings are reproducing a frequency range from 20 to 20,000 Hz. For motion picture usage, it is quite likely that studios will limit the response to about 15 kHz because this is about the upper limit of present theatre loudspeakers. We do not believe that the 20 kHz capability is likely to be used until theatre equipment is upgraded.

As the recorder development proceeds, we are simultaneously developing the conversion kit for the reproducer. One of the problems that had to be solved was a kit that would work with both types of sound scanning systems. On front-scanning systems, the slit is formed at the film plane. On rear-scanning systems, the slit is placed at the photocell.

The solution to this problem is a photocell conversion kit containing two silicon chips. One for color and the other for variable-area tracks. The projectionist simply throws a switch depending upon the type of track furnished. This function can be performed automatically for automated theatres. It is obviously essential to retain the capability of playing variable-area tracks because of the vast library

of films that exists. This dual capability is built into the kit.

The light from the track enters this kit at one end. At the point where light enters is an adjustable slit. For front-scan systems, the slit is opened wide since a slit is already formed at the film plane. For rear-scan systems the adjustable slit is set to its scanning height.

Perhaps the most unique feature of the photocell/optics kit is its use of a diffraction grating arranged in a Littrow configuration. This is a reflex system for separating the colors and directing them to their individual cells. Because it is a reflex system, orientation of the photocell/optics assembly does not change the location or position of the color pattern or track placement upon the photocells. This feature will be especially appreciated by the installer. His only adjustment is to position a single lens so that the track disappears into the slot on the face of the photocell enclosure.

The other half of the kit is a preamplifier to accommodate the push-pull input signal. Two versions of this preamplifier are planned to satisfy both monophonic and multi-channel theatre installations. In the monophonic version, all tracks are summed at the input so as to result in a monophonic reproduction. However, all other features such as wide-range response and noise-immunity are retained.

Realizing that the small theatre probably has the least money to spend, the monophonic kit is kept as inexpensive as possible and it may cost less than $100. The multi-channel kit will cost a bit more, but even for a multi-channel system the estimated cost is still about $300, depending on inflation and production volume.

We regret that complete performance data are not available at this time. Except for frequency response, any other data would be rather meaningless. Because, as we begin the transition from makeshift equipment to properly manufactured equipment we discover, to our delight, that we gain in signal level and in dynamic range at each step. At this point we do not know whether our final signal-to-noise will be 60db or 70db.

This paper has been presented for publication in the SMPTE Journal. A follow-up paper will be submitted as soon as test and performance data are complete. Unfortunately, one cannot always complete a development program to coincide with the date of a conference, even when one makes an effort to do so. We regret that for this reason, we are unable to demonstrate the system at FILM '75. ■

FILM '75 IN LONDON
Continued from Page 1017

completion in the near future of a new HMI 200-watt lamp ideal for portable battery-operated luminaires.

Another paper of special interest was one entitled "A Multi-Channel Hue-Modulated Sound Track" by Petro Vlahos (Motion picture & Television Research Center, Hollywood, USA), which chronicles the development of an optical multiple-channel sound track relatively immune to the effects of dirt and scratches. Three-to-six individual tracks may, therefore, be fitted into the standard track width with very good signal-to-noise characteristics.

The presentation that really boggled the minds of those attending the conference (and which became the main conversation piece) was that entitled "A New Concept in Stabilizing Hand-held Cameras" by Edmund DiGiulio (Cinema Products Corporation, Los Angeles, U.S.A.).

There was no paper, as such, on this device, because, as Mr. DiGiulio explained, he was not yet free to discuss certain as yet unprotected proprietary aspects of the device. However, as Confucius said, "one picture is worth 10,000 words", and it was the filmed demonstrations of what this develop-

ment will do that stunned the FILM '75 audience.

In one film clip the camera seems to float smoothly in space as it goes right along with a young woman running fast up and down a long exterior flight of steps. In other clips, the camera follows people running over hill and dale and the effect is that of an ultra-smooth helicopter-mounted camera flying over rough terrain at eye level.

An extra demonstration was raw footage shot by Haskell Wexler, ASC for a Keds commercial, in which very energetic teenagers run in fast random movements, again up and down stairs, with the camera "floating" alongside them. It became obvious that this development is no mere gimmick, but is, instead, a major advance that could have a very significant impact on future film-making.

As far as the Equipment Exhibition was concerned, as previously stated, there were more products on display than ever before. While relatively few of these items were absolutely new (in the "premiere presentation" sense) there were enough pieces being shown for the first time to make it an interesting show, and several such devices and accessories are treated in detail elsewhere in these pages.

In the camera category, General Camera Corporation's new TGX-16 created the greatest stir. While it had actually been "premiered" last fall at the 116th SMPTE Conference in Toronto, FILM '75 marked its European debut and the company's president, Dick DiBona, was kept busy demonstrating this "space-age" gem and answering questions about it.

Bach-Auricon, Inc. displayed two new versions of its famous camera — the "Whisper-Quiet" Cine Voice 400 and the crystal-sync cordless Auricon Pro 400, both with rear-mounted 400-foot magazines.

On display, also, was the handsome Arriflex 16SR camera, this time actually having gone into production. Cinema Products' ubiquitous CP-16 was present, with the latest in its seemingly endless list of advanced accessories.

The one really new and tremendously important item in the entire Exhibition was the displayed prototype of the new Ianiro "flicker-free" square wave ballast for HMI lighting.

As constant readers of this publication are well aware, the film lighting industry has been wrestling for the past few years with the problem of getting the flicker out of metal halide lighting — under any and all conditions of frame-rate and shutter angle — so that the tremendous advantages promised by this mode of lighting might

be available to cinematographers "without tears".

Up until now the solution to that thorny problem has eluded all of the great minds at work on it. That being the case, the announcement at FILM '75 by the Ianiro people that they had achieved this long-awaited major breakthrough was greeted by reactions ranging from almost religious awe to cautious skepticism.

The only way to settle the question, I suggested, was for a comprehensive series of tests of the new ballast to be made by an objective technician who would spare no pains to give it a thorough shakedown. Mr. Giovanni Ianiro and his good right hand, Mr. Mario De Sisti, readily agreed and also accepted with alacrity my suggestion that David Samuelson, Technical Director of Samuelson Film Service Ltd., be the one to conduct the tests.

Mr. Samuelson, who has been doing exhaustive research into HMI lighting, very kindly consented to run the series of tests. I agreed that once the tests were completed, I would go to Rome — after a couple of weeks back in Hollywood to get the magazine out — in order to help evaluate the tests and complete documentation of this most significant breakthrough. Hopefully, Mr. Samuelson would be able to be in Rome at the same time in order to add to whatever might be indicated by his tests.

And so it stands at this moment. In the next (October 1975) issue of *American Cinematographer,* readers will receive a comprehensive and fully objective report on the Ianiro square wave "flicker-free" ballast for HMI lighting.

Back to FILM '75 and the wind-up of what was a most rewarding, if hectic, week. The final social affair of this biennial event is always the black-tie Gala Banquet held on the Friday evening. This year the Royal Lancaster's Nine Kings Suite was literally filled to overflowing, as an extra hundred people were packed into the great hall. Although very crowded, the affair turned out most successfully.

BKSTS President Harry Manley introduced the Guest of Honor, Lord Harlech, a gentleman intimately acquainted with the film and television industries, a fact which his excellent speech reflected.

The affair ended "in a blaze of glory" with entertainment of the Old Time Music Hall variety by talented artists from the Players Theatre.

An innovative postlude to FILM '75 was the "Flea Market" held for the first time on the morning after at the Royal Lancaster Hotel. People brought items

of motion picture and TV equipment they wanted to sell or swap and a brisk business was carried on. Everything from slate chalk to Mitchell BNC's appeared on the stands, changing hands in a sort of genteel Portobello Road atmosphere.

It is always interesting to look back at an event like FILM '75 and try to sum it up with some kind of objective perspective. I think that David Samuelson hit the nail squarely on the head when he said: "The week started off very well for me on an international note with a meeting in London of the UNIATEC Bureau, a committee of the various vice presidents of this technical society, each representing a different country. It struck me that this meeting, although entirely unrelated to FILM '75, represented a microcosm of what the event really stands for and why it is so important.

"An event like FILM '75 forcefully underlines the fact that every two years London becomes the crossroads where film and television technologists meet together in a most productive and rewarding sort of way. This year, for example, there were almost 1,300 delegates from roughly 50 countries. It was wonderful to be able to come into contact with opposite numbers from abroad and, for a week, continually exchange ideas with them on a very intimate basis.

"An event like this differs greatly from *Photokina,* for instance, because, while most of these people and many more are present in Cologne, *Photokina* is so vast that you never really see people as often as you do in London. They become lost in the crowd.

"FILM '75 was larger than its predecessors and, indeed, many people commented that the Royal Lancaster Hotel was no longer capable of coping with the crowd. However, we in the BKSTS feel that it is of paramount importance to be able to house the papers program, the equipment exhibition, the banquet facilities and many of the guests themselves under one roof. We feel that if any one of these elements were to be lost to a different location, the entire impact of these events would be diminished."

I agree. Speaking as only one of the 90-odd (with accent on the "odd") Americans present at FILM '75, I can honestly say that, crowded though it was, the entire affair was pervaded by a camaraderie and a spirit of friendly cooperation that transcended all national boundaries and was a lovely thing to experience.

The United Nations might well take a lesson from FILM '75.

HERB A. LIGHTMAN

Continued from Page 1037

minutes, including installation into the aircraft. With a dovetail plate screwed onto the base of the camera which is then slid onto the pan and tilt assembly — minor adjustments made to correct the camera for balance—and the aerial filming package is ready to go.

Speed of assembly and the simplicity of installation, these then are the keynotes of the SKYMOUNT. This has led to its popularity amongst cameramen and helicopter operators alike. On some documentary shoots it is often the case where the production company has acquired the services of a helicopter for little or no payment, particularly if the aircraft is of military origin; so the low-cost SKYMOUNT is the more attractive to the production company on a cost-concious basis. The cameraman is naturally happier also not to do the shooting hand-held.

The SKYMOUNT has no electronic zoom control system. It was felt at the time that it would be impossible to make universal the literally hundreds of combinations of plugs and sockets, bearing in mind the differing cameras and zoom motors. After all, the primary aim was to make the SKYMOUNT attractive to the smaller production company and their cameramen who wished to use their *own* camera rather than a specially-rigged one which came with the mounting. A number of these cameramen possess their own favorite zoom control which they are able to tape onto the handgrips of the pan assembly.

It is generally acknowledged that successful aerial camerawork is mostly due to a sympathetic pilot, given good weather conditions. A pilot tuned in to the requirements of the cameraman and his shot will really be 75% responsible for its success — or failure. The other 25% will be up to the cameraman and his equipment. The SKYMOUNT will be making life that much easier for him as he goes about making the minor corrections to the shot.

The SKYMOUNT has proved itself an able tool and continuing development is in progress to improve the lot of the aerial cameraman and his cost-concious production company.

The SKYMOUNT is naturally a firm favorite with co-designer/cameraman Tony Coggans. An experienced aerial cameraman, he has put the SKYMOUNT to good use on a large number of assignments. His favorite helicopter pilot, Mike Smith, who has had years of experience with aerial filming, appreciates the ease of setting up the SKY-

MOUNT and the fantastic reliability during shooting.

Some facts about SKYMOUNT: It will accept just about every pro movie camera up to around 28 pounds (13kgs) including of course the smaller type of TV video camera. The Arriflex 35 IIc requires the addition of a flat base to swing the motor out to the side. Initially offered on a hire or long-term contract rental basis in the U.K.—SKY-MOUNT is being made available for sale to enable the smaller user to benefit from its low-cost, lightweight aspects.

Specifications:

Cameras accepted on mount	All, up to 28 lbs (13 kgs.)
Construction	High strength aluminium alloy black anodised. Pan & tilt assembly on twin ball race. (Fluid pan & tilt to special order).
All up weight as installed in aircraft (excluding camera weight)	35 lbs (16 kgs.)
Weight in transit case (shipping weight)	60 lbs (28 kgs.)
Case dimensions	36 x 20 x 14 inches. (91 x 50 x 36 cms.)

For further information contact: Coggans and Wilson, Attention of Mervyn Wilson, 5 Harwood Close, Tewin. Welwyn. Herts. England. Tel: Tewin 686 ■

HOT RESTRIKE CSI

Continued from Page 1040

FLICKER

Normal Settings

The low ripple content of Thorn CSI lamps enables good results to be obtained at normal settings (24 fps and 173° shutter or 25 fps and 180° shutter) without the need for precise control of either the camera speed or the supply frequency. For 60Hz supplies the settings are 24 fps and 144° shutter, 25 fps and 150° shutter).

Special Control Gear Units

Special control gear units based on "square wave" or on high-frequency operation are under development which should allow flicker-free filming at any camera speed or shutter angle in normal use.

These units are not yet generally available and, in the meantime, good results can be obtained at other than normal settings using standard control gear operated from single-phase or 3-phase supplies.

For tables detailing frame-rate and shutter angle combinations at which CSI and HMI lights can be utilized for flicker-free operation, see "THE LIGHT WHICH GIVES THE MOST LUMENS PER WATT", *American Cinematographer,* June 1975.

Further information pertaining to the new hot restrike CSI lamps may be obtained by contacting: Thorn Lighting Limited; Thorn House; Upper St. Martin's Lane; London WC2H 9FD; 01-836 2444. ■

COOKE VARO-KINETAL

Continued from Page 1041

price. Its aperture is constant at f/2.2 and T/2.5.

Currently, Rank Optics is developing a version for the television industry for use with the new breed of lightweight portable cameras.

At FILM '75 Rank Optics also showed for the first time in the UK its new 10:1 motion picture zoom lens, the Cine Varotal. The lens is designed for shooting 35mm film either on location or in a studio but particularly for long range shooting at 250mm. Like all Taylor Hobson lenses, the Cine Varotal holds focus throughout its zoom range of 25-250mm.

Two versions of the established Cooke Varotal, one for 16mm filming and the other for 35mm, were also shown.

For further information: Keith Walker; Grafton Public Relations; 20 Berkeley Street; London W.1.; 01-629 8090 ■

FILM *IS* DIFFERENT

Continued from Page 1025

There is ample recent demonstration of the proven methods of production using the two media. For example, of the four comedy series nominated for "Emmy" television awards in the United States this year, three were recorded on film and only one on tape. Of the five drama series nominated, four were on film; of the eight limited or special drama or comedy programs nominated, only two were on tape. But all of the programs nominated in the comedy/variety or music series or specials, were recorded on tape.

Similarly, of some 150 individual dramatic and documentary programs which were sold by the Canadian Broadcasting Corporation to broadcasting organisations around the world in this past year, only two were on tape — the rest were recorded on film.

These examples, it seems to me, are indicative of the acceptance, the proven ability of each medium to meet the specific needs of certain types of presentation. There are, of course, overlap areas, and these are likely to become more pronounced, placing greater pressure on producers, as the technology of the electronic method of production improves, bringing with it perhaps increased time and cost savings.

The Only Criteria

In spite of some of the biases which may be either perceived or imagined in many of my remarks, I am not *against* any medium which will provide a better or more meaningful service to the needs of television. I am completely *for* videotape and *for* film, provided they satisfactorily fill those needs. We should not forget that the image we transmit to our viewers is simply a source of information. The viewer does not know, and I am sure he does not care, whether the picture he sees was recorded on tape or on film, or on a piece of string . . . the only criteria are the content and the quality of the picture and sound.

To this end, electronic engineers are hard at work developing all sorts of wonderful new processes — processes of which some of us in the film end of the business can only vaguely grasp even the meaning.

At the same time, people in the film industry are also developing smaller, lightweight, more sophisticated equipment, faster, finer-grained and higher-definition films. These are the tools with which the horizons of the art will be expanded and the quality of the prod-

uct will be improved to serve the public, whether in movie theatres or on the television screen.

Fundamental Differences

It is being argued that the gap between film and electronic productions is rapidly and inevitably narrowing. This is only partly true. We must be on guard against the general acceptance of such statements, for there are, and for the next few years at least, there will continue to be, fundamental differences in the methods and modes of production practicability. For example, would you really want to take electronic cameras and recorders into the jungles of Africa or South America, or into the middle of the Sahara, or to the Arctic or Antarctic? I wouldn't, if there were a film camera available.

Television is a capital-oriented occupation with incredible deadlines and enormous program output. All involved with it are constantly striving for higher efficiency to minimise the problems that affect the time scale. To this end huge investments have been made — and many written off — by companies attempting to devise computer-assisted editing machines which will, with equal ease, handle film or videotape — and presumably any other image-storing medium. Several are in varying stages of development, and some are now on the market, but it will likely be some time before a commercially-viable device is perfected.

As we today rush headlong along the paths of technological development toward the end of the century let us not forget that Michelangelo probably would not have painted better pictures today than he did more than four hundred years ago — in spite of the unbelievable, unheard-of technological advances during these intervening years. But his equipment and materials would have cost him a lot more . . .

Two Distinct Art Forms

I would also note that the Canada Council — an organisation created almost twenty years ago to, among other things, foster and promote the production of works in the arts, humanities and social sciences — recently stated its position on film and videotape as follows. I quote: "It should be noted that in earlier projections and formulation of policy, film and video programs were discussed as being combined, even though council was well aware of the uniqueness of both media. The fact is that film and video remain two distinct art forms and our plan for the future is on the basis that each will reach a stage of satisfactory

development independent of the other . . .

I think *this* is the philosophy which should be guiding our thinking today. We must be aware of the need to interface the capital-intensive electronic system with what used to be called the labor-intensive film system.

Film *is* different — not only in the material, technological sense, not only because its time-honored methods of use are still valued by many of the world's most respected program-makers, not only, to quote its detractors, because it is slower and more costly to use than videotape, but also because it is better able, in many cases, to contribute more to the creative processes of program-making than its exotic new electronic rival. To say this must not be construed as detracting from the value, the impact, of the uses being made of the new technology — it, too, is different. And we must ensure, during this period of adjustment, that both are allowed to develop their potential to the ultimate benefit of the communications industry . . .

Healthy competition will make sure the technology is available, but it is the creative possibilities of both media which must be kept constantly in mind even when we are being forced to take into account those over-riding considerations of time and cost. ■

DOLBY STEREO TRACKS

Continued from Page 1033

In addition to stereo optical playback capability, the CP100 also employs its equalization circuitry when other film formats are being played. The unit contains comprehensive provision for the playback of conventional optical tracks and, when required, magnetic stripe.

Additionally, the unit contains a non-sync capability, so that tapes and records can be played back in the auditorium in high fidelity while using the existing theatre loudspeaker units.

The unit represents a simple one-time cost if the theatre already has three suitable power amplifiers and loudspeakers.

The CP100 Cinema Processor consists of a 19-inch main frame, into which the modules listed below are plugged in two levels.

Upper Level

(1) **Stereo optical playback module,** incorporating amplifiers and changeover functions for two projectors.
(2) **Standby stereo optical playback module,** identical to (1), selected by the changeover module in the case of failure of the main module.
(3) **Changeover module,** which incorporates the projector changeover logic.
(4)-(8) **Meter modules,** to check and calibrate internal signal levels.
(9) **Non-sync module,** with inputs for two stereo sources and also for a p.a. microphone.
(10) **Six-channel ganged fader,** electronically controlled and remotable.
(11) **Local control module** for setting volume levels in the auditorium, selecting film format, and also providing a monitoring control for booth loudspeakers.

Lower level (beneath a swing panel)

(12) **Noise reduction modules.** These are the standard Dolby A-Type noise reduction modules (Cat. 22) of which over 20,000 are currently in service worldwide.
(13) **Equalization modules** which have been specifically designed for theatre reproduction and consist of 27 filter bands together with upper and lower frequency tone controls.
(14) **Mono/Stereo optical format module** with logic circuit to ensure stable centre-screen dialogue.
(15) Space for two further **format modules,** allowing the acceptance of magnetic inputs, or for processing of any other cinema format.

(16) **Facilities module,** allowing for local or remote control of projector changeover, fader control, and format selection. This module incorporates a bypass key to remove the complete unit from the signal path in case of failure, giving immediate restoration of sound to the auditorium.

DOLBY CP100 SPECIFICATIONS

Layout
Unitary chassis, containing all necessary modules for playback of stereo optical tracks, including pre-amplifiers, noise reduction modules and cinema equalization modules. Also contains non-sync inputs module and control and facilities modules, providing full signal selection and processing from projector to the input of existing power amplifiers. Extra (optional) modules plug into pre-wired frame allowing full replay of 4 or 6 channel magnetic tracks, or for other cinema sound-track formats.

Signal connections
Standard screw-type terminal blocks for signal channels and remote facilities. Solder-tag fanning strip supplied for each terminal block.

Signal inputs
a) Optical pre-amplifier designed for stereo solar cell (current source)
b) Magnetic tracks. 10 K ohm input impedance, requiring 300 mV for Dolby Level.
c) Non-sync sources. Two switchable stereo channels provided, input impedance 10 K ohm, 500 mV max sensitivity. Also input for public address microphone, input impedance 2 K ohms.

Signal outputs
Six output channels, 30 ohm output impedance. Will drive any load impedance from 200 ohms upwards. Maximum output level + 23 dB into bridging load, + 22 dBm into 600 ohms. Typical operating level 1.23 V, + 4 dB for Dolby Level, giving 18 dB overload margin.

Noise reduction
Dolby A-Type professional characteristics providing 10 dB of noise reduction from 30 Hz to 5 kHz, rising to 15 dB at 15 kHz. Two Dolby Cat. 22 modules supplied for stereo optical, with provision for third plug-in module for magnetic formats.

Noise level
With local fader control set at 7 (10dB from maximum), output level of + 4 dB (1.23 V), and NR switched off, noise on outputs in optical mode is typically — 65 dB (20 Hz — 20 kHz), or — 70 dB CCIR/ARM weighted, referenced to

Dolby Level (Test Tone).

Cross-talk
Better than 40 dB between channels at 10 kHz.

Remote facilities
Facilities provided for remote operation of
a) Fader
b) Projector change-over
c) Full remote control of a) and b) and mode/format selection by remote control units, one per projector.
Automation facilities built-in (some programmers may require simple relay interface); functions switched by applying an earth (ground) to appropriate function terminal on rear of unit.

Stability
System is highly stable and does not require alignment after installation.

Ambient operating temperature
Up to 40 C.

Construction
Plug-in modules throughout, accessible through front panel. Fibreglass printed circuits, solid state devices throughout. Precision cast aluminium frame with steel panels, black stoved textured finish. Front panel stove enamelled red with white characters.

Size
267 x 493 mm rack mounting (10½ in x 19 in). Maximum projection behind mounting surface: 280 mm (11 in). Maximum projection in front of mounting surface: 25 mm (1 in) excluding handles, which project 50 mm (2 in).

Weight
16.5 kg (36 lbs).

Power requirements
Units are designed for operation from centrally switched power source (power cable provided). Unit requires 105-130 V or 210-260 V, 50-60 Hz single phase, 50 VA.

Fuse requirements
20 mm standard size, 1 A slow blow for 115 V, 0.5 A slow blow for 230 V supplies.

For further information, contact DOLBY LABORATORIES INC. at either of the addresses below:

1133 Avenue of the Americas
New York NY 10036
Telephone (212) 489-6652
Telex 125797
Cables Dolbylabs New York

346 Clapham Road
London SW9
Telephone 01-720 1111
Telex 919109
Cables Dolbylabs London ■

HAND-HELD TV CAMERAS
Continued from Page 1021

fixed wide angle. The viewfinder needs to be switchable for both hand-held or tripod use or replaceable. The tripod viewfinder should be physically not much bigger than the hand-held one. A 3" viewfinder is a reasonable size. There should be suitable fitted carrying handles and provision for standing the camera upright on the floor. The zoom and focus controls should be motorized and be available in two locations. The first when the camera is being carried and operated and the second when it is on a tripod. The cable between the camera head and back-pack should be light and fitted with very good plugs and sockets. Cameras have been known to be carried by the cable before now. The camera must be able to accept normal talkback facilities and also allow for microphone lines. The weight of the camera plus lens must be as light as possible but well balanced. The back-pack again, if carried by the cameraman, must balance out. If it is carried by a separate person the balance will have to be different.

The design of hand-held cameras seems to be in the state that monochrome cameras were in 1960. The old cameras which had been designed for the operator had been replaced by the new transistorised cameras. These cameras were smaller but were difficult to operate. They sold very well in some markets but the next generation changed back with the operator in mind. I hope the third generation portable cameras will progress in the same way . . .

. . . We are designing a single portable unit with simple facilities. This will be carried in an estate car, on site a simple unit is brought out on a sack barrow containing all the technical equipment. This will enable the director to work alongside the camera if he so wishes. The Lighting Director and Programme Director can view the output of the camera on a high quality monitor as the shots are being recorded. This unit will not replace the two-camera unit, but will be in addition. This we hope will help directors who prefer film cameras to try a video camera for their inserts. Because it is a self-contained unit it will be able to work on location where perhaps the other units cannot get to.

I would like to thank Peter Cazaly, Production Controller, for permission to give this lecture. I would also like to thank Gordon Williams, Outside Broadcast Supervisor, and Phil Tweedy, Outside Broadcast Senior Engineer, for their help and enthusiasm for the whole hand-held project. ■

DELNOCTA SYSTEM
Continued from Page 1053

minimum light level used with normal registration equipment.

- For film- or photocamera standard fine grain films of 200 ASA can be used.

Delnocta: takes cinematography beyond the conventional limits of filming

The total possibilities of application of the Delnocta are as yet unexplored. Its capability to film at extremely low light levels occurring on a moonless night opens up entirely new opportunities for the cinematographer. So far, the Delnocta has successfully been used for filming in the following fields:

- Newsreels for television broadcasts
- Cinematography within the framework of criminal investigations by the police, customs, border patrols, airport security systems, etc.
- Scientific applications such as the study of the nocturnal behaviour of animals
- Electron-microscopy: for filming faint phenomena during bacteriological or other microscopic research of micro-organisms, metal and nuclear research, etc.
- Motion analysis in combination with sensitive industrial TV cameras
- Poorly lit sporting events in stadiums such as football games and other sports having general public interest
- Underwater registration of poorly lit scenes
- Registration of soft x-ray diffraction patterns.

For further information, contact: N.V. OPTISCHE INDUSTRIE "DE OUDE DELFT", Delft, Holland. ■

CINEMA WORKSHOP
Continued from Page 996

The "safe title area" represents a worst-case situation for home receiver over-scan. The viewer may not notice a slight cropping of action, but he will certainly spot a couple of letters missing from his favorite actor's name.

In a nutshell, action within the "safe action area" will appear on most TV receivers, and action within the "safe title area" will appear on all but the most outrageously misadjusted receivers. The cinematographer must take these croppings into account when composing. A TV "safe action" ground glass would certainly be beneficial. ■

SONDOR LIBRA
Continued from Page 1057

- Foolproof logic system controlled by touch buttons.
- Synchronizes with mains, crystal, pilotone or any Sondor pulse generator, and will drive any number of Libra or other Sondor models in synchronism.
- 5-millisecond start time.
- Three tracks to EBU standard 3098, with built-in monitor speakers.
- Symmetric and asymmetric line inputs and outputs, plus three microphone inputs.
- Twin sliding faders and electronic VU meters (with and without limiting).
- Full remote control.
- Use on table, in console or in 19" rack.

Further information on the new Sondor Libra MO-3 16mm magnetic sound dubbing equipment may be obtained from: THE INTERCRAFT CORPORATION, 225 Park Avenue S., New York, N.Y. 10003, Telephone: (212) 260-2150, Cable: Intercraft New York, Telex: ITT 421856 KEM UI.

For those who wish a more technical analysis of the Sondor Libra equipment, the following short paper, originally presented by Mr. W. Hungerbuehler of Sondor at the International TV Symposium in Montreux, Switzerland, in May, 1975, may be of interest:

"SONDOR LIBRA" — A New Philosophy in Magnetic Film Recording

Magnetic film, the so-called "magnetic tape with sprocket holes", is the medium to record and replay sound in synchronism with film (or with videotape).

It still is by far the most simple way to record, edit and replay video and matching audio by using two identical tapes: picture film and magnetic sound-film. No alternative method has been found really to compete with this traditional operation technique.

Whereas in a film camera or in a projector the film is advanced intermittently, the magnetic film has to be fed past the heads as steadily as possible.

There are two possible ways of doing this: the first is to advance the tape by means of a projector-interlocked sprocket-wheel, where, through the interaction of complicated filtering and damping devices, the movement of the tape is transformed into a continuous one.

As a second possibility a continuously driven tape drive can be used, such as a capstan-drive. But in this instance

complicated electronic circuits are required in order to process the control signals and to adapt correctly the drive speed of the tape to such control signals.

A sprocket wheel mechanism, in contrast to the continuously driven tape drive, has the advantage that the control signals can be directly used for the feed movement. On the other hand, the continuously driven tape feed has the advantage of providing continuous movement of the tape.

The SONDOR LIBRA combines the advantages just mentioned of the non-continuous functioning or even step-wise functioning sprocket wheel with the continuous functioning band or tape drives, without having to take into account the drawbacks associated therewith.

Fig. 1 schematically shows the principle of the new SONDOR LIBRA tape drive, whereby the magnetic film (1) is fed from the feed reel (2). We can see a spring roller (3), a smoothing roller (4), the magnetic heads (5), the capstan drive (6, 7, 8), the sprocket wheel (13), another spring roller (14) and the take-up reel.

Fig. 2 shows more precisely the main drive components: capstan motor (7,16), rubber roller (8) and its activating electromagnet (13) against the sprocket wheel on the shaft of the SONDOR coincidence stepper motor (21). In the middle the servo control is shown, whereby the sensor roller (9) transmits any speed difference between capstan drive and sprocket wheel drive to the potentiometer (19) which controls the speed of the capstan motor (16).

The method of operation is as follows: The sprocket wheel motor is fed with control signals from a shaft encoder, a pilotone signal from a camera or any other source, and so drives the magnetic film in slip-free sync with this source, so film and sound are in sync. The movement of the tape at the sprocket wheel is far from being smooth.

The capstan motor at that time runs at about normal speed, the rubber roller is not engaged.

As soon as the sprocket wheel rotates at normal speed, let's say 25 frames a second +/- 10%, the capstan roller will engage and smoothly drive the tape along the heads and so achieve good wow and flutter figures. The accuracy of the servo control lies within half a frame and may be watched by means of an optical mark on the tape deck.

Above and below the normal speed the capstan is disengaged, so the magnetic film is driven only by the

sprocket wheel.

It is quite obvious that no more mechanical filters, dampers and flywheels are needed and, hence, it appears that for the first time a very simple lacing path can be realised with a magnetic film deck. In fact, with one only manual movement the tape track is opened and so the tape may just be dropped in. Final lacing is done automatically at the moment of starting the equipment.

Considerable saving in mechanics have made it possible to realise a complete new electronic design, taking advantage of the latest technology and using many of the sophisticated components offered these days.

Styling is a matter of personal ideas. SONDOR styling has won some international awards. But the main purpose of styling is to help the user, to facilitate operation, to make the handling and understanding of an equipment as easy as possible.

The LIBRA control panel integrates all operation controls in 120 cm².

Five only push-buttons offer an unbelievably wide range of operations including variable speed control and automatic fast return to zero.

To the right we find the sound control part, the keyed record controls, electronic VU-meter, faders for two microphone inputs, and switches for line or microphone inputs, with or without limiter.

Red filtered gallium arsenide displays show the exact mode of operation and the elapsed time in 1/2 second.

The control panel may be unplugged and so can be used for local and remote control.

The head assembly is composed of 3 individually plugged heads; the heads conforming to the latest EBU-standard 3098 for two identical 4 mm sound tracks and one cue track on 16 mm magnetic film.

The SONDOR MO3 LIBRA is ready to accept tapes of up to 230 mm of i.e. 1/2 hour of standard polyester film or one full hour with the new, specially manufactured 50 μ SONDOR-magnetic-film.

Symmetric and asymmetric inputs and outputs, 3 microphone inputs, 3 monitor amplifiers — each with its own speaker, mains/crystal/pilot- or SONDOR-pulse-controlled operation, up to 10 times normal speed, rock 'n roll operation — fast return to zero also to drive in sync any number of additional LIBRAs or other SONDOR recorders, fast spooling forward and reverse 30 times speed without unlacing, electronic film metering. These and many more features offered at an unbelievably low price. ■

WHAT'S NEW
Continued from Page 988

formance of much-higher priced horizontal editing tables.

— Sliding Magnetic Head Assemblies permit sync "tuning" plus or minus twelve frames while running at sound speed.
— The AC Synchronous Motor Drive produces intelligible sound and accurate program timing.
— Roller Outriggers on each sprocket wheel assist with removal and return of film to the synchronizer sprockets.
— Differential Rewind Adapters allow the editor to move one strand rapidly and independently of the other when the bench is used in the two-strand mode.

A single-system magnetic head is available as an accessory. The new Editing Benches are now available for delivery.

For further information, write Super8 Sound, Inc., 95 Harvey Street, Cambridge, Mass. 02140. A complete catalog of Super-8 production equipment is available for $1.

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AGFA-GEVAERT INTRODUCES GEVACHROME II TO U.S. TV FILM INDUSTRY

Agfa-Gevaert, Inc. has announced the introduction of its new Gevachrome II 16mm color reversal system designed specifically to meet the cost, quality and rapid processing demands of the U. S. TV newsreel and production film industry.

The new Gevachrome II color reversal system consists of three camera films, one print film, and a rapid processing unit with newly designed ferricyanide regeneration component.

In announcing Gevachrome's introduction, Robert A. M. Coppenrath, president, Agfa-Gevaert, Inc., said, "We deliberately withheld announcing Gevachrome II's availability until the system had been thoroughly tested under actual working conditions at a TV station in the United States.

"After three months of extensive use by the staff of WDAU-TV, the CBS affiliate in Scranton, Pennsylvania, the station's management told us they were pleased with all components of our new 16mm color reversal system."

"It lived up to our expectations in all aspects of local station news coverage and studio commercial production . . . cost, location coverage, flexibility, speed of processing and color stability, and quality of transmitted picture,"

Jack Scanella, WDAU-TV's chief cameraman said.

According to Coppenrath, the Gevachrome II 710 and 720 films were created to meet the demand for television newsreel films which had high film speeds and good force processing capabilities.

Gevachrome II 710 has an ASA of 125, is balanced for a color temperature of 3,200 Kelvin, and can be force processed two stops. The 720 has an ASA of 125, is balanced for daylight illumination with a color temperature of 6,000 Kelvin. It can also be force processed two stops. The Gevachrome "S" 700 has an 80 ASA film-speed, and is balanced for tungsten illumination and has a 3,200 Kelvin color temperature. The 700 was developed for documentaries, series and commercials where picture quality rather than film speed and force processing had top priority.

The total wet time for the Gevachrome II with its new rapid processing system is 16 minutes, 15 seconds at 25° C. Depending on machine characteristics, minor time-adjustments may be necessary, according to David Kronick, manager, Agfa-Gevaert's Industrial products III.

"To force process one stop, the first developer time is increased to four minutes from three, with all other processing times remaining the same. In the two stop forcing process the processing machine speed is reduced by one-third and time is adjusted accordingly," Kronick said.

As part of the Gevachrome II system, Agfa-Gevaert's research and development department designed a new electrolytic method of regenerating ferricyanide bleaches, which are considered pollutants. The function of the Agfa-Gaevert component is to reduce ferrocyanide into ferricyanide. And, according to tests, it reduces the ferrocyanide concentration of the machine effluents to a level below all existing standards of effluent discharge legislation.

"The systems are being marketed by Agfa-Gevaert's Industrial Products III division," Kronick concluded.

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VERSATILE QUESTAR TELESCOPES WITH ACCESSORIES DESCRIBED FOR WIDE USE IN ASTRONOMY, PHOTOGRAPHY, INDUSTRY, EDUCATION

The versatile family of lightweight, precision-made QUESTAR telescopes with accessories that permit wide use in

astronomy, education, industry, nature study and photography are illustrated and described in a new, nine page catalog and price sheet recently issued by QUESTAR, New Hope, Pa. Attachments for the world-famous portable observatories make them applicable for: sky, nature and industrial viewing and telephoto, motion picture and regular photography; teaching tools in schools and colleges; laser tracking; rocket-borne instrumentation; closed-circuit television; site testing; observing hot materials; quality control and many other applications, as described.

Prices for the various QUESTAR models are given together with the prices for the extensive list of accessories.

Request your free copy of this informative catalog from QUESTAR, Route 202, New Hope, Pa. 18939. ■

NOTED CINEMATOGRAPHER KENT WAKEFORD TO SPEAK AT SMPTE/PMPEA'S "HANDS-ON" EQUIPMENT DEMONSTRATION

Joseph N. Tawil, President of the Professional Motion Picture Equipment Association (PMPEA), is pleased to announce that Kent Wakeford, renowned Director of Photography of MEAN STREETS and ALICE DOESN'T LIVE HERE ANYMORE (both directed by Martin Scorsese), will be one of the key speakers at the special "hands-on" equipment demonstration scheduled to take place on the last day of the forthcoming SMPTE Fall Conference.

Planned and organized by the PMPEA under the sponsorship of the Society of Motion Picture and Television Engineers, this exciting special event will take place on one of the giant 20th Century-Fox sound stages on October 3, 1975, from 10 AM to 2 PM.

SMPTE conference participants and members of the film industry in the Los Angeles area who attend the session will have the unique opportunity to listen to and observe Kent Wakeford and some of Hollywood's best known cinematographers, gaffers and drips, as they demonstrate the latest professional motion picture equipment as it is used under actual film production conditions. There will be ample time for participants to ask questions and to operate the equipment on the set.

The 117th SMPTE Conference, scheduled for September 28 through October 3, 1975, at the Century Plaza Hotel in Los Angeles, promises to be most exciting and informative, with more than 100 major exhibits of the latest equipment on display, and scores of important technical papers by outstanding technicians reporting current developments in their field.

"THE PLATINUM YEARS"

Continued from Page 1072

this advanced age. They thought it would be a great thing to compile a volume of some of my photographs that had disappeared so quickly in the magazines. After a week they were gone and no one saw them again.

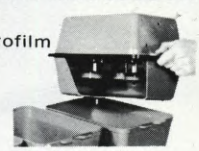
I was in Paris working on Blake Edwards' picture, "THE TAMARIND SEED", when I got a telephone call asking: "How would you like to do it and how long would it take you to put it together?" I was very excited at the prospect, but I hadn't printed pictures for about 15 years because I'd always had a lab man to do my printing in Hollywood. Happily, I'd built a darkroom into the castle here, so I went back and tried my hand after all those years.

QUESTION: What was your reaction to going through all those photographs — especially the ones that you'd shot quite a few years ago?

WILLOUGHBY: Well, it really was a lot of work, for one thing. Usually, when you're working on a film, you sort of edit your shots as you go. Then you go on to your next film and you don't see anything of the shots from that previous film again. So it really was an incredible experience for me to look into the files and go over the context and the color and re-edit material that I hadn't seen, in some cases, for 10, 15 or 20 years. I found myself going back in time — looking at pictures, looking at people, recalling many incidents that had escaped my memory. It was really nostalgia time for me, here in Ireland, going back and looking at those Hollywood pictures. It was truly a trip all in itself.

QUESTION: Did the photographs seem different to you now — in comparison, that is, to how they seemed when you shot them?

WILLOUGHBY: Yes. It was strange to edit things that I had forgotten — pictures that I had printed, and had not actually seen — including some that I had really liked. It was then that I truly started getting enthused about the project. It wasn't just rehashing; I was looking at the material with a fresh perspective. You know, your taste changes over 15 years. Things that I had not printed 15 years ago I now looked at and said: "Gee, that's a beautiful picture!" It reinforced my feeling that I had produced not only a lot of pictures, but some good ones at the same time. It was good for my ego at that



point, having been away from taking pictures for at least a year. It made me feel very good. It was an ego trip — a boost.

QUESTION: How many photographs did you submit to the editors for "THE PLATINUM YEARS"?

WILLOUGHBY: I would say — counting the black-and-white prints and the color transparencies — about 2,000. Out of that they pulled about 200 and some odd pictures. I would say that the editing was beautifully done — and the art direction is superb.

QUESTION: In other words, you're happy with the way the book ended up. Is that right?

WILLOUGHBY: I would say, generally, that I couldn't be anything else. The important fact is that at least my children will see what father was doing all those years. They don't happen to have issues of LOOK magazine easily available, or all those other magazines that have gone down the tubes. This way, some of my work is codified — and I'm very grateful for that.

QUESTION: Do you plan to do any more books?

WILLOUGHBY: Yes, I do have a few more books that I'm working on now. One of them is a book on women, called "METAMORPHOSIS". That's already completed and in New York. There's another on early Irish poetry, called "VOICES FROM ANCIENT IRELAND" that's currently in production. At least half of it has been completed. Then there are a couple of others that are just in the thinking stage. God knows, I could do another half-dozen movie books, if anyone would ask. There's certainly enough material. They touched on only 20 films, I think, in "THE PLATINUM YEARS". There are another 30 which, if anyone were interested, I would be very happy to work on. ■

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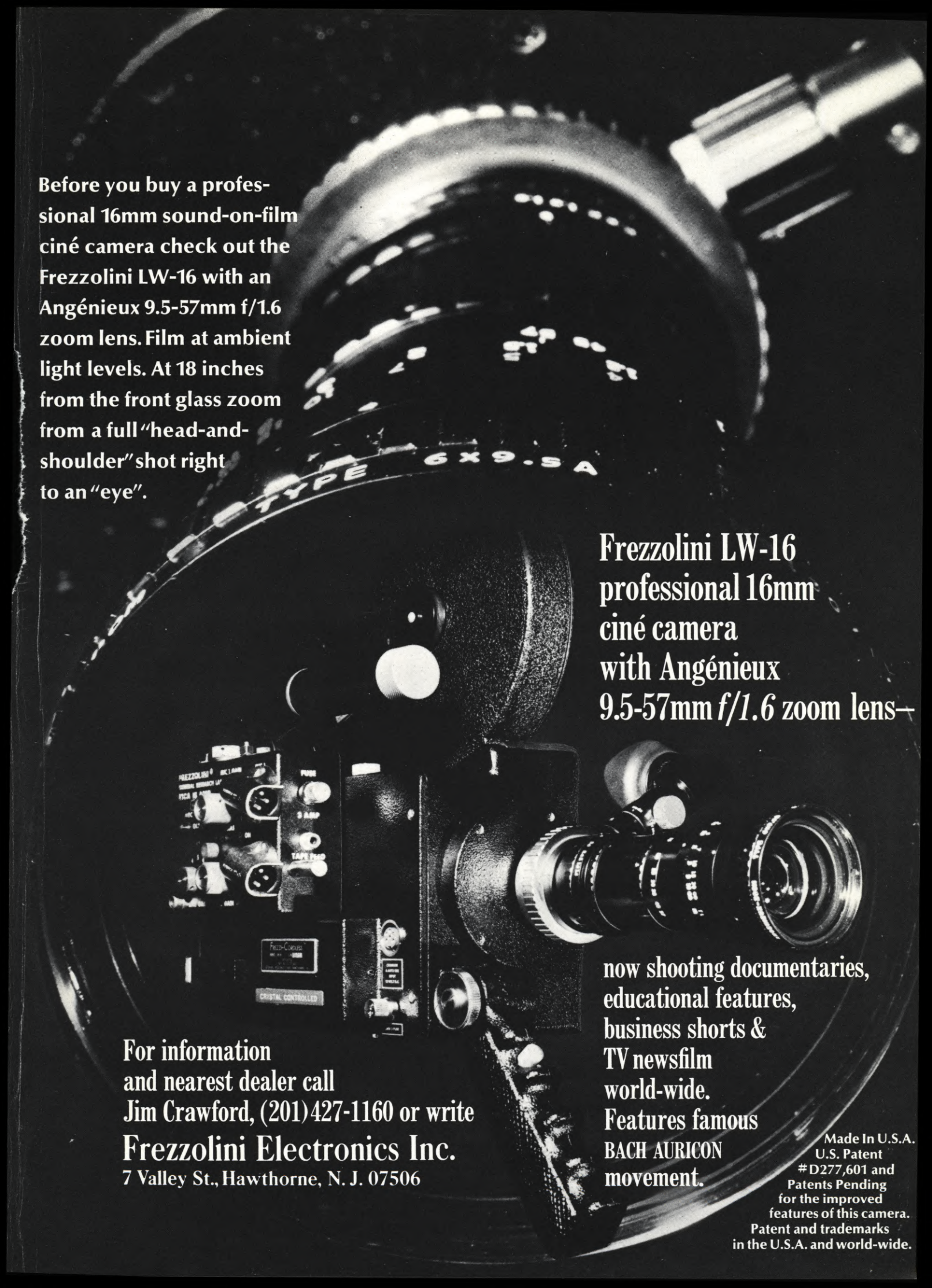

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