JULY 1970

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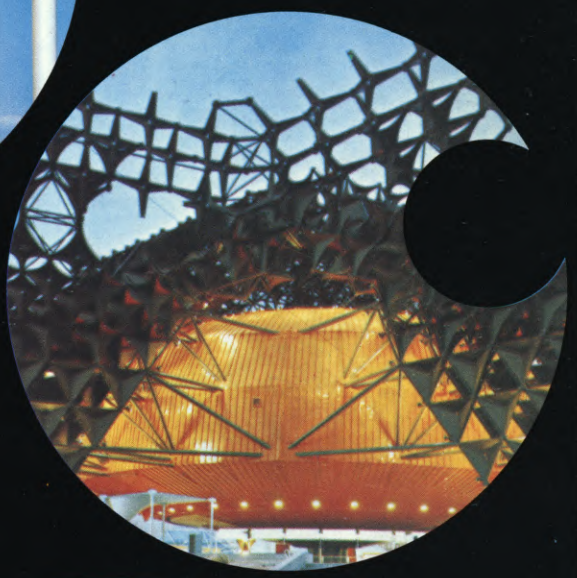
AMERICAN Cinematographer

International Journal of Motion Picture Photography and Production Techniques



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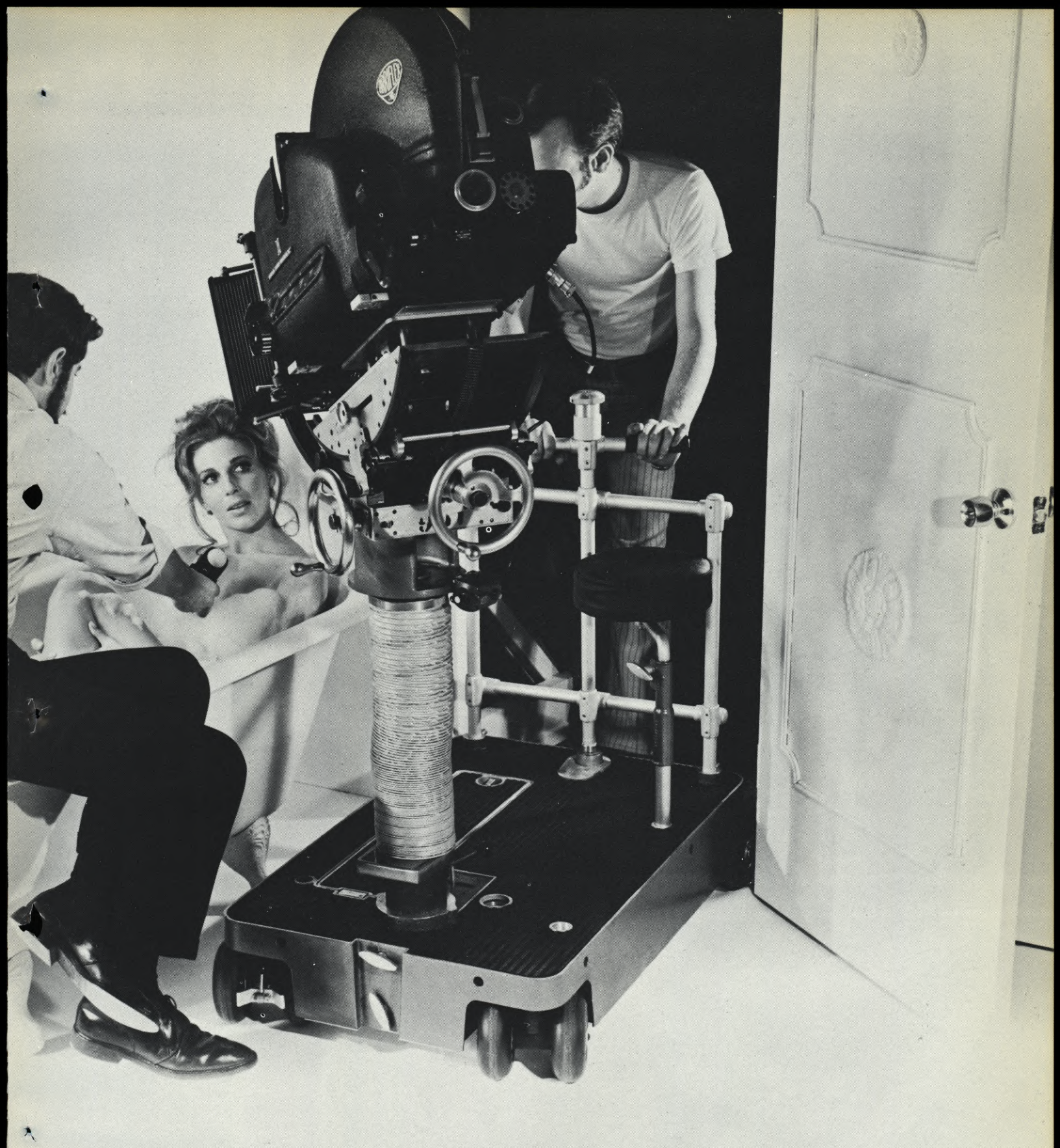

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• FEATURE ARTICLES

ON THE COVER: The official stylized Cherry Blossom emblem of EXPO '70 serves as a "window" through which are seen five of the more architecturally spectacular pavilions at this greatest of World Expositions. The red circle in the center symbolizes the host country, Japan. Cover design by Don Record.

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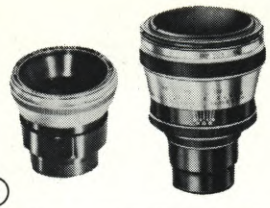

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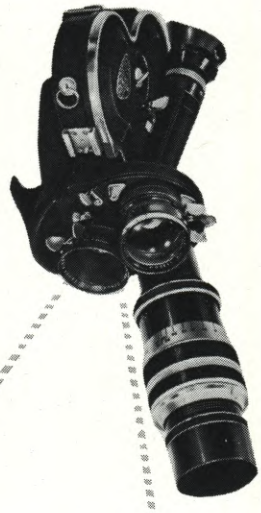

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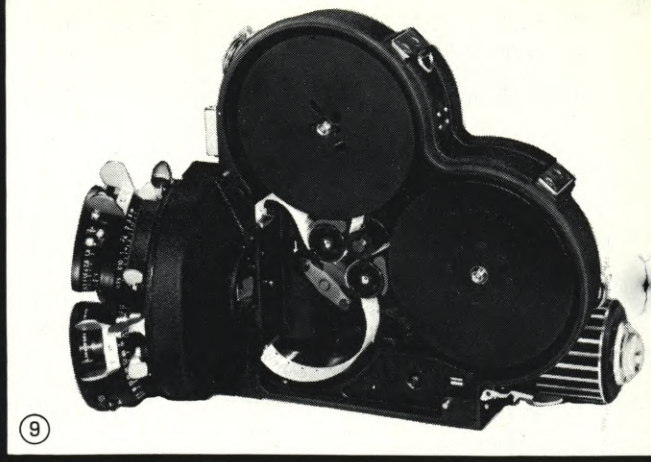

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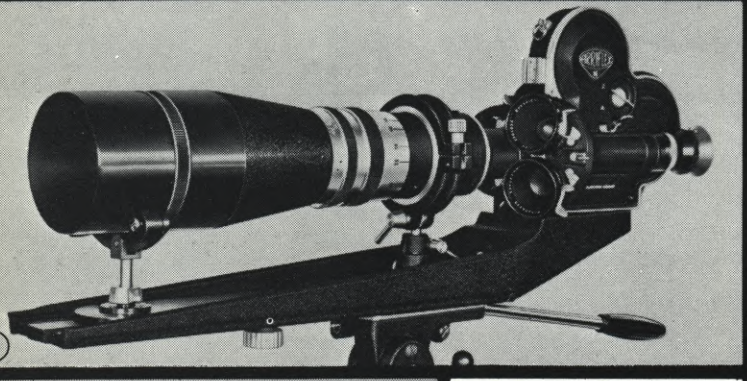

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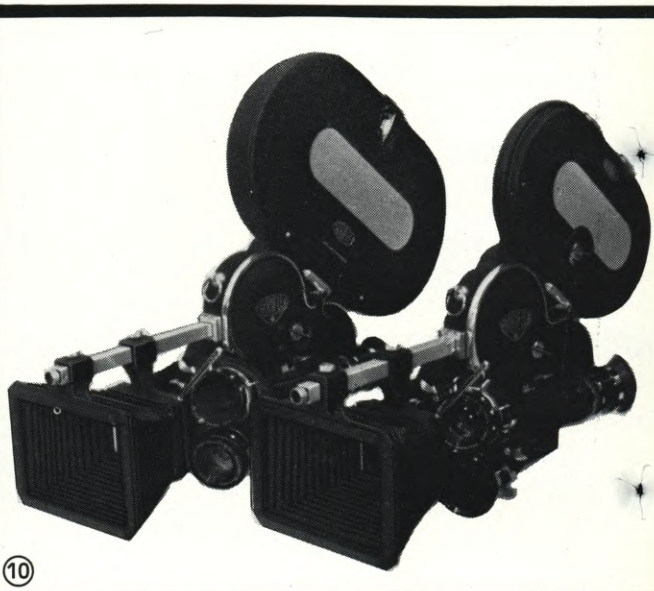

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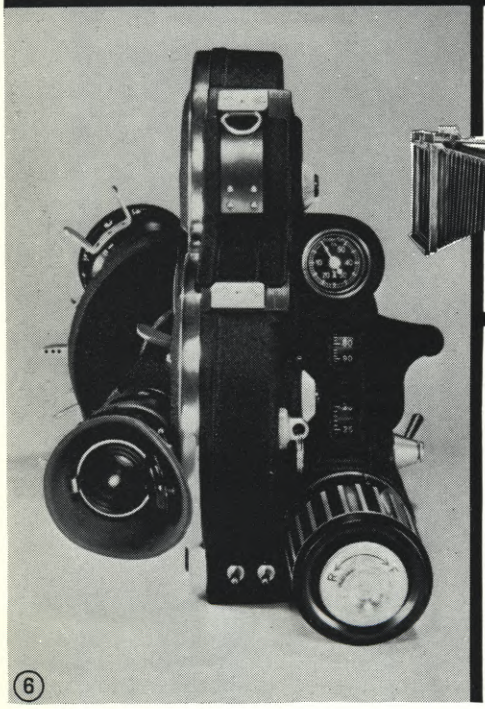

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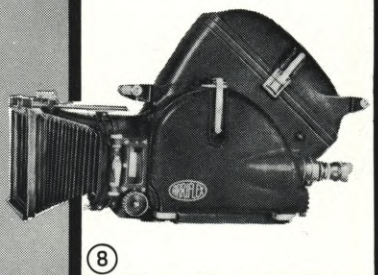

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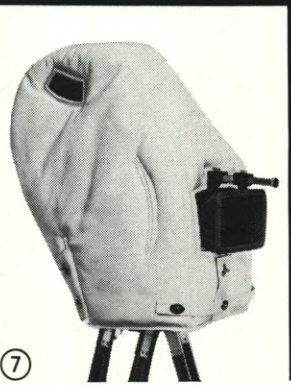

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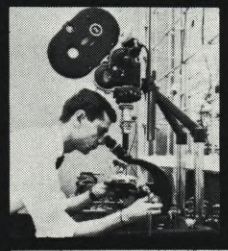

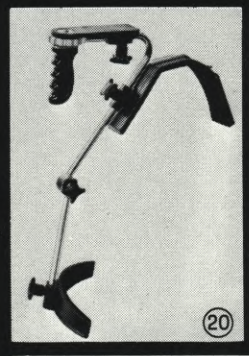

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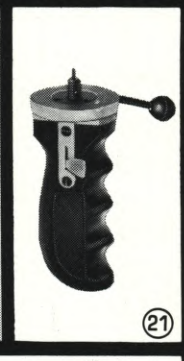

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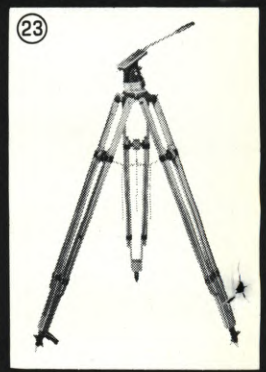

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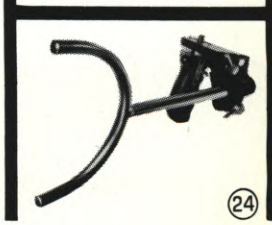

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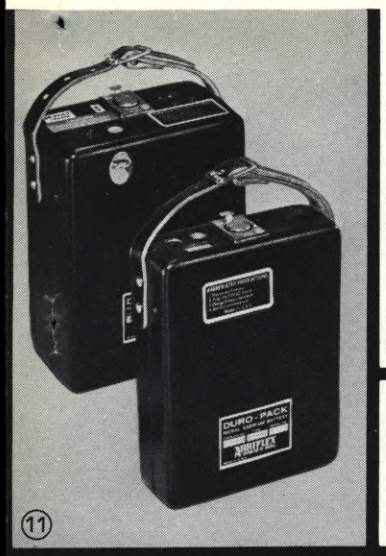

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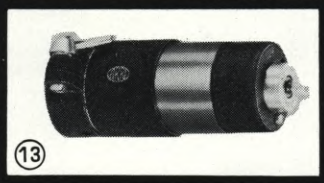

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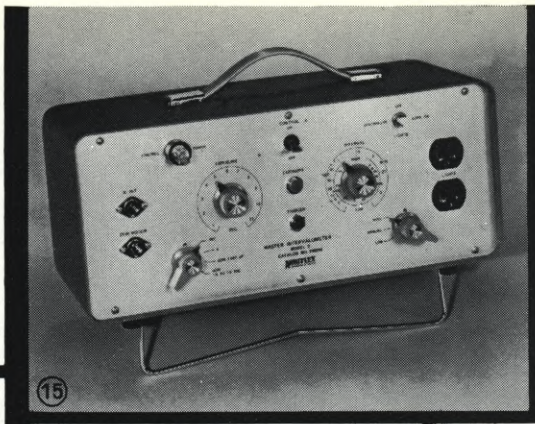

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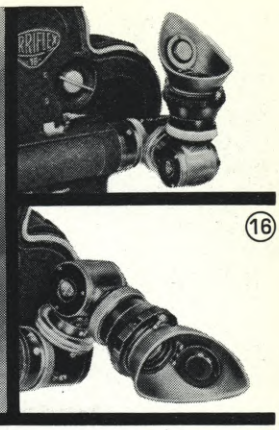

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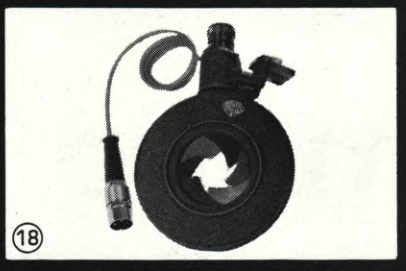

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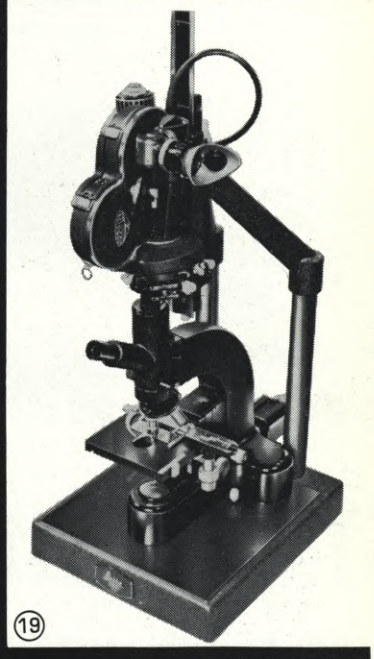

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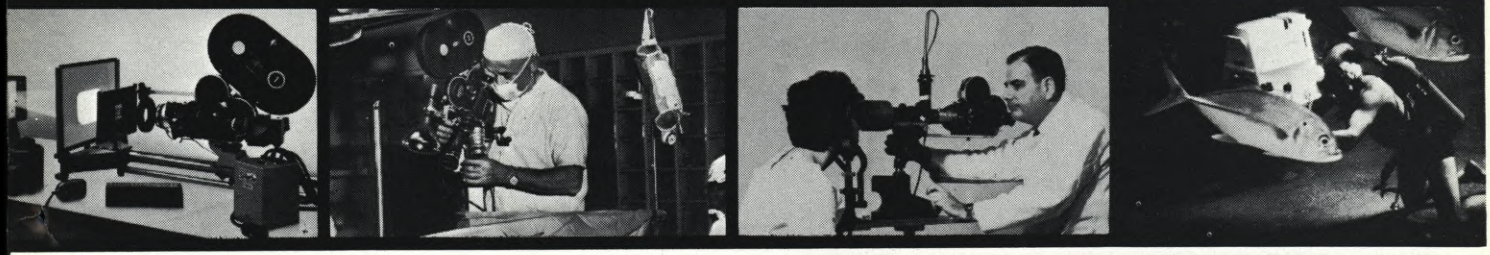

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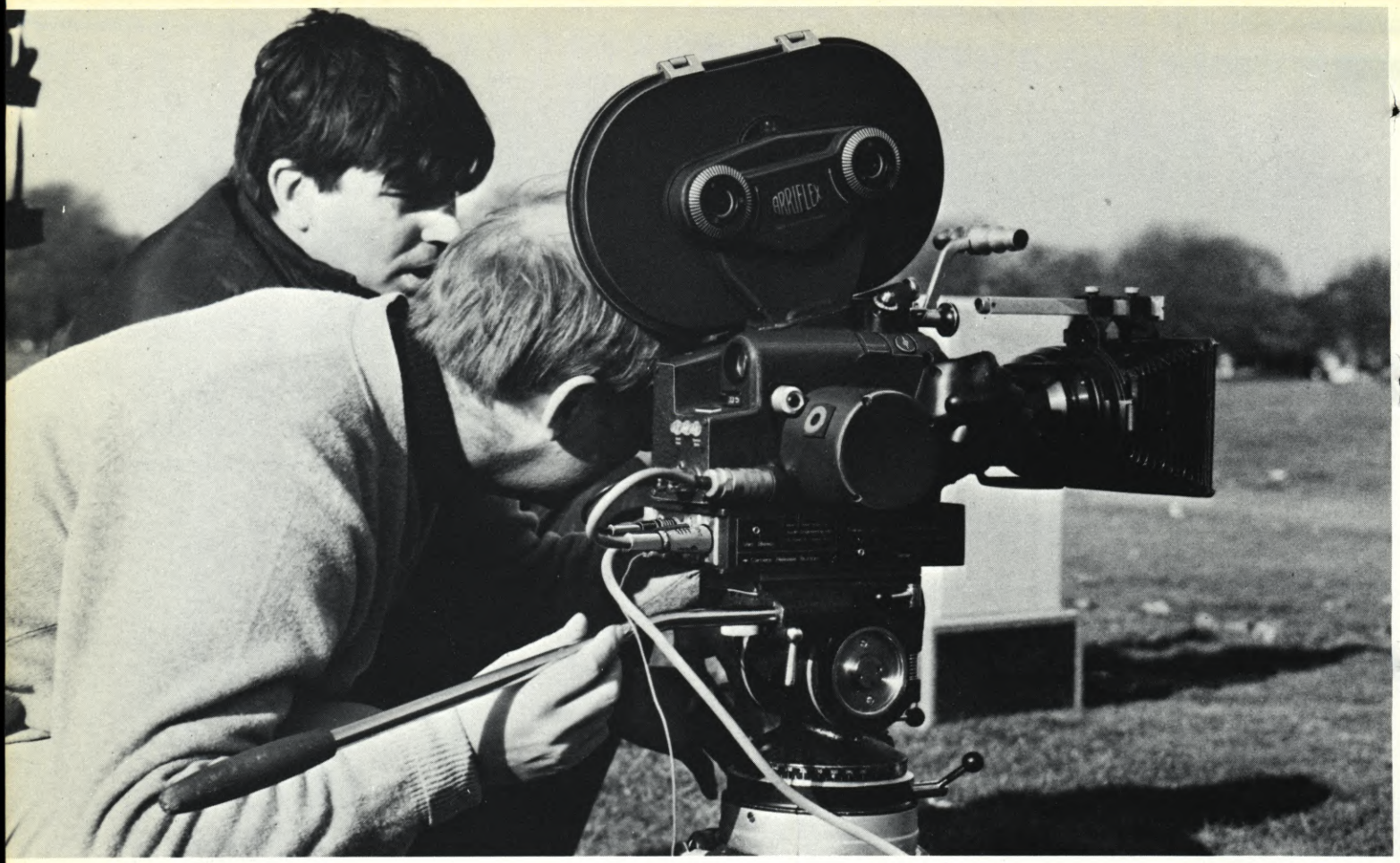

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Computer Camera Control System

The Crystamatic performs three functions which are basic to mobile double system film making.
1. It eliminates the need for a sync cable by precise crystal control of the camera motor speed and by providing an equally precise 50 Hz or 60 Hz pilot-tone at the tape recorder.
2. The computer provides an automatic clap mark on the film and sound track at the start and end of each take.
3. It counts the takes automatically and puts a mark to indicate the take number at the start and end of every shot.

A "no cables" post-sync shooting facility.
A 24/25 fps option at the flick of a switch.
A variable speed 8-50 fps option.
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Remote stop-start of the tape recorder in step with the camera.
An audio alarm in the cameraman's ear to indicate a malfunction such as a camera jam or a faulty cable.
Continuous monitor of the state of the batteries.
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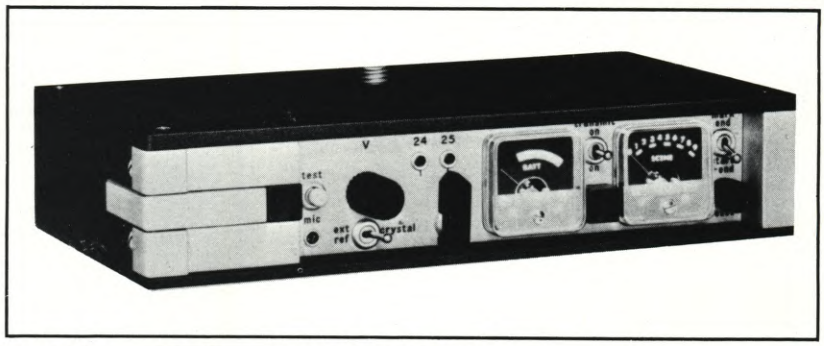

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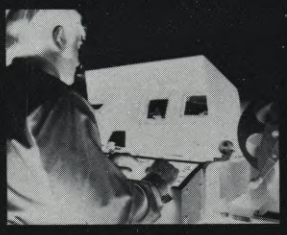
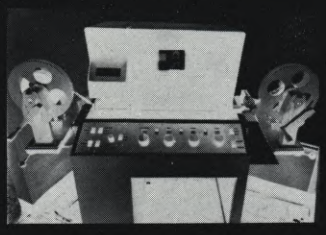
CFI's Title & Optical Department has eliminated the expensive and time consuming process of *wedging* prior to making optical masters or dupes. We do it by viewing your color master positives or original negatives—*positively*—right on the built-in TV screen of our Eastman Video Color Analyzer.





As our Color Timer looks at the picture, he adjusts it for proper color balance and density by using three color dials. They provide a practically infinite range of adjustment. Much more accurate than *wedging*, which is making several trial exposures with different color and exposure values and then interpolating for the one that is most nearly right.

Wedging is costly, it takes too much time, and it's hit and miss. CFI's Title & Optical Department does your job fast—*and right the first time around*—by using the sophisticated capabilities of the Eastman Video Color Analyzer. You save time (service in most cases in 24 hours or less) and you save money. And, most important of all, you get superior quality.

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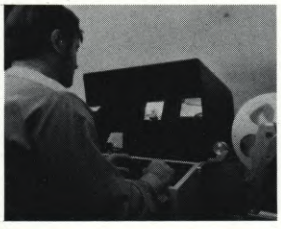

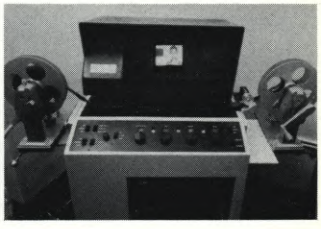

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TANDBERG
MODEL 11-1P "PILOTONE"

Battery-driven tape recorder with pilot-tone equipment for synchronisation of sound and picture

Tandberg Model 11-1P has professional features and possibilities. This model is specially developed with the advanced users, needing a portable tape recorder with possibilities for synchronisation of sound and picture – in mind. The tape recorder is a precision instrument giving first-rate recording quality and full synchronism between sound and picture.

Model 11-1P is fully transistorized and has 3 speeds, $7^1/_2$, $3^3/_4$ and $1^7/_8$ ips for monaural recording and playback. AB-test is possible during recording. Limiter-amplifier prevents overload of tape during recording.

Model 11-1P has electronic speed control. Servobrake provides constant tape tension, and a flutter-filter compensates undesired vibrations in the tape.

With cover removed 7″ spools can be used, 5″ spools with cover in position. All operation facilities are placed on the front.

Tandberg tape recorder Model 11-1P has been awarded the Certificate of Good Industrial Design.

TANDBERG

TANDBERG MODEL 11-1P «PILOTONE»

– top quality, battery-driven tape recorder.

Model 11-1P has separate heads for erase, record, playback and for pilot-tone. Separate socket for interconnection of film-camera and tape recorder. Pilot-indicator shows reception of pilot-signal: A «Startmarker» provides a signal to the tape as soon as the camera is started.
Inputs for dynamic microphone, radio and line. Separate volume controls for microphone input and for radio and line inputs, allow mixing. Separate volume controls for outputs – line (600 ohm), monitor (200 ohm headphone) and built-in control loudspeaker.
Model 11-1P is easy and fast – by a one-lever control for tape drive and pause button for instantaneous start/stop. Switches for recording, playback, built-in loudspeaker and limiter. A moving coil meter is used as a record level instrument.
Model 11-1P is designed for use within the temperature range – 5 to +45 centigrades. The design allows the tape recorder to be used in all positions.
Model 11-1P has gone through hard vibration and drop tests with satisfactory results: No measurable variations in wow and flutter have been noticed.
Tandberg tape recorder Model 11-1P weighs only about 11.5 lbs (5¼ kilos) with batteries.

Accessories:
Battery eliminator, Synchronizer, Microphone TM 4 Handy, Microphone TM 4 Complete, Headphone (200 ohm).

TECHNICAL SPECIFICATIONS

Battery powered: Ten 1.5 volt (15 volts) U.2 transistor batteries. A battery eliminator for 6 line voltages between 110 V and 240 V, 50/60 Hz can be fitted in the battery compartment of the tape recorder, or plugged in externally to the ACCESSORY socket.
Power consumption: 2–3 watt.
Motor: 9V DC motor, square wave excited.
Tape speed: 7½, 3¾ and 1⅞ ips.
Speed tolerances: Relative: ± 0.2 %, absolute: ± 0.5 %. Electronic speed control.
Playing time: Full-track recording and playback on 1800 or 1200 ft. tape gives the following playing times:

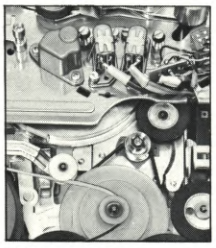
	1200 ft.	1800 ft.
7½ ips:	32 min.	48 min.
3¾ ips:	64 min.	96 min.
1⅞ ips:	128 min.	192 min.

Fast winding and rewinding: Approx. 1¾ min. for 1200 ft. of tape, 2½ min. for 1800 ft. of tape.
Tape: Maximum reel diameter: 7″. With cover in position: 5″.
Instant start/stop: Mechanical.
Heads: Recording head, playback head, erase head, pilot head and tachometer head for speed control.
Distortion: Below 0.5 % from the amplifier. Below 3 % from the tape.
Frequency response:
7½ ips: 40–16000 Hz ± 2 dB
3¾ ips: 50–10000 Hz ± 2 dB
1⅞ ips: 60– 5000 Hz ± 2 dB
Frequency range, f_u – f_o, according to DIN 45511:
7½ ips: 30–18000 Hz
3¾ isp: 40–12000 Hz
1⅞ ips: 50– 6000 Hz

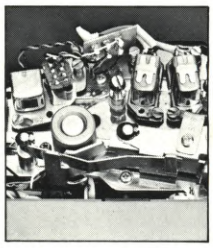
Signal-to-noise ratio:

	DIN 45511	IEC (A-curve)
Full-track:	59 dB	67 dB

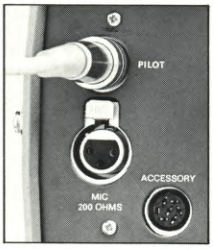
Wow according to DIN 45511:
7½ ips: Better than 0.15 % peak (0.1 % RMS).
3¾ ips: Better than 0.25 % peak (0.18 % RMS).
1⅞ ips: Better than 0.4 % peak (0.3 % RMS).
Erase and bias frequency: 85.5 kHz ± 2 kHz. Even harmonic distortion below 0.5 %.
Level indicator: Pointer deflection to zero at 3 % distortion from tape.
Pilot indicator: When the tape recorder receives pilot signals exceeding 0.7 V, the indicator will change from white to red.
Limiting device: A signal limiting device can be switched in during recording operating on all inputs. Limiting range approx. 25 dB above maximum level.
Inputs: MIC: Input for 200 ohm microphone. Max. input voltage 50 mV. At 1000 Hz and level control at max., the sensitivity is 0.15 mV. LOW: Input impedance 10 kohm. At 1000 Hz and level control at max. the sensitivity is 5 mV. Max. input voltage 1 V.
HIGH: Input impedance 200 kohm. At 1000 Hz and level control at max., the sensitivity is 125 mV. Max. input voltage 10 V.
Outputs: Balanced line output for 600 ohm telephone line. Deflection to zero dB on indicator represents standardized 1.55 V output voltage. Monitor output for 200 ohm headphone. Internal speaker (20 ohm). Max. output power: ¼ watt. Signals to indicator, monitor and line output are disconnected when playing back through the speaker.
Transistors: 53
Diodes: 16
Zener diodes: 2.
Dimensions: Width 13″, Depth 10″, Height 4″.
Weight: 11.5 lbs (5¼ Kilos).
Power consumption: With new batteries, approx. 220 mA at 7½ ips, approx. 180 mA at 3¾ ips and approx. 160 mA at 1⅞ ips.
Battery control: Battery voltage should be higher than 9.5 V, corresponding to deflection above the 0 dB mark on the indicator with button BATT TEST depressed.
Connecting plugs: Cannon socket XL31 is used for microphone connection.
Option: Cannon socket XL32 or a standard DIN socket.
Line inputs HIGH and LOW, miniature jack plugs. Line output LINE, miniature jack plug.
Pilot input. DIN plug with lock ring is used for connection.
Headphones, miniature jack plug. ACCESSORY socket, standard 6-pin DIN plug.



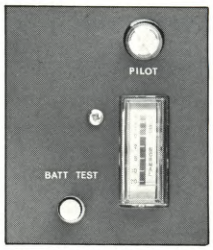
Tachometer serrated disc continuously controls the speed of the tape.



Model 11-1P has 4 heads for erase, recording, playback and pilot-tone.



Pilot signal and start-marking signal are fed to the PILOT-input from the camera or the synchronizer. The socket has a lock ring which ensures the connection.



The pilot-indicator (PILOT) changes from white to red at reception of the pilot-tone. The indicator for recording and playback can also show the state of the batteries.

Among accessories available are synchronizer, battery eliminator and microphone TM 4.
In the studio the synchronizer will ensure full synchronism between sound and picture. The battery eliminator can either be externally connected to the tape recorder or installed in the unit in the place of the batteries. TM 4 is a dynamic, omnidirectional microphone.

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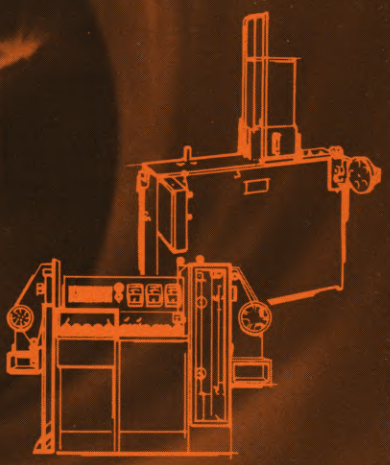
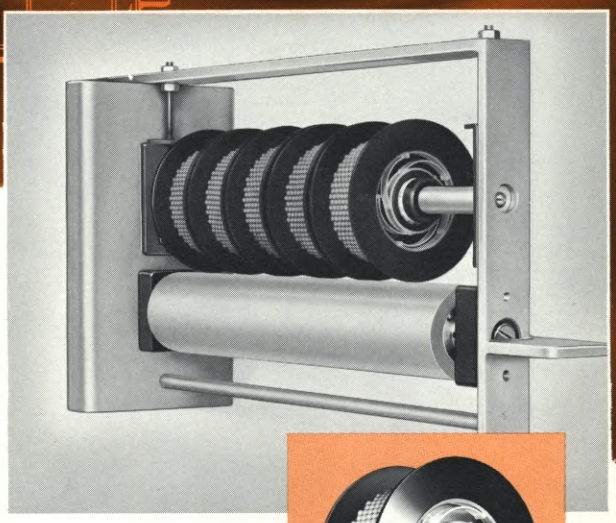


Now you can change film sizes ...and still maintain uniform tension and constant speed!

Any laboratory that changes film sizes frequently or plans to process multi-perforated film will find the new Treise Processors a dream to operate. They feature a revolutionary new type of demand-drive that assures uniform controllable tension and constant film speed throughout the processor.

The heart of the Treise SBR-Drive is a unique new film roller with a flexible heavy-duty 5-leaf spring insert. The spring bearing rollers (SBR) are mounted on a stationary shaft at the top of each rack and are free to rotate. An overdrive shaft is mounted directly underneath. As film tension increases (or decreases), the SBR contact (or pull away from) the drive shaft. The result is individual strand control! Due to the unusual construction of the Treise spring insert, the distance between the rollers and the drive shaft is so small that the slightest change in film tension creates a response and thus maintains a remarkable degree of equilibrium.

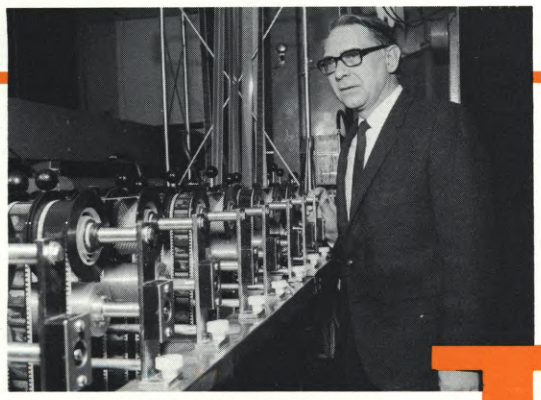
All SBR are equipped with "soft touch tires" that firmly grip the film and smoothly move it along without the slightest scratch or abrasion. Treise processors operate smoother, too, because they feature heavy-duty gear box drive and torque motor take-ups.



When using SBR-Drive, the elevator is kept at a fixed position less than an inch from the bottom of the tank, thus permitting full utilization of chemical solutions. SBR-Drive comes either in individual lift-out racks or as part of a complete unit lifted out by hoist, for quick easy servicing.

SBR-Drive includes an automatic braking system to stop the processor, in the event a film breaks due to some error in handling.

The new Treise SBR-Drive Processors feature stainless steel tanks, with hastelloy or titanium components in ferri bleach areas. Models are available to accommodate any film size from 8mm to 105mm, to handle any kind of process, and to operate at speeds from 30 fpm to 250 fpm.



Bill Smith, Allied Film President, checks over his SBR-Drive.

ALLIED FILM LAB modified a 10-year-old processor with SBR-Drive . . . and now it runs like new!

Join the many leaders, like Allied Film Lab, Foto-Kem, News Film Laboratories, University Microfilm, etc., who are already benefiting from this revolutionary "step forward" in processor design. Write today for complete details about our modification program. Modernize *your* processor with Treise SBR-Drive!

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6 Lowel-Light Barndoors for R 40 reflector bulbs
6 partitions for R 40 bulbs (bulbs not included)
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3 25 ft., 15 amp. neoprene extensions, cube taps
1 12 yard roll of Lowel-Light Gaffer-Tape
2 25 amp. fuses for emergencies

#U6623 Lowel-Light Uni-6 (less bulbs)

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LOWEL-LIGHT

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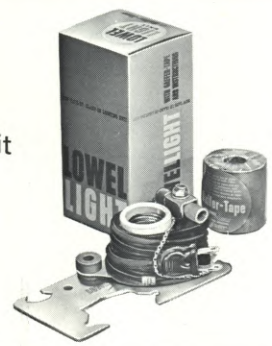

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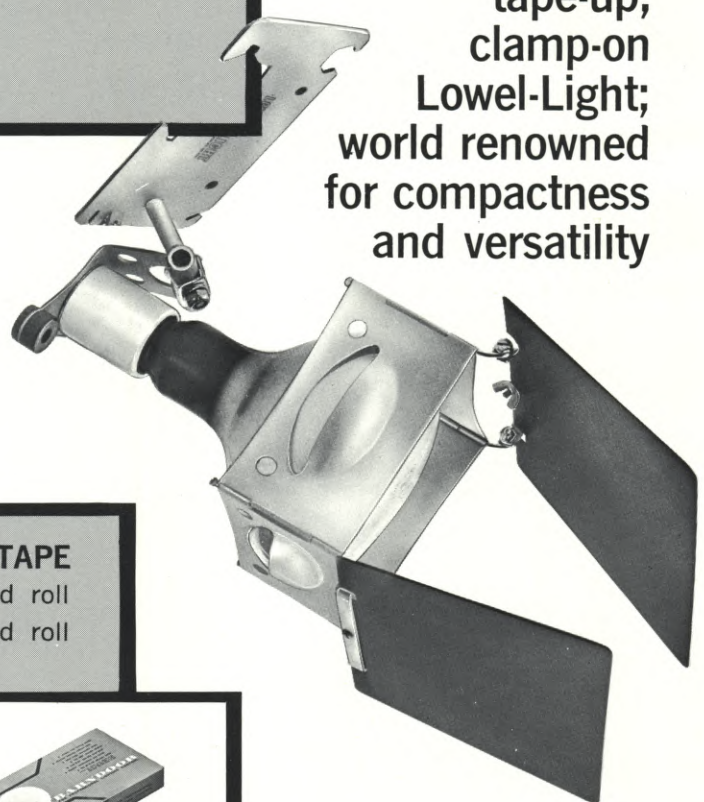

the tape-up, clamp-on Lowel-Light; world renowned for compactness and versatility

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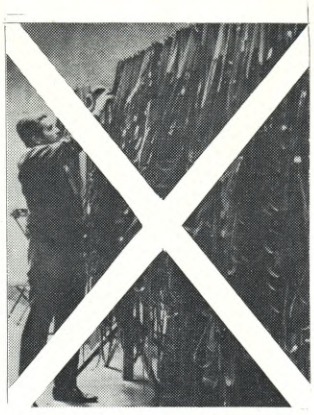


Magna-Tech's electronic method of altering sound tracks makes "looping" obsolete.

If you are still making hundreds of loops for a single feature, then consider a fast, precise and economical method of altering sound tracks that makes "looping" obsolete.

The new Magna-Tech system electronically synchronizes a reel of picture with a reel of full-coat magnetic sound-recording film. Footage and frame "PRESETS" permit the recordist to select the scene to be "dubbed" and to fully control the advance and return of the film as the actor voices the line to be "dubbed."

The system is so accurate it will even permit the change of a single word without danger of erasing an adjacent word.

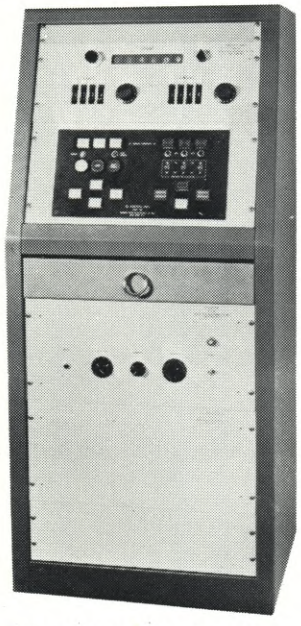
High speed return of the film to "start" saves time and permits new starts without waiting for a "loop" to complete its trip.

Actors, who so often succumb to the rhythm of a loop, are spared this hypnotic interference. Acceptable "takes" can be stored on the 3-track film and replayed for final selection.

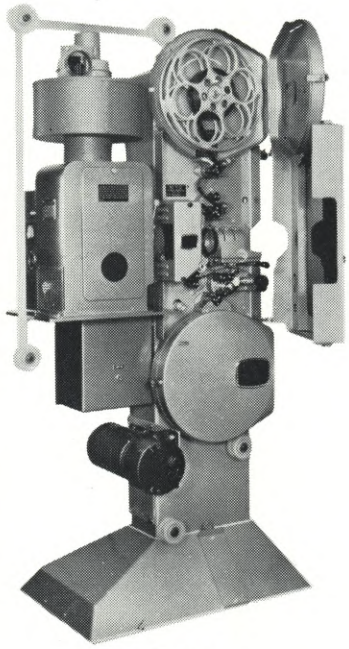
A complete remote control system is provided the director so that, once the recording engineer has preset footages, the director can take over if he wishes and directly control every facet of the recording.

The Electronic Looping System precludes the need for cutting loops and eliminates the need for editing of the track. Complete reels of the motion picture are run in synchronization with the full-coat magnetic film on which the sound track is recorded. Transfer of the best takes is then made to the third track of the same recorder.

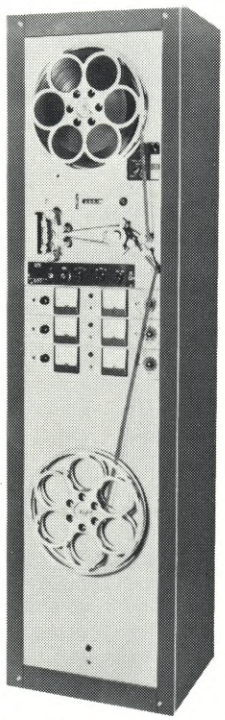
This track now has all of the final takes in sequential position and ultimately permits the screening of the picture and the final edited track in perfect synchronization. From this point the track is ready to go to a mix and no further editing is required.



Electronic Looping Console



35mm Projector



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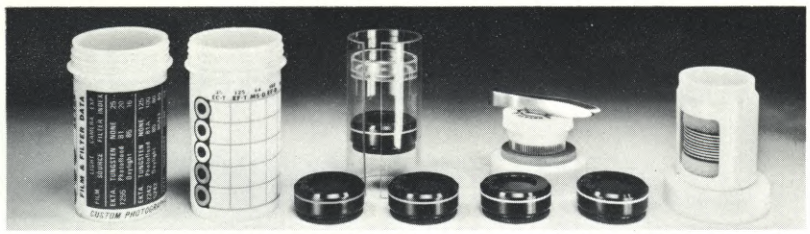

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"EMMY" AWARDS FOR CINEMATOGRAPHY

In its 22nd Annual Awards Presentation, the National Academy of Television Arts and Sciences honors the men behind the camera

The 22nd Annual Television Academy Awards of The National Academy of Television Arts and Sciences were presented on Sunday evening, June 7, 1970, on a special coast-to-coast color telecast over the ABC Television Network.

Presentation of the 1969-1970 Emmy Awards, for achievements originally broadcast between March 17, 1969 through March 15, 1970, originated from The Century Plaza Hotel in Los Angeles with Bill Cosby, Host, and from Carnegie Hall in New York with Dick Cavett, Host.

The Winners of The Emmy Awards were selected by Blue-Ribbon Panelists prominent in their particular fields of expertise who viewed all of the nominated achievements in their entirety before casting secret ballots.

The News and Documentary Emmy Award Winners, announced prior to the telecast on May 18, received their Statuettes on the air. The Craft Emmy Award Winners received their statuettes at formal banquets held on May 23 in both Hollywood and New York.

Emmy Awards presented for the various categories of Cinematography were as follows:

OUTSTANDING ACHIEVEMENT IN CINEMATOGRAPHY FOR ENTERTAINMENT PROGRAMMING;

A. For a series or a single program of a series

WALTER STRENGE, ASC — *Hello, Goodbye, Hello*
Marcus Welby, M.D. 9/23/69 ABC

B. For a special or feature-length program made for television

LIONEL LINDON, ASC — *Ritual of Evil*
NBC Monday Night at the Movies 2/23/70 NBC

OUTSTANDING ACHIEVEMENT IN CINEMATOGRAPHY FOR NEWS AND DOCUMENTARY PROGRAMMING; for a series, a single program of a series, a special program, program segments or elements within:

A. Regularly scheduled News programs and coverage of Special Events

EDWARD WINKLE — *Model Hippie*
The Huntley-Brinkley Report 12/31/69 NBC

B. Documentary, Magazine-type or Mini-documentary programs

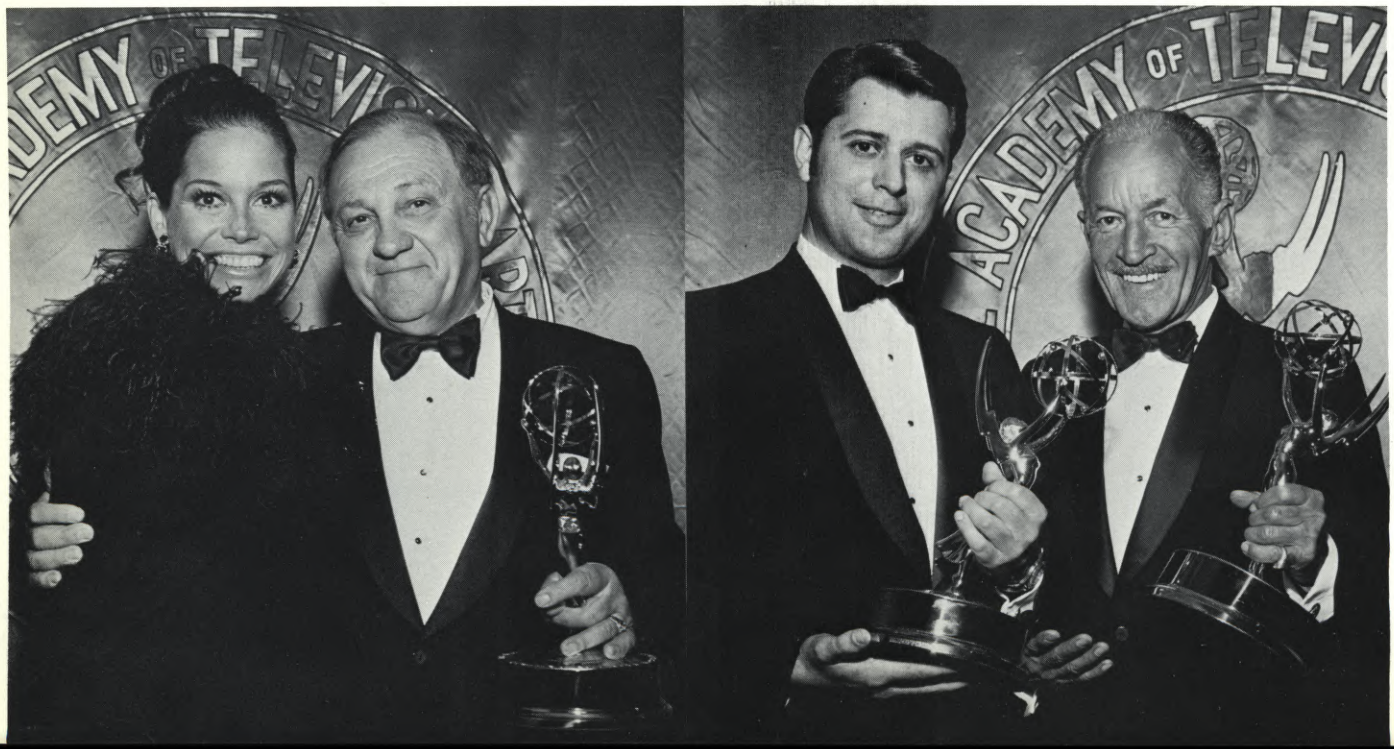
THOMAS A. PRIESTLEY — *Sahara*
La Caravane du Sel, 12/19/69 NBC

West Coast cinematographers Lindon, Strenge and Winkle were presented with their Emmy statuettes by actress Mary Tyler Moore. Priestley, operating on the East Coast, received his award in New York.

Veteran Director of Photography Walter Strenge, ASC, has been the recipient of many honors during his long career in the motion picture industry and recently co-edited (along with Arthur C. Miller, ASC) the Third Edition of the *AMERICAN CINEMATOGRAPHER MANUAL.*

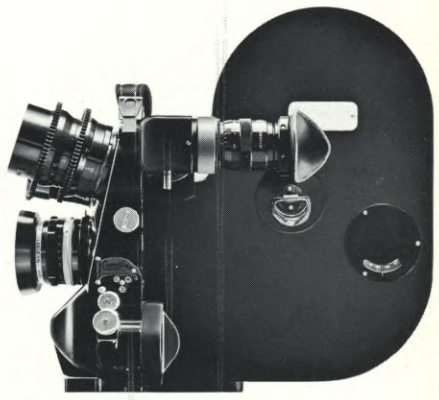
One of the top cinematographers in the industry, Lionel Lindon, ASC, received the 1956 "Best Achievement in Color Cinematography" Academy Award for his inspired photography of "AROUND THE WORLD IN 80 DAYS". ■

(LEFT) A gleeful Mary Tyler Moore presents the Emmy statuette for "Outstanding Achievement in Cinematography for Entertainment Programming" to Walter Strenge, ASC, Director of Photography on the "MARCUS WELBY, M.D." series. (RIGHT) Edward Winkle, winner of cinematography award in "News and Documentary Programming" category, is shown with Lionel Lindon, ASC, who received top honor in cinematography for "RITUAL OF EVIL", feature length program made for television.



EUROPEAN CURRENCY REVALUATIONS HAVE CHANGED SOME CAMERA PRICES

So which is the least expensive, totally professional camera: the Arriflex 16S/B? No. The Eclair CM3.



What's more, the CM3 lets you change magazines in five seconds, plus...shoot 16 and 35mm with the same camera!

The Franc has been devalued; the Deutsche Mark has gone up. As a result, most French products, including Eclair cameras, have become less expensive on the U.S. market, while most German products have gone up in price.

With two 400 foot magazines, three lenses and constant-speed motor with sync-pulse generator, the CM3 now costs about $200.00 less than the Arri S/B GS similarly equipped. Not much less, certainly. But with all its features, you would expect the CM3 to cost a lot *more.* The Arri S, of course, is the least expensive Arriflex. It's the one with a body designed for 100 foot loads, to which you can attach a 400 foot magazine.

The CM3 is the Eclair camera that won an Academy Award for its design. In addition to its five-second clip-on magazine change and its unique capacity for shooting both 16mm and 35mm with the same camera body, same motor and same lenses, (different magazines), the CM3 gives you extremely bright and accurate reflex viewing, (simpler optics, groundglass at the film aperture), a viewfinder and eyepiece that each rotate through 360°, (any angle, either eye), three heavy duty bayonet lens mounts, (for critical seating of wide-angle and zoom lenses), plus a variable shutter, matte box and sound blimp.

You can also adapt the CM3 to shoot 35mm Techniscope in seconds, at no cost; and the CM3 accepts Panavision lenses. Most features are being shot wide screen, most commercials in standard 35mm, most industrials and documentaries in 16mm. The CM3 is the only camera that will shoot all three formats. What's *your* next job going to be? And the one after that?

For a CM3 brochure, write to Eclair Corp. at 7262 Melrose Ave., Los Angeles, 90046; or at 73 S. Central Ave., Valley Stream, New York, zip 11580.

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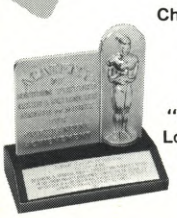

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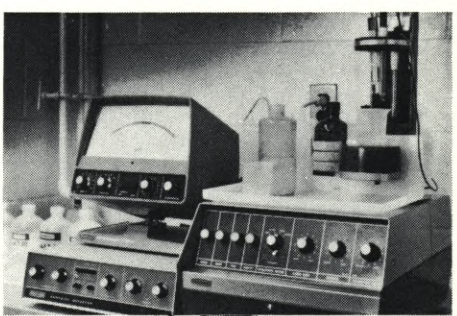

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ARRIFLEX® 35 victorious in shooting all footage for Robert Aldrich's war feature, "TOO LATE THE HERO"

The World War II setting was represented as the New Hebrides, but it was in the thick, muggy Philippine jungles that producer-director Robert Aldrich shot almost all of the footage for "Too Late the Hero", his first war movie since the spectacularly successful "Dirty Dozen."

The script required a complete British Army camp; the ruins of an island temple; several army watch towers; and the clearing of a number of 5-acre "pockets" for general movie action. That's a lot of work to do in an untamed, rugged tropical jungle; but complete authenticity was Mr. Aldrich's prime requirement in this $8-million co-production of Associates and Aldrich Company and ABC Pictures Corp. Many of the jungle warfare scenes, for example, were enacted on as broad scale as the real battle would have been, even though the concealed cameras might be photographing only a part of the action.

Scrupulous attention to detail is one of the reasons behind Mr. Aldrich's admirable string of box-office successes, including "What Ever Happened to Baby Jane," "Flight of the Phoenix," and the "Killing of Sister George".

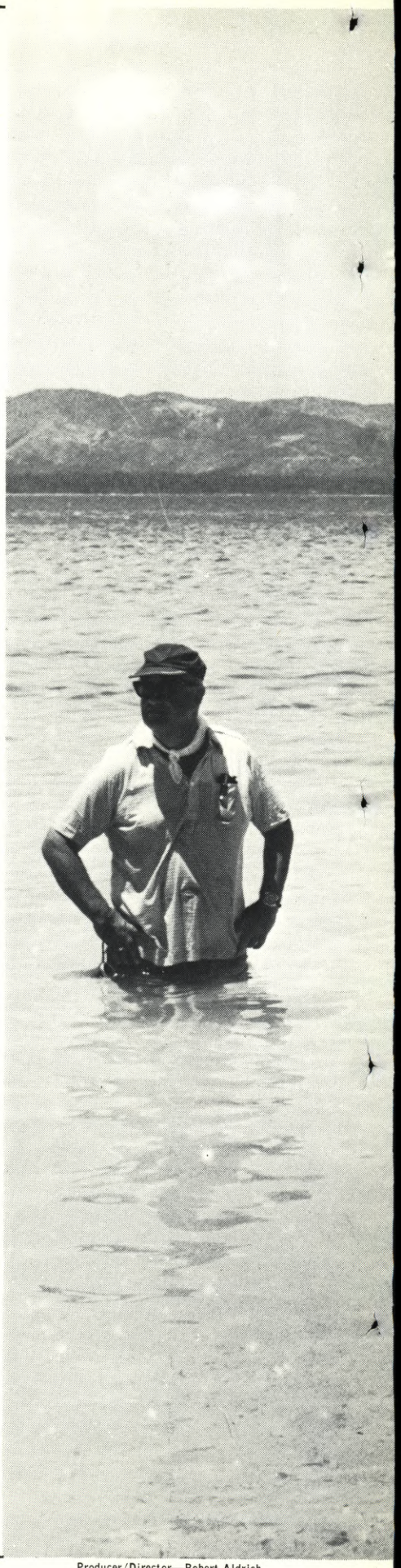
Mr. Aldrich compounds his films' appeal by adding the biggest-name performers . . . in "Hero," they include Michael Caine, Cliff Robertson and Henry Fonda.

Another "name" contributing to the excellence of the production was that versatile behind-the-scenes performer, Arriflex.

Anticipated to be released in 70mm as well as for 35mm wide screen presentation, the entire $8,000,000 feature—some half million feet of color film—was shot exclusively with Arriflex 35's. Floated on tiny, native built rafts in beach front scenes, hand-held through jungle trails and hacked-out clearings, the Arriflexes were among the top performers. And there are not many locations that are harder on talent, crew and equipment than the hot, steaming, muddy Philippine jungle.

"But more to the point", states Director of Photography, Joseph Biroc, ASC, "it was Arriflex itself that helped us get out of the jungle as quickly as we did. We were able to accomplish many more camera set-ups a day than experience with larger, heavier cameras had let us to expect".

Every movie production, whether or not the subject is war, involves many "battles" —against locations, against schedules, against budgets—but the most successful filmmakers consistently include Arriflex as part of their strategy. With the unique ability to adapt to any requirement, from hand-held 200-ft. camera to fully-blimped sound system for location or stage, the Arriflex 35 becomes the most versatile of the filmmakers' tools. And so outstanding at its job that it has received an Academy Award for technical excellence.



Producer/Director—Robert Aldrich

ARRIFLEX CORPORATION OF AMERICA Woodside, N. Y. 11377

Director of Photography—Joseph Biroc, A.S.C.

At dusk the lights of EXPO '70, near Osaka, Japan, glow like multi-colored jewels. (Photograph courtesy of Fuji Photo Co.)

FILM AT EXPO '70

By HERB A. LIGHTMAN

OSAKA, JAPAN

Everyone knew that Montreal's magnificent EXPO 67 would be a hard act to follow—but the Japanese, in presenting EXPO '70, have pulled it off with great style, originality and an almost tangible excitement that pervades the entire sprawling EXPO site.

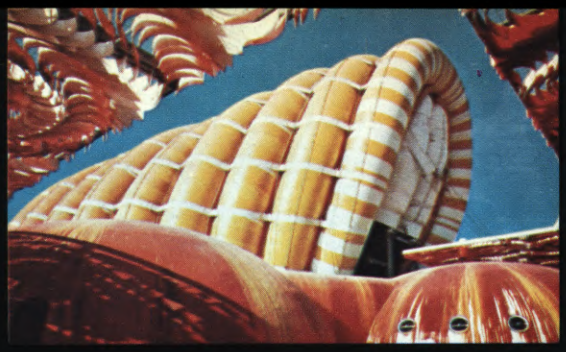
On what used to be rolling, sparsely-settled countryside of the Senri Hills (about 10 miles from downtown Osaka), they have created a dazzling "city" of spectacularly futuristic pavilions adjacent to acres of formal Japanese gardens—the "old" and the "new" Japan coexisting most harmoniously.

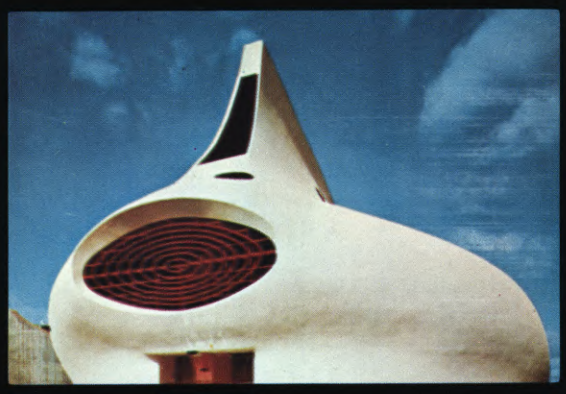
Official EXPO '70 emblem, designed by Takeshi Ohtaka, is stylized cherry blossom, representing five continents with host country, Japan in the center.

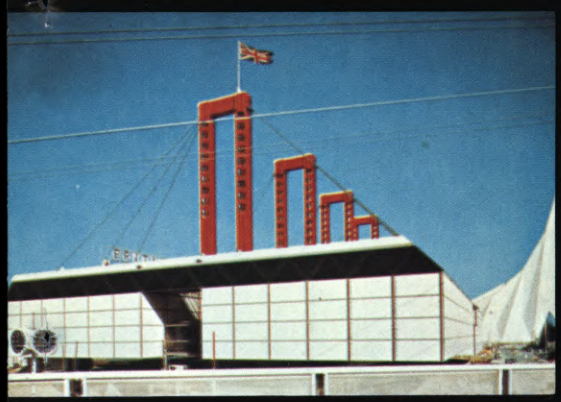
I appreciate both, which is why, instead of staying in the bustling commercial city of Osaka, I am headquartering in Kyoto, which is twice as far away. Kyoto has been one of my favorite places ever since my first visit there several years ago. The ancient capital of this country for 1,000 years, it represents to me the "old" Japan which I find so exotically appealing. It is dotted with scores of temples, shrines and palaces set in peaceful gardens, and they all seem like old friends to me because of the many Samurai films I have seen, and of which I am a devoted fan. When browsing through the grounds of one of these venerable places, I always halfway expect to see Toshiro Mifune come bounding out, swinging his lethal sword.

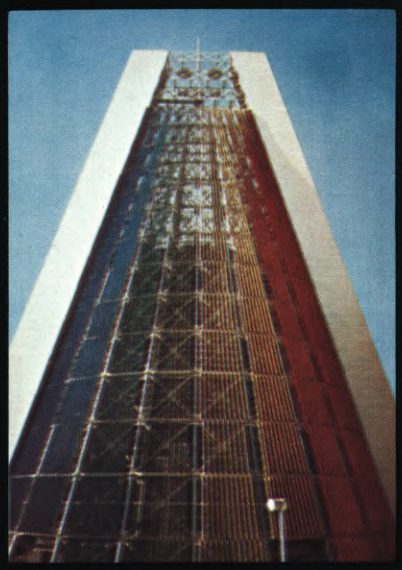
I have, unfortunately, little time for browsing on this trip. I am here to view and technically appraise for *American Cinematographer* readers the multitude of films that abound at this latest of World Expositions. It is an activity that keeps me busy 12 hours a day, every day—for EXPO '70, like its Montreal predecessor, is essentially a "Film Fair" and there is scarcely a pavilion that does not make at least some use of this most fluid of all communications media. My days are spent from dawn to dusk in viewing films, interviewing the filmmakers who are present, exploring the backstage mechanisms for presenting

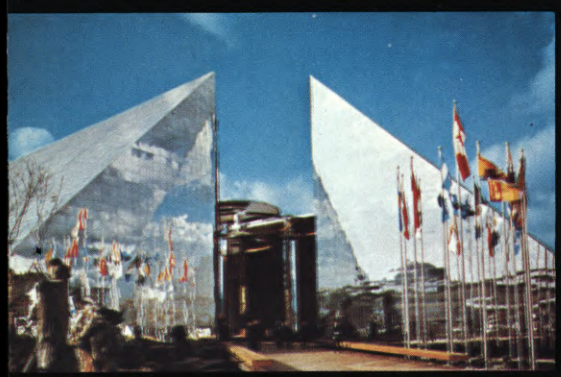
Striking "Tower of the Sun"—created by Taro Okamoto—soars 200 feet into the sky at EXPO's Theme Center.

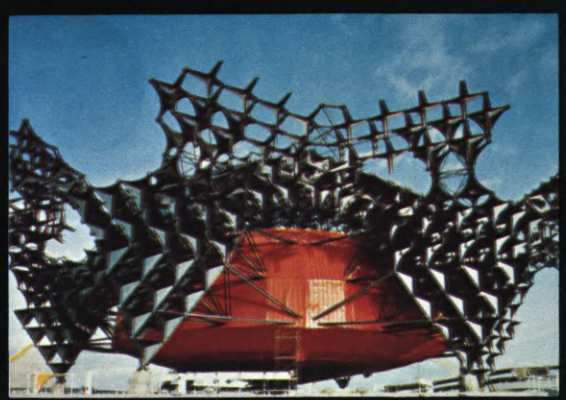








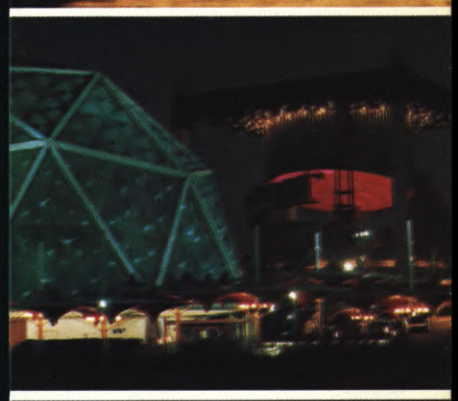




these cinematic spectacles and taking photographs, many of which appear in these pages.

Fortunately, I have the unstinted assistance of a couple of very wonderful people. The first of these is Mr. Kazuo Kawaguchi, who is in charge of the Film Unit for the Overseas Press and Publicity Dept. Upon arriving at the Press Center on my first day at EXPO, and knowing not a soul, I headed immediately for the office of the Film Unit, because motion picture technicians around the world are "my people" and I am never a stranger among them.

Though we had never met before, Mr. Kawaguchi greeted me like a long-lost friend, because, as it turned out, he is the one who translates *American Cinematographer* into Japanese for his fellow technicians. He is a veteran cameraman and a charming gentleman. I owe him a great debt, because without his constant, cheerful assistance I would never be able to gather the tremendous wealth of data needed to compile this



As usual, author found cameramen of Overseas Press Dept. Film Unit to be "kindred spirits". At left is Mr. Kazuo Kawaguchi, who was extremely helpful in assembling materials for EXPO issue.

special "FILM AT EXPO '70" issue.

Few of the other cameramen speak English, but it doesn't matter, because we have an international language—that of film. Their kind friendliness, like that of the other Japanese people I have known, does much to fill in the communications gap.

However, since I am on my own at the EXPO site, and Japanese is not among my several working languages, the Overseas Press Dept. has very kindly assigned as my personal interpreter Miss Yoshiko Kitawaki. She is a demure young lady who has recently graduated from the university with a degree in English and American literature. Very fond of poetry, she speaks poetic English—which goes well with her gentle personality. She is also extremely intelligent and catches on very rapidly to the technical terms tossed about when I interview the Japanese film-makers here.

Miss Kitawaki is a loyal, indispensable aid to my work and she goes far beyond the requirements of her job to help me in every way. She even insists on toting my gadget bag crammed full of accessories for the six cameras and tape recorder which I lug about the EXPO site. A "jewel among women"—as they say in the Bible.

The Japanese flair for color, form and design—coupled with an ability to treat familiar concepts in a fresh and original way—has created an almost "psychedelic" (to use an over-worked term) type of excitement that needs no extra stimulus to send any halfway sensitive visitor on a genuine "trip".

As for the almost countless film presentations that are featured throughout the site, it can be said that, in terms of technical quality, they represent the very highest state of the art. The photography is uniformly magnificent, the applications of sound and music impeccable—and often very exciting. The use of the written and spoken word has been wisely avoided—considering the possible language barrier—so that the images that prevail are almost pure cinema.

If any general criticism can fairly be levelled at the films being presented here, it is that there is a certain *sameness* about many of them—a kind of derivative dependency upon recently tried-and-true formulas. One can almost hear the Madison Avenue types saying: "Why don't we do the 360-degree bit—but with a new twist?"—or, perhaps: "How about a multi-image thing—with 243 screens arranged in the form of a bagel?"

As might be expected, in view of the success of such film presentations as "A PLACE TO STAND" and "WE ARE YOUNG" at EXPO 67, there is offered here a rash of productions involving multiple-screens and/or multiple-images. In pavilion after pavilion the eye is bombarded with anywhere from two to 22 images simultaneously. It is almost as though there had been an unofficial contest to see who could hurl the most images at an audience during any given split-second. The result is that, after having visited a dozen or so pavilions, the mind of the viewer becomes boggled with a surfeit of fragmented sights and sounds, most of which he finds difficult to sort into their proper bins. Having thus fallen into the trap of dazzling audiences with technique for the sake of technique, some of the film-makers seem to have forgotten that the name of the game is to communicate.

It is inevitable, also, that there should be a certain similarity of subject matter—especially in the films presented by the various national pavilions. A World Fair, besides serving as a type of progress report on the current state of man's ingenuity, also has an ancillary "Chamber of Commerce" function for the individual nations exhibiting—that of stimulating interest in trade and tourism. Each country, therefore, feels obliged to present a figurative *smorgasbord* of the homeland's attractions—and the tidbits offered are not all that different.

One comes to expect such *cliché* scenes as: huge glowing ladles pouring ruby-red molten steel into retorts, clanking combines moving imperiously across verdant farmland, bikinied *derrieres* undulating down sun-drenched beaches (what's wrong with *that?*), families intent on staying together shown picnicking in what's left of the local unspoiled countryside, skiers gliding in slow motion against star-filtered shards of sunlight beamed directly into the lens, sports fishermen (with home-movie gusto) quaffing their beer while holding up the day's catch to be camera-recorded for posterity, etc.

Of course, few nations have the guts to really "tell it like it is"—the bitter with the better—as did Francis Thompson's monumental "US", presented in the United States Pavilion at San Antonio's *HEMISFAIR '68.* There seems to be an unwritten law against stimulating an audience to think or (God forbid!) *feel* deeply about the content of films shown at World Expositions—and it has been argued that viewers get enough realism on TV without having to cope with it when they go to a Fair to be entertained. There may be a point there, but the fact remains that, for me at least, the two film presentations packing the greatest wallop here at EXPO '70 are those which dare this kind of honest comment while utilizing formats that are technologically unique in design.

I refer to "TIGER CHILD", present-

A meeting of top dignitaries off the Motion Picture and Television Engineering Society of Japan. (STANDING) Kazuo Miyagawa (Cameraman, Daiei Co.), Shuichi Shimozu (NHK), Sadao Yasunaga (Asahi Broadcasting), (SEATED) Kazuo Kawaguchi (Cameraman and Vice President of Society), *AMERICAN CINEMATOGRAPHER* Editor Herb A. Lightman, Kiyoshi Hara (Vice President of Asahi Broadcasting), Keiichiro Ryu (President of Ryu-Den Sha Co., Ltd.).

ed by the Fuji Group *(See Page 648)* and "BIRTH", one of the two films being shown in Midori-Kai's spectacular *ASTRORAMA* dome *(See Page 654).*

The Fuji film deals with Man's turbulent split-personality—the savage ("Tiger") side in conflict with the idealistic ("Child") side, and it contrasts images of indescribable beauty with those of brutal realism. The presentation is a technically ingenious achievement which combines multiple slide images with the brand new *Multiscreen* process—the world's largest motion picture format (more than 5 square inches of information on each 15-perforation, horizontal, 70mm frame).

The *ASTRORAMA* film portrays *"the exciting drama of the history of man, from the beginning of the Universe to a visionary glimpse of the distant future. It has attempted to help man break free from the shackles of his everyday life and to experience a new birth of the spirit."*

All of this unfolds in film form upon a gigantic 360-degree dome, with picture and stereophonic sound (515 speakers) totally enveloping the audience. At times this picture is a single composition, while at other moments it breaks up into five separate adjacent triangular images. The effect is stunning, to say the least.

Possessed of, perhaps, a pinch more than the normal amount of national pride, I must confess that I am sadly disappointed in my own country's EXPO '70 exhibit—and that disappointment is shared by every American with whom I have spoken here.

"Understatement" must have been what the perpetrators of this fiasco had in mind—and they have managed to understate America to a degree that is almost subversive. Architecturally (if one may dare use the term in this context) the United States Pavilion is probably the most insipid structure on the site. One of my fellow countrymen described it as "a hole in the ground covered with an oval-shaped white plastic waffle"—and that about sums it up.

Our exhibit at EXPO 67 was somewhat less than inspired—but at least it was housed in Buckminster Fuller's magnificent geodesic dome, and it *did* include a sprightly film presentation called "A TIME TO PLAY". The EXPO '70 exhibit doesn't even have these pluses going for it.

According to the guide book, *"The theme of the United States exhibit is 'The Images of America' and through these images an attempt is being made to familiarize visitors with what Americans are like; where and how they live, and what they have created in the way of culture, science and technology."*

Author's photograph of Apollo 12 Astronauts Gordon, Conrad and Bean as they wave to crowd of international journalists assembled for press conference at EXPO '70. Charles Gordon very lucidly answered author's questions about cinematography during the flight.

All I can say is that if foreign visitors actually *do* judge us by the "Images" presented here, we will emerge as a pretty tasteless and superficial crew. (Some of us *are,* of course, but there's no reason to make it unanimous.)

Illustrating how first things have been placed first, there is a huge area devoted to the frayed uniforms of former baseball greats. The architectural exhibit, which might at least have included a few of our really fine buildings, concentrates, instead, on some of the most pedestrian cheese-box structures in the land.

However, the brass ring for idiocy has to go to whoever it was that selected as part of our Arts exhibit a so-called sculpture by Claes Oldenburg titled "Giant Ice Bag". This inspired creation is an ordinary morning-after-hangover type ice bag rendered in soft plastic, but blown up to about 12 feet in diameter. It is set like a gem in a vast amount of space that might better be devoted to something slightly meaningful. Moreover, it doesn't simply lie there like an ice bag should. Instead, it writhes and squirms and carries on like "The Creature From the Black Lagoon"—a most unnerving sight, especially if one really *does* have a hangover.

A placard nearby wades into doubletalk about how this vinyl outrage "symbolizes human physicality" but such esoteric symbolism is wasted on the Japanese visitors who, not having been blessed with ice bags in their ancient culture, simply stare in bewilderment at this mechanized monstrosity and then walk away shaking their heads.

My greatest disappointment in regard to the American effort (or lack of same) at EXPO '70 is the fact that, except for three tiny screens devoted to "thrilling moments in baseball, basketball and auto racing", the United States Pavilion makes absolutely no use of the motion picture medium—a really incredible oversight, since there could not possibly be a better way to energize a theme like "The Images of America". The omission is especially deplorable in view of the fact that the motion picture was invented in America and is the nation's only original native art form.

If the United States Pavilion is such a disaster, one might reasonably ask, why it is that crowds stand in line for as long as three hours waiting to get inside? The answer is simple: The Moon Rock.

Although it looks like a chunk of stone that might have come out of anybody's backyard, I must confess to a certain awe in contemplating the amazing achievement involved in bringing it here from whence it came. In truth, our space exhibit is one of the few redeeming features of America's pavilion. The fact that there is an honest-to-God LEM standing there, plus Apollo capsules that have actually been to the moon and back is enough to turn us Space-buffs on. I am also impressed to see a display of the Maurer 16mm sequential motion picture cameras that were used in the lunar flights.

A bit later the Apollo 12 astronauts pay a short visit to EXPO and, in the course of the press conference that follows, I have a chance to ask about motion picture filming activities during their flight. After presenting the astronauts with copies of the special "Filming Man in Space" issue of *American*

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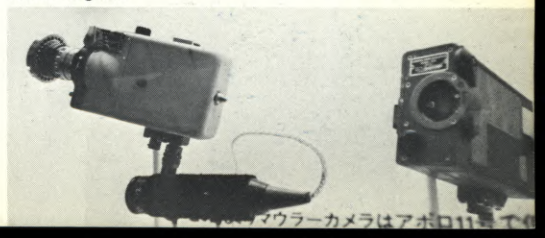
A display inside United States pavilion of Maurer 16mm cameras used during the Apollo lunar flights.



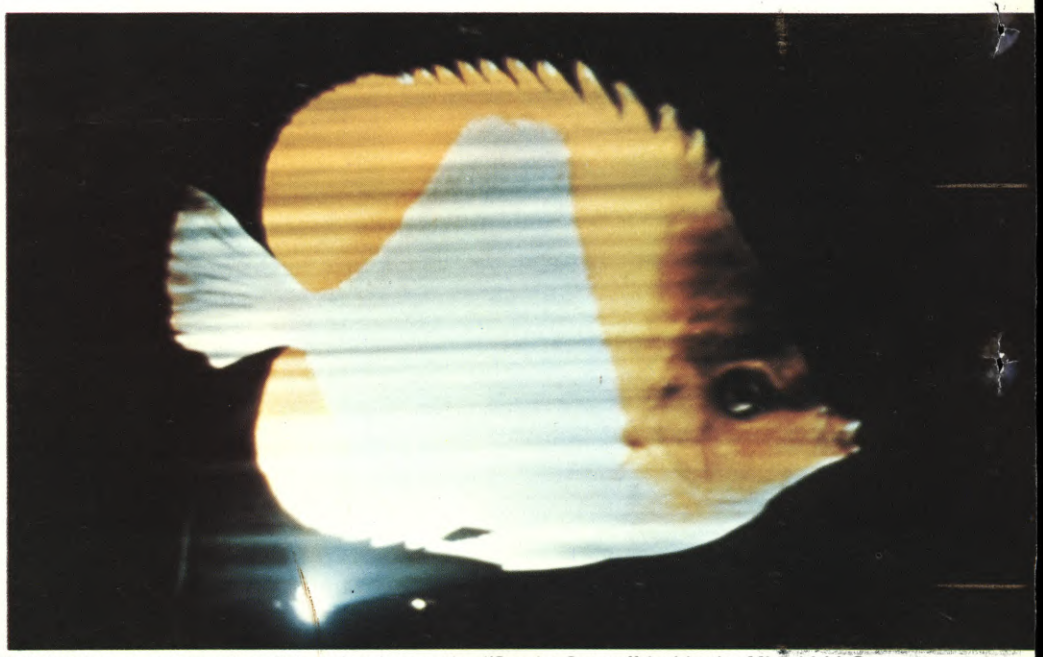
A veritable wonderland of sights and sounds provides a feast for the senses in this wildly imaginative pavilion that features a chilling typhoon, a volcanic inferno, fish that swim on a curtain of smoke and gem-like images on a sphere

MITSUBISHI GROUP

The Mitsubishi Pavilion provides a glimpse of the Japan of tomorrow as envisioned by one of the country's largest industrial and financial groups. It is a prescription of how harmony can be achieved between science and nature.

On the outside the Mitsubishi Pavilion is a colorful, free-form sculpture—clean and simple in design but not nearly as "far-out" as some of the other structures on the site.

But on the inside, the designers have pulled out all the stops in the creation of stunning effects and methods for presentation of the pavilion's theme: "The Nature of Japan and the Dreams of the Japanese." The visitor is engulfed in raging storms, floods and volcanic eruptions as he glides through this wonderland on moving sidewalks called "travators". It takes him to the bottom of the sea and soaring into outer space,



A brightly colored tropical fish swims by on the "Smoke Screen" inside the Mitsubishi Group pavilion. The result of several years of experimentation and research, the effect is an awesome sight to EXPO visitors.

(ABOVE) A single frame of the double-frame 35mm film used to project the volcanic eruption. (RIGHT) The result: "a trip through Hell."

(ABOVE LEFT) Crowd watches glowing images on Spherical Screen. (BELOW LEFT) Huge waves thunder down on spectators in the Hori-Mirror room.

surrounding him with fantastic images.

Out of the myriad of effects which make this one of the most exciting pavilions at EXPO, there are three which make unique uses of the motion picture medium: the Hori-Mirror Screen, the Smoke Screen and the Spherical Screen.

THE HORI-MIRROR SCREEN

Passing through the first of two rooms employing this effect, the visitor finds himself engulfed in a raging tempest with gigantic waves looming above and pounding down on him from all sides.

Scarcely recovered from this cataclysmic assault of sights and sounds, he moves into the crater of an erupting volcano, where he is surrounded by flowing streams of red-hot lava.

The Hori-Mirror Screen, a process developed by the Special Effects Department of the Toho Motion Picture Corporation in conjunction with Mitsubishi engineers, combines 70mm film projection with giant mirrors to create its super-realistic effects.

The last work of the late Eiji Tsuburaya, Toho's internationally famed Special Effects genius, it took three years of research and development to achieve the final result. The set-up is composed, basically, of two 70mm projectors set opposite each other and driven synchronously to project images onto huge screens installed face to face. Wall-to-wall mirrors, some of which are movable, reflect these raging images to infinity, so that as far as the eye can see, the visitor is engulfed in nature's holocausts.

SMOKE SCREEN

Moving into a colorful underwater cave, the visitor is startled to see a gigantic shark and other huge denizens of the deep swimming directly in his path. Their forms appear absolutely solid and real—except that he is able to pass right through them, probably not realizing that they have been projected onto a unique curtain of "smoke"—which is not really smoke at all.

The illusion involves a screen 2.6 meters in height and 4 meters in width, composed of a thin film of Ethylene Glycol vapor, and it is the world's largest creation of its type.

Based on the principles of the air-curtain, it was constructed by Mitsubishi engineers from designs by Toho. Refining wind-tunnel experiments on laminar flow, it involves 1300 nozzles which spurt vapor in a straight line to form a thin layer of "smoke" that is consistently stable.

Experiments by Toho several years ago had resulted in the creation of a Smoke Screen, but it was restricted to a size of 70 square centimeters. When it was suggested that this method be employed at EXPO, studies were instituted by Mitsubishi engineers to find ways and means of making a larger screen. An apparatus was constructed which sandwiches a layer of smoke between two layers of air, resulting in a screen of one

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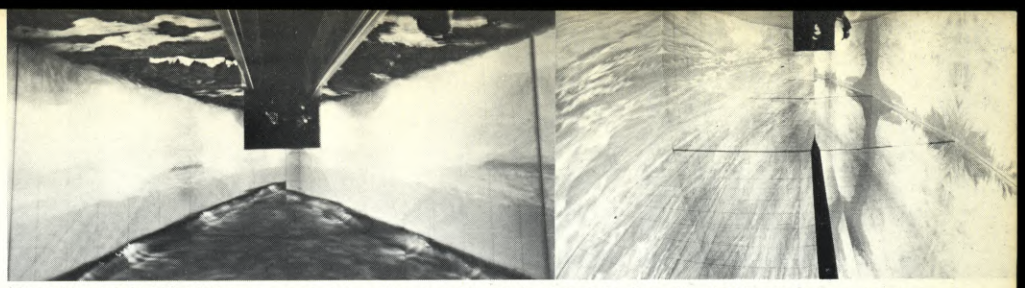
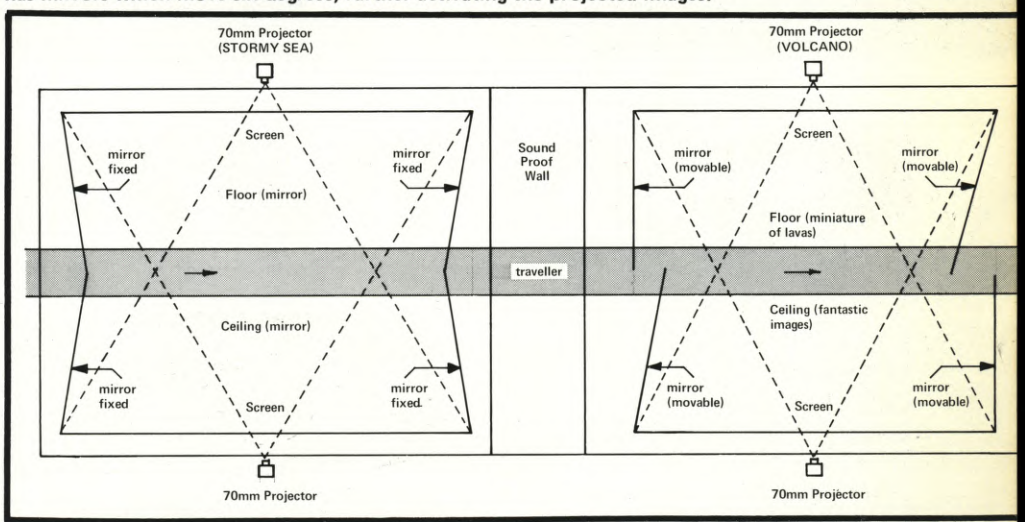
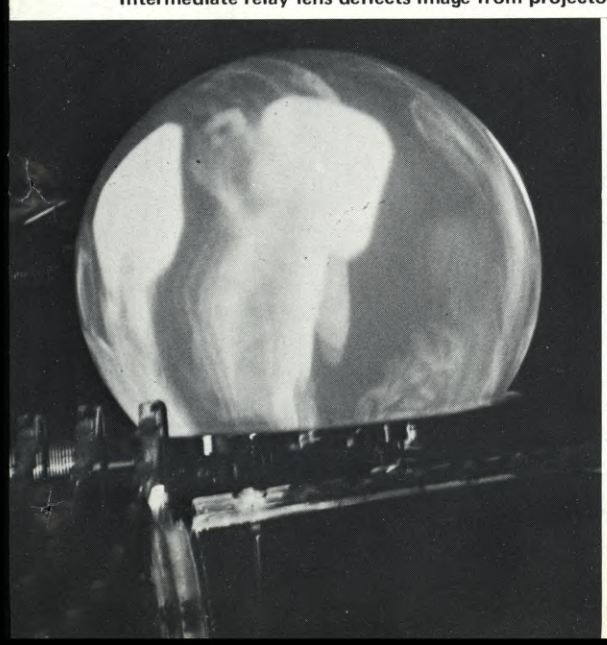
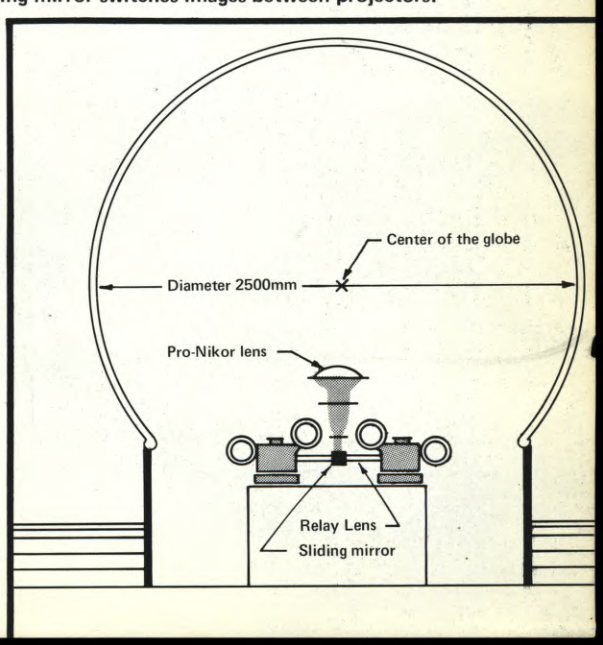


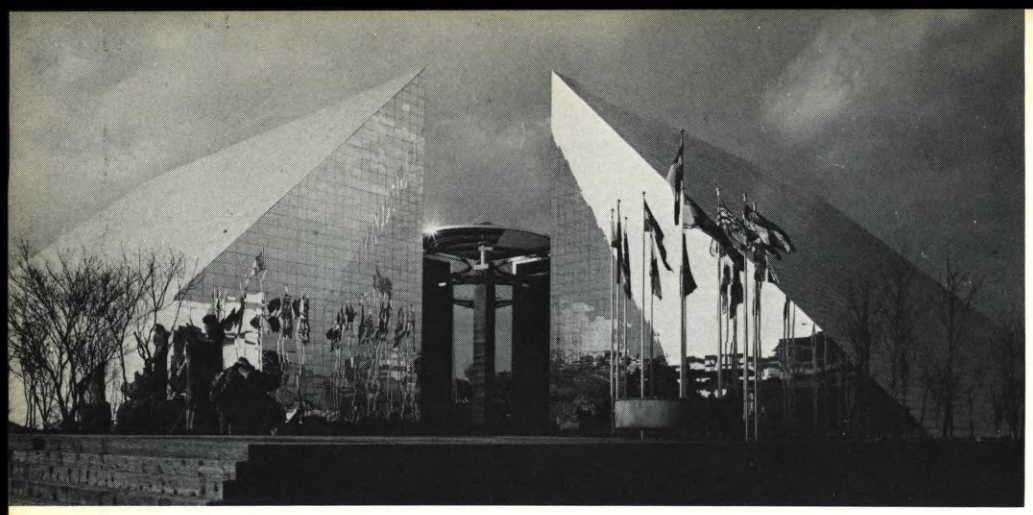
(ABOVE RIGHT) Visitors on moving "travator" glide through first Hori-Mirror Screen room, while giant typhoon waves crash around them. Special wide-angle projector lenses were designed to throw 70mm image onto huge screens only 55 feet distant. (LEFT) Second Hori-Mirror room features, besides fiery film images of volcanic lava flow, activated miniatures creating illusion of lava flowing across the floor. (BELOW LEFT) Diagram showing relationships of mechanical elements in "Stormy Sea" room in which mirrors are fixed. (BELOW RIGHT) "Volcano" room has mirrors which move six degrees, further activating the projected images.



(LEFT) Spherical Screen globe is coated on the outside with new luminescent pigment of 0.5mm thickness over arylic resin base. (CENTER) Pro-Nikkor F/2 lens with focal-length of only 2mm covers angle of 220 degrees. Containing 15 elements, it was mounted on a base 45 centimeters long to avoid picking up shadows of projectors. (RIGHT) Schematic diagram showing slide projectors, lens and relay apparatus inside globe. Intermediate relay lens deflects image from projector to Pro-Nikkor lens at 90-degree angle. Sliding mirror switches images between projectors.







"Excitement" is the key word for this "mirrored mountain" that rocks with the beat of youth—and houses two colorful film presentations

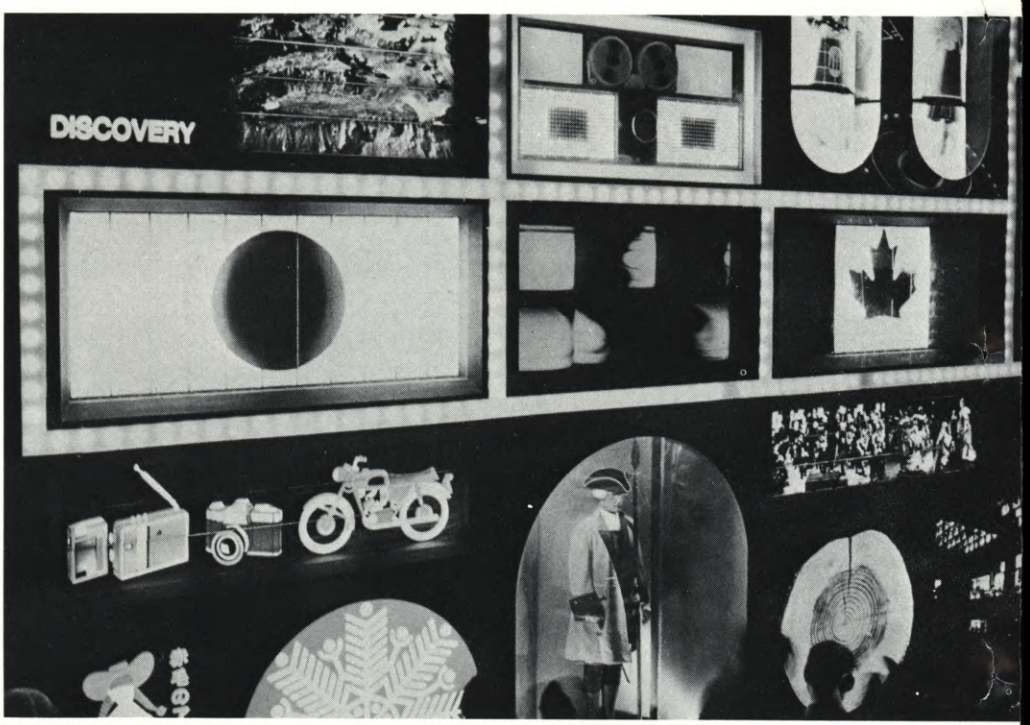
CANADA

The theme of the Canadian Pavilion at EXPO '70 is contained in one word: *"Discovery".* It is an invitation to the audience to discover Canada, as well as an explanation of how present-day Canada evolved.

The pavilion reveals the beauty and the challenge of the land and explains the diversity of the Canadian people. It is divided into six areas, five of them theatres, each one with a controlled pulse of 6 minutes and the last segment a free-flow area.

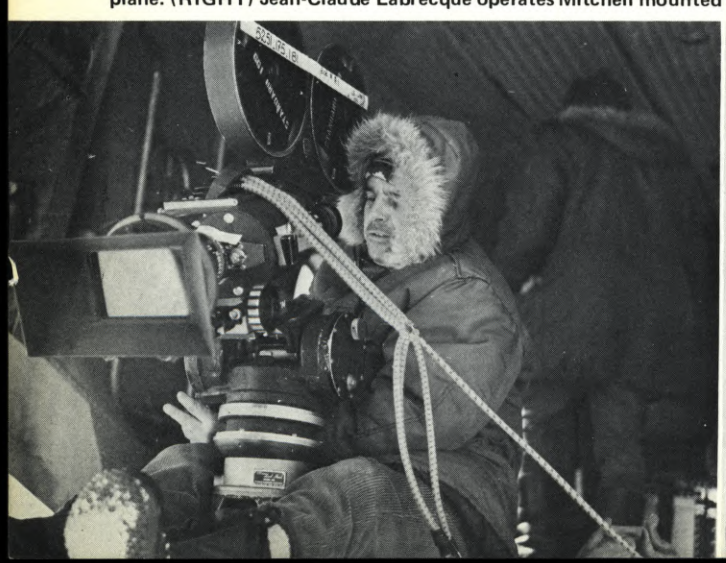
This controlled audience pulsing permits the accommodation of approximately 3,000 people an hour within the pavilion itself and another 1,000 or so in the courtyard.

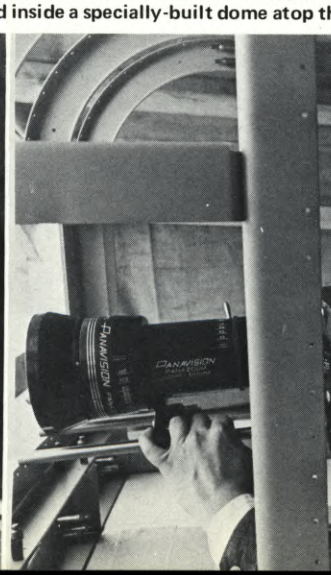
Throughout the pavilion, music flows from a soundtrack composed by "The Collectors," a widely known pop music group from Vancouver, who have based their musical interpretation on a theme that creates an element of continuity throughout the exhibit area. What is new about their instrumentation is the use they make of the remarkable range

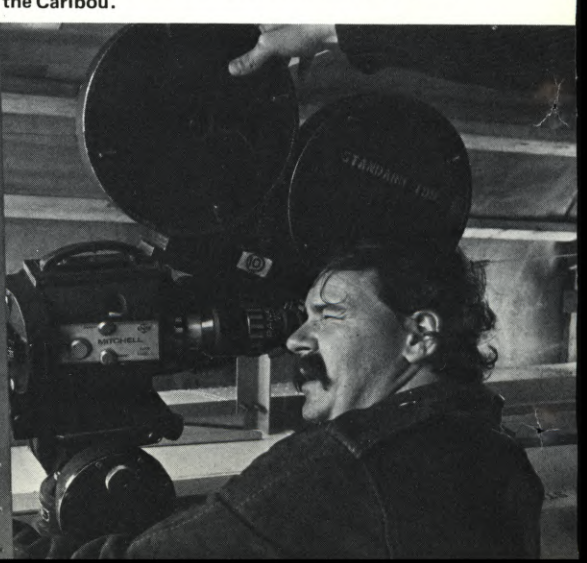


In the first area of the Canadian Pavilion a multi-media wall comes to life and a computer introduces visitors to Canada's history and cultural life through the use of artifacts, spinning drums, chaser lights and slatted panels in a mixture of eye-dazzling techniques.

Feature attraction of the Pavilion is "THE LAND", a six-minute spectacular filmed in Panavision and projected in 70mm onto a huge triangular screen. It was produced by the National Film Board of Canada. (LEFT) Michel Thomas d'Hoste shooting from the rear position on board the Caribou camera plane. (RIGHT) Jean-Claude Labrecque operates Mitchell mounted inside a specially-built dome atop the Caribou.








(LEFT) Bus eats man—or so it appears, as "SUPERBUS", four-wheeled star of the light-hearted film of the same name, pauses for repairs. (CENTER) In Vancouver a crowd gathers to enjoy an impromptu pop concert. (RIGHT) In the course of filming "SUPERBUS" being loaded aboard a Japanese freighter for its long sea journey to Osaka, a 50mm-to-500mm zoom lens slid off the camera and shattered as it hit a steel railroad track.

of dynamics made possible by electronics. The pop music of today is a universal language which, more than anything else, unifies the youth of the world.

Only slightly the worse for its lengthy safari across Canada and the Pacific Ocean, the psychedelically painted "SUPERBUS" pulls up in front of the Canadian Pavilion to remain on display during the entire run of EXPO '70.

GENERAL INFORMATION ON THE CANADIAN PAVILION

1. **SITE:** No. 4090 close to the main gate; it covers 103,000 square feet. EXPO's moving sidewalk system passes the south side. The first exit on the moving sidewalk is onto Tuesday Plaza, adjacent to the Canadian Site.
2. **CONCEPTION:** A truncated pyramid with 45° inclined walls sheathed with mirrors, terminating at a height of 65 ft.
3. **ARCHITECTS:** Erickson/Massey of Vancouver. As a team they have been recipients of several awards and distinctions. Amongst these are five Massey Medals; 1955, 1958, and three in 1967, the Best Design of Pavilion in the Tokyo International Trade Fair and the Prestressed Concrete Institute Award in 1966.
4. **EXHIBITS:**
   a) Designed by staff and contract personnel.
   b) The spirit of the pavilion has been derived from the theme *"Discovery"*. The magic carpet tour takes visitors through 5 pulsed sections; the 6th one being a free-flow area. As modern explorers, the audience makes a voyage through space and time, and discovers Canada by means of sound and color.
   c) Techniques include film projection onto a triangular screen 48 feet wide and 24 feet high, an entirely new method of illustration using electro-luminescent cells, and a "psychedelic bus" which was used in filming Canadians across the country is featured in the pavilion.
5. **SPECIAL EVENTS** include:
   (a) The National Ballet
   (b) The Montreal Symphony
   (c) The musical "Anne of Green Gables"
   (d) The Band and Musical Ride of the Royal Canadian Mounted Police
   (e) Continuous performances by individuals and groups including Les Feux-Follets on an open-air stage at the Canadian Pavilion

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(LEFT) Filming Arctic snowscape sequences for "THE LAND", Claude Larue shoots from the rear position of the Caribou. (RIGHT) Three Eskimos watch rather skeptically as the Mitchell camera is loaded aboard a dog-sled for wild traverse across Arctic wasteland. "THE LAND" was filmed intermittently during a period of eight months, covering Canada's five broad geographical divisions and all four seasons.


SHOOTING IN CANADA ?

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CINEQUIP

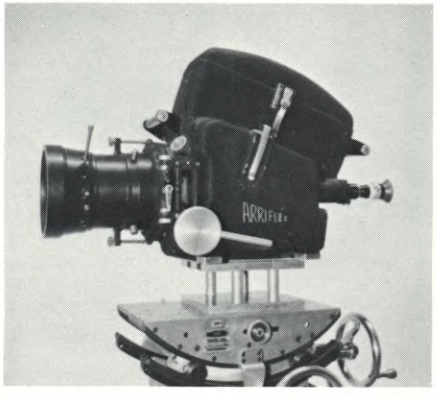
Cameras — BNC Reflex — NC Reflex — Standard High Speed
Arriflex — 16mm & 35mm — blimps & zooms
Worrall — O'Connor — Sachtler & Wolf Gyro

Studios — Dollies — Lighting & Grip Equipment — Generators
Crews — Video Tape — Set Design & Construction — Post Production

CAMERA MAINTENANCE & MACHINE SHOP SERVICE ON PREMISES

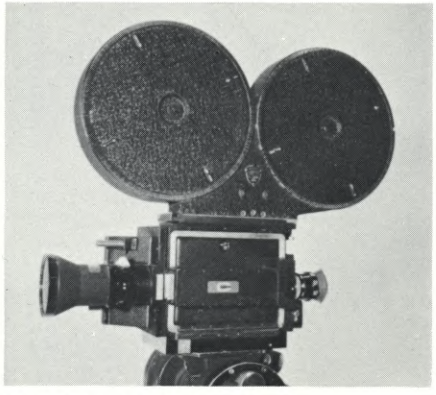
CINEQUIP MODIFICATIONS

35mm Arri Blimp
with Zoom Housing



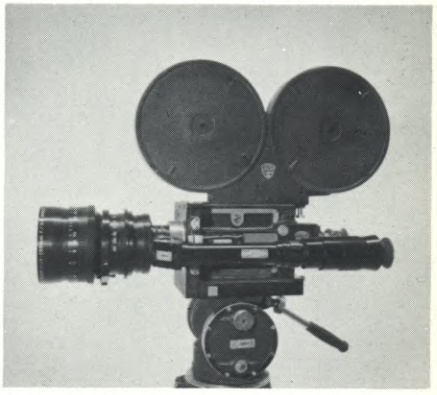
Quick change to standard lenses.
110 volt AC — 24 volt DC sync.

NC Reflex



All Arri mount
lenses from 9.8 up.

Mitchell
Standard high speed



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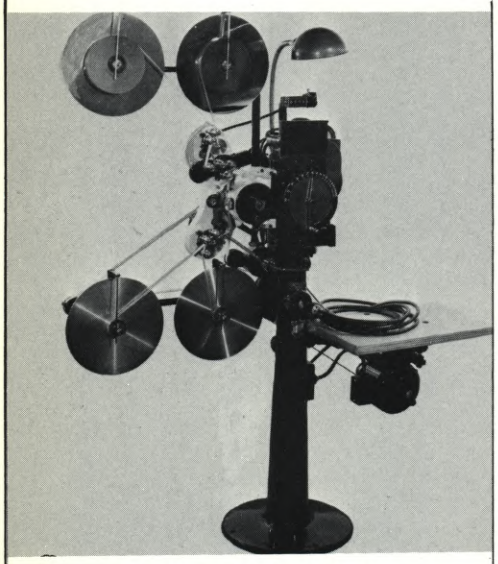

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Models D and J

These are the most widely used printers in the industry. Features include 22 exposure positions controlled by magnetic clutch, variable aperture, high-intensity lamp house, 1200-ft. capacity, motor-driven cooling fan, friction-type flange hubs and many more.

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Rebuilt, Like New **$4995.00**

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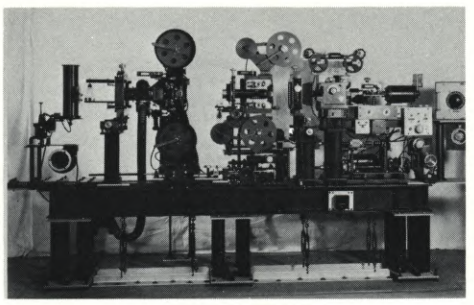
Capacity, 10-20 negative scene tests per minute. Single control, 11 step wedge. The standard of the industry for years.

Model 1049, used in good condition . . . SALE PRICE: **$995.00**



35mm OPTICAL PRINTER

Equipped with standard Acme 35mm camera with reflex viewing prism and variable fade from 8 frames to 12 feet. Projector is set up for bi-pack and has aerial lens which works with a third projector that slides in and out of place or with title board that takes front or back lighted titles. Camera and projector have motors with variable speeds from 2 f.p.m. to 4 f.p.m. Stop motion works at 20 feet per minute. Available for viewing in our Hollywood showroom. Original cost $90,000.00.

SALE PRICE: **$10,500.00**

C-2 FILM DRYER . . . 16/35mm

Automatic continuous drying of 16mm and 35mm 200-ft. black and white negative, positive, reversal and color roll film. Dries 100 feet of 35mm film in only 6-12 minutes.

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DEPUE LIGHT CONTROL BOARDS

Separate unit with provision for electrical connection to motion picture printing machines. Provides 22 standardized degrees of picture printing light intensity in any predetermined order or sequence. Also can be used with microfilm printers and optical picture reduction printers. Original cost more than $1500.00.

SALE PRICE, Model 152: **$685.00**

35mm COLOR ADDITIVE PRINTER

High intensity lamp, 120 f.p.m. printing speed, integral fader, separate sound head printing assembly. Original Cost, $20,800.00.

As is, needs repair **$6500.00**

HERRNFELD SCENE TESTER

Takes the place of a Cinex machine in making 35mm color prints. Primary function is to make it possible for the timer to select the proper color correction filters and printing densities for a given color original or dupe.

Model 1508, 35mm: SALE PRICE **$1295.00**

OPTICAL SOUND PRINTING HEADS

For attaching to all Peterson and Bell & Howell printers. Sound head comes complete with extra feed and take-up levers.

16mm for B&H Models J, C . . . Original Cost $3450.00.

SALE PRICE: **$1895.00**

35mm for B&H Models D, C . . . Original Cost $3450.00.

SALE PRICE: **$1895.00**

OTHER PRINTERS AVAILABLE

Arriflex 35mm Step Printer, with punch tape control **$1495.00**

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BELL AND HOWELL PRINTER PARTS AVAILABLE

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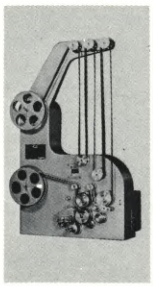

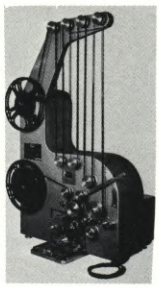

EDGE NUMBERING MACHINES

Edge numbers rolls up to 3000 feet. Micro switch cuts power when roll is completed. Counter checks film footage. Running speed is from 80-110 f.p.m. With new numbering block.

ENM-16mm, list price $2675.00 SALE PRICE: **$1995.00**

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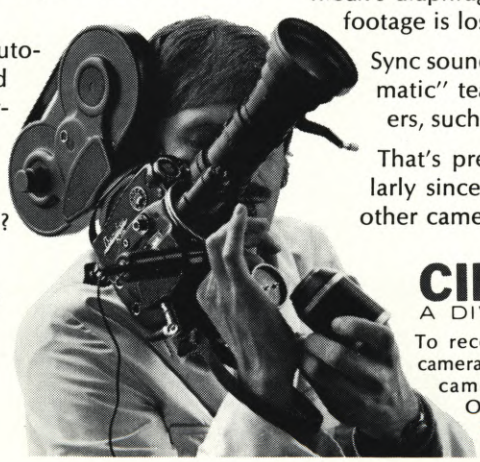
Take another look at the R16B "Automatic". That's a 200 ft. daylight-load magazine on top, a sync pulse generator plugged into the side, and an Angenieux 12-120mm zoom lens out front. Now how much would you say the entire outfit weighs? Including the battery.

If you guessed as little as 12 pounds, you guessed too much. It's 10½ pounds! And the price is just a little over $2,650!

You don't have to give up critically important features, either.



Like rock steady pictures. Like a mirrored shutter, for reflex viewing with no prism between the lens and the film plane.

You also get the finest automatic exposure control system ever built. A Gossen light meter measures the light intensity coming directly through the lens. And it electronically controls a miniaturized motor that instantly rotates the Angenieux's diaphragm ring to the correct aperture setting. No footage is lost due to rapidly changing light conditions.

Sync sound is no problem. Your Beaulieu R16B "Automatic" teams up naturally with professional recorders, such as Nagra and Uher, for sync sound filming.

That's pretty good for a little over $2,650. Particularly since you couldn't get this combination in any other camera even if you spent twice as much.

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To receive literature on Beaulieu 16mm and Super 8 cameras, or Heurtier projectors, please visit your finest camera store or write Cinema Beaulieu, General Office: 14225 Ventura Boulevard, Sherman Oaks, California 91403 or New York Office: 155 West 68th Street, New York City, New York 10023.

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During the shooting of his version of Snow White and the Seven Dwarfs, Theophilus P. Mogul heard of the Eastman Film Family for the first time. Turning to his leading lady he said, "I am curious, White. Will the Eastman Film Family sing in my new GP musical?"

"Film Family is simply a colloquial term for the Eastman Color System, T.P.," interrupted an assistant. "And you know we always use the entire system, from *Eastman* Color Negative Film, through *Eastman* Color Intermediate Film, to *Eastman* Color Print Film. We don't want to sacrifice quality anywhere in a Mogul release."

"Sure, sure," said Mogul. "But will they sing?"

"Everything sings with your leadership, T.P.," said the assistant, hiring an assistant.

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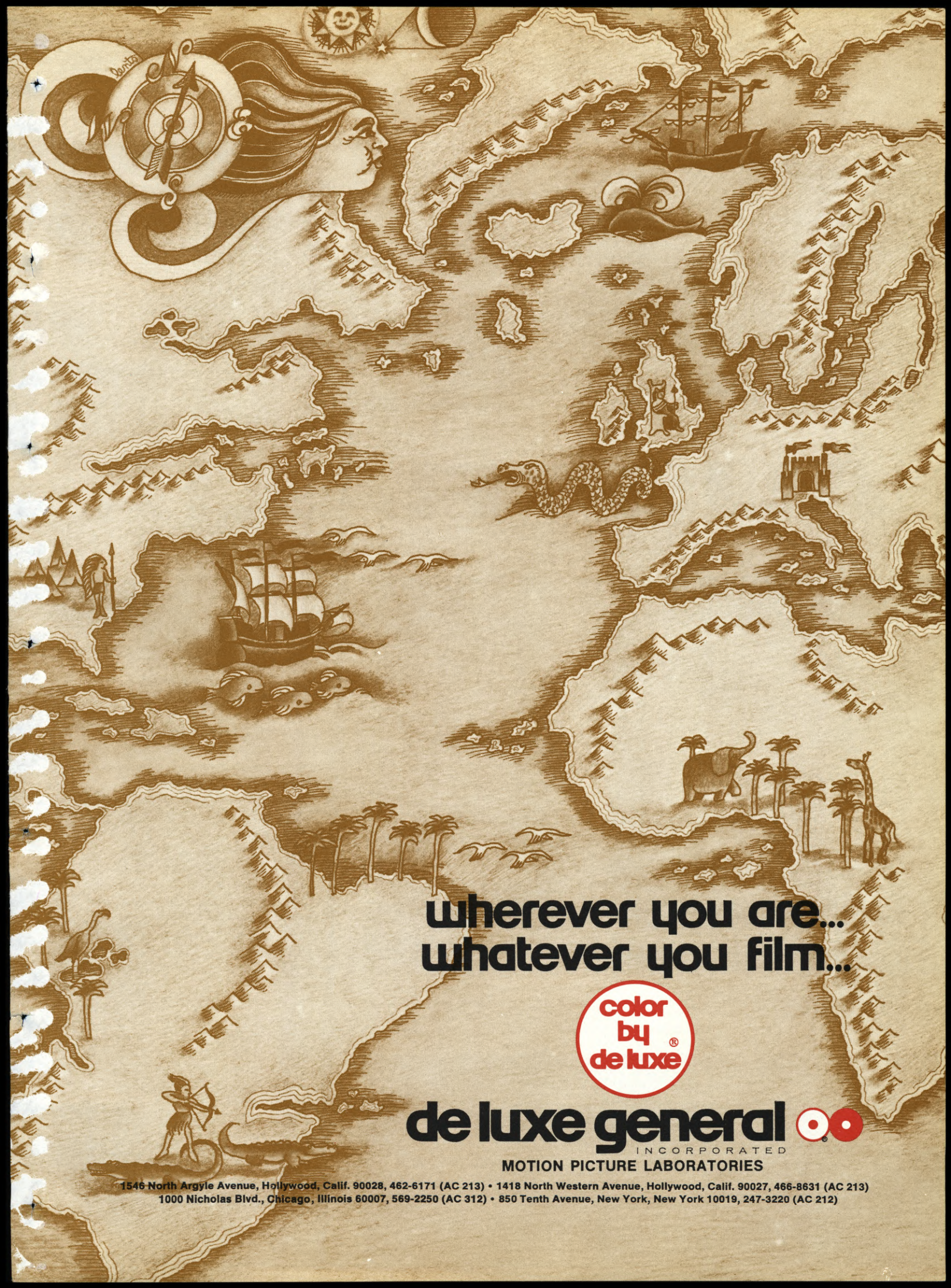

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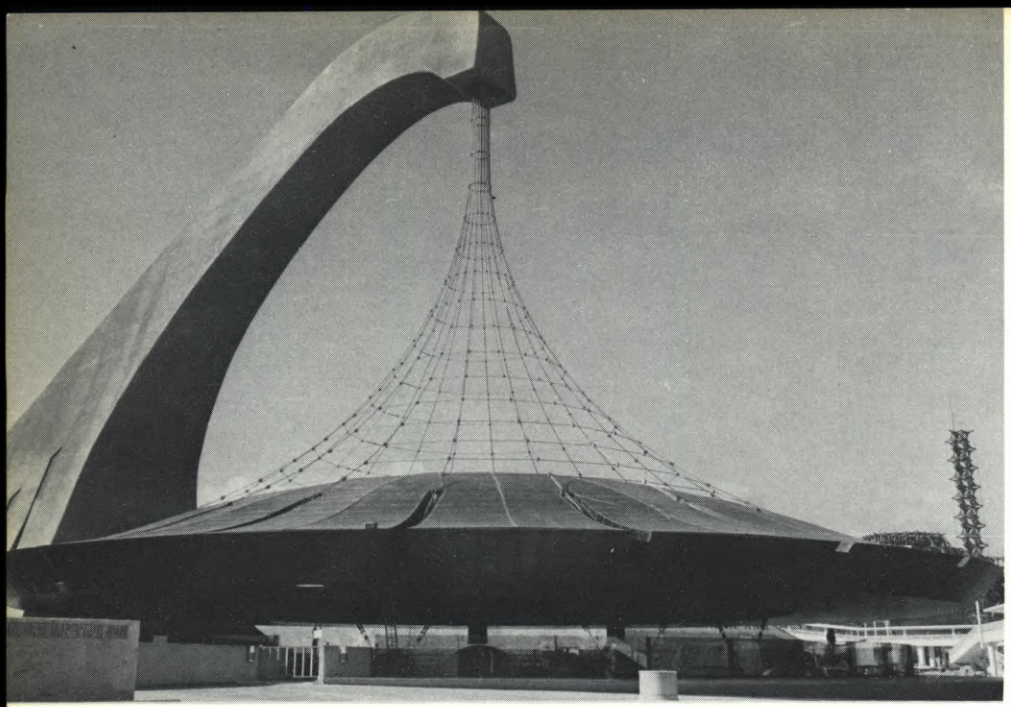
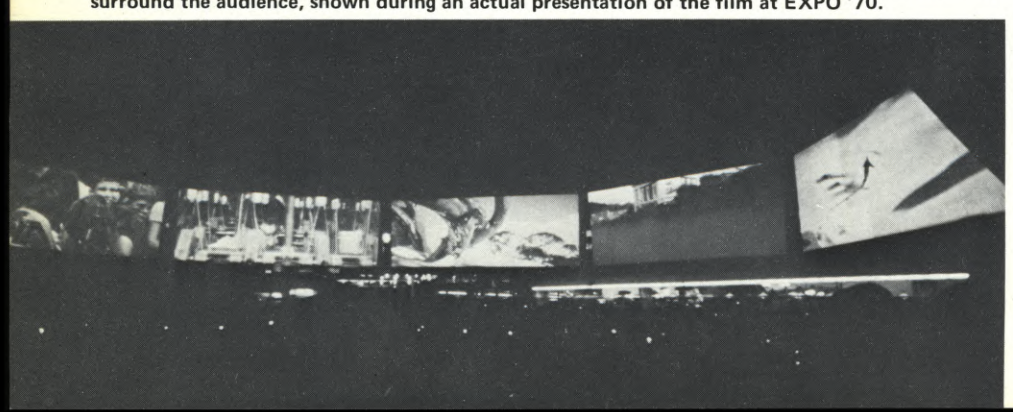


A beautiful film in-the-round, shown inside a pavilion that is a stunning statement of grace and strength in architecture

AUSTRALIA

(ABOVE) A mock-up of Australia's EXPO '70 circular pavilion was built on the "backlot" of Australian Commonwealth Film Unit's headquarters at Lindfield, a parklike suburb of Sydney. This provided a means of working out technical problems in the projection of "HORIZON" and testing audience reaction in advance. (BELOW) Five of the nine wide screens that completely surround the audience, shown during an actual presentation of the film at EXPO '70.



Combining two very different and seemingly opposed architectural forms into a design of stunning simplicity, the Australian Pavilion at EXPO '70 achieves an impression of clean strength and visual harmony that makes it one of the most spectacularly original structures on the site.

The most striking feature of the Australian Pavilion is a cantilever tower, sloping up gracefully to the height of a 10-story building and curving over at the top to form a "sky hook." From it is suspended a 260-ton, free-hanging circular roof which appears to float above the ground.

This tower resembles a huge wave, about to break, and in fact the inspiration was drawn from the famous Japanese Hokusai woodcut, "The Wave," with Mount Fuji in the background. The building also symbolizes Australian resources emerging from the ground and gaining refinement from modern technology.

Visitors preparing to enter the underground exhibition are sheltered by the roof and entertained by a dramatic film spectacular projected on wide screens extending entirely around its inner rim. The main exhibition is presented in a tunnel below ground through which you are transported on moving platforms.

THE "SKY HOOK" TOWER

Australia's pavilion at EXPO '70 was conceived and designed to present a contemporary image of a socially and

industrially advanced young nation which has emerged in a few years from its mainly rural beginnings. It is intended to symbolise the forward-looking mood of present-day Australia.

At past world expositions the pavilions that won world acclaim were those that demonstrated unusual and exciting structural principles. In the little Expo world of new shapes and forms, the unorthodox Australian "sky hook" tower, with the free-hanging circular roof suspended from it, strikes its own individual note. Its elegant simplicity has already been discussed in architectural journals around the world.

appreciated by the Japanese people. The building, as it rises out of the ground, can be seen to express the idea of the resources of Australia emerging from the earth, rough and crude at first, but gaining refinement as the form develops to the culminating point of the "sky hook". "The contrast" he said, "is carried down into the hanging roof which, despite its size and weight, is expressed with precision and delicacy. Weighing 260 tons, and 160 feet in diameter, the roof appears from a distance to float above the ground with no visible support as though it has broken

Continued on Page 686

Inevitably, kangaroos hop and gambol about the screens of "HORIZON", drawing reactions of delight from the constantly changing audience.

(LEFT) Keith Gow and David Sanderson at work filming an exterior sequence for "HORIZON". (RIGHT) Cinematographer Don McAlpine and Director Bob Kingsbury with camera in water-tight housing, prepare to shoot an underwater sequence. Camera teams of Australia's Commonwealth Film Unit traveled the vast Australian continent for a year to film scenes for the spectacular production.

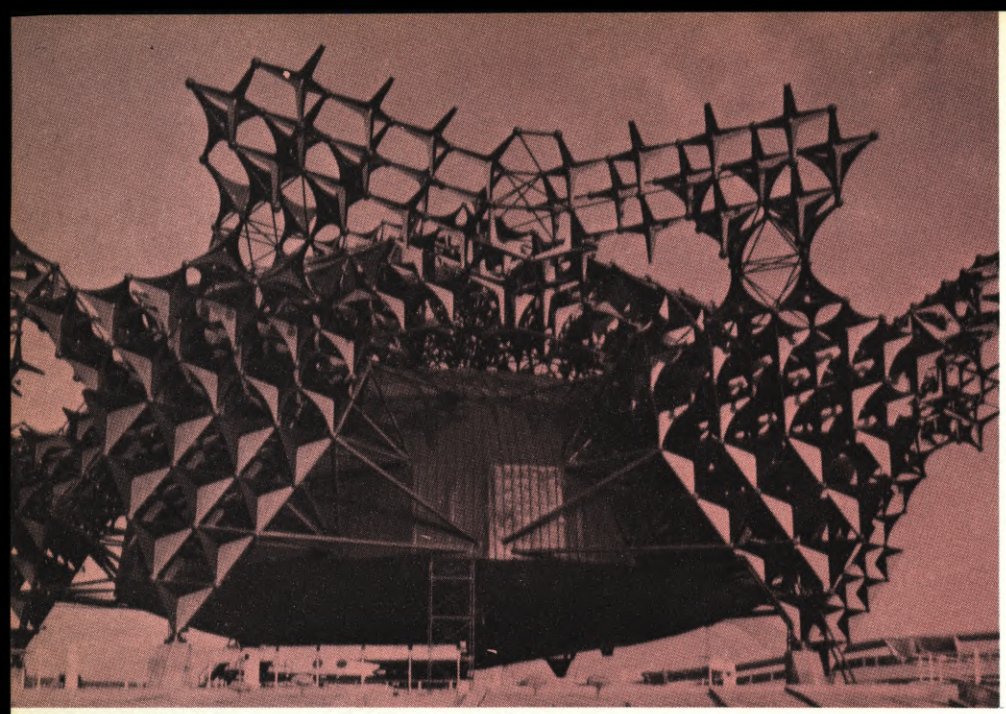
Its designer is a young Australian architect named James Maccormick, a principal architect of the Australian Federal Department of Works. It has been likened picturesquely by one writer to a dinosaur with a birdcage hanging from its teeth.

Mr. Maccormick says that he was influenced on a visit to Japan by the shape of a bronze lotus plant sculpture he saw at a Buddhist temple near Tokyo and also by the famous Hokusai woodcut "The Wave" from "The 36 Pictures of Mount Fuji". In other words, he says the building expresses the meeting of Western and Eastern influences.

Rising at an angle to a height of 128 feet (40 metres) to dominate the Australia plaza, the tower curves over at the top to form the "sky hook". It is formed by a structural steel cantilever covered by a skin of sprayed concrete. Inside the tower are housed four floors of administrative offices and reception and dining rooms.

Mr. Maccormick feels that the structure has a symbolism that will be

Gow and Sanderson shown filming girls riding the "Big Dipper" at Melbourne amusement park. "HORIZON" combines a wide variety of subject matter to present a unified impression of Australia and its people.



In a futuristic structure, designed by computer, the audience is raised by means of a hydraulic lift and rotated to view a cinematic paean to youth, presented on the world's largest 360-degree multiscreen

TOSHIBA-IHI

Computers helped design and build the pavilion sponsored jointly by Tokyo Shibaura Electric Co. (Toshiba) and Ishikawajima-Harima Heavy Industries Ltd.

The result is intended to symbolize a "forest of the future." The exterior is composed of 1,500 metal tetra-shaped units welded together into a striking framework. Suspended within the framework is the 500-seat Global Vision Theater. Next to this is a landmark tower, also made of tetra units, that is lighted at night for a sculptural effect.

The Global Vision Theater (center dome) is completely supported by the outer frame and deformation of the space frame is prevented by the torsional rigidity of the dome.

The Toshiba IHI Pavilion suggests a new venue for architecture in the future and symbolizes the unlimited energy of Man.

Noriaki Kurokawa—a promising young architect—is the designer of the pavilion.

EXHIBITS:

The main attraction takes place in the Global Vision Theater. In order to get to the theater on the second story level, spectators ride on a huge circular platform with 500 seats. When elevated, the platform turns into a viewing area. It takes exactly one minute to lift the 300-ton saucer (670-HP hydraulic system) into the multiscreen theater.

"A TRIBUTE TO MAN"—An 18-minute documentary is projected on the world's largest 360-degree multiscreen. The film dynamically depicts the energy of young people around the world.

During the film performance, the seating platform rotates several times, heightening the screen and sound effects.

A special symphony composed by Isao Tomita played on a 12-channel multi-sound system, provides vivid sound effects.

The film was made by Iwanami Productions and the crew toured the world for over 14 months, covering a distance of 77,000 kilometers.

About 124,000 feet of film (enough for 24 hours of screening) was shot and

Continued on Page 689

Cutaway rendering which shows the saucer-shaped audience platform in its fully-raised position in relation to the circular screen configuration of the pavilion. At times the picture is a single image totally surrounding the audience, while at other times it breaks up into multiple, individual images related by theme.

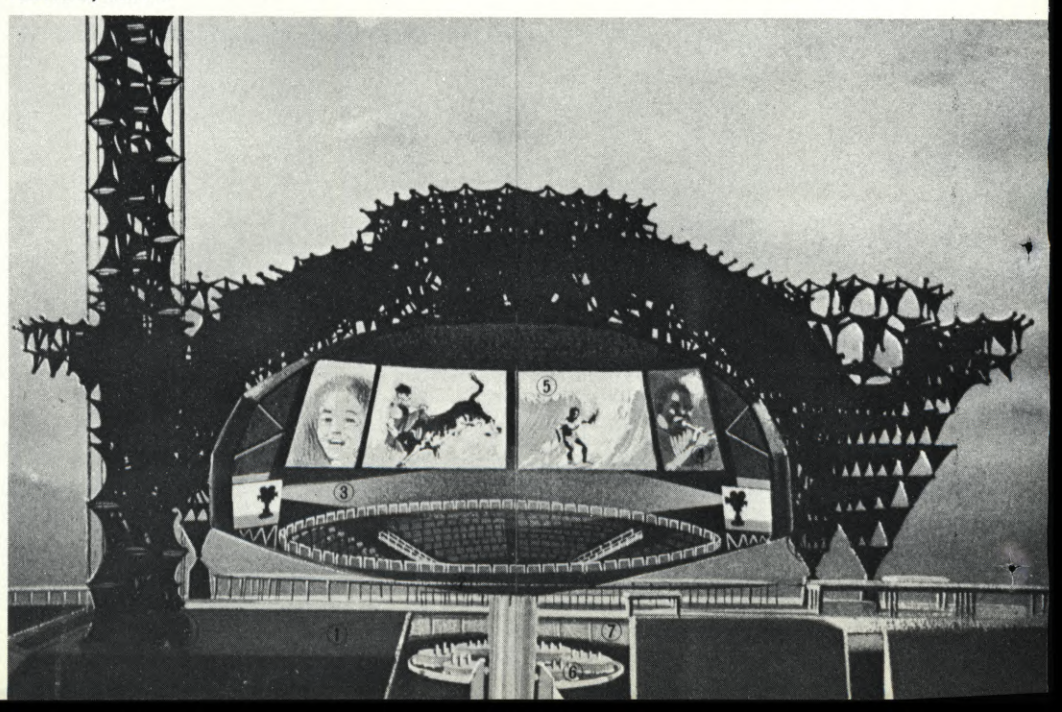
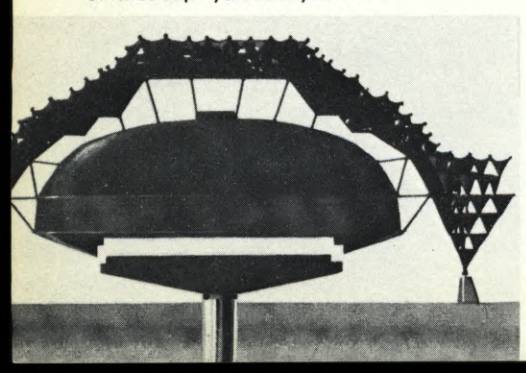


Diagram showing 300-ton "saucer" of the Toshiba-IHI Pavilion partially raised by means of its 670hp hydraulic system.



Would you be astonished?

A 16mm producer in a distant city who for years has had all his laboratory work done at MPL, recently came to visit us for the first time. He said he was astonished at what he saw, and exclaimed, "I had no idea of the size of this place!"

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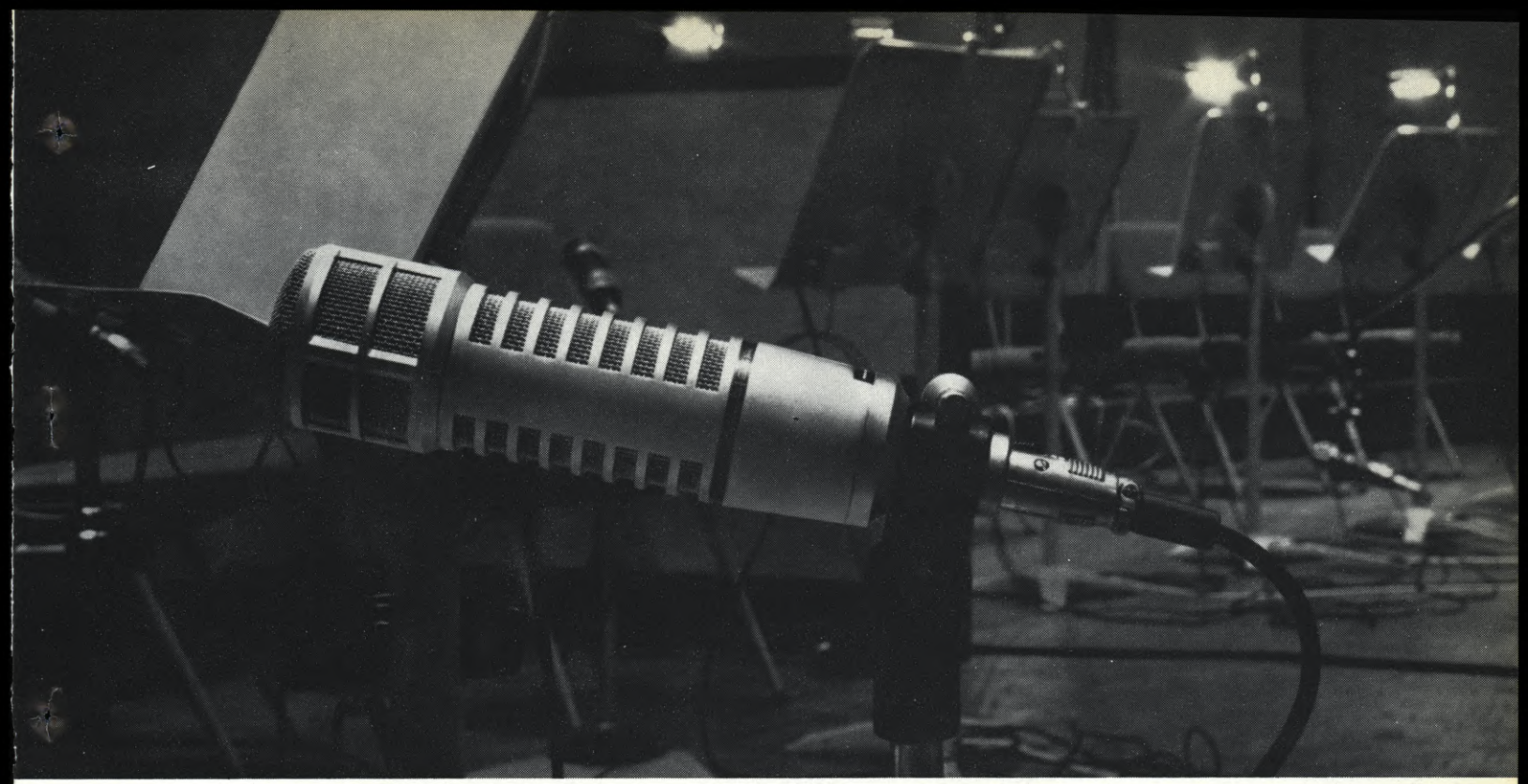
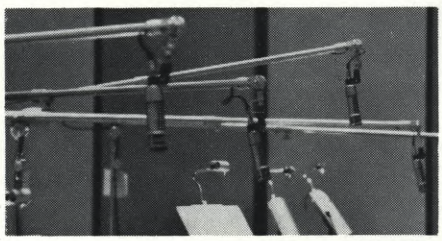


How good is the new Electro-Voice RE20 studio dynamic microphone?

Here's proof from the new scoring stage at Glen Glenn.

The fine reputation of Glen Glenn Sound Company rests on their knowledge of sound... their ability to turn a full symphony orchestra into a perfect sound track for TV, the movies, or a new album. And their desire to be first with the finest.

So for their new scoring Studio M, Glen Glenn engineers asked to see the latest products in every category... tape, film, electronics, and — of course — microphones. Especially a new E-V dynamic cardioid microphone which they had seen in prototype form earlier.



Glen Glenn put the RE20 to the test. Including days of studio experiments and actual sessions that pitted the RE20 against every type of musical instrument. Plus a searching critique by the musicians themselves. The RE20 passed every test with flying colors.

As a result, when Studio M was completed, RE20's were on the booms... almost four dozen of them from our first production run.

Since then, Glen Glenn has scheduled a number of major recordings with RE20's. And the RE20 has often been used where previously an expensive condenser was the automatic choice. Why? Because the RE20 has proved itself a significant advance in microphone design. With wide-range, peak-free response on axis (even the off-axis response is better than many other studio microphones on axis). Transient response rivals any other studio microphone, regardless of design. Directional control is uniform and predictable from every angle. Yet proximity effect is virtually eliminated (a problem that plagues almost every cardioid — except E-V Continuously Variable-D® microphones).

MODEL RE20
dynamic cardioid studio microphone $425.00 list, less normal trade discounts.

In short, the RE20 does everything a good condenser does, and some things better. Without the complication of power supplies. Or special cables. Or shock mounts or windscreens (they're both built in). Or the need for equalization just to overcome design faults.

It's simple. It's flat. It's rugged. It's clean. With a 2-year performance warranty unmatched in the industry (it's spelled out completely on the spec sheet). The RE20. For the studio looking for better sound. Your E-V microphone specialist will gladly loan your studio an RE20 to make any tests you like. Call him today.

P. S. For full technical data on the RE20, write us today. To find out more about Studio M, write Joe Kelly, VP, Engineering, Glen Glenn Sound Company, 6624 Romaine St., Hollywood, Calif. 90038

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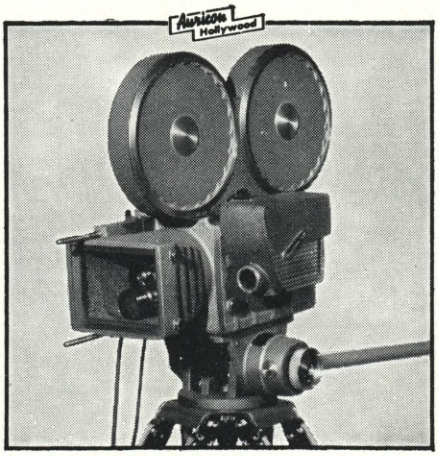
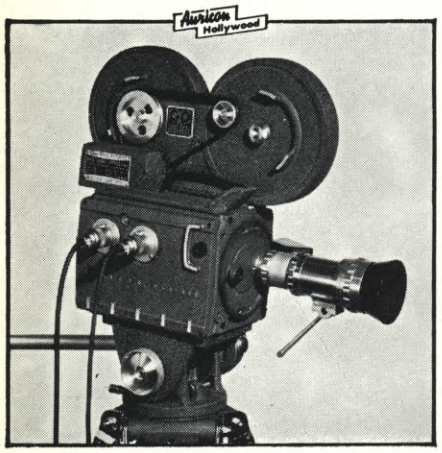


"AURICON PRO-600" 16mm Optical Sound-On-Film Camera.
600 ft. film capacity for 16½ minutes of recording. $1820.00 (and up) with 30 day money-back guarantee.

"SUPER 1200" 16 mm Optical Sound-On-Film Camera.
1200 ft. film capacity for 33 minutes of recording. $6425.00 (and up) complete for "High-Fidelity" Talking Pictures.



"PRO-600 SPECIAL" 16mm Light-Weight Camera.
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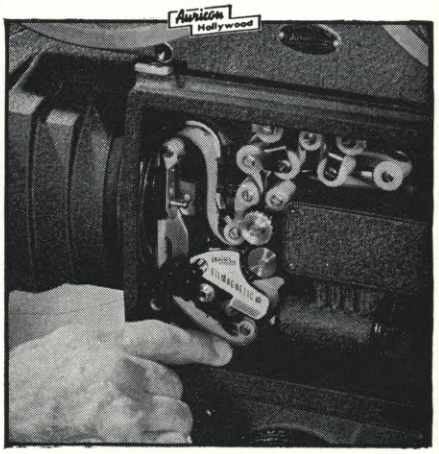

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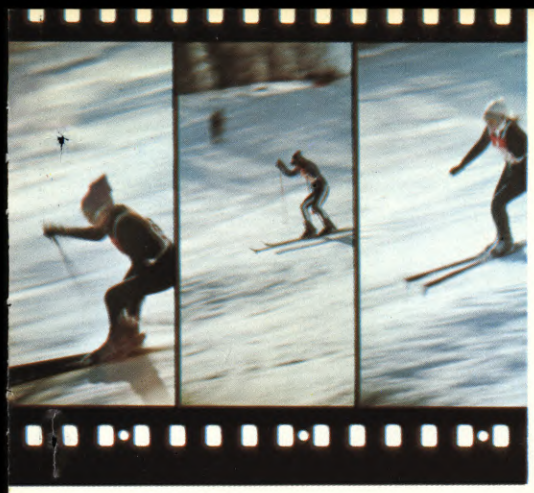
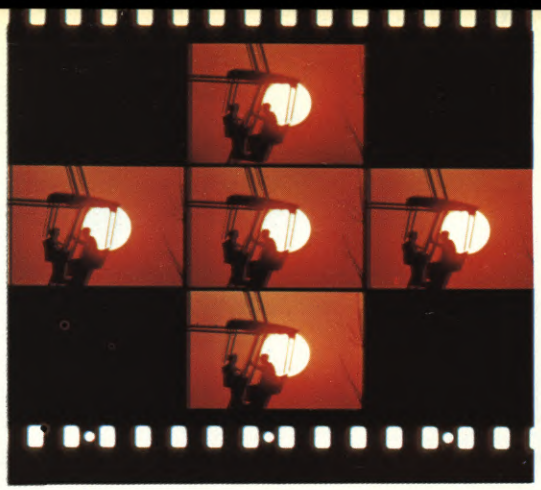
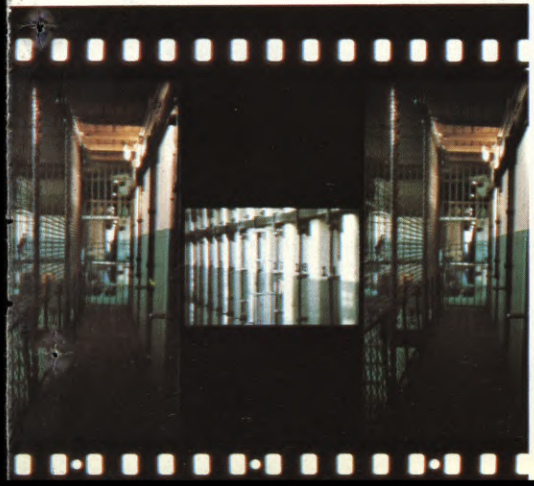
MANUFACTURERS OF PROFESSIONAL 16MM CAMERAS SINCE 1931

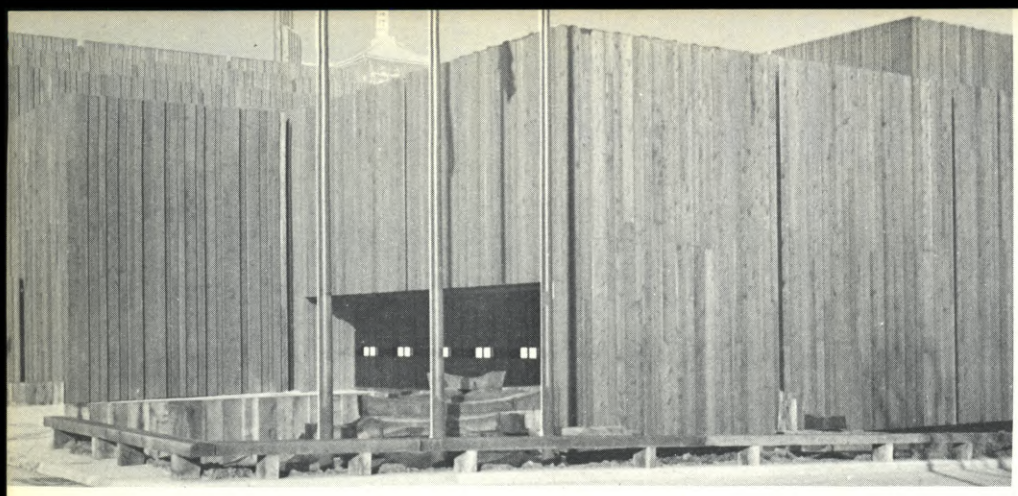













THE STATE OF WASHINGTON

A beautiful film created to represent a beautiful State employs a different approach to multi-image cinematography

Rising from multi-level pools, the State of Washington Pavilion is designed as a reflection of the waters, forests and rich lands of this state located in the northwesternmost part of the United States mainland. The Washington theme: The Harmony of Nature and Man."

The pavilion highlights a 12-minute color movie exposing the best in the environment and life of the State: the purity and beauty of the wilderness as preserved by man for his enjoyment and enrichment. The film shows the cities and how they influence and enrich lives and how man is developing resources from his natural environment. There are glimpses of a more tranquil past existing side-by-side with the future; and the ways that man has found to adapt, preserve, change and grow with his environment in the State of Washington. Filmed in the *Dimension 150* process, the movie is projected on a single, deeply curved screen; a multi-channel stereophonic sound system produces the dramatic effect of being transported to the lakes, forests, cities and farms of the State of Washington.

The feeling of the natural woodland environment is impressively maintained throughout the pavilion itself, which features exhibit clusters on the history and settlement of the State. Pacific Northwest Indian culture, education, resources, Columbia River Basin projects, lumber and related industries, aircraft and aluminum industries, nuclear energy and so on.

The pavilion form is expressed in native western red cedar mounted on a prefabricated steel frame.

CONCEPT INTO IMAGE

CREATIVE THOUGHTS ON "HARMONY OF NATURE AND MAN". BY: Roger Tilton

Creating a multi-image, 70mm, *Dimension 150* film is a little like building a house. You need to have a master plan from the beginning if each brick is to fit into place at the end. As writer, producer, and director of "HARMONY OF NATURE AND MAN" my job was to design a 12-minute portrait of the State of Washington for visitors to the Washington Pavilion at EXPO '70.

The exhibit design firm of Roger Tierney Associates had wisely selected

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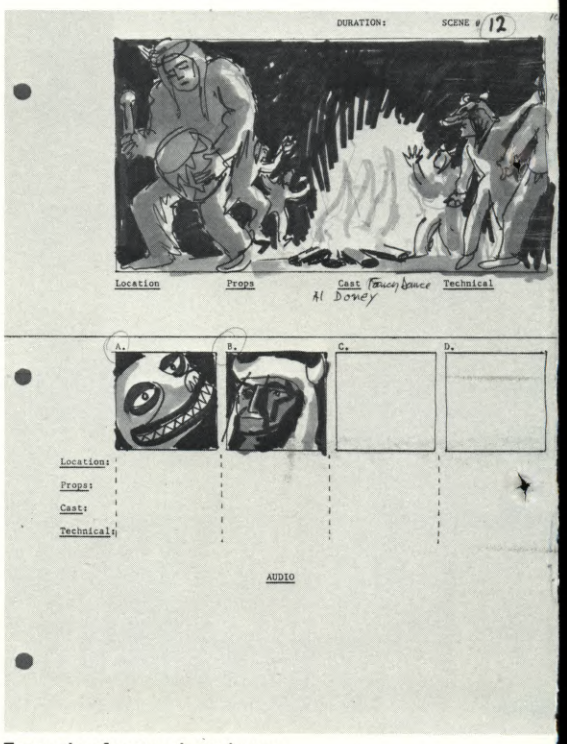
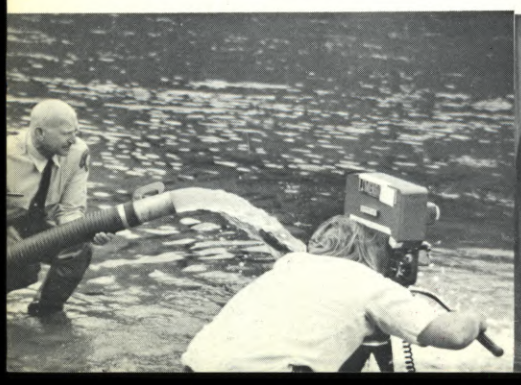
Writer-producer-director Roger Tilton lines up a camera angle while filming "HARMONY OF NATURE AND MAN".



Example of a storyboard page.

(LEFT) Camera operator wades in the water to shoot scene of game warden stocking a pond with fish. (CENTER) Behind-the-scenes during filming of interior sequence involving "hot radiation" equipment. (RIGHT) Cinematographer-editor Barry Gordon, CSC, who filmed EXPO 67's "A PLACE TO STAND", shoots from the nose of the camera plane.



FUJI GROUP

In a vari-colored pavilion held rigid by air pressure, the largest film format in motion picture history is used to communicate ideas of tremendous visual impact

The "hit of the show" at Montreal's EXPO 67, it is generally conceded, was the stunning sight and sound spectacle, "LABYRINTH", created by the National Film Board of Canada.

Certain of these same technicians have joined with some of the greatest talents of Japan to produce the program featured in the startlingly original Fuji Group Pavilion at EXPO '70.

While the EXPO site is packed with magnificent film presentations, most of them are pleasant travelogues and documentaries designed to "put the best foot forward" for the sponsoring organization. The Fuji visual presentation, "TIGER CHILD" is one of the very few that dares present a theme of forceful social significance, and the sponsors of the production are to be congratulated for their courage.

The content of the film includes some strong stuff. Example: on adjacent panels of the screen are juxtaposed images of cattle being butchered in a slaughterhouse and a man being executed in the electric chair. The impact is shattering.

Yet, with all of this gutsy message, there also goes imagery of breath-taking beauty and a visual technique of total originality.

"TIGER CHILD" may well come to be considered the "hit of the Show" at EXPO '70.

Using the revolutionary new IMAX system—the biggest film frame in the history of cinema—developed by Canada's Multiscreen Corporation, the show has been integrated with slide-projection and lights, playing on the walls of the pavilion.

The pavilion itself, built entirely of huge inflated tubes, has become a landmark on the Osaka fair site.

The film, written and directed by Canada's Donald Brittain, was shot on location in four continents, and is titled "TIGER CHILD". The audience views from one to nine images of different sizes and shapes on the screen at any one time.

Producing was Multiscreen's Roman Kroitor, the mastermind of "LABYRINTH", and Kiichi Ichikawa, who made the Japanese classic "WOMAN IN THE DUNES". Georges Dufaux, Canada's top cinematographer, was director of photography.

Continued on Page 670

(RIGHT) Images from 28 giant slide projectors flood the pavilion walls, as Multiscreen film, "TIGER CHILD" fills the giant screen. (OPPOSITE PAGE) Actual size IMAX frames show a few of the many film configurations.

The Dimension-150 camera shown mounted in the nose of a B-26 converted into a camera plane, photographed some of the smoothest aerial shots ever recorded on film. No glass or plexiglass was placed between the lens and the subject.

(LEFT) A series of composite frame blow-ups from the finished print of the Washington State film showing several of the configurations employed. Stationery inserts were "hard-matted" directly onto moving background shots.

Night-for-night filming of a Thunderbird ritual dance on Indian reservation. 2000-watt quartz lights, operated from generator, were filtered to balance warm light from campfire, which was the apparent natural source for the sequence.

Camera crew shoots through side port of camera plane, using 35mm Arriflex camera, with which insert scenes were photographed. Inserts served the same purpose as closeups, cutaways and reaction shots in a conventional film.

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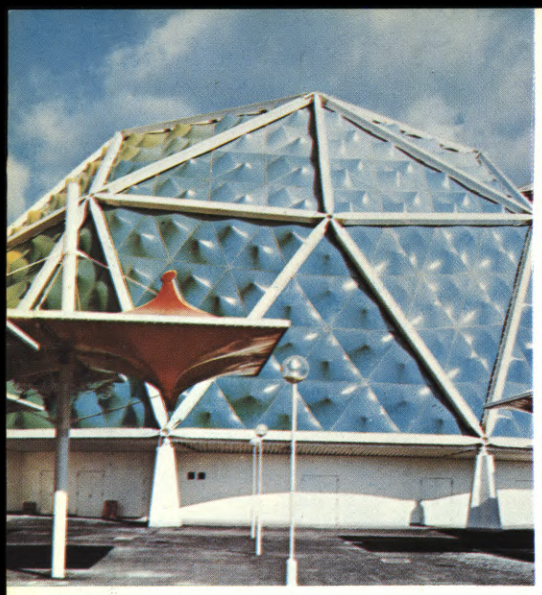


"ASTRORAMA"

In a unique presentation that involves five projectors, the audience is surrounded by a 360-degree film of stunning impact

Movies, the Midori-kai companies feel, are to be seen and to be part of. That's the principle behind this large, domed "Astrorama"—a coined word combining astro and drama.

To create this experience, there first came years of research into cameras, projectors, lenses, light, film and sound. And then into the unique design of the pavilion itself.

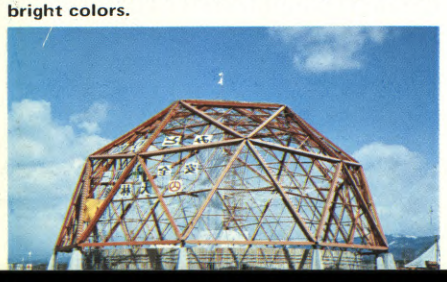
Inside, the visitor is totally surrounded by film images and sounds; he is, in fact, a part of it himself. Images cover the whole interior surface. So, in one sequence for example, a submarine scene can be seen on all sides.

"Astrorama—Multi-dimensional World" is the theme of the exhibition. It is housed in a dome 31 meters high by 46 meters in diameter and made of panels of glass fiber-reinforced plastics highlighted by bright colors. The interior projective space, greater than 12 Cinerama screens in area, involves 190,000 pieces of tape, each 40mm in width.

The upper part of the structure was build of pre-cast concrete sections that provide a sound-proof area for the Astrorama, yet can be quickly assembled or disassembled.

Five projectors—each set specially in a unit with a fish-eye lens—are used in projecting the spectacular.

The Astrorama dome under construction. Steel beams act as supports for panels of glass-fiber reinforced plastics, highlighted by bright colors.



THIS IS ASTRORAMA

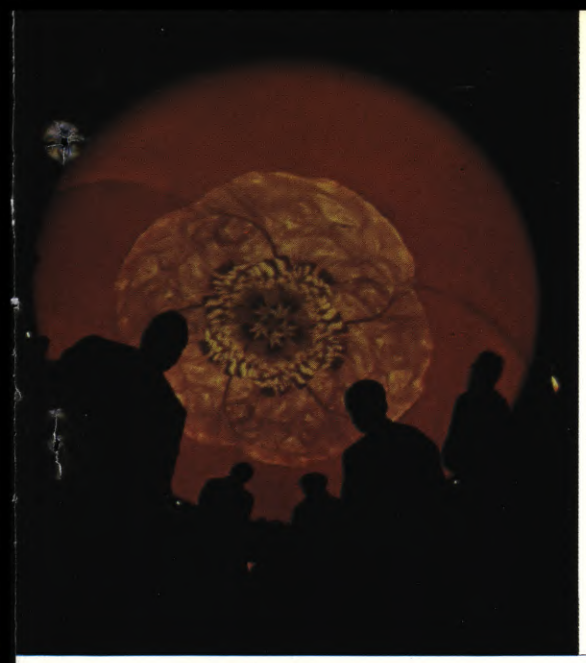
by Linwood G. Dunn, ASC
President, Film Effects of Hollywood

Much has been said, and much more will be written about the many marvelous pavilions at Japan's EXPO '70 in Osaka. This is a story about one of them . . . of the years of study and concerted effort leading to the realization of possibly the most unique and technically ambitious motion picture film presentation system ever exhibited.

The *Astrorama* Pavilion is a multicolored fiberglas paneled dome in which is installed an 18,000-square-foot hemispheric screen with a diameter of 98 feet and a height of 82 feet. The screen is made up of 190,000 40mm strips of special nylon tape, mounted horizontally and each slightly angled down to minimize stray light reflection. Five synchronized 70mm films, traveling horizontally, are projected across the theater from five equidistant points in the circle, just clearing the audience, the five segments blending together from bottom to top of the dome screen to form one complete hemisphere of motion pictures. 424 speakers of three types installed behind the screen in 16 groups complete an exciting sound and picture "surround" effect with a realism never before experienced.

Two film presentations, one 16 minutes long and the other 8 minutes, are shown continuously to an audience of 1000. "BIRTH" is "a stirring drama of the history of man, from the beginning of the universe to a visionary glimpse of the distant future. It attempts to help man break free from the shackles of his everyday life to experience a new birth of spirit." The shorter presentation,

(TOP) One of the five original 8-perforation 35mm strips involved in the photography of *Astrorama.* (BELOW) Projection print in 70mm format is printed onto wide film stock in such a way as to allow for horizontal projection on a one-fifth segment of the Astrorama dome.



hensive coverage of the subject.

The story behind *Astrorama* is one of intense determination on the part of its promoters and creators, and a group of 32 top Japanese industrialists called Midori-Kai, headed by Producer and General Manager, Yoshiro Ohbayashi, President of Ohbayashi-Gumi Construction Co.

With the financial backing and moral support of the 32 progressive Japanese companies, Mr. Ohbayashi gathered together the best technical and creative skills he could find to plan a project which would have such unusual technical aspects that practically every step of the way would be a new concept. In order to benefit from every available source of modern motion picture technology, Japanese technicians and creators made several visits to the United States to study all possible film systems in order to create a new type of presentation which would be exciting as well as a technical "first." There seemed to be little apparent regard to cost if the desired results could be accomplished.

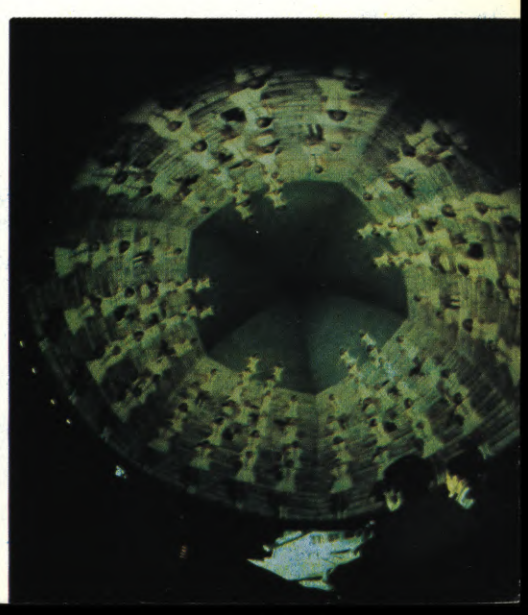
Over a period of many months several Hollywood companies were consulted by visiting Japanese representatives, and lengthy discussions carried on regarding the various wide screen systems, with the purpose of adapting the best readily-available facilities as a springboard toward developing a new and exciting film presentation concept. After several trips to the United States and extensive study by all concerned, a new and unique film system evolved from discussions with the author and the technical staff of Film Effects of Hollywood. The final decision was to utilize for principal

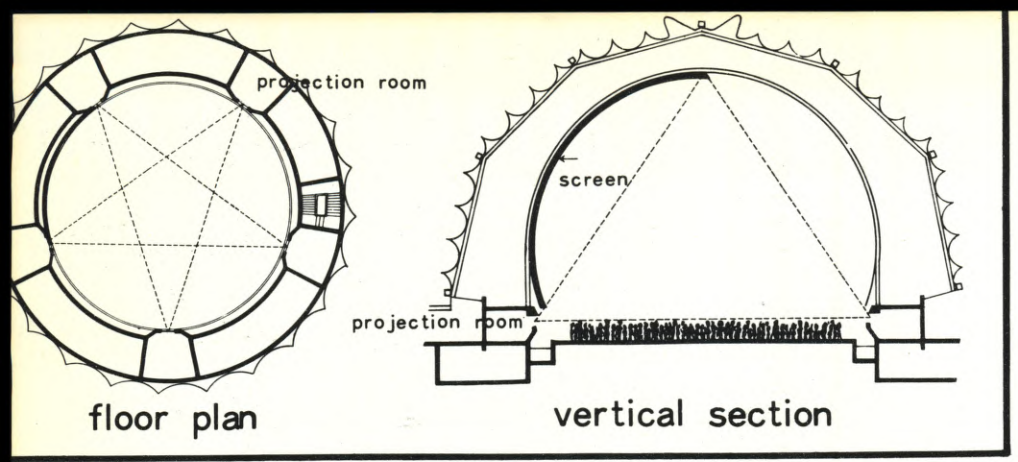
(LEFT) Astrorama audience watches in awe as poppy unfolds in time-lapse sequence. (BELOW) Frame clips from the individual film strips which recorded the unfolding of the poppy.

"MARCH", is of a lighter and more contemporary nature, showing various human aspects of man's everyday life. "Longing for a better day, nothing can hold man back from progress; so he goes forward, step by step, advancing with expectation toward a future full of promise."

Certain sections of the films show a complete hemispheric encirclement created by the five blending images, while other footage dramatically utilizes the screen as five separate gigantic panels, each carrying a different action, thus creating an exciting and most compre-

(RIGHT) Engineers at console check running of Astrorama short. (ABOVE) Two strip sequences of scenes—one a single composition, the other made up of individual abstract panels.





Schematic sketches of "ASTRORAMA" dome interior. (LEFT) Floor plan sketch shows how beams of five projectors criss-cross to join separate film sections into a single 369-degree composition. (RIGHT) Vertical section sketch shows relationship between projectors and curved screen segments of the vast dome. Picture entirely surrounds standing audience.

photography a 35mm 8-perforation vertical format and make color blow-up prints to 8-perforation 70mm which would travel horizontally in the projector.

As both the photographic and projection methods were far from being standard, the task of preparing the many necessary technical facilities seemed gigantic, as well as fraught with the added hazards of pioneering in the face of a "do or die" time schedule which required extremely close cooperation of many and varied talents. In addition to its unusual technical problems, this Japanese-American project was faced with serious geographic and language barriers, and thus became a highly complex undertaking . . . a tremendous challenge every step of the way. The major key to its success was obviously cooperation and understanding, as many approaches, methods and time schedules would need adjustment when conditions and requirements changed due to the unforeseen problems to be expected in such a pioneering venture.

After deciding on the 8-perforation vertical 35mm-to-70mm horizontal format, the prime project was to locate the special 35mm cameras with which to photograph the production. Extensive study of the available equipment resulted in the decision to modify Film Effects' Cinerama 35mm 6-perforation NC Mitchell type cameras to pull down an 8-perforation frame. Other major changes in the cameras included a new aperture plate, realignment of objective lens optical center, change of film travel speed, adapting a standard Nikon lens mount, change in footage counter drive, and modification of the focusing tube system. Film Effects completed modification of the first camera in September 1968 and it was shipped to Japan for rigid testing before the conversion of additional cameras.

The initial test photography done by Gakken Co., the film production unit of Midori-Kai, proved that the converted camera produced excellent results, and with certain further minor adjustments could well handle the project. Accordingly, I went to Tokyo to review the camera tests, study any further modifications, and to schedule delivery of the six additional cameras required. This visit was also to determine the 70mm release printing requirements and to work out a realistic delivery schedule for the theater prints required by March 15th, the opening day of EXPO '70. Last, but not least, it was necessary to write an agreement that would encompass Film Effects' involvement in Midori-Kai's *Astrorama Dome* project; and to provide for the contingencies with which such a new and intricate project could be faced. When all of this work had been completed, modification of the six additional cameras was ordered and I returned to Hollywood to plan and initiate construction of the 70mm release printing and film inspection facilities.

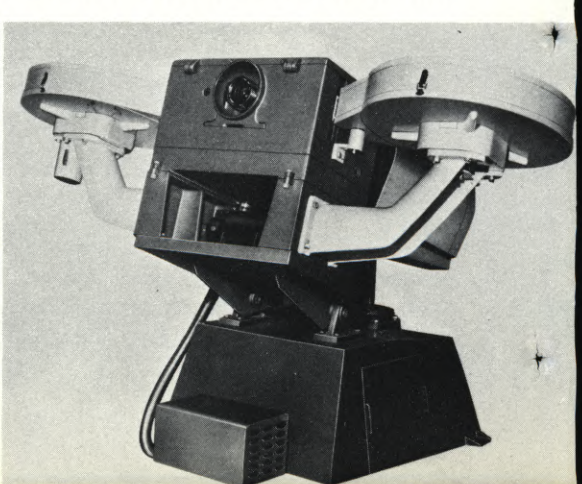
While the additional cameras were being modified to specifications, the Goto Optical Co. of Tokyo sent its engineer to Hollywood to study our motion picture technology as applied to certain aspects of the sophisticated circular Unit Camera mount to be designed. This device was to provide for the mounting of five cameras in a circle, all placed to overlap each others' angle of coverage, thus encompassing a complete Hemispheric dome.

After study of related American supplementary facilities, work was started in Japan to build the 5-unit Camera and mount. At the same time, construction was finally started on the camera accessories, and activity on the many other production phases of the project was launched. This included the very special optical requirements of the cameras and projectors; the 8-perforation 70mm horizontal projectors; special 35mm laboratory and editorial facilities; 35mm 8-perforation camera adaptations for underwater, animation and optical printing; and sound, story, script and other elements necessary to start filming the two unique productions.

Of course, all phases of preparation for the exhibition facilities then had to follow right along: Construction of the complex Astrorama Dome Pavilion, development of a special screen, newly-designed 70mm projectors with special synchronizing devices, sophisticated sound system, and the many other important aspects of the presentation, (including final approval by all Midori-Kai officials) . . . everything to be ready for the grand opening of EXPO '70 on March 15th.

Filming of the first production started in April 1969 and ended in August 1969, and was then followed by a

(LEFT) The 19.25mm, F/3.5, 140° ultra-wide-angle "taking" lens used on cameras of the Astrorama rig. (CENTER) The Astrorama Unit Camera, shown with its video viewfinder, batteries and camera drive controls. (RIGHT) One of the five 70mm Astrorama projectors used to beam the film inside the dome. Projector is completely original in concept and design.

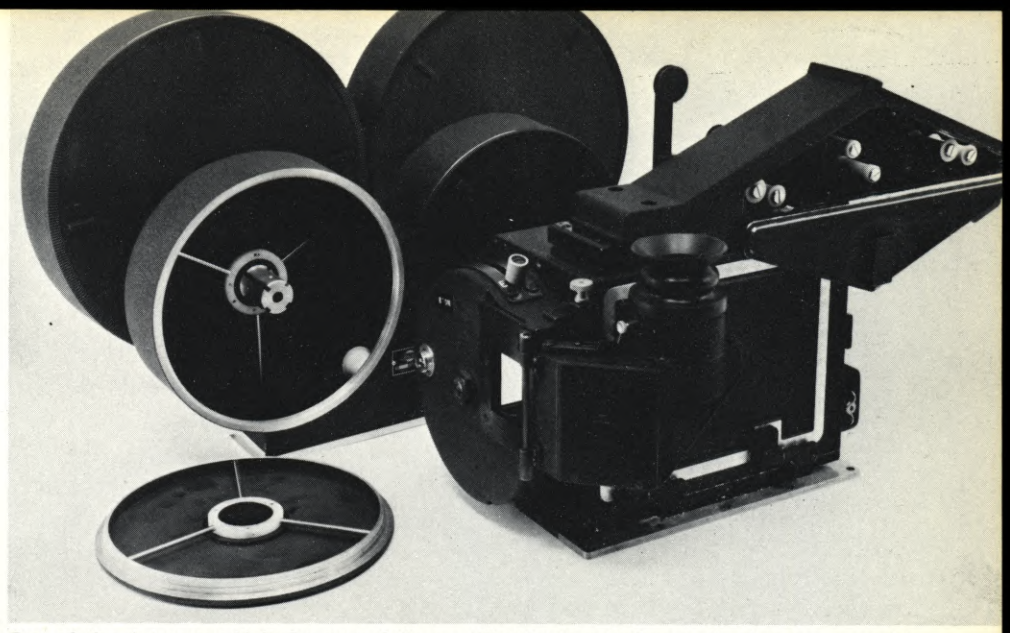


second, shorter film. Locations outside of Japan included Europe, India, United States and Mexico. About half of the production was photographed with the two single cameras, and the balance filmed with the Unit Camera, which was made easily transportable, although it weighed well over 600 pounds. As raw film stock was used at the rate of 180 feet per minute per camera, the Unit Camera consumed a total of 900 feet per minute! Each of the five cameras contained a color-coded marker light which indicated its number and position in the circle to the laboratory and film editors by color fogging the film edge. The lenses used were 19.25mm, F/3.5, 140° angle with a front element 210mm in diameter. The cameras were driven by a 1500 rpm, 1 HP motor. A video viewing screen receiving its image signal from a fish-eye lens mounted at the top of the camera unit provided the viewfinder system necessary to approximate the area being photographed.

In order to adhere to the very rigid time schedule, editorial work was carried on during the production period where feasible. Daily production photography was printed in the original 35mm 8-perforation format, making it necessary for the laboratory to provide special film inspection facilities and other equipment in order to produce the 8-perforation register master prints and optical internegatives; and to also provide all of the other facilities required to efficiently expedite the editorial and other post-production phases of the project. Certain special optical effects were created on 5253 internegative; and the new 5249 Eastman color reversal internegative film was utilized for the first time by the Japanese laboratory to provide loss protection on all original negatives to be eventually shipped to Film Effects for 70mm release printing.

As the film production progressed, and the work print gradually became assembled in edited form, all other phases of post-production were expedited to meet the October 15, 1969 date scheduled for delivery of the final cut negative to Film Effects in Hollywood. Concurrently, installations were being made in the completed *Astrorama* Pavilion . . . the massive multi-strip screen, the five newly-designed 70mm projectors, the involved sound system, centralized multi-control units, and all other facilities for efficiently handling the complex film presentation and the almost continuous turnover of 1000 people per showing.

Films could not be viewed properly on the screen in their full super-



One of the Astrorama Unit Cameras, fully modified for installation on the 5-camera assembly mount. It is shown here with 400-foot and 1000-foot magazines. As raw film stock was consumed at the rate of 180 feet per-minute, per-camera, the 5-camera rig ran through 900 feet of film per minute.

surround glory until Unit Camera test negatives were sent to Film Effects to make the 70mm blow-up prints needed to properly align the five projectors. Based on reports from screenings of these tests, several minute positioning adjustments were made between the optical printer film movements, until the five matted projector apertures were in perfect blending alignment on the screen. Again, distance and language barriers made such exchange of technical information a serious problem on both sides, as translations of such data was at times quite difficult and time-consuming.

In the early planning of the project Film Effects intended to construct the blow-up optical printer, modifying certain existing mechanical units and building other special devices. When several months of the time scheduled to prepare this equipment were lost due to unforeseen delays in obtaining certain necessary Japanese governmental approvals, it became an urgent matter to seek a short cut to preparation of the special blow-up printing facilities. Accordingly, the help of Technicolor-Hollywood was sought, and subsequent arrangements were made to combine Film Effects' printing equipment with special Technicolor units. Technicolor's interest and fine cooperation resulted in a very sophisticated blow-up printer having the capacity to automatically make all of the necessary scene-to-scene corrections, adapting Technicolor's standard timing and printer light control systems. This particular function was a critical part of the printing operation, as adjacent panels on the massive screen were to be perfectly matched in picture quality, which required meticulous color and density balancing.

As there was no equipment to project the 8-perforation 70mm horizontal film format for inspection of prints, Film Effects modified a 70mm Norelco projector to pull down the 8-perforation frame instead of its standard 5-perforation format. To simulate the horizontal travel of the projected film image, a prismatic unit was installed in the optical system to rotate the image 90°. The problem of inspecting the relative quality of a set of prints, by comparing the five panels side by side, still remained to be solved. As time would not permit construction of the 5-way slide film inspection comparator originally planned by Film Effects, the simple procedure of examining the prints by rewinding over a light box seemed to

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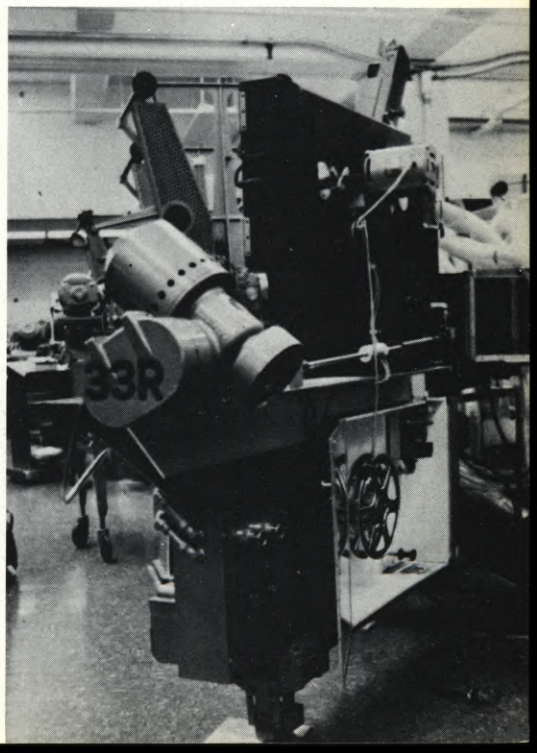
One of the special Technicolor-Film Effects 35mm-70mm blow-up optical printers used to make prints for Astrorama presentation.



EASTMAN'S GOLDEN PICTURE PAVILION

The romance of still and motion picture photography is strikingly presented in a fast-moving show that mixes the media of photos, slides, films and electronic music

Among the multitude of pavilions at EXPO '70, the Kodak Pavilion is the only one co-sponsored by an American company and a Japanese corporation. It identifies "Photography as a Universal Language."

A striking six-sided glass tower highlights Kodak's "Golden Picture Pavilion." The 22.5-meter-high glass tower is encircled from top to bottom by a ramp from which visitors can photograph many memorable views of the exposition.

Other major elements of the pavilion are two brightly colored towers of smaller diameter. Each tower also has six sides, painted alternately red and yellow.

Visitors may enter the pavilion at the ground level, or by the ramp that encircles the glass tower, or by a sloping bridge that pierces the glass tower at the second level.

Five integrated exhibits in the pavilion demonstrate that: "Photography Is a Smile," ". . . Is a Universal Eye," ". . . Is a Tool," ". . . Is to Remember," ". . . Is Fun."

Each of the five exhibits closely relates to the others, but also maintains a distinct identity of its own.

A mosaic picture-tower display, situated in the main exhibit area, is based on a broad theme—the varied faces of mankind. It also incorporates suggestions of the themes in the other four exhibitions: technology, fun, memories, and fine art.

The tower's intricate design reflects technology. The poignant moments captured in the faces on the picture-tower demonstrate the value of photography as an aid to memory. The artistic techniques employed in many of the portraits show photography as fine art. And its pictures of the "now" generation mirror the psychedelic atmosphere of the "Fun" exhibit.

This 22-meter tall, kaleidoscopic tower—rising from the center of a water pool—contains color photographs of more than 100 different faces, young and old from around the world.

The family-oriented "Photography Is To Remember" exhibit pictures three generations of Japanese spending a day at a lake in Hokkaido.

The other three exhibits were designed to appeal to special groups as well as general audiences.

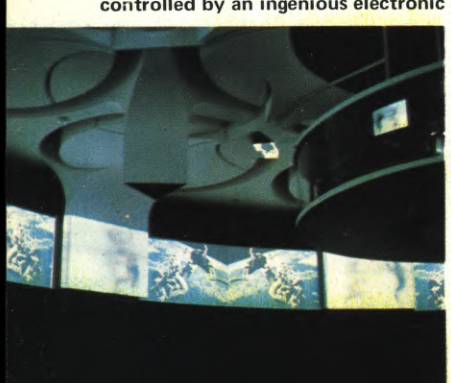
For instance, "Photography Is a Tool" is aimed especially at scientists, technologists, businessmen and educators. "Photography Is Fun" is expected to impart a special enthusiasm among the young or the "in" set. "Photography Is a Universal Eye" presents photography at its highest aesthetic and most powerfully communicative levels. It is expected to receive particular acclaim from professional photographers, artists, intellectuals, and philosophers, who will see in these great works why photography is considered a fine art.

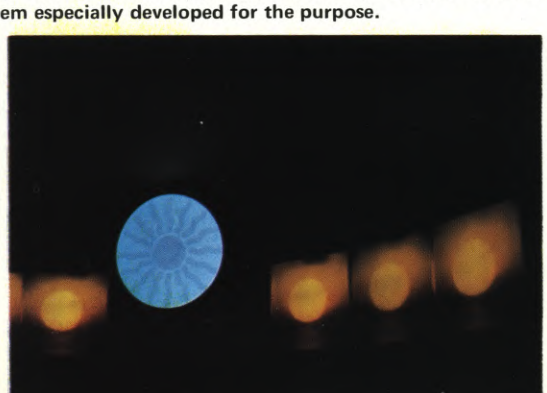
Unlike the sit-down theatre presentations which Kodak used at recent World Expositions in New York and Montreal, the Golden Picture Pavilion features dynamic two-minute audio-visual presentations, which visitors can view quite comfortably while standing. This enables visitors to move smoothly through the pavilion, without having to wait in line.

The four presentations, which run simultaneously, are timed to the second to last two minutes each. Fifteen seconds are allowed to permit visitors to clear the exhibition areas so newcomers may take their places. Thus, the shows are repeated every two minutes and 15 seconds, 12 hours a day, for the six-months' duration of EXPO '70. Keeping the breaks minimal between showings prevents loss of continuity in the unfolding story of photography.

In the main exhibit area, a kaleidoscopic tower rising 22 meters from a water pool features color photographs of more than 100 different faces from around the world.

Visitors to Kodak's futuristic tower pavilion at EXPO '70 are "pulsed" at two-minute intervals through five separate areas in which brilliant colors and forms dazzle the eye in surroundings that range in suggestion from a discotheque to outer space. The intricate presentation is completely controlled by an ingenious electronic system especially developed for the purpose.





Four variations of the pavilion's musical theme, "Images," have been orchestrated on the Moog machine, an electronic synthesizer, to accompany the different presentations.

Only the "Universal Eye" exhibit is viewed in reflective silence. There, photographs—and photographs alone—command attention. The environment is one of a stark totally black-and-white gallery of fine art.

A ballad variation of "Images" plays in the "Photography Is To Remember" gallery. The "Photography Is Fun" exhibit is given a rock interpretation of the overall musical theme, and a version with special electronic sounds accompanies "Photography Is a Tool." The music in the "Photography Is a Smile" picture tower is an amalgamated version of the music playing in the three other areas.

Gershon Kingsley, widely acclaimed as one of the world's greatest artists of the Moog instrument, composed and orchestrated all music for the pavilion. The revolutionary Moog synthesizer has a range of sound possibilities that far surpasses that of any other instrument.

Kingsley orchestrated the four variations with a common beat so that all the sounds reinforce and harmonize as visitors move through the pavilion.

"BACKSTAGE" AT KODAK'S GOLDEN PICTURE PAVILION

A completely automated, electronically-controlled projection system, pulsed to move visitors in a steady flow, fills Eastman Kodak Company's Golden Picture Pavilion at EXPO '70 with a kaleidoscope of still and motion pictures.

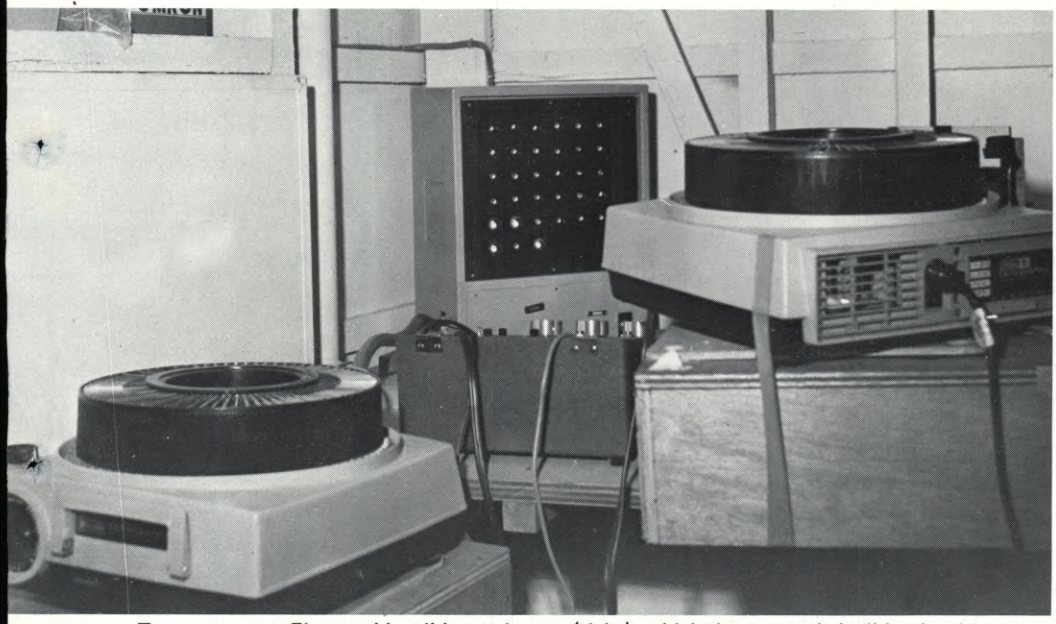
Standard Kodak Ektagraphic slide projectors and Carousel dissolve units, adapted only for electronic control, form the heart of the system to show "Photography—the Universal Language."

Timed to visual cues from both animated and motion picture films, they fill dozens of screens with still pictures that change constantly to reinforce the themes of the exhibits. Continuous zoom motion pictures in another part of the pavilion allow the viewer to test the inner and outer limits of vision.

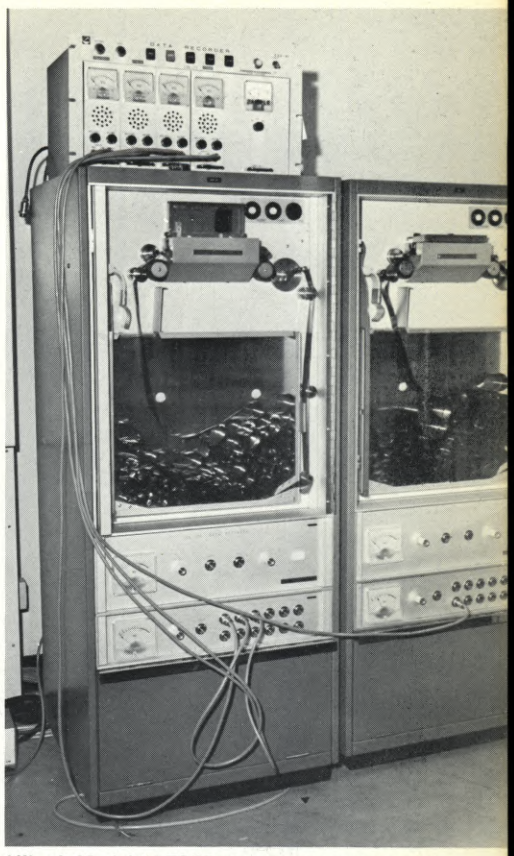
The system is governed by a closed loop, 150-second one-inch tape containing 12 channels. Eight of the channels supply the sound in the four exhibit areas including the pavilion's main tower, four channels are used for both slide and motion picture projection in three areas and to control the prints in the pavilion's main tower.

The Hikari Model H-7025 tape deck, spare modular tape units and the tapes themselves were designed expressly for Kodak.

Signals from the tape activate four Kodak Ektagraphic slide projectors whose slides are coded to operate 56 other Ektagraphic slide projectors and nine Eiki motion picture projectors, equipped with xenon light sources and adapted for continuous loop operation, in the exhibit areas. Beam of light passing through the coded slides hit photo cells in solid state program controllers designed by Hank Egoshi of Nagase & Company, Ltd., of Osaka, a major Kodak distributor in Japan and co-sponsor of the Kodak pavilion at EXPO '70.



Tape operates Ektagraphic slide projector (right) which beams coded slide signals onto a controller containing 33 photo-transistor units, 30 of which are used to control the programming. The remaining three serve as a delay mechanism and on-and-off controls.



Hikari Model H-7025 tape decks govern the system by means of a closed-loop, 150-second, one-inch tape containing 12 channels. Eight of the channels supply sound. The other four control slides, motion pictures and prints in the main tower.

Each controller contains 33 photo-transistor units, 30 of which are used to control the programming. The remaining three units serve as a delay mechanism and on and off controls. The controllers are designed to operate only when struck by the beams transmitted through the coded slides and can function in high ambient light without program disruption. They were built to Egoshi's specifications by the Toho Denki Company, Ltd., of Tokyo.

As the coded beams hit the photo-transistors, the controllers activate switching mechanisms that cause their respective Ektagraphic slide projectors to change slides. Where called for, they also operate the 14 Kodak Carousel dissolve controls used in the exhibits, as well as the motion picture projectors in the mixed-media portions of the show.

The greatest number of projectors—28—is used in the "Photography Is Fun" exhibit where 26 Ektagraphic slide projectors, paired for use in a combination of front and rear projection, and a single

Continued on Page 691

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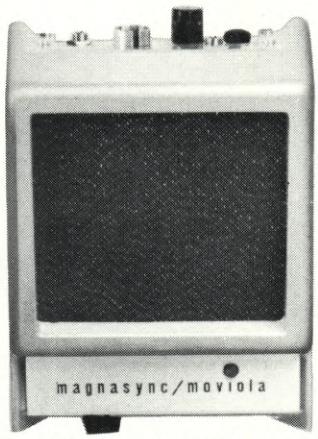

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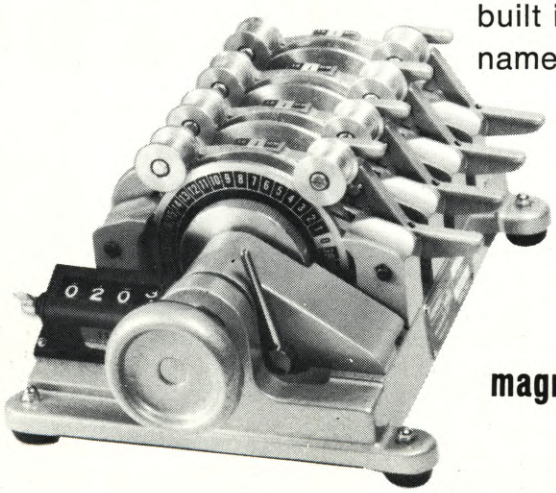

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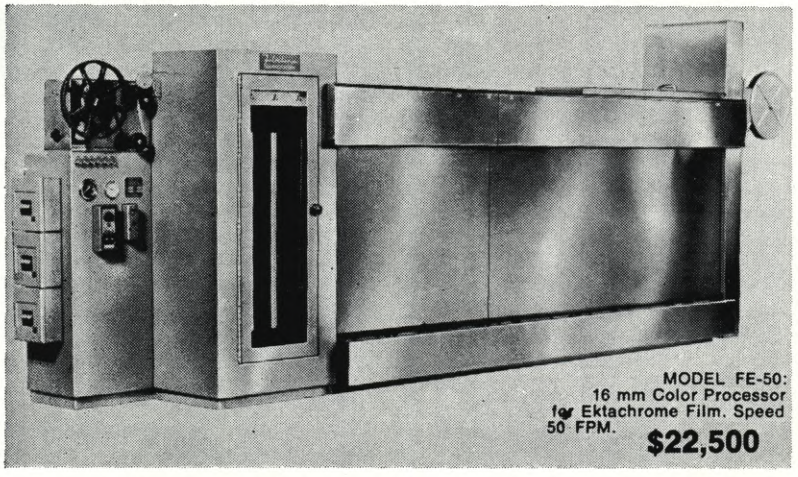

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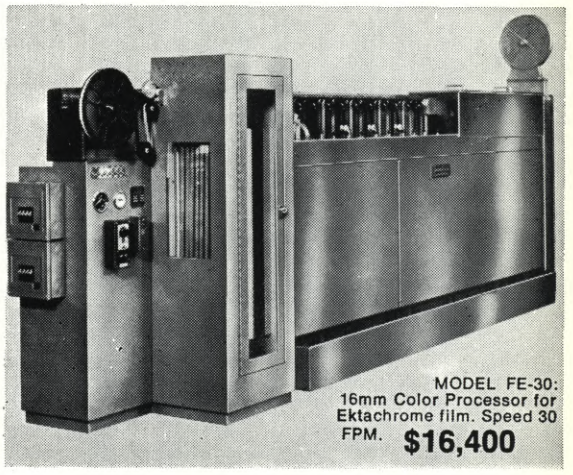

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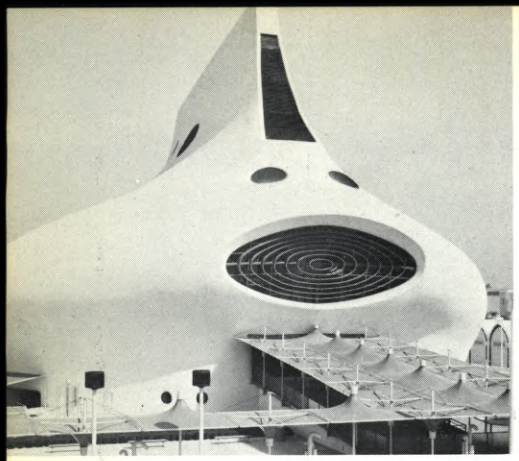


A pavilion that looks like a stylized smiling face, and is dedicated to laughter, presents a funny show on four ingeniously-rigged screens

GAS PAVILION

"World of Laughter"—the pavilion of the Japan Gas Association (201 companies from across Japan)—is next to Wednesday Plaza.

Outside the pavilion is unique—a flying saucer or a funny face with an open mouth, determined by your imagination.

Inside the highlight is the largest work ever done by the famed Spanish-born artist Joan Miro—a 5 by 12 meter mural in ceramic specially produced for EXPO '70.

Visitors first enter a large hall to see "The Story of Laughter," a 20 minute movie. A giant screen on the floor and one that comes down from above the audience plus two walls on both sides of the hall are used to project the film. Seated face to face with your fellow visitors on the other side of the screen, you can watch their laughing faces while following the action projected all around.

As the movie ends you enter the following room and wander around admiring a striking Miro fresco entitled "Innocent Laughter," which is enhanced by an amazing setting of water and light before an unusual musical background. In that room you can then enjoy a film dedicated to all the different kinds of laughter.

The Gas Pavilion is, naturally enough, powered totally by gas—even the movie projectors!

In the Projection Hall, the spectators sit in rising tiers of seats positioned opposite each other with a broad floor area in between which accommodates three gigantic screens arranged in L-shape configuration. The central screen, horizontal from the spectators' point of view, is in an anamorphic 70mm wide-screen format. The two end screens have standard Academy aperture aspect ratios.

At the beginning of the presentation, a fourth screen descends from the ceiling into a central position so that the audience can concentrate on the very funny prologue which is flashed onto it in 35mm. At the end of the prologue, this fourth screen ascends into the ceiling again to clear the way for an uncluttered view of the film presented in the L-shaped format.

At times these three screens show individual, but related images—but at other times, the action across them is continuous from one screen to the other. For example, a character may dive off the edge of a pool on the left screen, swim across the central horizontal screen, and pull himself out of the water on the right screen. It is a technically ingenious presentation, and one which keeps the audience in a constant state of hilarity. ■

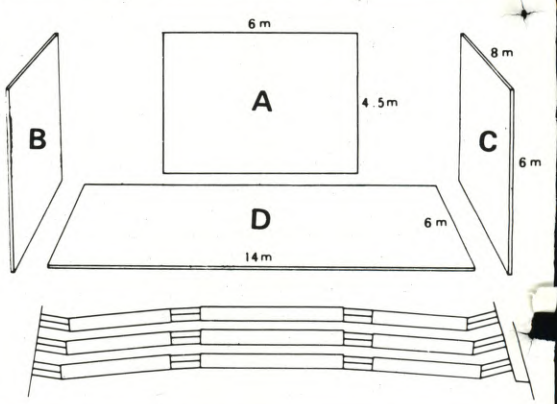
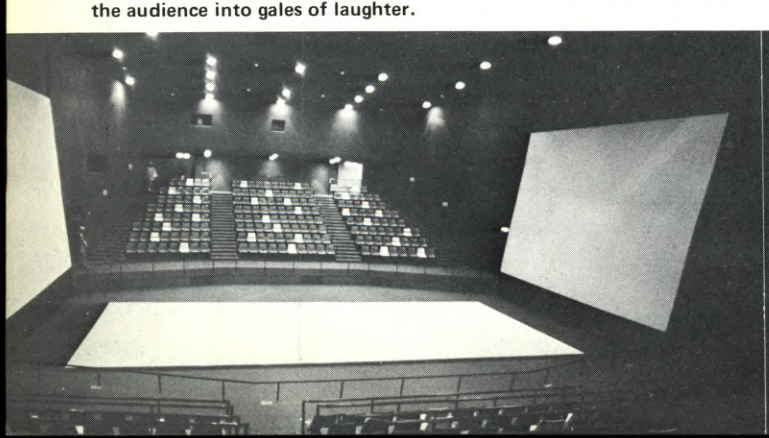
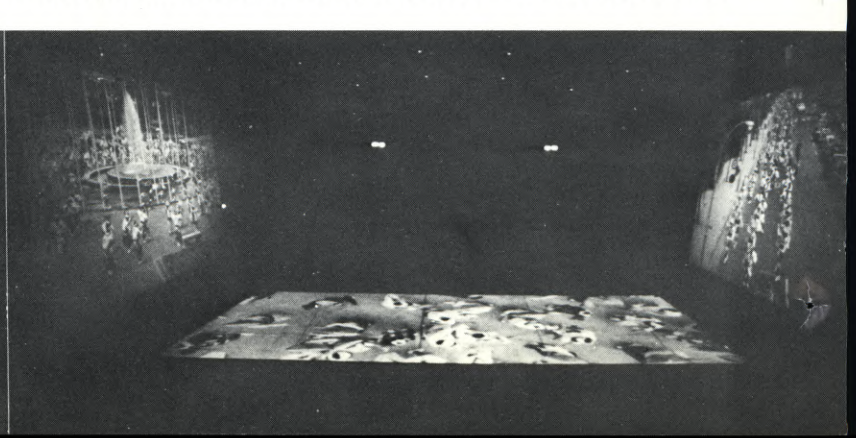


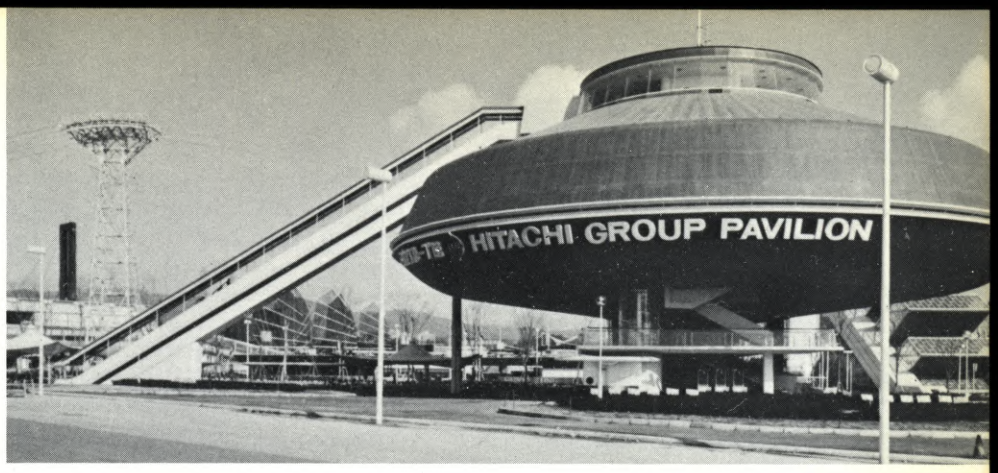
Diagram showing quadruple-screen arrangement. Screen A is movable, descending from the ceiling for prologue and ascending afterward. Screens B, C and D show separate actions or join to portray a single action.

(LEFT) Auditorium of Gas Pavilion has two tiers of seats facing each other across an L-shaped configuration of motion picture screens. (RIGHT) During performance, and after the prologue screen has ascended into the ceiling, the three stationary screens come alive with zany antics that send the audience into gales of laughter.





Passengers board a pavilion that looks like a "flying saucer" to take a trip which seems almost more real than the real thing



HITACHI GROUP

THE BUILDING

Featuring a capsule 46 meters in diameter and 22 meters in height, suspended in midair as though it were a huge flying saucer, the Hitachi Group Pavilion (a cylindrical building) is situated in a site occupying 5000 square meters.

PRESENTATION

Visitors to the saucer-shaped pavilion are whisked from the waiting circle up a long, stepless escalator to the sky lounge on the roof of the pavilion from where the entire EXPO site can be viewed.

The center of the pavilion is composed of a uniquely designed, cylindrical, double-decker elevator capable of carrying 260 passengers at the same time.

Visitors are carried by this elevator from the sky lounge to the third floor below. The 3rd floor is a round hall with 128 bucket seats arranged around the perimeter, forming a novel type of amphitheater.

Visitors seat themselves and fasten their safety belts. A stewardess explains the features of simulated travel and the necessary precautions. There are several choices of travel courses available, determined through popular vote by the visitors.

Suddenly the hall becomes filled with abstract music, sound effects, and fantastic light patterns. At that instant, 16 turntables each carrying 8 persons glide sideways and begin rotating.

When the rotation stops, the 128 persons will have been instantaneously separated into 16 small groups of 8 persons each seated in separate cockpits in a space-craft. Each cockpit from 1 to 16 is provided with a control stick in front of the pilot, together with a panel covered with instruments. Through the front window a view of the airport is visible, revealing a long take-off strip, blue sky and white clouds.

Operating the controls in cockpit #1 turns on the jets and the aircraft soars up from the white lines on the airstrip into the blue sky and then into a sea of clouds.

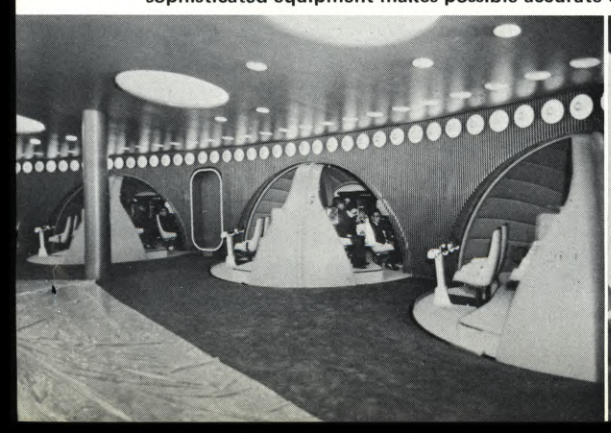
The 16 guide lamps flash on at 30-second intervals signifying the time to change pilots. When his turn comes to operate the controls, the pilot can bend the control stick to the right, causing the aircraft to bank to the right and the horizon to swing widely to the left. Should the pilot hurriedly attempt to correct this and bend the stick to the left, the horizon will swing to the right. Each pilot will have the assistance of a professional pilot as an instructor.

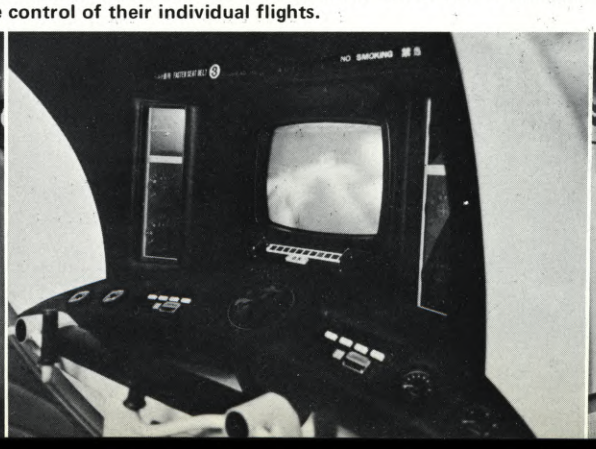
The entire spectacle is sparked with reality. The biggest enjoyment in simulated travel is the thrilling sensation of flying freely through the air.

After an enchanting flight, the aircraft returns once again to the skies over the airport. The controls are turned over to the final operator in cockpit #16. There are smooth landings and rough ones, the controls left entirely in the hands of the passenger.

The passengers all stare intently through the front window, holding their breath. The plane comes in on what seems like a safe landing, but it crashes into a tree and comes to a sudden stop. The simulator depicts the effects of the shock. However all such mistakes are erased by laughs of delight. This is the magical pleasure of simulation!

(LEFT) Groups of eight passengers, sitting in bucket seats on turntables, revolve to find themselves in what seems to be the cockpit of a spacecraft. Two forward passengers in cockpit, serving as pilot and co-pilot, face a color monitor on which they see a realistic simulation of takeoff, flight and landing. The picture "responds" accurately to their handling of the control stick. (RIGHT) "Passengers" later visit computer room where sophisticated equipment makes possible accurate control of their individual flights.





THIS IS "ASTRORAMA"

Continued from Page 657

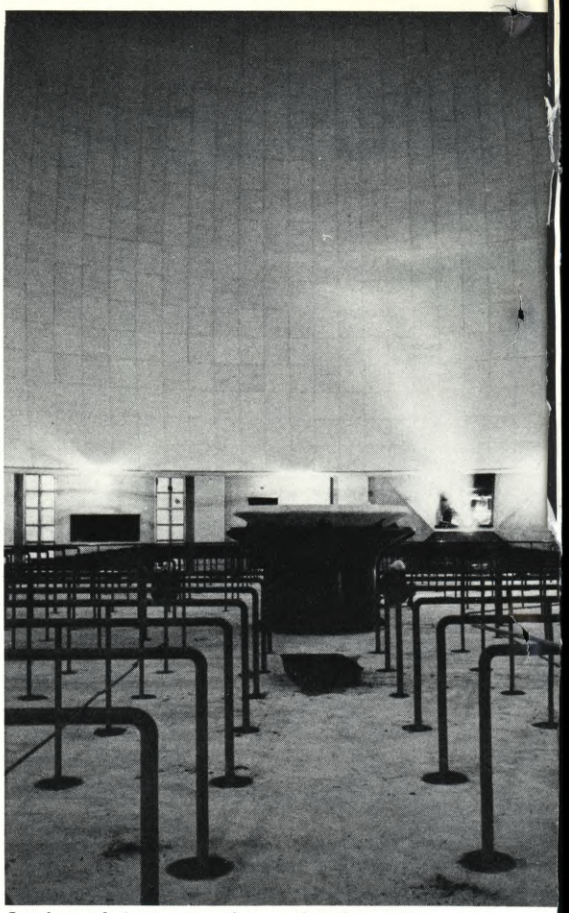
serve the purpose. Japanese technicians, Y. Aihara and T. Terayama, came to Hollywood to inspect the first prints of each show, and upon their return to Japan reported to me on the reactions of all concerned when the films were first viewed on the *Astrorama* screen. That was a momentous occasion, and their cabled thanks and appreciation brought us great relief! The problem of interpreting their color and density print corrections when using their subtractive print timing system, as opposed to the American additive printing method, presented a problem which was solved by comparative analysis of test strips made in Japan and Hollywood.

In accordance with my earlier request, I was provided with rolls of 6-foot clips taken from either end of each negative scene as cut in the final edited picture negative, and assembled in proper order. Prints from these clips were to facilitate preliminary quality balancing of related scenes. When a perfect print of the clip rolls was made, the resultant timing was correlated by Technicolor and applied to print the same scenes in the complete picture negative. In addition, the Japanese technicians delivered to us complete slide-film coverage of the show, consisting of frames taken from a balanced 35mm answer print made in Japan, each scene film clip, mounted in order, and adjacent to frames from the other four cameras in the circle. Special film leaders spliced to the negative rolls provided cue signals to synchronize the projection machines. The 5000-watt Xenon lamps in the five projectors, together with the 58.179mm, F/2, 60° lenses and high-gain screen, made it possible to use full density prints of neutral color balance, thus the optimum in picture quality, under such unusual circumstances, was obtained. In order to blend the five projected images together at all adjacent points on the Dome screen it was necessary to provide projector mattes which conformed to the five equal segments of the hemisphere, to be placed in a fixed position close to the film plane. The shape and position of these special matching mattes was, of course, extremely critical, in order to make the blend invisible between adjacent projected images.

Linwood Dunn, ASC, President of Film Effects of Hollywood, Astrorama Motion Picture Technical Consultant, and M. Terayama, Technical Director.

The projector optical problems were obviously most difficult, as were those of the Unit Camera. With the exception of the basic 35mm cameras, and the 70mm film printing and screening facilities furnished by Film Effects and Technicolor, all special optics, equipment, systems and, of course, creativity, was Japanese. The schedules we worked out in Japan in the early planning stage of the project were amazingly well adhered to. In working out the master schedule, I had to figure backwards from the fixed opening date of March 15, 1970, allowing enough time for completion of each step, but not going back beyond the starting date of the project, of course. In order to provide for the manufacture of a specified number of show prints needed for the March 15th opening of EXPO '70 (to be made on a printer yet to be designed, and from negatives to be made on cameras still to be built, and which were to photograph shows yet to be written!), I required the final cut picture negative to be delivered to me in Hollywood on or about October 15, 1969. On that exact day the complete edited negative and its test materials were brought in to Film Effects!

The tremendous amount of difficult work scheduled to be completed on time to meet commitments made this a most unusual experience for me . . . being used to American film operations where this is seldom the situation. I feel nothing but gratitude and appreciation for the understanding cooperation and friendly relationship we enjoyed while working with the many talented Japanese people on this fascinating project. In particular I refer to Executive Producer Yoshiro Ohbayashi; his associate, T. Maeda, who handled communication and certain business matters; Assistant Producer Toshiro Watanuki; T. Terayama and Y. Aihara, film technicians with whom I worked the closest; M. Maeda, camera engineer; Nichiman Co., Japanese agents, in Los Angeles and Tokyo . . . and the many other fine gentlemen with whom we became associated. All involved contributed immeasurably to whatever success we at Film Effects, in association with Technicolor, gained from our contribution to *Astrorama.* It was the most unusual and challenging film project in which I have ever been involved; and I will say now that if we had all the work to do over again there would be very little I would do differently . . . which is a compliment to our associates. I now look forward expectantly to new exciting film presentations . . . possibly a *full*-sphere screen next time! ■



Section of Astrorama dome, showing screen and floor segment, with projector ports and rails used to control audiences of up to 1000.

SUNTORY

"Water of Life" is the title of a beautiful film presentation that fills a six-sectioned screen inside pavilion that looks like a cut bamboo stalk

The pavilion representing Suntory, Ltd., Japan's leading distiller, has a clean, but distinctive exterior form that looks like a bamboo stalk cut aslant.

This is natural enough, because wherever one finds water, one finds bamboo—and that fits right in with the theme of this exhibit, which is "Water of Life." The Japanese, from ancient times, have used bamboo as a vessel to draw, store, carry and sluice water. It is also a symbol of vitality.

However, there is another (and even more appropriate) reason why the bamboo motif fits well with this pavilion. The land on which it stands was, before the EXPO bulldozers moved in, a luxuriant bamboo grove. The pavilion is a kind of tribute to the bamboos felled to make way for it.

Even though its design is very basic, the pavilion is an imposing structure. Its massive, rough concrete walls rise 36.8 meters (121.4 feet) around a diameter of 34.5 meters (113.8 feet) and it has a kind of natural, primitive beauty.

The interior, which is divided into a basement level and four upper stories, houses a cinema theatre, exhibition hall and lounge.

The pavilion's theme of water as a life-giving medium is most dramatically presented by means of a 16-minute motion picture projected before a standing audience onto a six-sectioned mammoth screen in a four-story cinema theatre.

The cinema, with a capacity of 300 spectators, shows the film on a screen segmented into six slanted sections, measuring in total area 16.2 meters (53.4 feet) high by 16 meters (52 feet) wide. Viewers are literally surrounded by the picture, which is projected above, below and in front of them simultaneously.

The film portrays water as an integral part of nature, as a friend and adversary of man—as a medium both essential to life and destructive to life. It traces festivals throughout the world that man observes as a means for offering thanks for the harvests made possible by water.

The Japanese festivals, which are well represented in the film, include the "Awaodori" dance of Shikoku, the snow festival of Hokkaido and the devil's drum festival of Sado Island.

Because of the rather radical slant of the screens at the top and bottom of the six-section configuration, the projectors beaming the pictures to the two top frames must shoot upward from below, while those covering the two lower screens, project their images from the top level. The projectors covering the two center screens shoot straight out ahead.

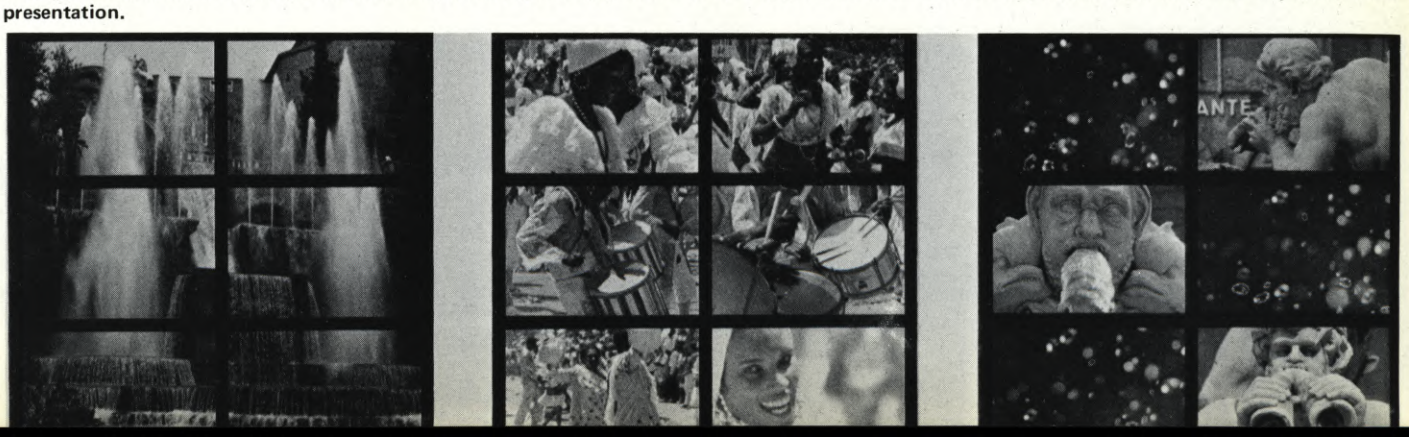
In order to photograph this stirring film presentation, camera crews roamed the world for a full year, shooting a total of more than 250,000 feet of color film in 20 countries.

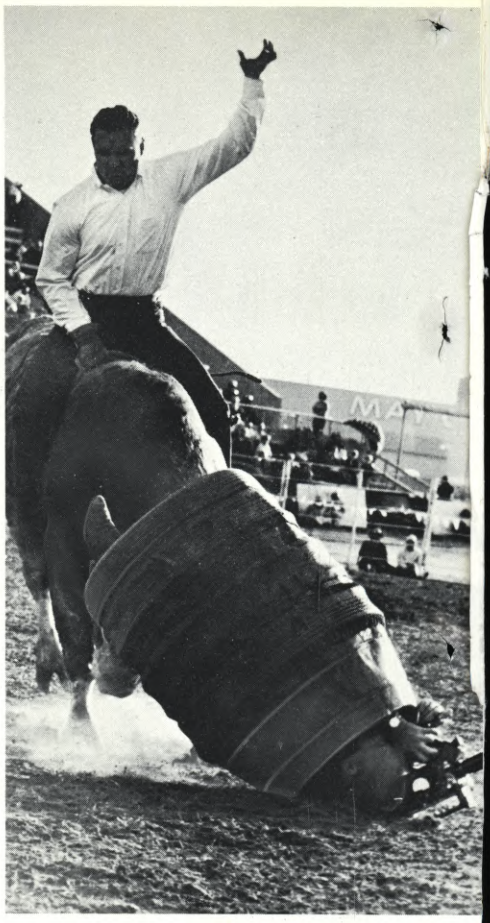
The footage edited to create this interesting motion picture includes scenes of winter in the United States, summer in Africa and New Guinea, plus water festivals in Brazil and Japan.

The film is beautifully made and very dramatically depicts the many facets of man and nature which give meaning to the phrase, "Water of Life." ■

Schematic rendering of cinema interior shows slanted screen configuration. Bottom two projectors are beamed toward top screens, while projectors at top project images on bottom screens.

Examples of separate "scenes" from "Water of Life" film, as they appear to spectators who stand on tiers just below the center two screens. Slanted configurations seem to envelope the audience, involving it deeply with what is being shown on screens. A magnificent musical score accompanies the presentation.





VILIS LAPENIEKS AT WORK

Shooting an hour-long CBS TV Special on the Tijuana Brass, Vilis Lapenieks decided to get a close shot from inside the bull ring at a rodeo. They said: "Bulls never touch that steel barrel." But this one did. So Vilis got a great shot of 16,000 spectators upside down, until the battery cord came unplugged. Vilis had a broken arm and he hopes the bull had a headache. But the camera was O.K. They used it the next day. An Eclair NPR.

For an NPR brochure, write Eclair Corp. at 7262 Melrose Avenue, Los Angeles, Calif. 90046; or at 73 S. Central Avenue, Valley Stream, New York 11580. Factory: Paris, France.

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CAMERA MAKERS SINCE 1909

RAINBOW TOWER

Figures sculptured in "smoke" combine with multi-image films and live action to form a lively mixed-media show

Sponsored by the Japan Monopoly Corporation (maker of Japanese cigarettes), the Rainbow Tower is a 70-meter-tall conical building with silvery walls. Water sprays from the top of the tower to create an artificial rainbow. The silver walls become red at twilight and then at night lights turn the structure into another kind of rainbow.

On the first floor is the "Forum of Rest" which features special music by Japanese composer Ikuma Dan.

After that a round elevator—holding 150 people—lifts you to see a special "smoke" show. This presentation combines smoke, light and sound. It occurs on a gigantic wall, designed to create for visitors a unique environment and experience.

Next—viewed from seats in a semi-circular space—comes a film projected on a large three-faceted screen that appears from out of the floor. Japan's four seasons and its traditional arts are the subjects of the film. This, however, is a special film that seeks to "blend the viewer" with the action on the film.

"Smoke Show"

The smoke in the Smoke Show is actually vapor from dry ice that is ejected from the wall, ceiling and floor of the theater to form various shapes, with background music and lights adding to the unusual aura. The surrealistic effects created thus are completely new and never-before experienced.

There were many problems that confronted JMC staff members involved.

The first was the type of material that should be used to create the smoke. Under the capable direction of Professor Toshio Sekikawa of the Tokyo College of Physics, repeated experiments were conducted. Vaporized dry ice, the final choice of materials, proved to be the most suitable material among the many different types that were under consideration.

The second problem: In the rear wall and in the ceiling of the stage area a total of 28 "smoke boxes" were placed. When warm water is poured over dry ice it quickly vaporizes to produce smoke. The smoke is ejected through some 100 jet holes in the surface of the wall and ceiling via ducts. Automatic bulbs controlled by electronic signals project the smoke onto the stage area. On the floor 32 separate pieces of special equipment to project smoke rings, ranging from 25 centimeters to one meter in diameter, are located.

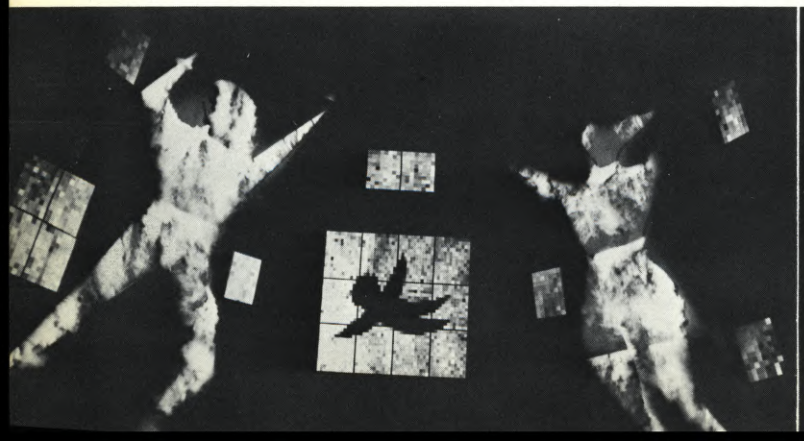
Smoke boxes are also placed behind seats in the theater to envelop audiences in harmless smoke and to assist in creating the desired atmosphere for the Smoke Show.

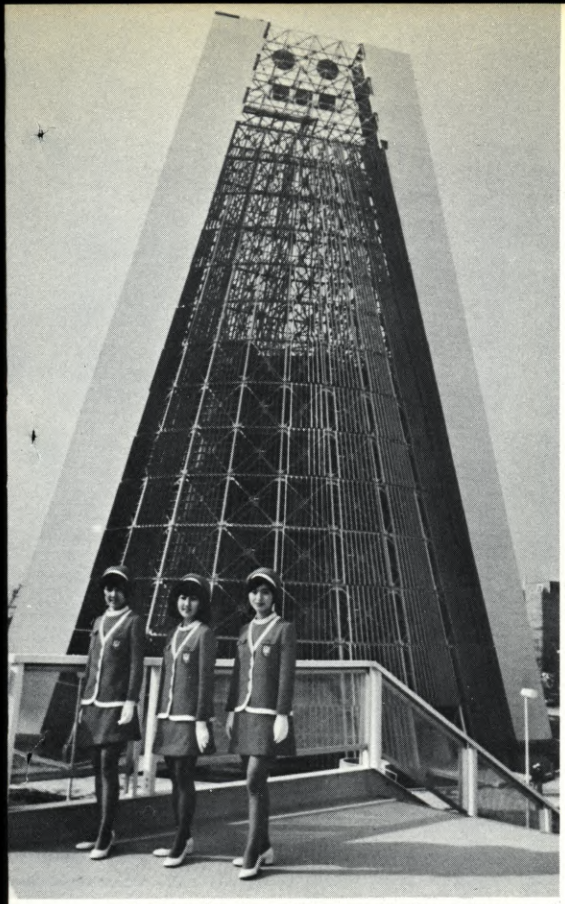
In order to create shapes or images, it is necessary to keep smoke in a stationary form for extended periods. To accomplish this many patterns are set in the wall. Jet holes and absorbing holes are set in the upper and lower parts of each pattern. Smoke ejected from the upper hole is absorbed or sucked in through the lower hole . . . this assists in creating an image within the pattern as the smoke moves downward from the jet hole to the absorbing hole.

The Image Show

What is the origin of the sensitivity and delicacy Japanese are renowned for? From what sort of climate or natural atmosphere has the Japanese culture evolved? Seeking the answer to such questions, some of Japan's most talented film-makers have produced "Wind, Light and Mud" (also known as "Beautiful Land"), and the natural beauty of the Japanese landscape is

(ABOVE RIGHT) Audience leans back in reclining seats to watch display of lights and sculptures created by jets of dry ice vapor. (BELOW LEFT) According to the program notes, these smoke sculptures represent Adam and Eve. Center screens and small multiple screens shown, carry constantly changing colored light patterns. (RIGHT) A drama of Japanese culture unfolds on triple-screen in front of which a graceful dancer performs her art.





During the day, water sprays from the top of the conical Rainbow Tower to create artificial rainbow. At night, colored lights make the tower glow in rainbow hues.

projected onto a huge three-section screen.

On a stage in front of the screen, famous exponents of Japanese classical dancing from the Hanayagi and Nishikawa schools perform during the final three minutes of the show, appearing in person to overlap the screen presentation. The music for this motion picture is composed by Chojuro Imafuji and enhances the feeling of capturing the "spirit of Japan". The title of the film, in Japanese, is the creation of Ryuzaburo Umehara, renowned Japanese painter.

In creating the fantasy effects for some of the scenes in the Rainbow Tower film, Cinematographer Shigeo Hayashida made multiple exposures through various light filters onto Eastman 5254 color negative.

For scenes on the Tokyo expressway after dark he made a total of 17 separate exposures of the cars driving along, using various filters, mattes and frame rates—and combinations thereof.

For a fantasy scene of hikers silhouetted against a seascape of startling surrealistic colors, he first made a silhouette matte of the hikers on Eastman Hi-contrast positive and then made repeated exposure of the seascape background scene, using 58, 25A and 47B filters successively and bi-packing the matte with color negative film by means of a double magazine. ■

HITACHI GROUP

Continued from Page 663

The turntable rotates again and 128 seats once again face the amphitheater. Safety belts are unfastened and the visitors take the central elevator to the 2nd floor. Here, the visitors can observe the entire mechanism of the computer-controlled flight simulator equipment that provided them with such a breath-taking ride.

MODEL SIMULATION

Camera shifting equipment is installed in the Model Room on the second floor. A camera moves forward and backward (X direction), to the right and left (Y direction), and upward and downward (Z direction). The color camera used here is a live camera similar to a TV camera for on-the-spot broadcasts. Special optical devices are attached to the camera to represent pitching (up and down movement), rolling (turning to the right and left), and yawing (right and left movement). As a whole, these optical devices are able to create six movements, X axis, Y axis, Z axis, pitching, rolling, and yawing in relation to the mock-up model. All of these movements are conducted by a servo system. Pictures of the models picked up by the optical devices are carried by a transmitter to 16 TV receiving sets inside the individual cockpits.

The control stick is equipped with an instrument for detecting positions of the stick. The changing positions become input of an analog computer which transmits signals for various movements of the optical devices and camera shifting equipment. As a result, the optical devices move over the model, following the control stick, creating effects similar to freely flying in the sky. The same system is responsible for swinging the gauge needles and slanting the floor.

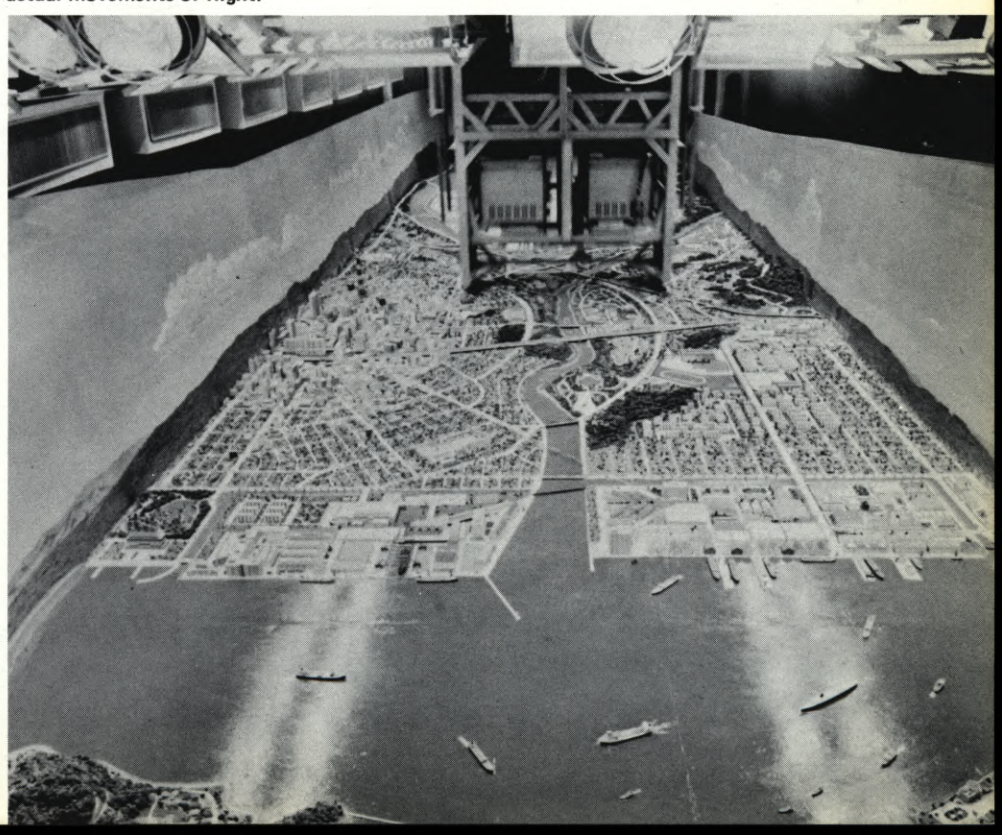
An electron circuit creates a whirring sound and an engine sound, controlling them to produce louder sounds during take-off and less sound after take-off. The same mechanism is used in landing.

FILM SIMULATION

In this method, television film projectors and a color film camera take the place of a live camera. One projector unit consists of three projectors, each responsible for the A, B, or C course respectively.

A special optical instrument is inserted between film projectors and the color film camera. The instrument turns to the right and left of a light axis according to positions of the control stick. As a result, a screen rotates to the right and left, creating an effect as though the plane itself were moving to the right and left. The degree of these swinging movements appears on the gyro horizons on the upper parts of both sides. ■

In Model Simulator on second floor of the Hitachi Pavilion, a video camera moves back and forth across airport model, simulating takeoff and landing of aircraft from pilot's point of view. Pilots in 16 individual cockpits vary these respective images by means of control sticks to simulate actual movements of flight.



FUJI GROUP

Continued from Page 648

"We are happy to be working with the great documentary Director, Brittain, and the great multi-image Producer, Kroitor," said co-producer Ichikawa.

"It is a happy marriage of Canadian and Japanese artists. Film is now truly global."

"This film has no beginning or end," Director Brittain explained. "You can come and go anytime. The audience comes out of the screen and goes back into it. It is about man, the best and the worst of creatures, as he is living today—the best and the worst of times. It is a plea for global compassion. It was shot in eight countries but it is not a travelogue. Unless maybe it's a travelogue of the human spirit."

NOTES ON THE MAIN SCREEN FILM: "TIGER CHILD"

TECHNIQUE:

Various combinations of nine 35 mm images, alternating with three vertical panels of 70 mm images and the single fullscale IMAX image. These are printed on the largest single strip of film ever projected, thus giving the best quality picture ever shown with a single projector. The image is approximately three times the size of Cinerama. The IMAX system, developed by the Multiscreen Corp. of Canada, is being used for the first time at the Fuji Group Pavilion. The installation is under the direction of William Shaw, Director of Development for Multiscreen.

THE MECHANISM

Designed to project the largest single frame in the history of motion pictures, IMAX uses a 25,000-watt xenon lamp to place the first ultra-high-fidelity image on a motion picture screen.

The Fuji Group Pavilion is the world premiere of IMAX. The main screen is 60 feet wide and 40 feet high.

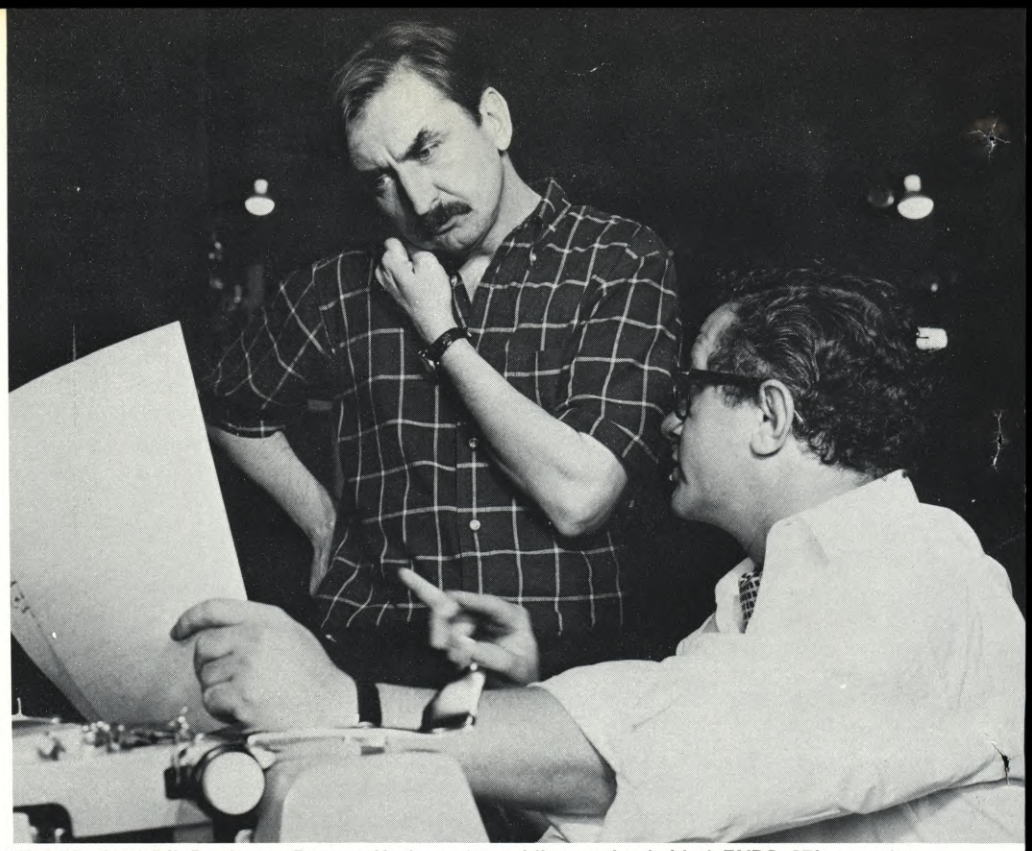
Integrated with the motion picture are 28 giant slide projectors, capable of filling the entire pavilion with up to 168 separate images.

The slides are projected onto the curved surfaces of the air beams themselves by 4,000-watt xenon lamps and are magnified 120,000 times. Capable of changing every fifth of a second, the slides are immersed in liquid to counteract the intense heat of the lamps.

A light-show completes the visual experience, and the stereophonic sound and music are fed through 126 speakers, completely surrounding the audience.

The audience enters under the Main Screen, makes a complete revolution of the pavilion on a slowly revolving turntable, and is carried on a moving ramp to a lounge area below.

The show is 20 minutes long, and because the audience moves in a continuous flow, there is no beginning or end.



"TIGER CHILD" Producer, Roman Kroiter, the guiding genius behind EXPO 67's stunning "LABYRINTH" presentation, discusses script with writer-director Donald Brittain, who was also associated with the Montreal project.

THE ENVIRONMENT

The Crystal Palace . . . . . London 1851
The Eiffel Tower . . . . . Paris 1889
Habitat 67 . . . . . Montreal 1967
The Fuji Group Pavilion . . Osaka 1970

In the tradition of World Expositions, the Fuji Group introduces a new concept in architecture: a pneumatic dome made with beams of air.

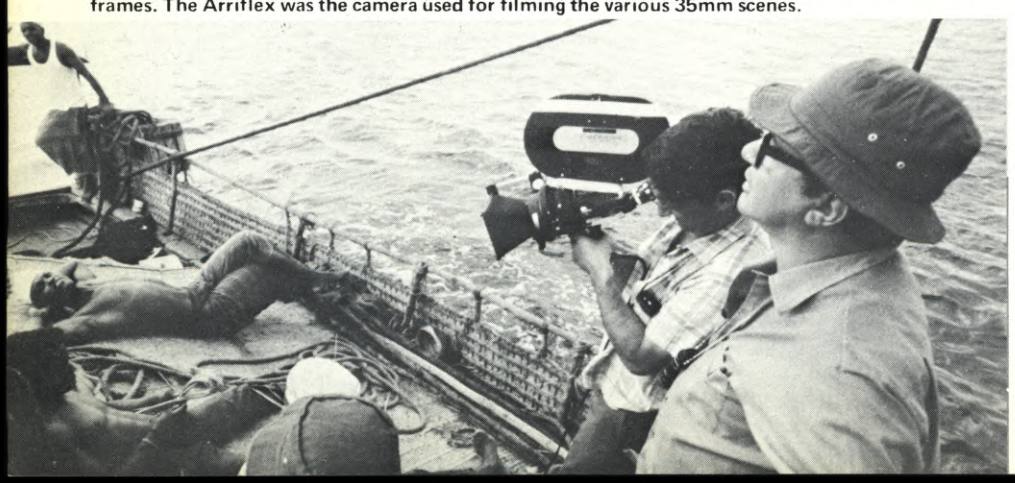
No steel, no concrete, no wood—the building materials are cloth and air. It cannot explode, it is earthquake-proof, it can withstand winds of 145 miles per hour.

The Pavilion is circular, 164 feet in diameter, and 105 feet high. It is constructed of 16 beams or tubes, each 13 feet in diameter, and 262 feet long. Made of the synthetic fiber, Vinylon, these air-beams are anchored at either end and filled with compressed air until they form a giant hoop. The 16 beams are lashed together to complete the structure—very strong, very light, and looking like tomorrow.

The pneumatic concept is carried into the interior. The control rooms, the coffee shop, the sculptures, the washrooms, even the main motion picture screen, are all made of air and cloth.

Designed by the eminent Japanese architect, Yutaka Murata, and built by Taisei Construction, one of the Fuji Group, this revolutionary pavilion is a result of two years of intensive research.

Filming aboard ship during voyage between Kenya and Arabia. The IMAX frame accommodates up to nine 35mm frames, which are also composited in some configurations with standard 70mm frames. The Arriflex was the camera used for filming the various 35mm scenes.



FILMING "TIGER CHILD" IN THE WORLD'S LARGEST FILM FORMAT

By GEORGES DUFAUX, CSC
Director of Photography

EXPO 67 in Montreal tried many experiments using films, still pictures and sound in an attempt to create new forms of visual perception called "mixed media". The image was the basic unit of communication.

Multiple-image cinematography was not an entirely new film technique. Abel Gance in "NAPOLEON" (shot in 1927) tried to use three screens to show simultaneous action. He never went beyond experimentation, for technical reasons, but also because of a public which was not at that time visually conditioned.

Since then the motion picture medium has freed itself from the linear convention of "doorhandle" continuity. With TV, the spectator has become still more used to grasping and understanding a mixture of a variety of images (actuality, fiction, news, commercials) freed from psychological preconception of the theatrical experience. The visual sensibility of the audience has reached a new threshold of perception.

EXPO 67 was just in time to experiment in that direction, with very few technical or commercial restrictions.

The response of the public, immersed for the first time in multi-screen, split-image, variable-image and circle vision, was beyond all expectation. Their reaction could, I suppose, be compared to the wonder of the first cinematographic performances at the turn of the century. The multi-image presentation seemed to appeal more to the average mass audience than to sophisticated fellow film-makers who looked on it as a gimmick. Few film critics reviewed it.

Among all the films shown at EXPO 67, it was "LABYRINTH", produced by a team of the National Film Board of Canada that was reviewed by LIFE Magazine as "a fascinating fusion of film, sound and architecture . . . ."

From that group of film-makers, Roman Kroitor and Colin Low were called in as consultants at the beginning of the Fuji Group project for EXPO '70.

Graeme Ferguson, who did the Polar Regions film for EXPO 67 joined the group, and, together with Roman Kroitor, formed Multiscreen Corp. to produce the Fuji film for Osaka.

Don Brittain, writer and director of the Osaka film, had been connected with "LABYRINTH" during the stage of planning and wrote the commentary.

Personally, I had been involved in the shooting of a few sequences of "LABYRINTH" where I experimented for the first time with the use of a vertical format filmed with a Panavision camera.

During the fall of 1967, I started to direct for the National Film Board of Canada a split-screen project on EXPO 67 which was supposed to reflect the image of "Man and his World", the theme of the fair. A film about what was mostly films can look like a second generation process job, but for me, it was an opportunity to experiment in the same direction. I had been very impressed by the dynamics of Christopher Chapman's film "A PLACE TO STAND", where he used variable and moving images created by means of mattes and optical movement. Chapman shot in 35mm optically transferred to 70mm.

My film called "MULTIPLE MAN" was a combination of actuality material shot during EXPO in 35mm and stock shots in color and black & white. All the optical work was done in 35mm by the National Film Board optical and lab departments and they did a great job. A 70mm blow-up was made later in Hollywood to facilitate the use of stereophonic sound. I worked for more than a year on that project with Claude Godbout and Roman Kroitor, after which Don Brittain asked me to be Director of Photography for their new project. I was quite happy to leave my editing room in order to carry on another split-screen adventure in "fresh air".

The Multiscreen project for the Fuji pavilion was, from the beginning, a very ambitious one, using a completely new picture format. The frame was 15 perforations wide (three times the size of the standard 65mm frame) and the film was to move horizontally. The size of the picture 2.04" by 2.805" (51/65mm) made possible a projection on a gigantic screen with maximum brightness and resolution.

The aspect ratio, identical to that of the academy aperture, would offer various possibilities: Three panels of standard vertical 65mm, nine pictures of 35mm, or a combination of both—plus the full frame sizes.

In order to fill the full frame, two approaches were possible: using a completely new camera or blowing up a 65mm or 35mm camera picture. This second possibility was rapidly discarded because of the considerable loss of picture definition and the necessity of designing a completely new optical bench.

With the actual 15 perforations negative-positive, a standard 70mm printer could be used and a standard optical printer to transfer 65 or 35 printing every third frame and skipping two.

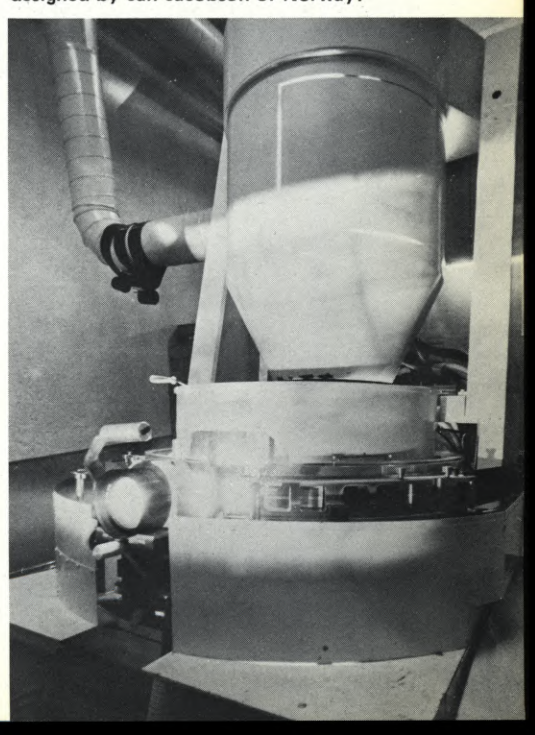
Filming simultaneously with Arriflex and 70mm horizontal format IMAX camera in EXPO '70's "backyard", an Osaka street scene.

A completely new projector system was designed and built in Hamilton by William Shaw of Multiscreen, while a Norwegian mechanical engineer-inventor, Jan Jacobson, was working on the camera in Denmark. Jacobson has been, for many years, associated in designing special film equipment.

The shooting schedule was split into two periods—Decmeber '68 and January '69. A six-week interruption was scheduled in order to allow evaluation of the rushes. The first prototype of the projector would not be ready before that period. And we also wanted to use that time to solve possible technical prob-

Continued on Page 680

The completely new IMAX projector, with its unique "rolling loop" that makes possible 70mm projection at 340 feet a minute, was designed by Jan Jacobson of Norway.



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CANADA

Continued from Page 631

6. **GENERAL DESCRIPTIONS:** From the outside, the leaning laminated beams have a mountainous scale. To lighten the forms and create an ambiguity and the double entente *so much a part of Japanese aesthetics,* the exterior surfaces are sheathed in mirror sloped at 45 degrees, reducing the mass of the pyramid to a reflection of the sky. This illusion evoking sky or hill, solid or void, suggests the arctic ice, the mass of mountains, vast prairie sky or the glitter of Canadian waters.

The sloping planes create an ambiguity of scale, distance, position and mass. Rising skyward from a base of trees, the hard line between the reflected image and the earth is muted and the sense of immensity is enhanced. The pavilion becomes a kinetic display of mood and change.

The absence of sharp demarcation edges to the forms, the surprise effect of slot entrances which compensates for lack of multiple entry points to the site; the sudden revelation and hint of a fantasy world within the mirrored walls; the effect of mirror views in all directions; the attraction of rotating multi-coloured spinners which are essential to the design—all inter-relate to create a total effect of extreme subtlety, enigmatic, arbitrary, and transcendental.

The entrances through the mirrored surfaces into the courtyard are purposely kept narrow, yet lofty, to impart a sense of infinity and the mirrored walls create an illusion of multiplying the space or letting visitors see their reflections hundreds and hundreds of times while the walls contribute intriguing fragments of the interior areas. At the main entrance, the walkways are bordered by reflecting pools which act as a kaleidoscope with the mirrored walls.

The Caribou, with camera dome. In front are (LEFT TO RIGHT) Director Rex Tasker, Captain Paul Apperley (back to camera), Associate Producer Robert Baylis and Cameraman Jean-Claude Labrecque.

FILM IN THE CANADIAN PAVILION

It took eight months of intermittent filming for the National Film Board of Canada to complete its production of "THE LAND", a six-minute Panavision spectacular presented in the Canadian Pavilion at EXPO '70.

The film tells of the vastness of the land, of its potential natural wealth and of the challenge of the climate and geography to its relatively few inhabitants. It is shown on a gigantic triangular screen. Director Rex Tasker has attempted to show the land: in its natural untouched state; as it looked during the course of becoming populated as it is today.

"THE LAND" covers Canada's five broad geographical divisions and all four seasons. The most difficult sequences were left to the last when the N.F.B. crew wrapped up its film-making on Baffin Island in the Northwest Territories. In temperatures averaging -27 degrees and with winds up to 30 m.p.h., the story of the land was concluded.

Cameras froze, heaters failed to heat, trucks got stuck, skidoos stopped and the Eskimos decided that they preferred hunting to performing for the camera. Not even the caribou herds were cooperative. Tasker had originally planned to film the vast herds of caribou crossing the barren wastes in their annual migration. But the graceful animals had no such plan and chose to remain in more intimate groups of twelve to fifteen.

Some of the most spectacular shooting in the film was done from the rear of an RCAF twin engine Caribou. Captains Paul Apperly and Brian Cuniff, who had flown the Film Board crew across Canada, provided some low level flying so that cameraman Michel Thomas d'Hoste could capture a breathtaking view of the North from the air.

Earlier filming had been made possible through a specially designed turret over the captain's head where both cameraman and camera could film the land head on. As Tasker directed both his film crew and the airforce pilots in their aerial journey through mountain passes, across vast ice fields and over towering icebergs, Thomas d'Hoste and his camera sat strapped to the large open ramp at the rear of the plane.

Earlier filming for "THE LAND" was by the award-winning cameraman Jean-Claude Labrecque who also had his share of anxious moments. Aside from aerial shooting, one of the Labrecque sequences required that he and his camera sit perched on the front of a locomotive, six inches above the rails. As the train sped along at 65 m.p.h., Labrecque filmed the prairie landscape. In the Rockies, filming was done from an open-sided gondola car swinging its way up the mountains.

Other camera positions included the top of a truck along the Trans Canada highway; a lobster fishing boat off the east coast; a dog sled in the North and an open cement bucket swaying high over the mighty Manicouagan Dam in Northern Quebec.

FILMING "THE LAND"
By REX TASKER
Director and Editor

The Canadian Pavilion at Osaka is divided into 5 areas—each showing different aspects of Canada. Two of these areas present films made by the National Film Board: "THE LAND" and "THE CITY". The latter is a 5-minute black and white animation film made by Kaj Pindal which is rear-projected onto a lightboard of 16,000 photoelectric cells. A third film, in Eastmancolor and Panavision 35 called "SUPERBUS" was made by Gerry Potterton of Potterton Productions in Montreal and concentrates on the people of Canada.

The NFB was also the producer for all film used in the pavilion, and Peter Mundy and Peter Bohonis, both of the Board, were responsible for the successful programming and technical running of the entire show.

The cameraman and co-director of "THE LAND" film was Jean-Claude Labrecque—one of the very best cameramen in Canada—who had previously shot such films as "60 CYCLES" and "THE ERNIE GAME". Labrecque also has two of his own films running in the Quebec Pavilion at Osaka—"EASY WIN-

Continued on Page 700

JAPANESE GOVERNMENT

Glowing with ever-changing color, the pavilion of the host nation symbolizes EXPO's emblem and tells the story of Japan's proud land and the ways of its people

As befits the host nation, Japan has built by far the largest pavilion at EXPO '70. It's as interesting as it is big.

Five drum-like elevated structures surround an 80-meter (260-foot) tower. From above, the grouping looks like a cherry blossom, which is both the Expo emblem and the national flower. Each of the five halls is 58 meters (190 feet) in diameter and 27 meters, nearly 90 feet, tall.

Under the theme "Japan and the Japanese," the pavilion presents the past and present of the land and its people in all their varying aspects. Then it delves into the future, when the world will have come to know Japan better and when the Japanese will have developed their dreams.

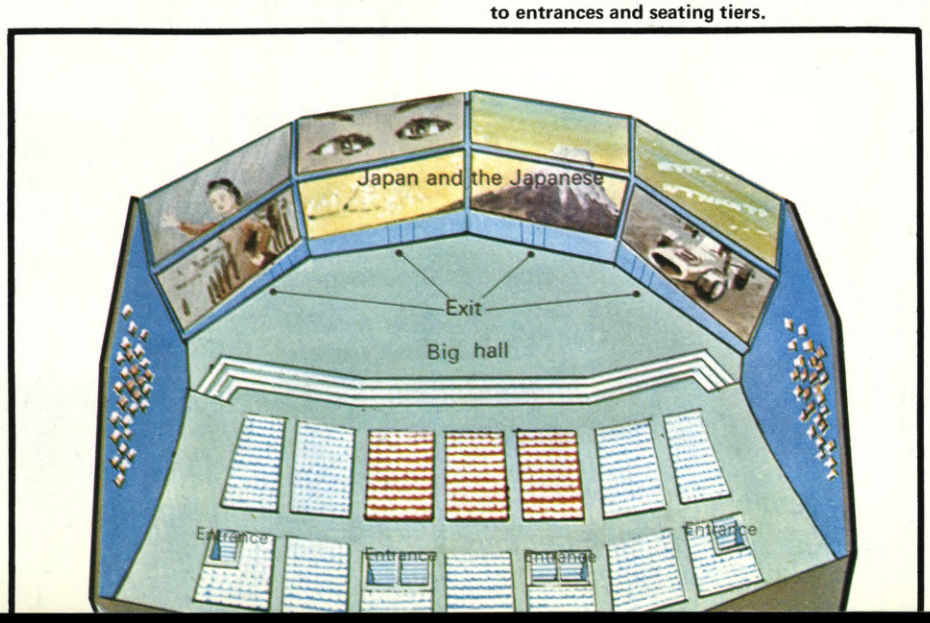
The Japanese Pavilion tells how the EXPO '70 theme, 'Progress and Harmony for Mankind," has sprouted and will bloom, like a cherry blossom. Exhibits, therefore, stress the "progress" that has made the historical development of Japan more than a mere "lapse of time." You see contemporary industry and culture and hopes for the 21st Century. Exhibits also stress the "harmony" of a Japan that has drawn on both Eastern and Western cultures and has built upon this double foundation the structure of a vigorous and unique culture of its own.

Consequently, exhibits are arranged in the three sections of yesterday, today and tomorrow—Mukashi, Ima and Asu. All is understandable wherever you begin; but you may follow the flow of history by entering Hall 1 and proceeding clockwise through the others.

When you come to Hall 5, Asu, Tomorrow, is the theme and film called "Japan and the Japanese" is the main attraction. It is shown on a huge screen, 48 meters wide (157 feet); production became possible only with the development of an eight-lens camera of a quite special type.

Majestic Mount Fuji spreads its splendor across eight screens as one scene in a magnificent film panorama of "Japan and the Japanese." The Nac-MC 358 cameras used were modified to photograph a double-frame 35mm format similar to that of VistaVision.

Diagram of Hall 5, showing curved panoramic screen configuration 157 feet wide, in relation to entrances and seating tiers.



Nac-MC 358 CAMERA, CONVERTED INTO VISTAVISION FORMAT

The Nac-MC 358 camera which had been designed and manufactured by Nac, Inc., of Tokyo, as a photo-instrumentation camera, was converted into a double-frame camera, similar to the VistaVision format, in order to shoot the scenes of "Japan and the Japanese". The conversion was made by the engi-

Continued on Page 695

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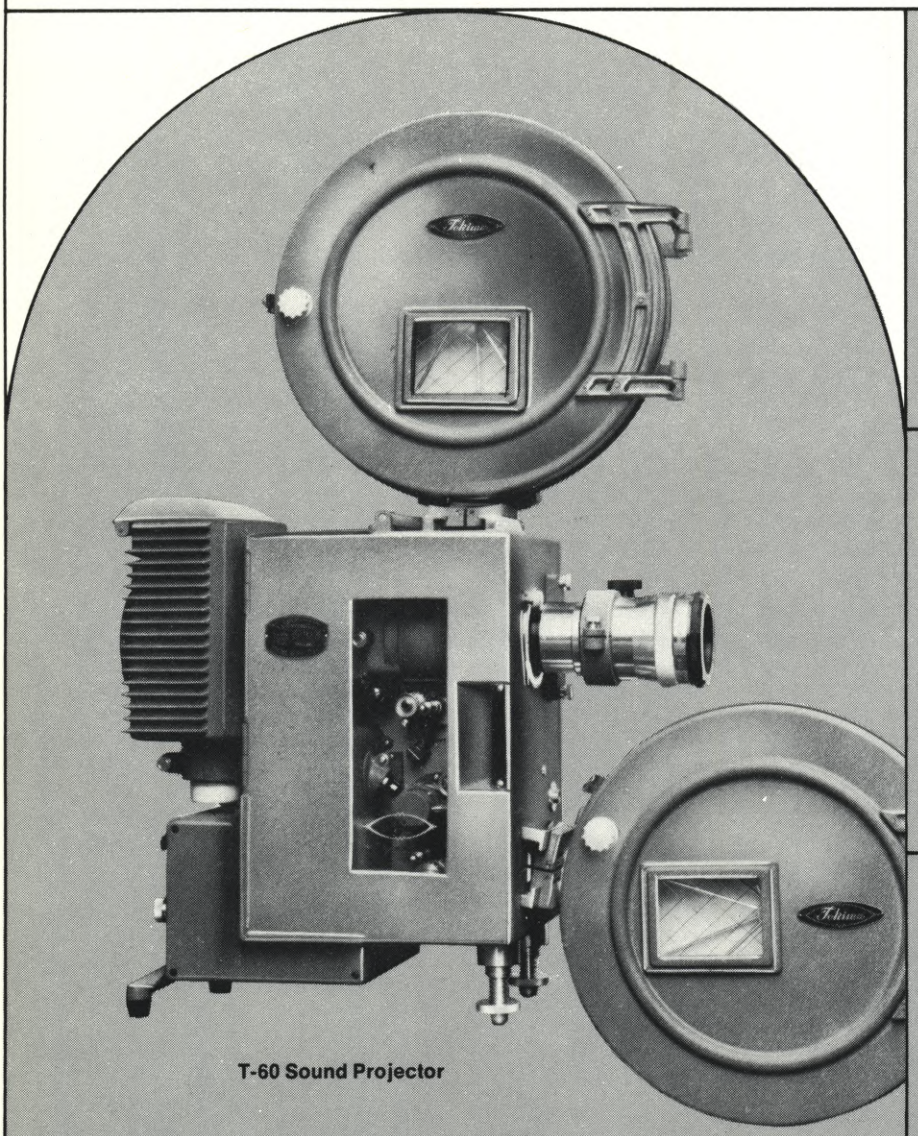
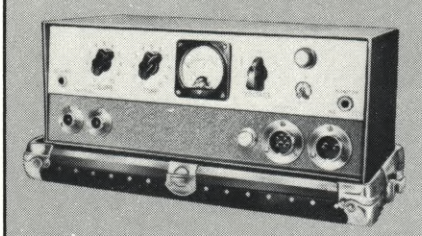
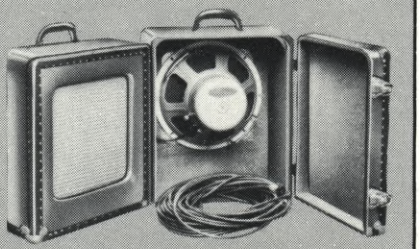


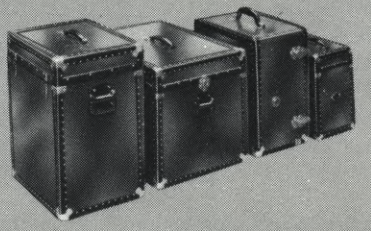
T-60 Sound Projector



Type T Portable Amplifier



Type T Speaker System



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BRACKEN'S WORLD
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THE JAPANESE

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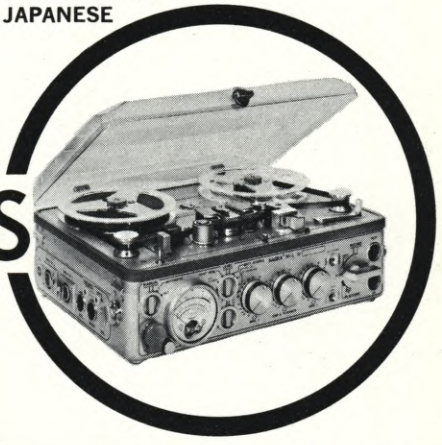

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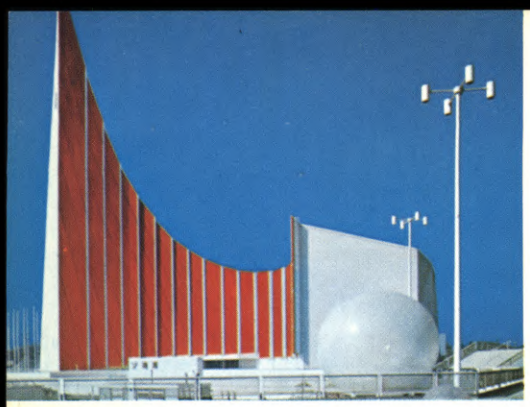

A giant diamond-shaped film format, plus a true three-dimensional illusion that can be viewed without glasses enliven EXPO's tallest pavilion

SOVIET UNION

Soaring skyward in a graceful swirl, the superb sculptural form that is the pavilion of the Soviet Union reaches its peak at 110 meters—making it the loftiest building on the EXPO '70 site.

The U.S.S.R. exhibits pay graphic tribute to such pioneers of the cinema art as Sergei Eisenstein and V.I. Pudovkin. More than 60 films of various formats are used throughout the pavilion to tell the story of the nation and its people.

In the Cinema Theatre there is a rotating program of documentaries, newsreels, cartoons and animated puppet shorts—plus the unique 15-minute "Stereo-70" travelogue, "Russian Sketches", which presents a true three-dimensional effect *without the use of glasses by the audience.*

Inside the heroically proportioned main exhibit hall, a "Varioscopic" documentary entitled "Earth and Sky" unreels in a towering diamond-shaped multi-image format, the top of its irregular shape rising to a height of 30 meters above the floor.

Mr. Igor M. Bolotnicov, Deputy Director of the Cinema & Photo Research Institute (NIKFI) and his colleague, Dr. N.D. Bernstein, are present in the pavilion at this writing. Both gentlemen welcome the *AMERICAN CINEMATOGRAPHER* Editor most cordially and very kindly conduct him on a "behind-the-scenes" tour of the more exotic motion picture installations.

"Stereo-70"

The most unusual of the film formats in the U.S.S.R. pavilion—and a real conversation piece—is the 3-D short subject presented several times a day in the cinema theatre. It is shown on a special, relatively small (3 x 4 meters) lenticular glass screen in a 1.33-to-1 aspect ratio format.

If one sits somewhere near the center of the auditorium and is careful not to move his head, he sees a true three-dimensional image of extraordinary depth without having to wear the usual polaroid glasses. Sitting off to the side at too sharp an angle results in a loss of image to the viewer; moving one's head creates a "rippling" effect and possible momentary blanking out of the image. Thus, while the system is less than perfect, it still creates a stunning illusion of depth.

"Stereo-70" is produced by filming with a twin-lensed camera that places the two images side-by-side on a single strip of 70mm film. It is shown by means of a standard 70mm projector onto which has been fitted a special double-lens mount. The image from one lens hits the screen directly; that from the other lens is offset by a beam-splitter to achieve the proper degree of separation. The two images strike the lenticulated clear-glass outer screen, an optical system consisting of 1700 cone

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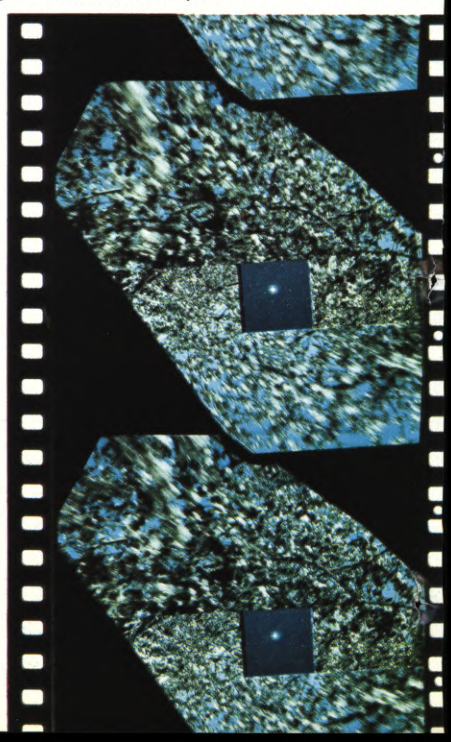
A section of the lofty main exhibition hall of the U.S.S.R. Pavilion, showing area devoted to space exploration display.

(LEFT) A strip of Russian "Stereo-70" film, showing two images printed on same 70mm strip. Beam-splitter in projector off-sets one of the images to proper separation distance. (RIGHT) The unique Varioscope format in which rhomboidal frames overlap on 70mm film strip.



A beautifully conceived series of displays achieves the almost impossible task of taking the spectator on a full tour of Japan

LOCAL GOVERNMENT

Japan's local self-governing bodies—from prefectures to towns to villages—have all joined together to present the Local Autonomy Pavilion. Here is a quick tour of Japan with remarkable thoroughness.

Hall No. 1 is entered through a morning glory-shaped "tunnel of light." On the first floor are displays about local self-government. Guide corners give visitors an idea of the scenery and products of each area. On the second floor, the history of local government from its beginnings to the present day is shown. On the fourth floor, 53 cylindrical screens flash pictures of all the prefectures and Okinawa and show the various activities of governing bodies throughout Japan.

Moving down a gently sloped passage, visitors see what Japanese towns and villages will look like in 20 years' time.

Guests are then lifted slowly up and around the circular building and into Hall No. 2—an immense single-story structure. A 25-minute "air ship" takes you on a trip over the entire country. The model of Japan is on a scale of 1:30,000 and the air ship "floats" 10 meters above the floor—creating an illusion of seeing Japan from an altitude of 30,000 meters. Films projected on the walls as the ship makes its trip point out details and facts about the country's eight regional blocs.

Hall No. 3 is devoted to rest and entertainment. Here a round stage resounds with folk dance performances and traditional entertainment programs from various parts of Japan.

For most visitors, the high-point of the pavilion is the trip in the passenger-carrying gondolas called "air capsules" which not only soar above the gigantic three-dimensional scale model of the Japanese islands, but put them directly in position to view the striking array of films presented on the two huge screens stretching the length of the exhibition hall.

The film presentation begins with a prologue, which is followed by individual portrayals of the regional blocs—Hokkaido, Tohoku, Kyushu, Okinawa, Tokai and Kanto—and closes with an epilogue. The theme is "Japan stands on the threshold of a new era."

Both standard film formats and anamorphic (or CinemaScope type) aspect ratios are displayed by means of 22 projectors operating simultaneously to show film scenes on the two facing giant screens, which are eight meters high and extend a total of 160 meters in width.

Sixteen millimeter color films produced by the various prefectures are shown in the general exhibit section. ■

Forty "air capsules", each carrying six passengers, move past a huge relief map of Japan, while 22 projectors flash film scenes on giant overhead screens.

On the fourth floor of Hall No. 1 in Japan's pavilion dedicated to Local Autonomy, 53 circular screens flash pictures of all of the prefectures and Okinawa and show the various activities of governing bodies throughout Japan.

FUJI GROUP

Continued from Page 671

lems encountered in the use of the new prototype camera.

Graeme Ferguson, who was in contact with Jan Jacobson, had asked me my requirements for the new camera and, considering the time pressure, I could not be too demanding.

A few weeks (I think five weeks) before shooting was to begin, Jacobson arrived with a very reasonable-sized square box with one 500-foot magazine mounted flat on the right side and I witnessed the first "take" of a 200-foot short-end at the speed of 340 feet a minute. A car battery ran the 15-volt motor.

The movement was working, but the camera, at that time, had only one lens (an 85mm Bronica) and a lot of work still had to be done on the adaptation of different lenses, buckle switch, magazine tension, pilotone, matte box, etc. We had to solve the problem of making a camera test without the possibility of screening it with the projector.

A split-mirror viewer was the only solution for a semi-reflex camera such as this. A normal reflex mirror would have required too big a shutter. With a loss of 30% to 50% of the exposurable light because of the split-mirror, plus lenses of F/3.2 to F/4, I had to face certain lighting problems. We were lucky that the fast Eastman 5254 color negative was, at that time, just coming onto the market in 65mm.

A range of Bronica lenses had been chosen but a few of the focal-lengths barely covered our picture size, which is a little larger than the 2¼ x 2¼ format. We had a 50mm, 85mm, 150mm, 200mm and 500mm. The 500mm had to be used almost wide open between F/6.3 and F/8 because of vignetting.

It was really a race against time—Jacobson and another engineer, Pierre Abelos, were working nights and days to finish a camera built from scratch in less than four months. During that time I was preparing our shooting with the Director, Don Brittain. Guy Dufaux who worked as second cameraman, head assistant and later as maintenance chief, was processing tests in an Inox tank adapted to 65mm. We were also preparing and testing the rest of the equipment.

The second camera, the 65mm vertical, was another Jacobson model which had been used in filming "BATTLE OF BRITAIN". This camera was relatively light, simple and reliable. We built an L arm and the viewer system was changed to work on its side. Because of the weight, I designed a shoulder brace that I didn't use later on, having always preferred to have freedom of movement while doing hand-held shooting. On that camera we had a 35mm, a 50mm, a Japanese zoom 85mm—200mm and we adapted our 500mm Bronica lens. After the complexity of working with prototype equipment, the third camera, the 35mm Arriflex, seemed to handle like a Kodak Instamatic.

The first three weeks of shooting were in Montreal with one day in New York for a football game and required more work at night on the 15-perforation camera. The battery (nickel-cadmium) was specially built in New York. Meanwhile, and during all the first part of the shooting, we had to carry a 6-volt and 12-volt car batteries. When using the 15-perforations camera I had to shoot with a very high light level on location. I used many times, the blue Mini-brutes to avoid covering large surfaces of windows with 85 filter material. I also used the usual quartz lights bounced off of white cardboard, when possible, and a few old-fashioned lights. For interiors the main problem was, of course, the critical depth of field when you go beyond 50mm. Around Christmas, we made a fast trip to Calgary where we hit 40° below zero temperatures and we wasted a lot of valuable footage to get a few complete shots of a cowboy in the snow.

Before leaving Canada for Africa, we were able to see our 35mm rushes. Our 65 rushes were screened in a theater "lying on their sides" and we looked at our 15-perforations footage frame by frame. MGM was working on a reduction system to print all three different formats onto 35mm stock for screening and editing purposes.

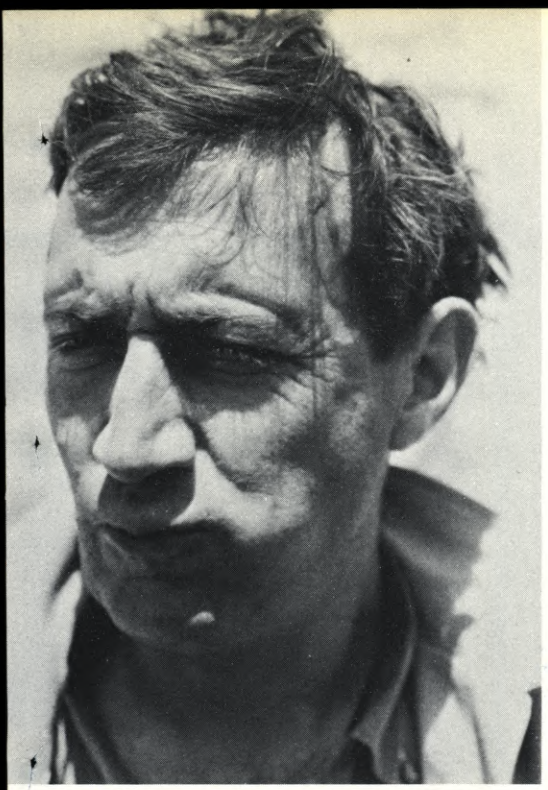
We went overseas with all of our camera equipment and a minimum of lighting gear: six quartzes and Lowel-Lite kits. The entire crew consisted of a business manager (Paul Salzman), a soundman (Ted Healy), Don Brittain (the director), three (including myself) for the camera, Guy Dufaux and a Japanese assistant. We added another camera assistant for the second unit shooting. On the spot we hired helpers and electricians, when necessary.

Don Brittain and I tried to figure every sequence with a rough story board as we had to decide in advance which of the three different formats to use.

We were not quite past all of our technical troubles. The second day in Kenya, we had to change our split-mirror to a single glass (used for slide frames) which gave us a double image not easy to focus. The mirror broke when our safari driver practiced a fast getaway with the camera mounted on a Land Rover (in case of a possible elephant charge).

At that point, when the projector was still in its early experimental stage,

(LEFT) Director Donald Brittain (standing beside IMAX 70mm camera), Olympic champion Kip Keino and Director of Photography Dufaux, shown on location near Mount Kenya during filming of African sequences. (RIGHT) Side view of IMAX camera clearly shows position of horizontal magazine in relation to viewfinder eyepiece and camera body. Viewfinder mirror became broken on safari during second day in Kenya, forcing substitution of single glass that produced a double image and made focusing most difficult.



Director of Photography Georges Dufaux, having filmed sequences in the exotic L-shaped format of "LABYRINTH", gamely tackled the challenge of the IMAX system.

we received a report of possible camera jiggle with the 15-perforations IMAX camera. With the help of a Kenyan craftsman, we designed a steel blimp with foam rubber inside. The camera became bullet and vibration-proof. We discovered later on that the alert had been only a false alarm.

Back in Montreal we were able to start an evaluation of our shooting and confirm certain theories regarding the use of the three different formats.

The vertical 65mm format can be framed naturally with certain scenes and actions. The full frame, which we at first dedicated to landscape and establishing shots, proved sometimes to be more interesting for shooting closeups. A mosaic of three 65mm panels or nine 35mm images could reproduce the feeling of a general shot—with more impact. In March, we started our second journey with more trustworthy equipment: London, Berlin, Israel, Bangkok and, finally, two weeks in Japan, headquarters of the Fuji group. Minor camera troubles (particularly magazine tension) had still to be solved but nothing very serious.

We were now facing another kind of problem: film stock. As our 65mm stock was running three times faster with the IMAX camera, our shooting script had sometimes to be adjusted to this requirement, a lot of footage having been wasted at the beginning because of our camera trouble. But this is inevitable in an ambitious experimental project where you are involved with prototype equipment, new designs and new creative concepts.

When the shooting was over, the pressure was still on for the director, producers and editors who were using a newly designed 8-Head editing projector while the IMAX projector, design and construction continued up until a few weeks before the opening of EXPO '70.

Now that the show is running smoothly and 25,000 people a day are watching the spectacular effect of the IMAX system, I think that I have been involved in the most exciting (and easiest) part of this very unusual and ambitious film adventure. ■

(EDITOR'S NOTE: Space limitations preclude a more comprehensive exposition of Multiscreen Corporation's IMAX System at this point. However, because this unique new format implies a possible new dimension for the motion picture medium, we will publish an in-depth analysis of it in the August, 1970 issue of AMERICAN CINEMATOGRAPHER.)

CREATORS OF THE FILM, "TIGER CHILD"

DONALD BRITTAIN, Writer-Director.
Called "a master of the craft" by Time Magazine and "a truly creative film maker" by the American Film Quarterly, Brittain's documentaries have won dozens of international awards including Grand Prix at Venice, San Francisco, Leipzig, New York and Montreal festivals. He has written the script for two "Oscar" nominees and three times has been chosen best director by the Canadian Society of Film Makers. Such feature documentaries as "BETHUNE", "LADIES AND GENTLEMEN: MR. LEONARD COHEN", and "NEVER A BACKWARD STEP" are studied at many universities, and his masterwork, "MEMORANDUM" is considered a documentary classic. He was a writer and consultant for three pavilions at EXPO 67.

ROMAN KROITOR, Producer.
One of the most inventive minds in film, Kroitor has made a career of breaking new ground, creating landmarks, and moving on. With an early film, "PAUL TOMCOWICZ, STREET RAILWAY SWITCHMAN", he stripped the documentary to basic elements and helped create a new style of utter simplicity. He pioneered the use of still pictures with "CITY OF GOLD"; highly sophisticated special effects with "UNIVERSE"; cinema verite with "LONELY BOY"; and the multi-image spectacular with the now-famous "LABYRINTH". The hit of Montreal's great EXPO 67, Kroitor spent 17 years at the National Film Board of Canada before becoming the Vice President of Multiscreen Corp. in 1967.

KIICHI ICHIKAWA, Producer.
An independent feature film producer since 1952, Mr. Ichikawa has been in the forefront of the great Japanese film boom. His best-known work is the famous "WOMAN OF THE DUNES" which won the special "Prix des Juries" at the Cannes Film Festival in 1964, was distributed throughout the world and won great critical and popular acclaim. His other films include "THE SONG OF THE BATTLEFIELD", "KIKU AND ISAMU", "NAKED GENERAL", "THE RUINED MAP", and "HERE IS A FOUNTAIN". His films have won many Japanese awards and prizes in France, Mexico, Belgium, the United States and Italy. Mr. Ichikawa brings a deep understanding of Japanese audiences and the flair of a great showman to the Fuji Pavilion.

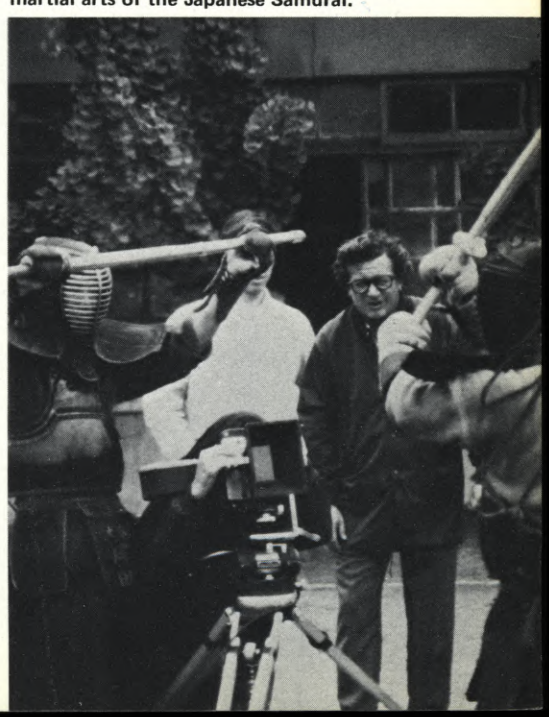
GEORGES DUFAUX, CSC, Director of Photography.
Winner of the Canadian Grand Prix for black-and-white cinematography in 1966, and for color cinematography in 1968 for the Paramount feature "ISABEL", Dufaux is also a director and editor, whose films have won top prizes at Venice, Cairo, Salerno, Vancouver and Montreal. He was chosen to direct the Official film on Montreal's EXPO 67—a multi-image work which has recently been released.

TOSHIRO MAYUZUMI, Composer.
One of Japan's best-known composers, Mr. Mayuzumi's recordings have brought him an international reputation. His works include "Sphennogramme", "Ektoplasm", "Nirvana Symphony", and he composed the music for the Balanchine ballet "Bugaku", commissioned by the New York City Ballet Company. His film music includes the score for John Huston's "THE BIBLE", which was nominated for an Academy Award. Mayuzumi planned and organized the Electronic Music Studio for the Japanese Broadcasting Network (NHK) and has composed several electronic works. He has studied in Paris and traveled widely in America and Europe, and has won a number of international awards.

EDWARD T. HALEY, Director of Film Sound.
After working at England's famed Pinewood Studios, Haley joined the National Film Board of Canada where he has recorded and mixed some 300 films. He was active in developing stereophonic and multi-track recording systems and did all the original recording and final mixing for the "LABYRINTH" Pavilion at EXPO 67. He has recently been the director of all multi-track sound mixing for the Canadian Pavilion at Osaka.

**IMAX is a registered trade mark of Multiscreen Corporation Limited, Galt, Canada* ■

Director Brittain supervises filming of a sequence involving *kendo*, one of the ancient martial arts of the Japanese Samurai.



ELEC

TRIUM

A giant "lamp", sculptured of steel and light, is Japan's Electrical Power Pavilion—site of a lyrical five-screen film presentation and magic show

Night is not the only time to see the Electric Power Pavilion. It is an awesome structure always. But at night, the brightly lit surface radiates a multitude of colors with the effect of a huge and glorious electric lamp.

This "lamp," this pavilion also known as the Electrium, is a 1,200-ton structure suspended by 16 steel cables from four 43-meter-high columns.

The visitor is first taken by elevators to the 500-seat Aerial Theater on the highest level to see "Hunter of the Sun."

Projected on five screens, this movie shows man's dependence on the sun's energy; it traces man's gradual harnessing of various power sources—beginning with the taming of fire and climaxing with the development of nuclear power reactors.

On the lower level are engrossing displays centering on the Electrium theme—"Man and Energy."

After leaving the main structure of the pavilion, the visitor is led to a 400-seat Floating Theater where magicians reveal new and fascinating aspects of electricity. A tent supported by three huge air-beam arches, this structure is constructed to revolve in a man-made pond during the performances.

The pavilion can accommodate 1,800 visitors at a time, and the viewing

(LEFT) Prologue, with English and Japanese titles, identifies the sun as Man's basic source of energy. (RIGHT) Comely hostess of the Electrium welcomes audience to a screening of "HUNTER OF THE SUN".

In a separate structure of the Electrium, the "Magic Illusion" show is presented. Along with its other tricks, it features a "Flying Sportscar" that levitates and tilts realistically on stage in front of a rear-projection screen.

Electrium's stunning five-screen film, "HUNTER OF THE SUN" is a production of Toho Company, Ltd. and Iwanami Productions, Inc., directed by Hideo Onchi and produced by Shinya Izumi. Musical score is by Toru Takemitsu.

interval for the complete program is 50 minutes.

THEME

The Federation of Electric Power Companies, an association of the nine major electric power companies of Japan, has sponsored the Electric Power Pavilion to introduce and familiarize visitors with the role of the electric power industry in modern society and to explore the future potential of the industry under the comprehensive theme of "Man and Energy".

The general program of the Electric Power Pavilion consists of three sections—a film, exhibits, and an electrical magic show—each showing aspects of the theme "Man and Energy".

ARCHITECTURAL CHARACTERISTICS

The Electric Power Pavilion consists of two buildings—the main pavilion characterized by its suspended structure and the pneumatically supported Floating Theater.

MAIN PAVILION

The impression of tremendous strength and stability given by the main pavilion structure may be said to symbolize the future of the electric power industry.

The 1200-ton structure is suspended from the roof and four steel columns 43 meters in height. The highest section of the structure, enclosing the Aerial Theater, hangs directly from the roof while the disk-shaped exhibition gallery is suspended by sixteen steel cables from the columns.

This structure was pre-assembled on the ground and then lifted up to its present position by huge jacks placed at the top of each pillar.

FLOATING THEATER

Measuring 23 meters in diameter and 20 meters in height, the Floating Theater has been designed to utilize the principles of air pressure to the utmost. The canvas forming the exterior of the structure is supported by three giant air beams while the internal canvas layer is kept in position by the "minus" air pressure between the two layers of canvas. Air pressure is used not only in the external structure but also in the door mechanism, benches, and emergency rafts. The lightness of the materials and the simplicity of construction make it the ideal type of building for the future.

The air in the 44 vinyl-coated open "boxes" found underneath the structure sets the building afloat, thus giving

visitors the sensation of being aboard on a huge rubber boat. Automatic adjustment of the air in the "boxes" counteracts any possible swaying.

An additional feature of the Floating Theater is that it revolves 180 degrees from one bank to the opposite bank during the presentation of the magic show inside.

LIGHTING

Special emphasis has been placed on bringing out the dynamic quality of the Electric Power Pavilion through various lighting effects.

Four programs fed into an automatic control system continuously change the lighting so that the image received is uniquely different according to the particular time and place.

PROGRAM

Aerial Theater: "HUNTER OF THE SUN"

The multi-camera—multi-screen film, "HUNTER OF THE SUN", introduces the general theme of the Electric Power Pavilion.

The history of man from the discovery of fire to the development of nuclear reactors may be said to be one of a never-ending search for newer and better sources of energy. In other words, man's history is that of chasing after the "sun". The film, "HUNTER OF THE SUN", attempts to interpret this aspect of man on the screen.

This sixteen minute film is shown on five screens, nine meters in height and 22.5 meters in total width. The use of five projectors makes it possible to screen five separate and different images at one time as well as to project one huge image covering all five screens.

FLOATING THEATER: "MAGIC ILLUSION"

The "Magic Illusion" is a unique magic show under the direction of Tenko Hikita, Japan's foremost magician, which takes visitors into a world of electrical fantasy.

Below are the main features of the "Magic Illusion":

1 Electric Eel Magic
Electric eels greet visitors by having their electricity transformed into sounds.

2 Magic Variety
Tenko Hikita appears both on stage and on the screen to perform a magical duet.

3 Laser Beam Magic
Various magical tricks are presented using laser beams.

4 Flying Sportscar
A car is levitated on the stage to run in front of the screen. ■

AUSTRALIA

Continued from Page 641

free from the forces of gravity."

The functional purpose of the dome-shaped roof is to provide shelter from sun and rain for up to 2000 visitors at a time who queue to enter the exhibition tunnel. This idea emerged from observation of the many queues of people waiting for hours in all weather at Montreal to enter the most popular pavilions.

Under the circular roof visitors to the Australian pavilion move around a spiral pathway which drops progressively to the entrance level of the main exhibition area.

The Australian show begins here under the roof with a film spectacular to entertain the waiting visitors. The film, produced by Australia's Commonwealth Film Unit, is projected on nine screens extending around the full circle of the roof's inner rim above head level.

Australian film units spent a year shooting scenes for the film all over the Australian continent. It is in colour and was produced by the most advanced techniques to give a new kind of film experience.

It serves as a dramatic introduction to Australia before the visitors move on to their next experience in the exhibition tunnel, a steel cylinder 25 feet in diameter and 230 feet long standing in a sunken garden.

A "WRAPAROUND" FILM

For 12 hours a day seven days a week for six months, an Australian film spectacular is being shown continuously under the hanging dome-shaped roof of the Australian pavilion.

The 70mm film called "HORIZON" compares favorably with some of the experimental film spectacles which caused a sensation at EXPO 67 in Montreal.

It is projected onto a series of nine wide screens around the inside rim of the circular hanging roof (324 feet in circumference), entirely surrounding the audience with colourful fast-moving images.

Units of Australia's Commonwealth Film Unit spent a year travelling the vast Australian continent shooting sequences for the film.

These show spectacular scenic panoramas, life in the cities and the outback, farm and manufacturing industries, the fine arts and performing arts, and more expecially the Australian people.

The film had its origin in the EXPO

67 experience at Montreal where thousands of people queued up for hours in rain and sun with little to entertain them as they waited to enter some of the pavilions.

The designers of the Australian pavilion for EXPO '70 decided to shelter the waiting public and from this came the concept of the hanging circular roof. Under the roof the public moves around a spiral pathway leading down to the entrance of the main exhibition, which is shown in an exhibition tunnel below ground level.

It was then decided to entertain the waiting visitors by projecting a film around the inside of the roof above head level.

"This called for a special approach to film making" said Mr. Stanley Hawes, Producer-in-Chief of the Commonwealth Film Unit. "Some accepted rules of film making had to be thrown overboard.

"In the ordinary movie theatre the audience is seated and has a fixed point of view. The approach has therefore been to make the film episodic rather than in sequences which a moving audience would not be able to follow."

The form chosen to present this concept was that of nine 70mm films which would be screened simultaneously. About 250 images have been selected from the mass of material shot. These are projected onto the various screens but the order of the images is varied so that no film resembles any other except in its component parts.

The viewer is able to see three screens at a time as he moves around the queue and usually these will be showing contrasting images. At certain points, to gain dramatic impact, identical images may be seen on more than three screens and even on all nine screens. For example a good shot of a leaping kangaroo might be shown on every screen, completely encircling the spectators.

Images have been selected and arranged for their individual and thematic value rather than for continuity. Violently contrasting images are often shown side by side. A distant herd of cattle stampedes across the screen into a picture of a dainty drifting butterfly with a 15-foot wingspan. One screen may be occupied by the excited faces of children riding a roller-coaster, while on one adjacent screen there is a blood red desert sunset and on the other a freighter looms across the foreground.

The film has no spoken commentary but 1400 small speakers in a handrail around the spiral pathway will provide music and stereophonic sound effects.

"HORIZON" is expected to be seen by an estimated 6,000,000 visitors to the Australian pavilion during the six months of EXPO '70.

ABOUT THE FILM-MAKERS

The Australian Commonwealth Film Unit is a section of the News and Information Bureau in the Commonwealth Department of the Interior. Headquarters are at Lindfield, a suburb of Sydney, N.S.W.; a projection theatre and office are maintained in Melbourne, and a cameraman stationed there permanently, and a projection theatre is attached to the Head Office of the Bureau in Canberra.

The Unit is the official Government authority for the production of films:

(a) For use within Australia on important matters of national interest and welfare such as schools and adult education, rehabilitation, social development, international understanding, trade and tourist expansion.

(b) For dissemination abroad to expand trade and commerce with other countries, encourage tourist traffic with Australia, to improve Australia's relations with other countries and, where necessary, to explain Australia's national policies.

Staff

Staff comprises about 150, including a Producer in Chief, Production Manager (who is the deputy Producer in Chief), Producers, Director/Editors, Scriptwriters, Production Assistants, Cameramen, Sound Technicians, Laboratory, Distribution and Administrative Staff. In Canberra the News and Information Bureau has a small production unit dealing with television news items, as well as projection staff.

Accommodation and Facilities

The Film Unit occupies a modern building at Lindfield, N.S.W. Facilities include a sound stage, offices for production and clerical staff, two projection theatres, one of which is equipped with full sound recording equipment, twelve cutting rooms, storage rooms for films and equipment, titling and animation room, camera department, artists' dressing rooms, film vaults, garages and general facilities for the production of documentary and educational films.

16mm black and white printing and processing is done by the Unit's laboratory in the nearby suburb of Chats-

Continued on Page 699

TOSHIBA-IHI

Continued from Page 642

some 300 reels of sound tape (enough for 75 hours of play) were recorded.

After the film performance, the circular seating platform descends again and the audience is led to the basement exhibit area via three gangways.

A big fountain surrounds the cylinder shaft of the elevating platform. Leaving this area, the display of 'Light and Water' continues along the outer wall, called 'The Corridor of Light and Water.'

The black carpeted corridor offers an opportunity for moments of relaxation after the excitement of Global Vision.

OPERATION:

A single push button activates the programed show . . . Operation of the elevating platform, movie projection, lighting and sound effects are controlled automatically by a special program control system.

CREDITS:

Theme
Light for Man
Building Lot:
Total area 6,440m^2 Lot No. 3320
Exhibitors:
Tokyo Shibaura Electric Co., Ltd.
Ishikawajima-Harima Heavy Industries Co., Ltd.
Producer:
Shinya Izumi
Architectural Design:
Noriaki Kurokawa Architecture & City Planning Ltd.
Construction:
Takenaka Komuten Co., Ltd.
Film Production:
Iwanami Productions Co., Ltd.
Projectors:
Toshiba Photo-horn Co., Ltd.
Exhibits Production:
Nomura Display Co., Ltd.
Approximate Tour Time:
40 min. ■

The 18-minute documentary, "A TRIBUTE TO MAN", is shown to 500 people at a time seated on circular platform that takes one minute to rise into position.

AMERICAN CINEMATOGRAPHER MANUAL

COMPILED AND
EDITED BY
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ARTHUR C. MILLER, A.S.C.
AND
WALTER STRENGE, A.S.C.

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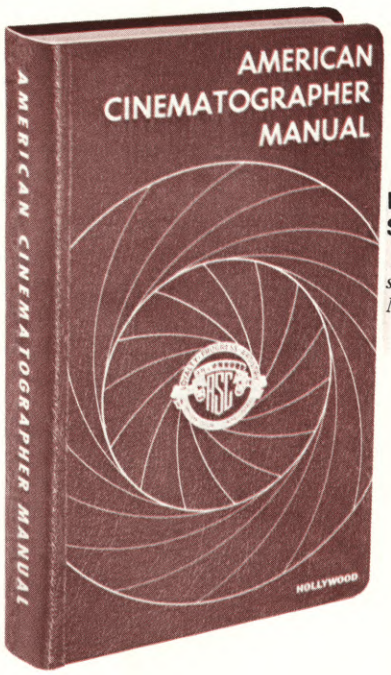

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KODAK'S GOLDEN PAVILION

Continued from Page 659

motion picture projector, cast images on the sides of a circular tent. One controller projector is needed for this display alone.

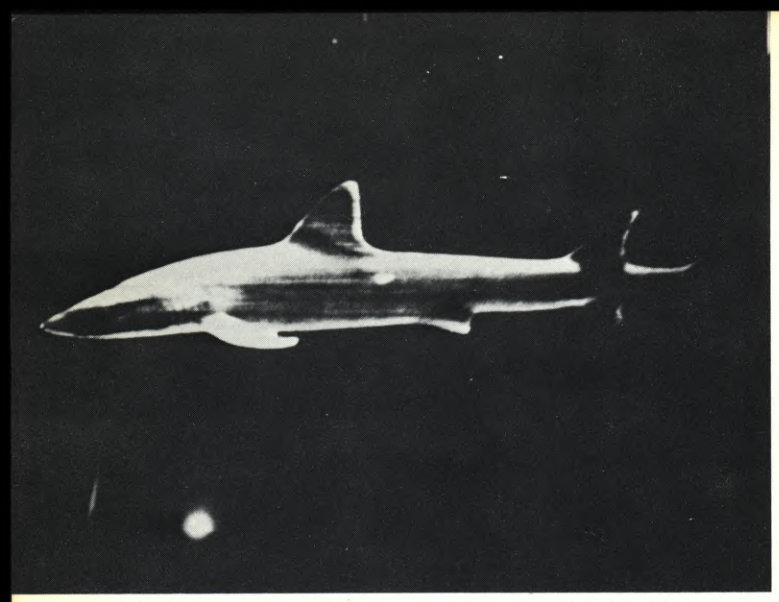
Kodak's Instamatic camera is featured in an animated film of brilliant colors and forms, which provides visual cues for the explosion of slide images that fill the sides of the test, dissolving up and down as the motion picture unreels. The tent, which serves as an almost circular screen, was built in projection-size modules using screen material developed by the Andrew Harkness Company, Ltd., of London, England, which permits both front and rear projection with equal brightness.

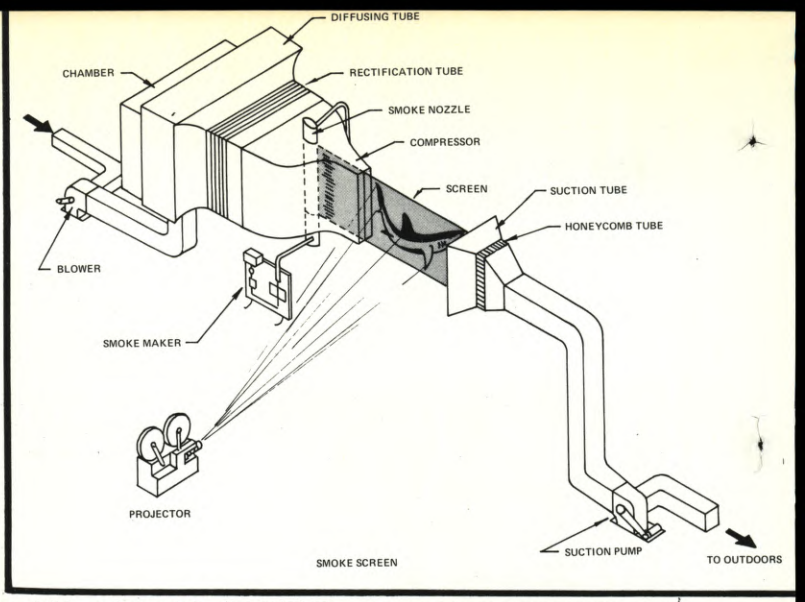
A brilliant display of stroboscopic lighting turns the entire exhibit into a modern discotheque as the presentation ends.

Twenty Ektagraphic slide projectors and two motion picture projectors, controlled by one slide projector, are featured in the "Photography Is to Remember" exhibit which shows three generations of a Japanese family spending a day at Lake Onuma on the Island of Hokkaido. The action on two motion picture screens illustrates the same scene taken from different points of view. At various times, when a member of the family takes a photograph, the motion picture image freezes and slides fill screens almost surrounding the audience with a mosaic of images of the moment to remember.

Fourteen types of photography, ranging from the macrocosm of space to the microcosm of electron-microphotography, are illustrated by 10 Ektagraphic slide projectors and six motion picture projectors on 11 screens in the "Photography Is a Tool" exhibit. One Ektagraphic slide projector synchronizes the presentation. The viewer is rocketed from the whirling pink center of a galaxy in outer space to the molecular structure of bacteria in a drop of water in a visual voyage that lasts just two minutes.

Three Kodak Carousel slide projectors, Model 850, and six models of the various Super-8 Instamatic movie projectors available from Kodak provide a constantly changing display at the base of the "Photography Is a Smile" picture tower in the gold-tinted glass-enclosed main tower of the Golden Picture Pavilion. The images are projected on standard 40 x 40-inch Ektalite screens which permit viewing with clarity and brilliance in full room light. ■





(LEFT) Image of shark projected onto smoke screen, with projector beam visible at lower left. (RIGHT) The enormously complex smoke screen apparatus, jointly developed by Toho Corporation and Mitsubishi Electric's Nakatsugawa Works, Production Equipment Department and Central Research Laboratory. Ethylene glycol vapor from smoke generating device is ejected under pressure from 1300 nozzles. Resultant smoke curtain, or "screen" is held stable by air layer "sandwich" flowing in the same direction.

MITSUBISHI GROUP

Continued from Page 629

square meter. Attempts to make a larger screen created a "flutter" effect (the effect of a flag fluttering in the wind.)

Reorganization of the technical team and new experiments finally created a large screen with a neat flow of smoke that does not bend, whirl or disperse, the current Smoke Screen on view in the Mitsubishi Pavilion.

SPHERICAL SCREEN

In the last room of the pavilion, a sphere 2.5 meters in diameter appears to "float" in a pond. The sphere is made of acrylic resin plastic and is coated with a new type of luminescent pigment on the outside. Images are projected onto the inside of the curved "screen" by means of a unique 220-degree ultra-wide-angle lens specially designed for this purpose by Nippon Kogaku Co., Ltd. It is the widest-angled and fastest projection lens in the world.

The images are projected alternately by two slide projectors inside the sphere, with these images being deflected to the main "fish-eye" lens by means of a relay lens.

The sphere, which is the symbol of the Universe, seems to be alive with the images that flow over its entire glowing surface. ■

SOVIET UNION

Continued from Page 687

segment shaped lenses, and converge on a conventional reflective screen placed about 10 inches in back of the glass.

Dr. Bernstein explains that, for involved technical reasons, no one has yet been able to produce a lenticular screen for the system that is larger than the 3 x 4 meter size currently in use. He also comments that the new October Theatre in Moscow features such a screen and that the seats are clearly marked off to indicate the optimum angle for successful viewing of the stereo effect.

The method, invented by S. Ivanov, has been elaborated by NIKFI in collaboration with Mosfilm.

"Vario-70"

Presented for the first time at EXPO '70, the new "varioscopic" system of cinematography places an optically printed image of irregular shape onto a strip of standard 70mm film. The frame area includes information equivalent to that of three 35mm frames, and this large picture format makes possible the compositing of as many as 10 separate clear-cut images to fill a vertical screen about 30 meters high.

The world's most powerful projectors, with a useful output of 80,000 lumens, have been developed for projection onto such large screens and to over-ride, as is the case in the pavilion's main hall, a certain amount of ambient light.

As optically printed for projection, the Vario-70 frame is masked in the form of a tilted rhombus, with the separate frames "nesting" together in a curious overlap on the 70mm film strip, rather than being separated by conventional frame lines.

Scenes for printing in the new system are photographed with both 35mm and 70mm standard cameras, as well as newly-designed cameras which shoot a "double square frame" onto 70mm film.

As presented at EXPO '70, the "Vario-70" format is extended even further in size by means of a separate 35mm projector which butts a second (triangular) image onto the bottom of the primary rhombus-shaped frame.

The creators of the Vario-70 film, "Earth and Sky", developed a new method of "parallel and horizontal" editing in order to facilitate assemblage of the multiple-images involved in the production. ■

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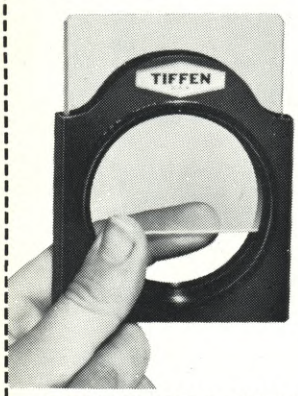

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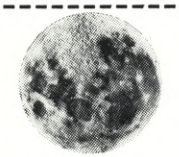

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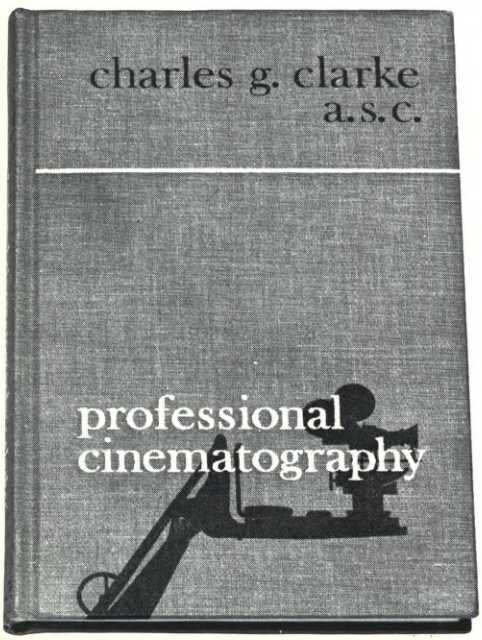
PROFESSIONAL CINEMATOGRAPHY

By CHARLES G. CLARKE, ASC

Professional Guidance For Aspiring Cinematographers



SUBJECTS INCLUDE: Camera, camera mounts . . . Lenses, wide-screen lenses . . . Filters and Filter effects . . . Day-for-night photography . . . Exposure for color and black and white films . . . Light meters and their use . . . Color temperature meters . . . Equipment for set lighting and its control . . . Camera angles and techniques . . . Special lighting problems . . . Color psychology . . . Composition . . . Special photographic effects . . . Set operation on the sound stage . . . New film emulsions . . . Forced development data.

ABOUT THE AUTHOR: Charles G. Clarke, ASC, a top Director of Photography at 20th Century-Fox for many years, and an ASC member, taught Advanced Cinematography at the University of California at Los Angeles, where he recognized a need for practical professional guidance for students striving to be the industry's future Directors of Photography. It is this need which has given rise to his publication of a book on the subject and subsequently the latest revised edition of Professional Cinematography. The first edition of this valuable book has become required reading at many universities and schools offering courses in cinematography.

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Unusual screen configuation in which identical images are repeated four times on each frame, making a total of 32 images on the eight-screen format.

JAPANESE GOVERNMENT

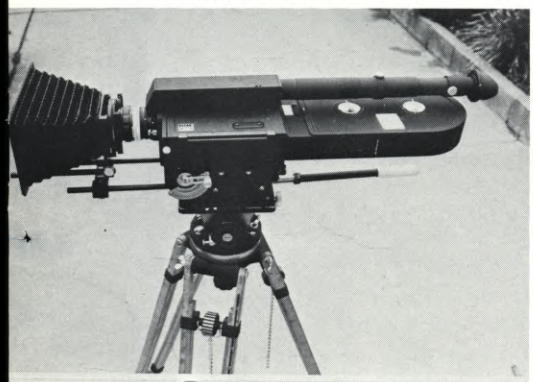
Continued from Page 675

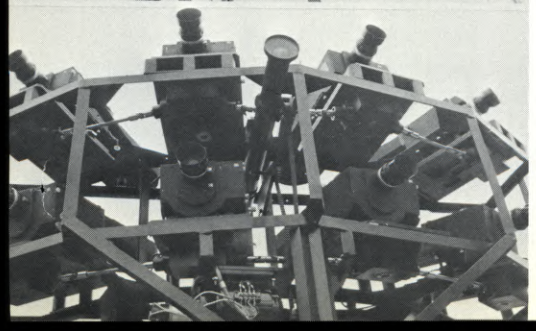
neers of Nac, Inc. Its specifications are as follows:

Dimension of the frame: 36 x 24mm
Camera speed: 8 to 24 fps, variable continuously.
Movement: Intermittent pull-down system with double registration pins.
Shutter: 0 to 160 degrees, variable. Dissolves available.
Motor: 28-volt D.C., variable.
Lens: Various focal-length lenses made by Nihon Kogaku Co., Ltd., for Nikon F camera, with a special mount for adaptation. Lenses range from 20mm to 2000mm.
Dimensions of the camera: 242mm (W) x 213mm (H) x 650mm (L) with 400-ft. magazine.
Weight: Approximately 14 kg., with 400 feet of film in magazine.

The picture "Japan and the Japanese" was exposed on Fuji Color Negative and printed on Fuji Color Positive film. ■

(ABOVE) The Nac-MC double-frame 35mm camera, similar to that used for VistaVision. (BELOW) Nac-MC 358 cameras rigged for shooting the eight-frame format. Long lens in center is a viewfinder combining images from the various camera lenses.





FILM AT EXPO '70

Continued from Page 627

Cinematographer, I address the following questions to them:

"First, may I congratulate you on the extraordinary motion pictures taken during your lunar flight. The readers of our journal, who are top motion picture technicians in 92 countries, would be interested in knowing what types of 16mm cameras you used, whether or not they were equipped with any sort of automatic exposure control, were they deployed in stationary locations and remotely controlled or did you hand-hold them and hand-operate them?"

Charles Conrad gives the following very lucid answers to my questions:

"The cameras were made by the Maurer Company. We used 18mm, 25mm and 75mm lenses. All the interior shots you saw were hand-held. The strip photography that we did was done with the camera on a window bracket. The exterior photography on the lunar surface was done out the window. You did see it get moved, but we had it on a bracket and Al would adjust it to wherever I was out there, to make sure I was in the picture. No, we don't have automatic exposure controls on the cameras. We wanted something like this, but they tell us it won't work. Therefore, they calibrate them up for us in advance, based on what they think the illumination will be, and this has worked very well. The only place we use a light meter is for near-object photography, from space craft to space craft, or something like that. Then we use a Pentax light meter."

I take time off from EXPOing to be honored at a dinner given by top officials of the technical organization which is the Japanese equivalent of our SMPTE, the Motion Picture and Television Engineering Society of Japan, Inc.

The affair is held at a posh private club and I am interviewed later by the assembled gentlemen, with my friend, Mr. Keiichiro Ryu, kindly serving as interpreter. They are most interested in the latest technical trends of the American motion picture and television industries—and I do my best to give them a full briefing.

It adds up to a delightful evening, and I am grateful to these gentlemen for their kindness and hospitality to the stranger in their midst who, thanks to their warm welcome, does not feel at all like a stranger.

In attempting to evaluate the outstanding film presentations at EXPO '70, space limitations and deadline de-

mands make it inevitable that certain of those deserving of such recognition must be by-passed.

However, I do wish to call special attention to a few outstanding examples that fall into that category:

New Zealand Pavilion—"This is New Zealand", a 35mm triple-screen documentary created by the National Film Unit, and made with such skill and visual verve that it makes one want to hop a plane and head for New Zealand.

Ontario Pavilion—A 70mm, multi-image, single-frame film 26 minutes long and entitled "ONTARIO". It was produced and directed by Christopher Chapman, who won an Academy Award for his film, "A PLACE TO STAND", made for the Ontario Pavilion at EXPO 67. "ONTARIO" is shown in a 825-seat theatre on a screen approximately 40 x 100 feet, having a curve of 120 degrees—probably the largest conventional-type curvilinear wide screen at EXPO '70.

Mitsui Group Pavilion—"Tour of Space and Creation", a total "happening" in which spectators, riding 80-seat turntables that gyrate in front of 858-square-meter screens, are exposed to "1800 seconds of flashing lights, ear-splitting sounds, breathtaking speeds and sudden appearances"—all of which emanates from nine 35mm slide projectors, 12 16mm film projectors, three strobe projectors and 1,780 speakers.

Japanese Textile Pavilion—A mixed-media freak-out similar to the above, very artfully flung onto the sculptured walls of a circular theatre, to the accompaniment of marrow-vibrating rock music.

Scandinavian Pavilion—Each spectator is given his own little portable screen or "light fan" onto which he catches projected messages relating to the exhibit's ecological theme.

Ricoh Pavilion—A giant balloon, floating above the pavilion, serves as a huge screen for an ever-changing vision of color and light, projected from within. "Space Vision" is a separate spectacle, viewed by taking a moving conveyor around the exterior wall of the cylindrical main building. Screened images appear on the wall—images that vary according to your position. The effect is made possible by a lenticular surface composed of tiny lenses imbedded in ceramic tile.

Of course, there is much more to EXPO '70 besides the films—but that is what I have come to see and it keeps me occupied 12 hours each day.

The simple fact is that there's something for everybody here.

It's a smashing show! ■

STATE OF WASHINGTON

Continued from Page 650

screen and six-track surround sound system, as the projection process for their pavilion. By using the unique *Dimension 150* ultra-wide-angle (18mm) lens we were able to simulate normal peripheral vision. Then, to achieve a truly visceral response on the part of the viewer, I felt that the *D-150* camera should be kept constantly moving throughout the film. Foreground, middle ground, and background planes are thus in constant flux, providing the viewer with the feeling that he is part of the scene, moving through rain forests, along beaches, and flying over mountains.

The kinesthetic experience created in this manner quickly sweeps the audience into the film and stimulates each person's own imaginative participation in the action.

I carefully storyboarded the scenes which were to be shot in *Dimension 150,* selecting subjects both for their symbolic value and for their plastic potential. Each scene was chosen to epitomize some facet of Washington State while, at the same time, providing a dynamic, moving experience for the viewer. Director of Photography Barry O. Gordon, C.S.C., and camera operator Burleigh Wartes expertly translated the concepts of the storyboard into majestic moving images on film.

Much that is Washington State does not lend itself to depiction in the form of wide-angle vistas—There are many relevant details which are essential to the story of the State. Salmon and apples, water skiiers and sculpture, smiling faces and working hands had to be woven into the texture of our film. Here again I relied on a storyboard to provide the necessary guidance in graphically identifying the specific subjects which would be required in closeups.

The process was one of simplifying and condensing, eliminating and choosing, so that the barest minimum of details would speak eloquently for the multitudes which could not be included. The insert scenes were filmed in conventional 35mm and then optically combined as multi-image "drop-ins" over the 70mm, *D-150* backgrounds. Here again, Barry Gordon's technical expertise as Editor saw this work through to successful completion at Film Effects of Hollywood.

Since the background is moving, and the insert panels are static, an effect is created in which the insert scenes seem to be "flying". They become a constant

Continued on Page 708

AUSTRALIA

Continued from Page 688

wood, while colour and 35mm processing is done by commercial laboratories.

Production of Films

The Film Unit's output in an average year is approximately 100 ten-minute reels, making a total of between forty and fifty films of varying lengths. In addition to these new films, new versions are often made of older productions, usually for circulation in other countries. Versions of Film Unit productions are regularly made in foreign languages, including Italian, French, German, Indonesian, Japanese, Russian, Malay, Thai, Dutch, Danish, Spanish, Finnish and Swedish, and even Esperanto.

Of the films produced, about two-thirds are made wholly by the Unit's own staff, and about one-third by outside units under contract, or by outside directors or producers. Outside scriptwriters are frequently employed and extensive use is made of Australian composers, artists and actors.

General

Despite the lack of a genuinely self-supporting Australian feature film industry, film production in Australia is varied and active, ranging from a growing number of independent feature films through co-productions with overseas companies to an active television industry and an increasingly impressive experimental film movement. All this is in addition to a television commercial industry of some size and the regular production of sponsored documentaries for private films.

In this range of production, the Commonwealth Film Unit has established itself as the most important producer of documentary films, an activity in which it aims to keep up with all technical developments and to make use of any appropriate avenue of release. It produces films on any subject of national interest, and spreads information about Australia and Australians to people of other countries.

The Film Unit undertakes production for the Commonwealth Government, and in certain circumstances for State Governments and instrumentalities. In its programme of making information and documentary films on subjects of national interest, the Commonwealth Film Unit aims to encourage rather than compete with private enterprise, and in fact many films are made under contract by private producers and production companies.

CANADA

Continued from Page 674

TER" and "ICE RALLY IN QUEBEC".

In approaching the making of "THE LAND" film we were faced with two major problems: the first was how to portray the theme of "The Challenge of the Land" in a country as vast as Canada in less than 8 minutes; the second was that the theatre screen was to be triangular shaped (the triangle being drawn from the two bottom corners of a Panavision frame with the apex at the top). This triangular screen was part of the total architectural concept—not the film-maker's choice since we would be losing 50% of our frame. We appreciated that A-frame houses, trees and mountain peaks would fit nicely—but that buffalos were something else again.

It soon became apparent—through testing—that static shots, pans and tilts just drew attention to this awkward shape so we had to devise a style which would turn the format to advantage. This we did by almost exclusively using *movement*—towards or away from the camera—at speed. The frame then became a sort of tunnel through which the audience would be continually travelling.

Given the problem of conveying an idea of the immense emptiness of much of Canada (3000 miles East-to-West and the same distance North-to-South) to a Japanese audience who knew little of our country and live in a very cramped and manicured landscape, we decided on aerial shooting for the body of the film. In this way we could connect big establishing shots with tighter ones through a "dive bombing" effect. Having edited "HELICOPTER CANADA" I was well aware of pacing problems in editing aerial footage so we also decided to do some ground shooting—mainly in extreme close-up to cut with specific aerial shots.

The plane we wanted had to meet the following requirements: be a stable camera platform; able to carry a fairly heavy pay-load, as we would be using it to transport ourselves and equipment from location to location; able to land and take off from short and rough airstrips; able to carry a large crew (5 NFB and 5 Air Force); have a fairly good range without refueling; be able to climb over the Rockies which rise to over 12,000 feet in Canada; or skim over the surface of the sea at an "altitude" of five feet above the water.

We finally decided on a Caribou—a Canadian Transport plane in use by the Air Force who provided the crew and

innumerable copies of standing orders entitled "Operation Cinema '70." The plane's manufacturers, De Haviland, built a dome over the pilot's position so that the cameraman could either sit or lie on the outer surface of the plane and shoot directly forward over the nose. This dome we referred to as a bubble. The Air Force called it a blister. It cut about 10 m.p.h. off the normal speed of the Caribou.

The entrance was through the pilot's escape hatch. Guide rails were provided for the camera so that it could be moved back for loading. In the front of the dome we had a 24" x 14" x ½" piece of optical glass installed. Hot air was blown into the dome to defog the glass and defreeze the cameraman. There was only minimal left-to-right or up-and-down movement possible for the camera so we marked a triangular frame on the pilot's window and after rehearsing repeatedly, the pilot, by lining up the shot in his frame, became in effect, the camera operator. Labrecque, Apperley and I were all connected by the plane's intercom system. A second camera position was located on the cargo doors which could be lowered to a horizontal position. A high hat was mounted a few inches from the edge so that we could shoot down vertically, pan and tilt.

The camera initially chosen was a Mitchell R35 with 50-500mm zoom and 35mm Panavision lenses. We chose the Mitchell because we wanted the optimum in steadiness to compensate for any vibration within the plane and because we would later be blowing the footage up to 70mm. (The theatre at Osaka was too small to allow 35mm projection onto a 45 x 22½ screen.) Later, in the Arctic, we took along a standard Arriflex 35 with a 50mm anamorphic Prominar Nac lens (Kowa Co, Inc.) so we could shoot both forwards and backwards at the same time. A triangle was scribed on the ground glass, as we wished to shoot full frame for eventual theatrical distribution.

The Land of Canada that we wished to show was to be vast, awe inspiring, and hard. We would only show people briefly and then as isolated figures moving on a landscape of epic dimensions. The two other films in the pavilion would complement this viewpoint by showing the cities and peoples of Canada. We divided the Land into its main geographic regions: Arctic; Pacific Coast; Prairies; Eastern Canada and the Maritime Provinces and we arranged a schedule whereby we could shoot during the four seasons. Because of the cost per-flying-hour of the Caribou we had

to make every hour in the air count. There was to be no candid shooting or random searching for locations. For this reason we did a large part of the ground shooting first so that the aerial shots would be designed for specific purposes. Eventually we spent 100 hours in the air—slightly less than the figure we had budgeted for.

On our first days out, in September 1968, we collected a few insects on the optical glass and built a primitive deflector. This didn't work, but fortunately the weather turned cold, and the bugs disappeared.

The plane's heating system was erratic (it had just returned from service with the UN in North Africa) so we were constantly taping up windows, heating soup and changing into Arctic survival kits. Above the Rockies we passed around portable oxygen tanks as the plane was not pressurized. We had two flat tires and in Frobisher Bay in the Arctic we lost a magneto. Also in Frobisher (April 1969), the Mitchell froze up on us and had to be flown to the Film Board in Montreal—over one thousand miles away—repaired and returned to us within 24 hours as there are only three flights a week to Montreal.

Our only truck lost its first and reverse gears after ending up in three snowbanks. (No vehicles in the Arctic have working brakes due to blowing snow.) Three skidoos quit on us when we were isolated on the ice in the middle of the bay in 30-below-zero weather; and just prior to leaving for the Arctic Jean-Claude Labrecque broke his leg so Michel Thomas d'Hoste and Claude Larue handled the "fore and aft" cameras.

In the prairies we so scared the Canadian Pacific transcontinental train with our diving that it hid in the non-scheduled stop of Portage La Prairie and refused to come out. A woman passenger on the train reported seeing a wing tip only 5' feet from her window—but she was probably exaggerating.

We spent almost two weeks trying to get from Calgary to the Columbia Icefield—a distance of only 100 miles, but we were always defeated by the winds which blow through the mountain passes onto the foothills where Calgary is situated. We had made great plans to drop smoke bombs on the ice field itself to see how the wind was behaving before flying in very low—but the park warden was worried about us "denting his glacier with our bombs." We finally made it after one memorable flight in which the plane was emptied of all cargo and crew except for the pilot,

flight engineer, Labrecque and myself. We were twisted every way by up-drafts and down-drafts and finally ran into the edge of a 140 m.p.h. jet stream, so we had to turn back before everything fell to pieces. During this sortie, Labrecque and I were floating around inside the plane at the end of long safety straps. In the Okanagan valley we did some shooting around the town of Osoyoos—only to find out later that we had been working just over the border in the United States.

Otherwise, everything went just fine and the air crew under Captain Paul Apperley contributed immeasurably to the shooting, despite our decidedly non-military dress and behaviour. We had painted psychedelic flowers on the camera dome in phosphorescent paint (the dome was NFB property after all) but at one RCAF base the commander ordered the plane "to be hidden—fast!"

The pilots performed seemingly simple flying manoeuvres for us which we only later realized had taken extraordinary skill—like passing over the Canadian National ferry boat between Nova Scotia and Newfoundland so close that a photograph taken from the plane shows the cameraman appearing to be sitting on top of the ship's mast. But Apperley spends his summers crop-dusting in a Dakota, so he got a great charge out of the type of flying that most pilots are discouraged from doing.

On the ground we mounted the camera on just about anything that moved: cars, trucks, a gondola ski lift at Banff, a cement bucket at Manicouagan Dam, a lobster boat in Nova Scotia, a dog sled in the Arctic. We built a special platform and mounted it on the front of a diesel locomotive only a foot above the tracks, and the stationmaster scratched his head sceptically as we sailed off down the straight prairie tracks at 60 miles an hour.

To increase the speed of our shots in the air we consistently shot at 16 f.p.s. and the filming fell into a style characterized by shots that were short, simple and always in movement.

Editing the 30,000' of material posed special problems. In order to show as much as possible, there could be no repeats of the same or similar shots; everything had to be "read" very quickly; everything had to move; and the juxtapositions were based on strong contrasts of mood, movement and color rather than on a more conventional "smooth" continuity. There had to be a constant element of surprise. And there still had to be an internal pacing within the 7½-minute length. To the basic elements of low flying aerial and close-

up ground shooting, we added some black and white archival material—engravings and old photographs of sailing ships wrecked off the Atlantic coast; long lines of men on foot crossing the Rocky Mountains in the 1870 Gold Rush; dust storms on the Prairies in the Depression years with cattle skeletons lying on the plains. These inserts were shot on an animation stand with a standard lens. When intercut with the Panavision footage the slight distortion added to their effectiveness.

The sound track consisted of realistic sound effects alternating with a music track recorded by *The Collectors*—a Canadian West Coast group. They were asked to provide "musical effects" and "strange sounds" to complement specific picture segments; they were not to write the sort of music which could later be played as a continuous piece. In the New York Times John Canaday described the effect as "non-melodic and frequently onomatopoetic." This was something I had been wanting to try in film for a long time and the results were most satisfying to both the filmmakers and the musicians. *The Collectors,* incidentally, provided all the music used in the Canadian pavilion.

The film was eventually blown up to 70mm and projected as a loop with a metal triangle aperture plate inserted into the projector to conform to the screen in the pavilion. The three speakers for the stereophonic track were mounted behind the screen. During the first minute of the film the audience (300 at a time) enter the theatre so we have an image of the sun frozen during this period to keep the screen alive—with the music building up to a climax at the one minute mark—upon which the images start to move. This effect is done in reverse at the end of the film as the audience leaves the theatre over a period of 30 seconds.

So far, reaction to the film has been very good: Emperor Hirohito was led away unhappily after seeing only a part of it; a schoolboy fell off his seat in excitement at seeing a moose for the first time ever; and a Japanese producer congratulated me on being a world authority in the understanding and use of triangle symbolism in cinema! To date over 11 million visitors have been through the Canadian pavilion.

Finally, the film is very simple. Unlike other EXPO films there are no multi-image, multi-screen or sophisticated optical effects. To me the imposition of these geometrical, symmetrical shapes would have been against nature—against the subject matter of the film—"THE LAND". And although the trian-

gle (with whatever its symbolism in graphic art), was a frustrating shape for this film because of the loss of panorama, nevertheless, I think that the end result is quite satisfying.

It is hard to create a fresh view of something familiar—particularly a subject like the Land after a thousand travelogues have transformed nature into moving post cards of pretty scenes where people can feel comfortable and warm. I have seen Canadians who have lived all their lives in cities, become uncomfortable when watching this film. They are reminded of the harsh and cruel world that lies just beyond the suburbs; the *millions* of square miles of raw nature. In a theatre they are protected by the screen from the feel of sun and ice; from the smell of fear and the touch of death—but something of the brute force of the Land does come through to them—and this is what we wanted. ■

CREDITS: "THE LAND"

Filmed in Eastmancolor and Panavision 35, with stereophonic sound. Produced by the National Film Board of Canada for the Canadian Pavilion at EXPO '70, Osaka, Japan. Director and Editor: Rex Tasker; Co-director and cameraman: Jean-Claude Labrecque; Additional shooting: Michel Thomas d'Hoste and Claude Larue; Location Manager: Jean Savard; Sound editing: John Knight; Re-recording: Ted Haley and Jean-Pierre Joutel; Associate Producer: Robert Baylis; Producer: John Kemeny. Music by The Collectors; Photo Research: Claire La Chance; Pilots: Captains Paul Apperley and Brian Cuniff (R.C.A.F.)

"SUPERBUS" or "CANADA, THE PEOPLE"

By GERALD POTTERTON
Director

From the moment we first saw the architectural drawings and models for the projected Canadian Pavilion we became excited by the project as a whole. There was a unity of purpose to pull all stages of the presentation into a single statement.

Our own job was to provide the visualization for Area 3 of the inner pavilion, "Canada, the People". With a programmed time of only five and a half minutes we were faced with a few initial problems. The first was always the question "How can we feed an audience into yet another area and still keep the show on the road?" That is to say without the feeling of being led into another darkened chamber with a blank screen at one end and waiting for the five-hundredth movie of the day to start. Short of showing no film at all, the problem seemed insoluble.

In any case, we thought, how can

one portray a cross section of twenty million Canadians stretched across four thousand miles of North America in five and a half minutes? Multiscreen? 360-degree screen? Ceiling screen? Three projectors? Thirty-three projectors? Great, but what about the good old budget sitting whining away in the corner?

It all came full circle back to one screen, one projector and to spruce it all up, Panavision. Disguise the oval shaped theatre with an array of wall constructions, including the actual screen, which, heavily camouflaged, would spin around and *become* the actual screen at film start. The whole was to reflect a young, vital North American society of the 70's and the sound of the pop group whose music we hear running through the Pavilion.

This led us into the theme of the film itself—*youth.* We needed a vehicle to string the film together visually. Why not a plain yellow school bus—an innocent and attractive reminder of early school days—and with a bit of magic and a fairly hefty design and paint job turn it into a psychedelic school bus. Drive it from the Atlantic to the Pacific and attempt to film the reactions of people to its wild colors and sounds. We installed an amplifier and two large horns (Japanese), filled up with a good supply of tapes and away we went.

Our equipment consisted of standard Panavision equipment and Eastman Color Negative 5254, exposed and processed normally. Point-of-view shooting was done from the roof of the bus or from the interior using a standard tripod tied to the roof deck or the interior floor. With most of the windows blocked with photographs, the light level inside the bus was kept quite low and this facilitated candid shooting in that it made it difficult for people on the street to see the camera inside . . . although this didn't matter much since people were to look at the bus anyway, but still, it meant that they reacted to SUPERBUS and not to the camera.

Looking at the camera usually spoils candid shooting or necessitates cutting, but this was a production where the camera could be placed in a crowd, as at Toronto city hall or on the beach at Vancouver, and people looking at the camera would be seen as looking at and reacting to the bus. This was a nice break and change from the usual "street-shooting" assignment, where gawking people spoil the effect.

Shooting from the station wagon roof was again from a standard tripod wired down to a plywood deck, al-

though a helicopter mount borrowed from the National Film Board was tried for one sequence. The camera went hand-held for shooting closeups of musicians on the roof, a low angle view from a sewer and into the curling rink. The curling rink sequence was the only one with a heavy lighting setup. Half a dozen 1000-watt quartz lights were carried across the country under the seats of the bus but they stayed there for the whole trip and were only used for sleeping shots . . . the last sequence of the film.

The production was shot in two sessions, a brief winter shoot in the fall of '68 and a thirty-four-day stint from April to June in '69. The crew worked with two standard Panavision batteries and to test the capacity of the units, one was kept as a standby and the other used without recharging for the whole thirty-four-day session, which is some sort of recommendation for those batteries! (That's almost true. We were chicken and had both at full charge for the beach sequence in Vancouver!)

We ended up, after a four thousand mile trip, standing by the harbour in Vancouver. The bus itself was to be loaded onto a Japanese freighter, shipped to Osaka and displayed in the area immediately following our film, which is indeed what finally occurred.

It was while shooting this loading operation that our good old faithful 50-500 zoom slid off the Arriflex yoke rods and dropped with an expensive crunch onto a steel railroad track that just happened to be directly beneath it. A day later, thanks to the ever efficient and long-suffering Panavision people in Los Angeles and some nifty air transportation and customs officials, we had a new lens which we pointed towards the Japanese freighter as it headed out across the Pacific. This, fortunately, happened to be our last shot which, as it fades, triggers the revolving screen mechanism back to its heavily-disguised other side. By chance the other side portrays a relief structure of the side of a school bus.

In fact, even today, the sight of a school bus hammering along makes our blood run cold, but, one must admit, with the seats removed you can really pack in those 50-500 zoom boxes.

PRODUCER: Potterton Productions Inc.
DIRECTOR: Gerald Potterton
CAMERAMAN: Herb Taylor C.S.C.
PRODUCTION MANAGER: Robert Baylis
EDITOR: Tony Douglas
ASSISTANT CAMERAMAN: Robert Saad
GRIP: Orel Dion
MUSIC: The Collectors ■

STATE OF WASHINGTON

Continued from Page 698

foreground, upstaging the larger scenes behind. By combining the two types of film materials we were able to make otherwise difficult visual statements. The rich expressiveness of the multi-image approach offers many avenues for future exploration and refinement in the film medium. It provides, if nothing more, an extremely efficient way of presenting a great deal of screen information in a limited time. "HARMONY OF NATURE AND MAN" contains over 45 minutes of linear information displayed in 12 minutes of real time. The viewer's attention is controlled and directed by the appearance and disappearance of the insert scenes while at the same time being left free to scan the entire frame if he so desires. Visual boredom is not one of the problems one faces in doing a multi-image film!

The moving mosaic is a new visual experience, a complex and exciting way to communicate visually. To make a film worthy of the viewer's individual attention one needs a larger message than the mere promotion of a single State, even when that State is as varied and fascinating as Washington. In "HARMONY OF NATURE AND MAN" we sought to portray man's relationship to nature as one relying ultimately on the replenishment of nature by man; Scenes of logging are contrasted with scenes of reforestation, Salmon fishing finds its counterpart in fish hatcheries and the stocking of streams.

In picking each location or in setting up individual shots I looked for ways to include Nature as part of the scene. Carl Williams, of *Dimension 150,* provided a special director's finder for the 18mm lens which proved invaluable in blocking moves for the *D-150* camera.

Wherever possible action was staged outdoors or in front of windows opening onto vistas of trees and water. Conversely, I always tried to bring people into scenes portraying man's impact on nature. For example, apple orchards and wheat fields were brought to life by groups of children running and playing in the otherwise inanimate scenery.

Incidentally, the musical score, by Elmer Bernstein, does much to capture the feeling of vibrant human life throughout major sequences of the film. These were planned, from the very beginning, to be characterized each by its own dominant musical mood, either robust, lyrical, childlike, cosmopolitan, threatening, or triumphant. Recorded at

the Samuel Goldwyn Studios, the music was carefully balanced with complex sound effects and voice tracks into six-track stereo at Todd-AO Studios in Hollywood.

The vast *D-150* format, augmented by multi-image inserts, provided the ideal medium with which to create images equal to the scale and complexity of our theme. ■

A DIFFERENT APPROACH TO THE MULTI-IMAGE FORMAT

By BARRY GORDON
Cinematographer/Editor

In approaching the production of a film for EXPO '70's Washington State Pavilion, I didn't want to repeat the technique we used in "A PLACE TO STAND"—which was essentially a format of multi-images on a black screen. "HARMONY OF NATURE AND MAN" superimposes multi-image inserts directly onto full-screen background scenes—with no "frames" around the inserts. Actually, the film was conceived as a lyrical, rather slow-moving pictorial look at Washington. The background shots themselves, cut together without further embellishment, could have been used to make up a complete picture—but we have taken the detail scenes (closeups, reaction shots, etc.) which would normally be used to liven up the subject, and have used them as inserts hard-matted directly onto the background scenes. I don't know whether this is actually a step forward, but I think it is.

All of our camera equipment for shooting the background scenes in the Washington State film came from *Dimension 150.* The camera itself is essentially the same as the TODD-AO hand-held 70mm camera—except, of course, for the lenses, which were designed by *D-150.* The camera's magazine accepts a load of 333 feet of 65mm negative stock, which Kodak will provide in rolls of that length if a substantial amount is ordered. Otherwise, it breaks down quite nicely from a 1000-foot roll if you have to do it yourself.

All of the insert shots used in the picture were photographed with a 35mm Arriflex camera. Since we were on a very limited budget, everything had to be worked out very carefully in advance to avoid unnecessary shooting. We shot for exactly nine weeks and used only 6,000 feet of 65mm negative and 8,000 feet of 35mm. I don't think there's anything we shot in 65mm that isn't in the finished film.

That kind of economy is pretty rare in documentary filming, but the Direc-

tor, Roger Tilton, made very careful storyboards in advance, so that we knew exactly what we needed to shoot. Of course, those storyboards got rearranged pretty often during the cutting phase, but essentially everything we started out to get is there.

Even though the *Dimension-150* camera we were using for the background scenes is technically a hand-held camera, there was only one sequence in which we resorted to hand-holding it. That was the sequence inside a corral where a horse is shown being broken. Otherwise, we shot at all times from a tripod. I feel that the picture must be as steady as possible when you're dealing with that big a screen. You just can't get away with *cinema verité* on that sort of thing.

Except for three or four shots, all of the background scenes were photographed with the 18mm extreme wide-angle lens, and the camera is constantly in motion. We always had it mounted on a dolly, a truck, or in an airplane. The 18mm lens did a lot to smooth out roughnesses in camera movement. Some of the track-laying that we had to do for dollying on the ground got pretty hairy at times. For example, in one of the opening scenes, where we go from a shot of Mount Rainier to a scene showing a waterfall, we had to dolly down a 45-degree slope. That location was about a mile and a half from the nearest place where you could drive a car, and a good 1,000 feet below the road—which meant that the camera, the dolly, all of the track and everything else required had to be packed in by porters.

The dolly we used was one designed by our grip. It was a rather lightweight affair, similar to a Western dolly. It runs on track made up of two one-inch steel rods with ties between them, and we had 48 feet of it. In one scene, where we move through an Alpine meadow full of wildflowers, the camera was mounted on the end of a piece of 2 x 8 board that extended diagonally across the platform of the dolly and out about four feet beyond it. We couldn't use an operator on the shot because the camera was so delicately balanced that nobody dared touch it. We simply turned the camera on and shoved it down the dolly track, watching it very carefully to make sure the movement was smooth. For that scene, we were actually below the level of the tallest wildflowers. The outrigger camera mount was devised in an attempt to avoid picking up the dolly track with the wide-angle lens. As a matter of fact, it *is* visible in a couple of the scenes, but because the track is only one inch wide and is made of black

steel, only the Operator and I have ever spotted it.

We shot the aerials out of the nose of a B-26 and we had a very good pilot who was a crop-duster, which explains why he could get down into some of the low-level areas where ordinary pilots would fear to go.

When we were photographing the aerial scenes there was nothing between the lens and the subject—no plexiglas or anything like that. The plane was moving at about 250 miles-per-hour during the shooting, which added to the smoothness. Only once did we run into any trouble and that was over the San Juan Islands. We were flying so low that we picked up a June bug on the lens halfway through a scene. Since the camera is a through-the-lens reflex type, we were immediately aware of what happened, but there was absolutely nothing we could do about it. We went right on filming the scene and later covered up the spot with an optical insert.

Incidentally, a similar accident happened during filming of one of the scenes used early in the picture. We were up on an Indian reservation and the Chief's son had a jeep which he had converted into a dune buggy. We decided to use it for filming a shot moving through shallow water along a beach, so we built a small platform out under the front bumper and mounted the camera on it, hoping that it wouldn't get too wet. It didn't really—but we *did* pick up a drop of water on the lens. That frame dictated where the multiple-image inserts would start, because we used them to cover the water drop. That was a decision that was made for us, but it worked out very well.

There were only a few sequences in the picture where we used artificial lighting and this was supplied by Mole-Richardson 2K's run off of a generator. We used this equipment for shooting the Thunderbird ritual dance on the Indian reservation. The visible source was the fire, and so we balanced our lighting as closely as possible with the firelight. We were limited by the fact that our wide-angle lens was only F/5.6 and we, therefore, didn't have enough equipment to light the entire situation. The effect is a bit more primitive than it would have been if we'd had all the lights in the world to work with, but the action is lighted where it counts and that's what we were really after.

During the post-production phase I went to Hollywood and worked for about two weeks exclusively on the cutting of the 65mm background footage. It was cut for pacing and timing,

with the opticals planned right down to the frame. After we all decided that the background footage was the way it should be, we started laying in the inserts to that pattern.

In this phase I worked very closely with Don Weed at Film Effects of Hollywood. I had designed some special forms for the planning of the opticals. When we made "A PLACE TO STAND" I had chosen an arbitrary figure for the graph lines on my forms and Don had to go through a great deal of mathematical translation to get the figures to work on his optical printer. This time I redesigned the forms so that each line represents 25/1,000ths of an inch, and there was no translation required. He could simply read the lines and put the figures directly onto his dials.

This is the fifth multi-image film I've worked on and I've learned by making mistakes. I've still got a few to make, but I've already made most of the critical ones and learned what not to do. At this point I can pretty well predict how long it will take me to cut so many minutes of opticals and just how long it will take the lab to shoot them. This can make a big difference in the budget.

The inserts for this film were planned very carefully in advance of shooting so that they would matte down to the desired compositions and would contrast properly with the background scenes. In the past I've attempted to put together multi-image films with material that had been shot before I ever came into the situation. I've found this terribly hard to do, because the cameraman had composed his scenes very tightly so that they would look nice in the rushes. When you're shooting for multi-image you have to keep in mind the shape (circle, rectangle or whatever) that the scene will ultimately take—and compose accordingly. If you looked at my rushes in 35mm form you might think I was a pretty sloppy cameraman, but I'm simply giving myself space to play with.

As a result of my experiences in trying to create multi-image films from material shot for other purposes, I would never attempt to do a picture like this if I weren't pretty well in control of the shooting myself. The other way, you're just buying somebody else's problems.

This film for the State of Washington was Roger Tilton's original concept and I'm very pleased with the opportunity it presented and with the freedom I had in working on it within his concept. We both understood where we were going and worked toward that end. We aimed to express a certain philosophy—and I think we accomplished it. ■

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STUDIO PRODUCTION EQUIPMENT

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STUDIO PRODUCTION EQUIPMENT

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(Continued)

RATES: Ads set in lightface type, 30¢ per word. Minimum ad, $3.00. Text set in lightface capital letters (except 1st word and advertiser's name) 50¢ per word. Modified display format (text set in **boldface** type, capitals or upper-and-lower case) $3.00 per line. Send copy with remittance to cover payment to Editorial Office, American Cinematographer, P.O. Box 2230, Hollywood 28, Calif. Forms close 1st of month preceding date of issue.

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M-R 170 ARC Heads W/Ballast—$100.
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FILM, 16mm. Any quantity outdated 16mm film all types except Kodachrome. Old dates and print stocks ok. Prefer color or unusual b&w emulsions. JON RUBIN, 23 Revere St., Lexington, Mass 02173.

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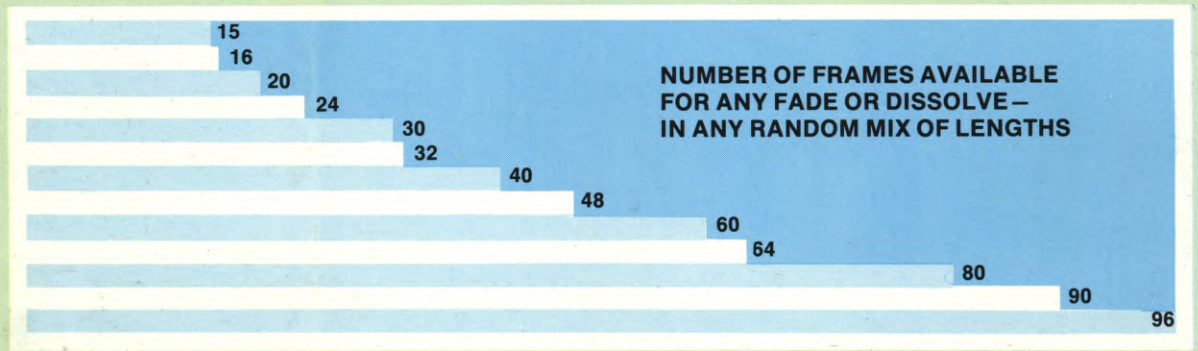

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