

TO PROVIDE a detailed survey of the vast shop window represented by the latest Photokina exhibition at Cologne, even in the restricted field of motion-picture practice, would call for a breadth and depth of technical experience far greater than that of the present writer and would no doubt call for many more pages of the *Journal* than the Editor would be prepared to allocate. So rather than attempt the impossible, let me limit my selection to a few items showing the development of trends which may be of interest to members of the Society in some varied fields.

This year the size of Photokina was again a record with a total of 875 firms exhibiting, the greatest representation of course coming from West Germany. But there were 28 other countries present, who made up nearly 60% of the organizations showing, the USA leading with 111 firms, followed by Great Britain with 85, Japan 72, France 71 and Italy 54. There was expansion too in the scope of equipment shown as well as in numbers: while the product range on the "Photo" side is reasonably well defined, the "Kina" aspect continues to spread well beyond cinematography, both amateur and professional. Videotape hardware has already taken its place alongside photography and this year even such items as electronic surveillance by CCTV were on display.

JVC for ENG

Typical of this trend was the fact that JVC Industries (formerly Japanese Victor Corp.), with their European distributors Bell & Howell, took the occasion of Photokina to present to a European audience their new group of portable color cameras and videotape recorders in the 3/4-in U-Matic format, using the lighter KCS-20 cassette (Fig. 1). For mobile operations the CR-4400E recorder weighs less than 25 lb (11.4 kg) complete with rechargeable battery and cassette and gives up to 20 min continuous recording on one charge (Fig. 2). A mains-power adaptor is also available. Used with the lightweight two-tube color camera GC-4800E linked by a newly developed sync coupler, the combination is as manageable as could be wished for outdoor use, while for higher color quality in studio operation the NU-1800E three-vidicon camera with a larger electronic viewfinder is available.

The CR-4400E recorder can be played back directly over a regular color television receiver and its cassettes are interchangeable with any other U-VCR machine. For full editing functions with standard full-length cassettes JVC has the new CR-8300E with search mechanism and pre-roll

automatic selection, while their third new recorder CR-6060E has still picture facilities and remote control. The variant model CR-6060ED has dual NTSC/PAL playback capacity for international exchange.

Although this equipment was presented in the ENG context, discussion at the press gatherings indicated that in Europe the field of application for such equipment was likely to be that of commercial, industrial and educational production rather than strictly newsgathering for television broadcast use. The term Electronic Field Production which is coming into use would thus seem more appropriate.

Handheld Cameras

But despite such electronic activities the 16mm camera is still playing a dominant part in image recording and one of the most striking demonstrations at Photokina was the new Steadicam stabilized camera mount from Cinema Products Corp. For years the handheld camera has been known to provide convenience and viewpoint flexibility; it has long been used with great success but always at the cost of a picture unsteadiness which was often positively distracting. The Steadicam answer to this problem seems to offer a real revolution in camera usage.

In this mount, the camera is carried on a spring-loaded jointed arm in such a way that the whole weight is transferred to the cameraman's body by a harness, leaving his arms and hands completely free to direct the camera movement without having to support it at the same time. The operator's head is no longer tied to the eyepiece of a viewfinder, since an electronic finder monitor is mounted on the top of the camera body and the screen can be turned in any direction. Batteries and control gear are slung below the camera center and help

to encourage vertical stability, even though their weight is also taken by the body harness. As a result, the camera can be held and operated anywhere within the reach of the cameraman's arms and the direction of view is in no way limited by his own direction of movement.

Demonstration films shot while walking, running and moving up and down steps showed an outstanding flexibility of viewpoint in relation to the operator's own eye-height and line of action, but it was the smoothness of motion which was really so amazing, being comparable with a fully tracked dolly shot. This could bring the creative cameraman a new dimension in camera mobility.

Camera Servicing

With the smooth production of picture and sound so dependent on electrical and electronic linkages, it was interesting to see that the Eclair International division of Soremecc-Cehess (Paris) has developed a comprehensive test unit for all the functions of its 16NPR and ACL cameras, designed for installation in control maintenance departments (Fig. 3). The complete rack contains signal generators, digital meters and oscilloscopes to carry out a rapid program for checking speed, shutter settings, synchronizing frequencies, cable connections, clapper signals and power supplies. Multiple battery chargers with indicator lights are built into the bottom of the unit.

Time-Code Equipment

Automation in film editing and dubbing operations is currently a subject of much interest in all parts of the world, particularly to cut down the time taken for search and location of the required section. It was therefore significant to note the number of manufacturers at Photokina now prepared



Fig. 1. JVC ENG equipment on demonstration at Photokina 1976.

A contribution submitted on 17 October 1976 by Bernard Happé, consultant in motion-picture technology, 9 Cole Park Rd., Twickenham, TW1 1HP, England.

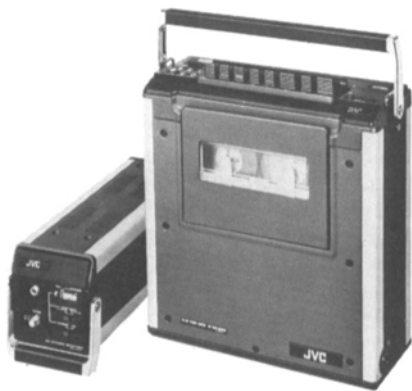


Fig. 2. JVC lightweight portable VTR, Model CR-4400E.

to offer equipment for the proposed IRT-EBU time-code system of frame identification and selection. Among the camera suppliers both Arri and Eclair had their standard 16mm cameras fitted with emissive photodiodes at the gate to provide the exposure of optical code markings between the perforations of the picture record, while on the sound side most of the well-known European manufacturers, such as Nagra, MWA and AEG-Telefunken, were all showing the IRT-EBU sign, with signal generator equipment for the corresponding coding on the magnetic record.

As an indication of the subsequent use of the coded information on picture and sound, an impressive demonstration was given by Steenbeck, who had combined their latest multi-path editing table with a time-code setting console to allow rapid identification, location, selection, synchronization and combination by full pre-programming of code setting.

For final mixing operations, very advanced automatic programming was shown

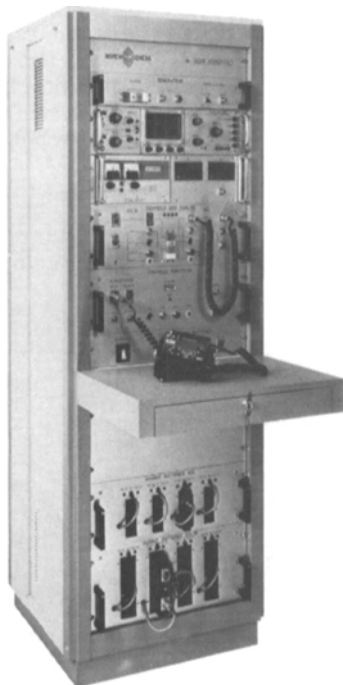


Fig. 3. Electrical and electronic test rack for Eclair cameras by Soremec-Cehess of Paris.

by Automated Processes Inc. (Huntington, N.Y.), whose new control unit Model 1024 used a digital data cartridge for storage. The timing reference can be the output of any time-code generator but can also be provided by an internally generated Mag Link coding. This programmer can be adapted to many existing mixing consoles but forms an integral part of their Automix Console, with up to 32 inputs and 4 echo channels, which is capable of either manual or completely programmed operation.

Continuous Projection

As automation in post-production operations increases, there is a growing demand to be able to handle the picture record as flexibly as the magnetic sound: to have forward and reverse running at any standard rate, to locate precisely at slow rates and single-picture presentation, and in addition to have high speeds for rapid location and rewinding when required. All this emphasizes the need for picture projectors in which the film movement is continuous rather than intermittent. This requirement can be met by the use of the flat-bed editing table type of viewer, as in the Magnasync/Moviola mixer unit for preview and theater use, but at Photokina there were several continuous motion projectors for studio operations with a vertical panel layout, very similar in appearance to the sound recorders with which they are linked in operation.

The KEM Editing Systems PR 1000/16 uses a multi-faceted prism as an optical intermittent, similar to that used on the KEM editing tables, usually with a 24-V, 150-W lamp, but a 36-V, 400-W halogen or even a xenon lamp may be fitted if required. For location and rewinding, variable speed control from 0 to 100 frames/s is provided. Double-head running can be obtained from a perforated magnetic film path on the opposite side of the cabinet taking a common mechanical drive.

The rotating multi-faceted prism system somewhat limits the light which projectors can transmit, and the reflection-type optical intermittents offer greater efficiency and hence better picture brightness. The Hollogon "Skanner" (Fig. 4) is a good example of this method, using a sprocket drum containing two sets of 24 roof prisms as the optical compensator in a shutter-less continuous-motion projector which can be run at any rate from 0 to 250 frames/s. Model 3M35 (Fig. 5) is available for 35mm film, and optical units for 16mm and Super-8 are in production.

The 16mm Comitor projector by Perfectone achieves a similar result of optical compensation by use of a four-sector mirror disc, the surfaces of which are tilted as the disc rotates so as to follow the motion of the film. Variations of perforation pitch in the film being run are sensed and compensated for, so that a very steady picture is obtained even with varied film condition. Light efficiency is high and standard projection lenses can be used to give high pic-

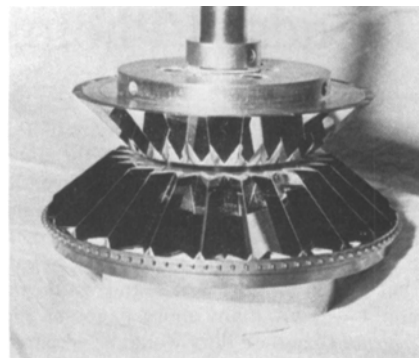


Fig. 4. Hollogon "Skanner" optical intermittent prism assembly, showing the 24 pairs of roof prisms.

ture brightness from a xenon lamp of either 500 or 1600 W. Speed can be fixed at 24 or 25 frames/s or continuously variable from 0 to 150 frames/s, and a built-in pulse generator allows the projector to act as the master to other recording equipment. This projector in fact forms part of a very comprehensive range of equipment all of which can be coupled and operated together on the Perfectone Rythm-O-Start synchronizing system at speeds up to four times normal. Units in the range include the three-transport Trans-Ultra magnetic recorder/reproducer (Fig. 6) in studio or transportable form and the Tele-Trans (Fig. 7), which is a 16mm monochrome television film scanner with polygon prism optics for use where a television monitor picture display is preferred to direct optical projection.

35mm Studio Projectors

Although not strictly providing continuous film motion, the new FR-35A pro-

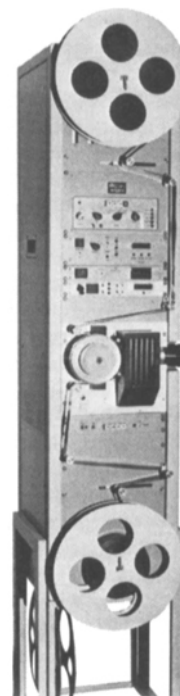


Fig. 5. Hollogon continuous motion 35mm projector 3M35 with optical compensation.

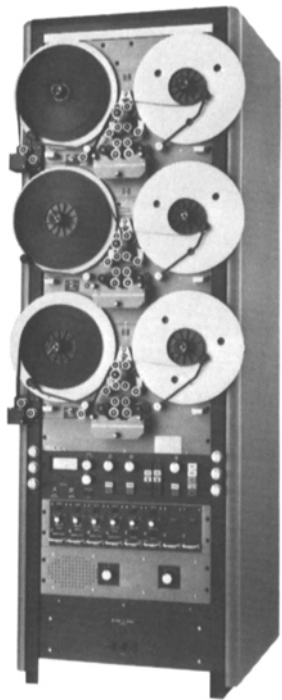


Fig. 6. Perfectone Trans-Ultra R, a triple path magnetic recorder/reproducer for studio operation, available in 16, 17.5 and 35mm versions.

jector by RCA with its stepping motor servocontrolled drive offers effectively the same facilities — forward and reverse running at cine speeds, step-frame projection and rewind and location at speeds up to 150 frames/s, all capable of locking to associated sound recorders.

Among 35mm projectors, the new FP30 projector, a joint effort of Kinton of Munich and Philips (Eindhoven), provides

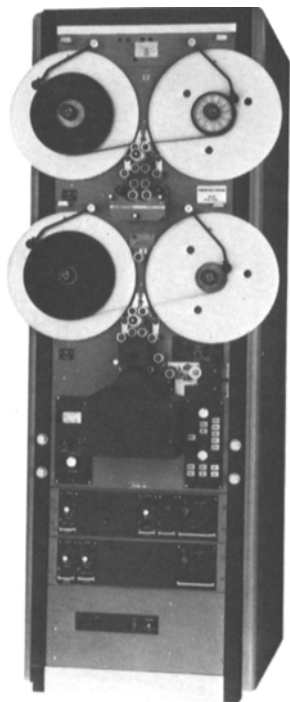


Fig. 7. Perfectone Tele-Trans, a monochrome television film scanner with polygon optics (lower path) mechanically coupled to the 16mm sep-mag recorder/reproducer (top path).

functions of interest for both studio and regular theatrical use, combining a precision intermittent mechanism for normal picture presentation with continuous film movement when rewinding, at up to five times normal speed (Fig. 8). The essential feature is the Kinton cross, which allows the normal intermittent drive to be decoupled from the pull-down sprocket and changed over to continuous drive of the same sprocket. This permits forward and reverse travel up to 120 frames/s, and since the changeover takes place while the shutter is in the open position, it also allows single picture projection and frame-by-frame selection.

The model FP 30ST for studio use is combined with a sound reproducer for 35/17.5mm perforated magnetic film mounted on the other side of the main panel for mechanically coupled double-head running under remote control and can be linked to any other sound equipment. Frame pre-selection by electronic counter can also be provided. In this model the film is handled as 2000-ft (610-m) reels and the light source is a 400-W tungsten halogen lamp to allow single picture showing.

For cinema theater use, the FP 30RR can be fitted with 500-, 700- or 1600-W xenon lamps in horizontal mounting. It can take spools for 2000 m and 3500 m (6500 and 11,500 ft), the film feed and take-up drives being mounted on interchangeable panels in front of the main rack frame. Rewinding is done by running the mechanism in the continuous reverse mode and can be programmed for automatic operation at the end of the reel. Alternatively, the projector can be fitted with horizontal turntable discs for handling up to 20,000 ft (6100 m) without rewinding on the well-known "platter" system.

Long-Run Projection

All 35mm theater projectors at Photokina show the demand for long-running program presentation and all accommodate spools of at least 2000-m (6500-ft) capacity. Some, like the Ernemann 12, can take 4000-m (13,000-ft) spools with both feed and take-up set below the main projector body, but in most cases spools larger than about 2700 m (8860 ft) are handled by separate freestanding units.

The long-play "tower," with a pair of large reels having separate take-up drive and tension control, usually takes up to 4000-m (13,000-ft) spools; units of this type are offered by Ernemann, Hasso, Wassermann (Madrid) and Weston. The Weston 5035 assembly is double-sided and mounted on a turntable, so that one 2½-h program can be assembled or rewound while the other is being projected.

For even longer lengths the horizontal turntable system which avoids rewinding ("platter" or "cakestand") was shown in its freestanding form as the Christie Autowind, the Zeiss Ikon Ernowind, and the Philips Kinton Disc. A four-plate version was shown by both Christie and Philips for

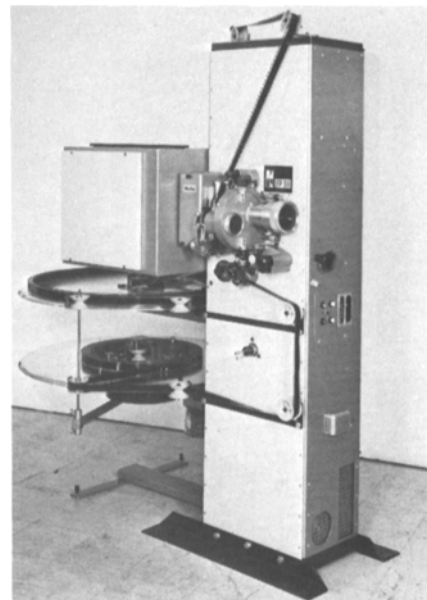


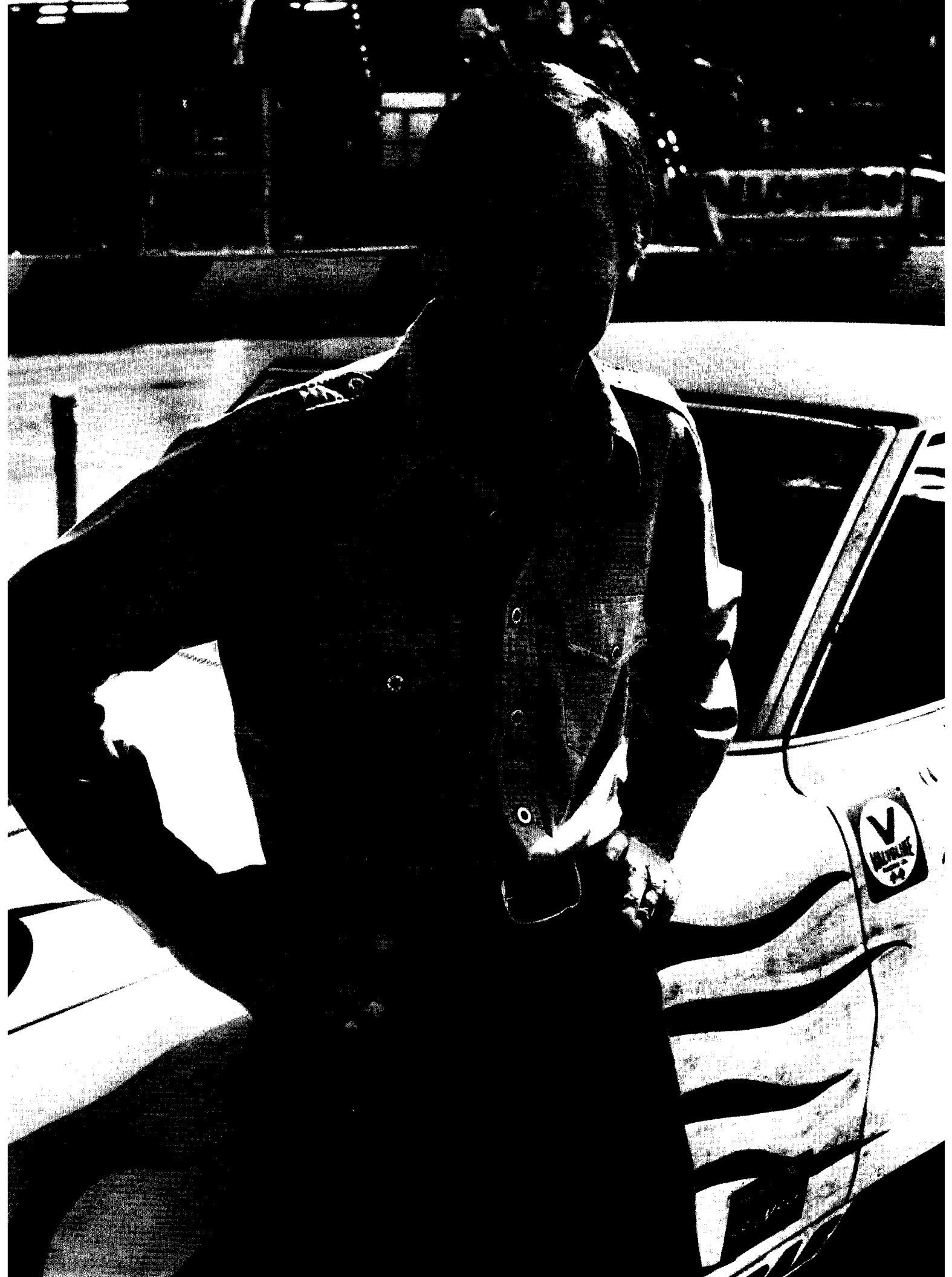
Fig. 8. Kinton (Philips) FP30 theater projector with no-rewind turntable feed and take-up.

feeding two projectors simultaneously where one projection box serves two auditoria in a twinned theater. A horizontal feed and take-up system for up to 6000 m (20,000 ft) but requiring rewinding between showing is available as part of the Bauer U6 projector (Fig. 9).

All these long-run facilities have been in use for several years but a significantly new approach was provided by the Loopmatic system (Fig. 10) manufactured by Fanco AG of Vaduz, Liechtenstein (represented in the U.S. by Carbon Inc. of Cedar Knolls, New Jersey). This accommodates up to 18,500 ft (5640 m) of 35mm film as an endless loop, so that uninterrupted presentation is possible for as long as is required. The principle is known as bi-filar winding, the looped film being wound as a double-layer spiral on one spool. When feeding off, one of the two strands passes to the projector while the other goes to a take-up reel, where it is similarly wound as a double layer with the strand coming from the projector (Fig. 11). When the first spool is empty, half-way through the loop length, the second spool becomes the feed and the first the take-up, the changeover



Fig. 9. Bauer U6 theater projector with horizontal disc feed and take-up for 20,000 ft.



ROGER CORMAN



Coppola, Nicholson and Bogdanovich—these are among the major talents that you helped get started. How about your own career? How did you start?

After graduating from Stanford, I got a job as an engineer. After four days I knew it was a total mistake. What I really wanted was to make movies. So I went to work at Fox as a messenger. It wasn't too long before I was writing screenplays and directing. Then I became an independent producer. And then I opened my own company, New World Pictures.

What do you look for in a new director or writer?

Intelligence. The people I am dealing with must be intelligent. They must also have more than just an interest in films. It's more like a vocation. The best filmmakers have a need to make films.

How about the new young cinematographers?

Because of our budget restrictions, we want cinematographers who can work rapidly and still give us quality. We've had some outstanding cameramen start with us. Several have gone on to win Oscars. I've always liked to experiment with new types of film. I remember using different emulsions for different psychological effects. If I have any questions about film, I just call your local Kodak office. I'm generally the first in Hollywood to work with each successive generation of Eastman film. The Kodak people have always been very helpful,

Les Baker in particular. He also keeps me up to date on Eastman release print stock. This is important because when we distribute foreign films, we make all our release prints here. This way, I can be sure I'm getting the best quality.

How would you describe your company?

New World Pictures, now five years old, has become, somewhat to my surprise, the largest independent producing and distributing company in the country. We've produced and distributed fifty-three pictures. Films that range from "Death Race 2000" to "Cries And Whispers" and "Amarcord." We've won Academy Awards in each of the past two years. Because we distribute fewer films than the majors, we feel we can give each one specialized handling. My lawyer, who is a woman, describes us as a boutique as opposed to a department store.

Is it true you made a bid for "Cries And Whispers" without having seen it?

Yes. When it was first offered, all the major companies passed it up.

I've always admired Ingmar Bergman's work, so when I heard it was available, I made a bid. The film was brilliant and went on to win many awards. Bergman was delighted with our distribution pattern. After the art theaters and regular hard-tops, we put it into drive-ins, bringing his work to audiences that had never seen it before. Incidentally, it went on to become the highest grossing film he's had in this country.

How many projects are on this year's schedule?

I like to give each picture personal attention, so New World will handle no more than ten to fifteen pictures. Again, they're going to be either very commercial or pure art films ranging from a youth-oriented film starring Ron Howard called "The Car," to the new Francois Truffaut film, "The Story Of Adele H." The average run-of-the-mill film is something I'm definitely not interested in. As for the future—we're working with some extremely talented young people, and feel that our best films are still to come.

If you have any questions about film, do what Roger Corman does, call your local Kodak Sales and Engineering representative.

The people who staff the Kodak regional offices are all exceedingly knowledgeable, involved men and women who are constantly aware of the needs and activities of the industry. They are there to assist in every way they can; to provide information, solve problems, or serve as technical consultants.

And for a free copy of this and other interviews, send for our booklet. Write Eastman Kodak Company, Dept. 640-F, Rochester, N. Y. 14650.



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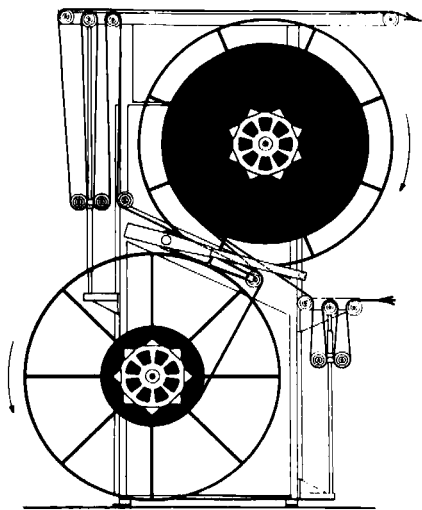


Fig. 10. The Loopmatic system for continuous projection: each spool in turn alternates as feed or take-up, the changeover and loop formation being made automatically as each spool comes to an end.

from one to the other, the re-formation of the double path and the reversal of the direction of rotation all being completely automatic. Monkey elevators before and after the projector function during the brief period while moving arms transfer the take-up and allow continuous projection at all times. A prototype bi-filar system for a similar purpose was also being demonstrated at Photokina by the projector manufacturer Auvitel of Boulogne.

Laboratory Equipment

In regard to developing machines, André Débrie of Paris showed their new compact DAC processor with sprocketless friction drive for 16mm width or for single Super-8. Here the emphasis is on small overall dimensions (less than 6 ft or 1.8 m in length and height) and minimum solution volume (20 liters, less than 5 gal, per tank) with as much automation of controls and operations as possible. It can be supplied for processing Gevachrome II, Ektachrome ECO-3, or ME-4 reversal stocks with output capacities of the order of 1600-1800 ft/h in 16mm and 2300-2800 ft/h for single Super-8. In the VNF-1 version the capacity is greater, at 2800 ft/h for 16mm and 4000 ft/h for Super-8. This machine is a good example of the trend towards small, compact, self-contained machines with comparatively small output of one gauge and process-designed for local or in-house operation, in contrast to the large high-speed multi-gauge installations with which major release print laboratories must be equipped.

In printing machines, the latest models of the well-established panel printers (Bell & Howell, Peterson Industries, and Hollywood Film Co.) were all on display, but it was interesting to see the sudden appearance of total immersion wet-printing methods for contact prints offered independently by four European manufactur-



Fig. 11. Principle of the bi-filar winding used in the Loopmatic: the continuous loop of film is wound as a double spiral on each spool in turn.

ers, all using additive lamp systems of individual design. GMF of Belgium has total immersion of both picture and sound contact heads for both 35 and 16mm, and of the picture only for double- and quad-rank Super-8, with speeds of 100 or 200 ft/min (30.5 or 61 m/min). From SECT of Puteaux (France), their model CC 2000 offers a totally immersed picture head and either immersed or dry sound heads for 35 and 16mm. The printing apertures are illuminated by a fiber-optics path through the immersion tank with running speeds up to 150 ft/min (46 m/min). Michel Picot of Pantin (France), better known for their optical and magnetic sound transfer equipment, especially on Super-8, were also showing a panel-type contact printer with totally immersed paths.

From André Débrie, both contact and continuous optical reduction printers using total immersion were available. Model TC1 is a contact printer for 16mm with the Débrie additive lamp-house and perforated tape control. The picture head is immersed and the sound head dry and the drive is uni-directional at speeds up to 165 ft/min (50.3 m). Model TCO is a continuous optical printer for making four Super-8 prints on 35mm width stock from a one-light 16mm intermediate; an additive lamp-house with scene-to-scene changes is therefore not provided. The negative path on the printing sprocket aperture is totally immersed and on the printed stock side photographic soundtracks can if required be contact printed from a quad-rank recorded track negative.

Inspection and Treatment

Items of miscellaneous film-handling and inspection equipment included three new models of the Vedette inspection viewer, which is now available for Super-8 in both single strip, double-rank on 16mm (1:3 and 1:4 perforations) and quad-rank on 35mm, with or without magnetic sound reproduction. Complete automatic inspection and cleaning units for 16mm work, operating at speeds up to 2000 ft/min (610 m/min), were shown by Research Technology Inc., ranging from the comparatively simple Omega inspector/cleaner up to the Evaluator which provides a computer printout record of the length, number of splices and types of defect encountered in each copy. Hollywood Film Co. showed their new complete film cleaner-regenerator, available for both 35 and 16mm, in which thorough solvent

cleaning by scrubbers is followed by re-forming both surfaces of the film to heal scratches and abrasions; the base is treated with the application of a cellulose solvent layer and the emulsion side with an aqueous softening solution, while at the end of the process the film is fully lubricated and ready for projection. Depending on the range of operations required, treatment can be given at speeds up to 150 ft/min.

Super-8

Two years ago my reviews commented on the emergence of Super-8 cameras with a range of professional features and the arrival in Europe of the single-band system using pre-stripped stock for sound recording in the camera. By this year the process is very thoroughly established, and there were at least fifteen manufacturers each showing two or three models with a full range of advanced features. In general these cameras divided into two main groups, those of the XL (available light) type, with lenses of $f/1.2$ or 1.4 and a zoom range not greater than 6:1 (typical focal lengths of 7.5 to 45mm) and those with lens apertures $f/1.8$ but providing extended zoom ranges of 8:1, 10:1 and even 12:1 (6 to 72mm). Automatic TTL exposure control, macro-focus down to object distances of 2 cm or so, split-image or dichroic range-finders, and speed selection of 18, 24 and 36 frames/s with single frame were generally standard features. Many models provide simultaneous automatic fade of picture and sound, and in some cases the camera may be remotely switched from the microphone point.

Many of the corresponding Super-8 sound projectors provide facilities for complete mixing, transfer and recording from additional sources for both 18- and 24-frames/s operation, and these can often be quite elaborate, as in the Elmo 820 Sonomix (which has a digital frame counter and can run preset lengths with automatic fade and remote control of voice-over commentary).

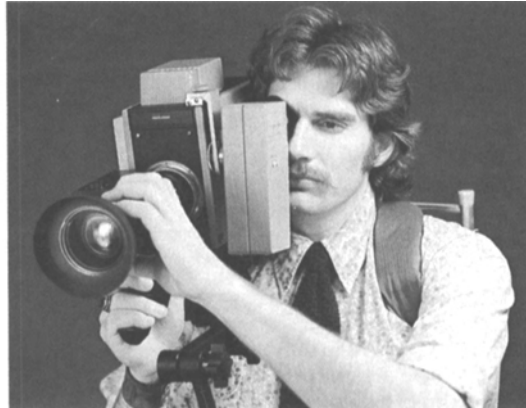
But the growing strength of Super-8 as a serious production medium is perhaps best shown in the range of editing and associated mixing equipment now available with facilities for handling several sound sources. Bolex, with the advanced amateur in mind, supplies the basic viewer V 180 with a range of separate accessories: a sound head unit, sound erasers, frame counter and even a film cleaner for the initial editing, and there is a Bolex four-channel mixing console to be used in conjunction with the SM80 projector, with feeds from microphone, tape deck or record player. The Goko RM-3 Sound Editor on the other hand is typical of units which combine similar facilities in a single assembly.

All we have said so far pertains to the single-band system, but for the professional user recording, editing and mixing by the double system using full-width coated Super-8 magnetic film must still show the

Now Hitachi Covers The News...



Hitachi FP3030



Hitachi SK-70

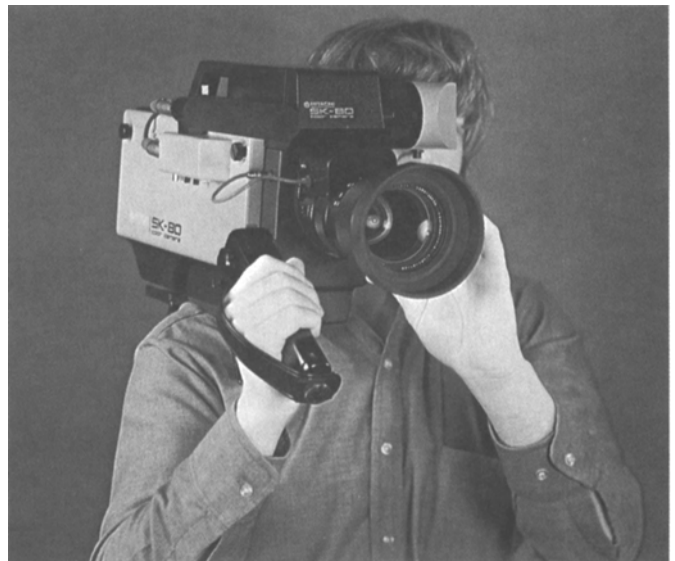
Three Different Ways

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Hitachi FP3030 A low cost and lightweight (7.7 lbs.) completely self-contained portable color camera with built-in battery that is ideal for broadcast capability in ENG, as well as a variety of industrial applications. The FP3030 also features excellent colorimetry and sensitivity with registration-free tri-electrode single tube.

Hitachi SK-70 A modular system camera that can be converted easily from studio to portable use with superior broadcast performance in either mode. Digital command control unit is also available. The SK-70 is many cameras in one!

Hitachi SK-80 Totally self-contained ENG camera whose exceptional design and features are sure to be appreciated by broadcasters. Features three 2/3" Saticon tubes. Optional Gen-Lock available, as well as many other fine built-in features.



Hitachi SK-80

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greatest attraction. Super-8 Sound Inc. of Cambridge, Mass., has its Crystal Camera Control and Sync Generator units for a range of cameras; its new Recorder II can function as location recorder, studio dubber and final transfer unit. Cinesync of Paris in its Electra system has the Auto Quartz and Diamant radio control of synchronization, and its Sono-Studio unit provides corresponding transfer and editing features. And of course fully professional multi-path editing tables are now available for Super-8, the established KEM and Steenbeck range now being joined by Cinecraft's MKM Model 824, the Schmid Diploma II and the EM 800 from CTM of Levallois.

Audio-Visual

For the audio visual user there was such an enormous range of slide projectors and equipment for synchronization and multi-screen presentation that even enumeration is impracticable. However, the new Electrosonic cartridge player-decoder should be mentioned with its provision for the immediate selection of two alternative programs of picture or three sound versions.

Normally, dissolves between slides requires the use of a pair of coupled projectors but the new Rollei P3800 has twin lenses in one body, using only a single slide magazine but having two separate slide stages and optical systems. The dissolve time between successive slides can be set from $\frac{1}{2}$ to 6 s, and for automatic operation a slide change interval between 4 and 30 s can be selected.

Slide projectors using the 110 frame size were not numerous, but a new application



The SMPTE stand at the 1976 *Photokina* in Cologne, West Germany. Many hundreds of the fair's visitors stopped by and requested information about the Society's goals, services and organization. Thousands picked up our literature. Shown here are Wilhelm Roth (l.), Editor of the *Fernseh- und Kino-Technik*, the German counterpart to the *Journal*, and Pablo Weinschenk-Tabernerero (r.), Motion Picture Engineer from SMPTE Headquarters. There was great interest in the Society and its activities.

of this format was the Audiocard system shown by Revox of Regensdorf (Switzerland). In this application, 60 110-size slides are mounted on a single card or plastic sheet approximately 6×4 in or 15×10 cm. In the projector, which accepts this card horizontally, any of the 60 slides can be immediately selected by a numerical pushbutton encoder and shown either on a small self-contained back-projection screen 12 in (30.5 cm) wide or by front projection onto an external screen. A sound cassette

unit provides commentary or instruction and can be coupled either to select pictures in automatic sequence (not necessarily in numerical order) or to provide multiple-choice questions for students to answer through the encoder. For the preparation of Audiocard software, there is a camera unit with mounting equipment which allows any existing material such as 2-inch square slides, diagrams or printed text to be reduced and assembled in the required format.

A Report on the 12th International Congress on High-Speed Photography

By LINCOLN L. ENDELMAN

The 12th International Congress on High-Speed Photography was held in Toronto, Canada, 1-6 August 1976 at the Inn On The Park.

The Congress was sponsored by the Canadian Science Film Association and supported by the National Research Council of Canada, the Ontario Science Centre, Society of Motion Picture and Television Engineers, Society of Photo-Optical Instrumentation Engineers, The Canadian Secretary of State, The Government of Ontario and numerous industrial firms.

There were 18 National Delegates and a total registration of about 160. National Delegates were present from Australia, Argentina, Canada, France, Hungary, Israel, Japan, Korea, Netherlands, Spain, Sweden, Switzerland, Taiwan, United Kingdom, USA, USSR, Venezuela, and West Germany. Twenty exhibitors from the USA, Canada, United Kingdom, France and Switzerland demonstrated their equipment.

There was an informal reception on Sunday, 1 August for the conference delegates and their spouses. This was followed by a

meeting of the Schardin Medal Awards Committee. The chairman was R. Schall of West Germany. Present were D. Clayton of Canada, P. J. Bradley of the United Kingdom, M. Ya. Schelev of the USSR and L. L. Endelman of the USA. A discussion was held for a potential candidate for the award and the ground rules for a candidate. A second meeting was scheduled for later in the week to make the final decision.

The Inaugural Session began Monday morning with a welcoming speech by Congress Chairman Prof. B. J. Thompson, Dean of the College of Engineering and Applied Science at the University of Rochester. This talk was followed by the official opening of the Congress by Dr. P. A. Redhead of the National Research Council. Dr. Redhead remarked upon the use of high-speed photography as a diagnostic tool with the special emphasis placed on the techniques involved in the study of laser fusion and plasma effects.

The Program Chairman, Dr. Martin Richardson, of the National Research Council of Canada, Division of Physics, then commented on the further development of high-speed photography from the previous picosecond studies to the femtosecond capabilities now being used.

A contribution submitted on 27 August 1976 by Lincoln L. Endelman, Aerospace Systems, c/o Perkin-Elmer, 411 Clyde Ave., Mountain View, CA 94040.