Report on the SMPTE Television Conference Atlanta, 3–4 February 1978

By HUGO A. BONDY

Many people coming from the north and midwest to the 12th Television Conference thought Atlanta would be warm and sunny. Perhaps not like Miami, but better than up north. Those who had these preconceived notions were disappointed. Atlanta was cold and blustery. But no one was disappointed in the Television Conference. It was terrific.

Those who have been to recent SMPTE Television Conferences have come to expect a large turnout of professional television people, mostly engineers; a first class program; and an interesting program-oriented equipment exhibit. That's the way it was. The registration exceeded 650. Registrants came from all over the U.S., Canada and abroad. The program, featuring three very important television subjects, was very well received. There really was standing room only for both days of the meeting. The exhibit featured equipment that related to the subjects of the Conference (one-inch recording, digital video, and video still store and slow motion). Most of the manufacturers of such equipment participated. Because the sessions and the exhibit were in adjacent areas, and because the areas were small, the meeting had a busy and exciting quality about it, as if something important was happening all the time. And, of course, something important *was* happening all the time.

There were many people who were responsible for the success of the Conference. Eugene Myler, Eastman Kodak Co., did a remarkable job as General Arrangements Chairman. He began planning the Conference months in advance and the results reflected his many hours of hard work. He had able assistance from many members from the Atlanta Section who handled specific areas of Conference planning as chairmen of committees. These people were Edward Warnecke, Wine and Cheese Party Chairman; Herbert Jenkins, Registration Chairman, Larry Bowling, Registration Assistant; Bill Powers, Audio Visual Chairman; Bruce Godley and Lynda Thomas, Audio Visual Assistants; Bill Marks and Joe Abercrombie, Membership and Hospitality Chairmen; Paul Higginbotham, Publicity Chairman; and Charles Cannon and Leigh Kelly, Hotel Arrangements and Luncheon Chairmen. William Reddick and Hugo Bondy provided help as Administrative Assistants.

The program, which was the primary attraction of the Conference, was hammered out by Papers Program Chairman Richard G. Streeter, CBS, with the assistance of three topic chairmen, Fred M. Remley, One-Inch Videotape Machines; Robert McAll, Digital Television; and Albert H. Chismark, Video Still Store and Slow Motion.

This report, submitted on 1 March 1978, was prepared at the request of the Editorial Vice President by Hugo A. Bondy, 149 Mocking Bird Lane, Decatur, GA 30030.

One-Inch Videotape Machines

The first of the sessions was presided over by Fred M. Remley of the University of Michigan and opened with Eastman Kodak's "Salute to the Broadcast Industry." This was followed by a welcoming address by Frank L. Flemming, SMPTE Vice President for Television Affairs.

Fred Remley, in his second role as speaker, led off with the first paper — **An Overview of One-Inch Helical Video Recording.** The history of the intensive SMPTE efforts at setting standards resulting in the Type-B and Type-C formats were given as an introduction to the papers which followed.

The second speaker of the morning was David Fibush of Ampex Corp. who provided details of the SMPTE Committees leading to the **Proposed SMPTE Type-C Helical-Scan Recording Format.** Reference was made to the five documents completed by the end of 1977, after less than a year's intensive work by these committees. These documents specify track locations on the tape, mechanical configurations, and electrical parameters for video, audio and control track recording. Reference was also made to the SMPTE working groups which are developing standards and recommended practices for one-inch videotape, reels and time-code recording. The six different channels which it is possible to record in the Type-C format were outlined. It was pointed out that when one of these six — the optional "sync" channel — is recorded, the Type-C format in effect becomes a "segmented" format. A significant improvement in signal-to-noise ratio in playback is brought about by a 6-dB boost of "burst" amplitude in making a recording. Videotape interchange between Type-C formatted machines of different manufacturers is presently under the purview of appropriate SMPTE Committees.

Hans-Peter Maly of the Robert Bosch Fernseh Group provided novel applications of the BCN Type-B recorder in his paper **BCN Digital Store: Economical Accessory for Production and Post Production.** Through the use of digital store device produced by Fernseh for use with the BCN Type-B segmented one-inch helical-scan reel-to-reel *or* cassette recorder the following can be accomplished: (1) random access electronic picture store, (2) slow or stop motion instant replay, (3) multi-image real time and freeze effects, and (4) animation with single system synchronous sound. Film style editing is also possible in the high-speed search and slow and stop motion modes. Multi-image special effects and electronic animation are within its range of capabilities.

Design Concepts in The Development of the Sony BVH-500 One-Inch Portable VTR was the subject of M. Morizono's paper. This was an exposition of the criteria set for the development of the BVH-500

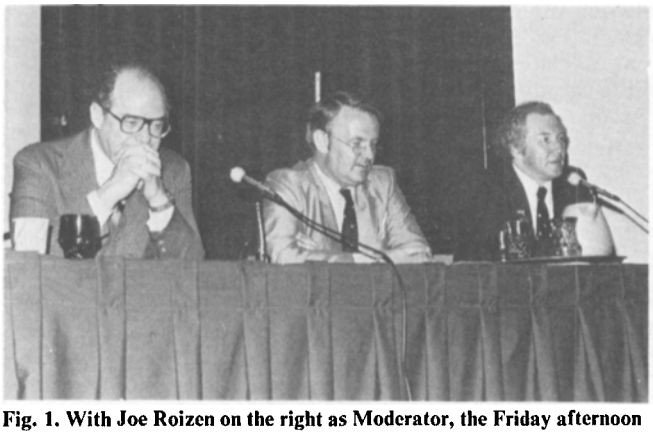

Fig. 1. With Joe Roizen on the right as Moderator, the Friday afternoon panel discussion on one-inch helical video fielded some difficult questions from the crowd. Here, William Connolly and Howard Steele assist.

Fig. 2. Other members of the "blue ribbon" panel included (left to right): William Kelly, Henry Zahn, David Fibush, Denny Fussell and E. Grey Hodges.

Fig. 3. Interacting with associates is often as rewarding and useful as attending a paper presentation.

Fig. 4. The Wine and Cheese Party Friday night was enjoyed by both registrants and their spouses.

Type-C one-inch portable videotape recorder. The same general mechanical approach was used as in the U-Matic units in extensive use throughout the world. However, extensive efforts have been expended to improve the reliability and durability of the BVH-500 over its predecessors, especially in the realm of temperature and humidity tolerance. The random or "hand-carry" motion, which plagued its predecessors, has indeed been reduced to negligible proportions. The potential for operation by nontechnical personnel (idiot-proofing) has been advanced by the inclusion of safety and warning devices. Its light weight, small size and low power consumption (long battery life) make the BVH-500 a valuable tool for EFP (electronic field production).

Mechanical Design Considerations for a Helical Scan VTR was the subject of Dennis M. Ryan, Ampex Corp., and dealt with the basic concepts which went into the development of the Ampex VPR-1 Type-C recorder. The helical scan videotape system, unlike the transverse system, is a three-dimensional path device. In the development of the VPR-1 recorder, tape guiding, speed and tension control were among the most basic considerations. Tape entry into and exit from the scanner points, wrap angle and type of wrap, and reel arrangement all presented problems which had to be solved. This led to a wrap angle of just 0.9°. Methods of controlling tape tension disturbances were discussed.

Outdoor Program Production Utilizing Compact Equipment was the subject of Ichihiko Hishida of the Tokyo Broadcasting System. This related his company's experience with Sony "BV-series" equipment in electronic field production (EFP). By making use of one camera of this series, a BVH-500 recorder and associated audio and lighting equipment, this organization has successfully embarked on documentary production. Mr. Hishida's paper was accompanied by tape playback of a story relating an accident which befell a fisherman on a Japanese vessel off the coast of Alaska and showed how he was evacuated by a U.S. Coast Guard helicopter, hospitalized and returned to Japan. This program, two hours in length, was the result of 768 cuts spread over 146 hours of editing time. All equipment operated without breakdown. The area of editing, however, is one which requires basic improvements.

At the luncheon held on the first day of the conference, Ken Leddick of Scientific Atlanta was the guest speaker. Mr. Leddick's subject was the transmission and reception of satellite communications in program dissemination, a technology which is gaining ever wider acceptance by broadcasters and cable system operators. Scientific Atlanta's earth station was described and illustrated by slides.

In the afternoon session presided over by Norm Ritter of 3M Co., the first paper was Bill Kelly's (WNEW-TV, New York) **Users Experiences with Type-B (BCN 1-inch helical) Portable and Studio Editing VTRs.** WNEW has had five BCNs in service for more than nine months. Although operating hours have totalled 850, there have been no breakdowns and no head replacements. Set-up and stabilization time, which are important factors in portable operations, are excellent. Quality matches among the five VTRs are very good. Mr. Kelly invited the viewing of a WNEW produced tape at the Fernseh exhibit; this 12-min promotional tape involved 14 edits and took just 4½ hours to produce.

Videotape Program Production at CBS Studio Center was the subject of William Connolly's paper. It described the experience gained at the CBS Hollywood Studio Center with an editing system and eight Sony BVH-1000 Type-C recorders. CBS's experience has been that through the use of a combination of film and videotape post-production techniques an accurate frame synchronization of up to five VTRs is possible. Initial installation and operating costs have proven to be significantly lower than for the quadruplex standard. Performance is at least as good as that of the quadruplex equipment with perhaps a 30% reduction in costs.

William Nicholls continued with the CBS experience, especially from the editing standpoint, in **CBS Television Network Edit Room Using One-Inch VTRs.** Mr. Nicholls described the second of three systems installed by CBS, this one at CBS Television City, Hollywood. The requirement for expansion of the CBS Hollywood post-production facilities coincided with the imminent availability of Sony's BVH-1000 Type-C VTRs. It was necessary to design the new facility for operation either off-line or on-line for compatibility with the already existing quadruplex plant. This was accomplished through various equipment modifications which were described. The editing system incorporated the CMX 340X controlling four Sony BVH-1000s. SMPTE time code is entered in the vertical interval to permit readout when the tape is stationary; consistent one-frame accuracy is achieved for both "entry" and "exit" points. The remotely located editing room equipment was designed for extreme simplicity of operation. It consists of a joystick control in the shuttle and jog modes and has four knobs, one for each VTR, with room for a fifth. Once again the lower costs and superior performance of the Type-C equipment compared with the existing "quad" standard was emphasized.

The location of a videotape production facility in the idyllic surroundings of Hilton Head, South Carolina seems unlikely. Yet just such a facility was described by Denny Fussell of Tricomm. This organization has a van equipped with a VPR-1 Type-C recorder, as many as four Plumbicon cameras and the usual associated equipment. All editing is done on two additional VPR-1s together with Sony U-Matic decision recorders. The quality, reliability and cost determinations which went into the selection of the VPR-1 have been more than justified, in Tricomm's experience. The post-production work done with the VPR-1 was seen as the key to a saleable package.

Jefferson Productions' **Post-Production and Production Using 1-Inch Helical Videotape and VTRs** was presented by Grey Hodges who coauthored the paper with Emerson Lawson and Robert Dycus. Jefferson Productions has standardized on

Fig. 5. Bill Koch and Ken Mason also found time to enjoy the party.

some Sony BVH-1000s and a CMX-340 editing system in their facilities. Their experience has been that this new generation of videotape equipment can give results rivaling those of the quadruplex systems, and it has the added advantages of smaller size, greater flexibility and reduction in costs.

The last event of the first day was a panel discussion involving some of those who had presented papers earlier, two newcomers to the proceedings and Joseph Roizen as the moderator. Howard Steele, formerly of Britain's Independent Broadcast Authority and now the the head of Sony Broadcast in Europe outlined, in his opening statement, IBA's investigations into the possibilities of developing a commercially attractive digital videotape machine. Charles Urban of the British Broadcasting Company reported on the European Broadcasting Union's activities regarding one-inch videotape equipment. Type-B equipment has found wide acceptance. The EBU is reluctant to get into the Type-C format primarily because of the need for a third audio channel. The many languages and dialects of Europe make this requirement basic. Up to the present time there is a lack of enthusiasm for the Type-C format or making use of the sync track during the vertical interval. Should the proposal of manufacturers of Type-C equipment to combine the control track with the time/address track prove feasible a third audio track would then be provided. This could well lead to the EBU's acceptance of the Type-C format.

A question from the floor concerning the possibility of production of a "playback only" machine was answered by several panelists. A number suggested that if the demand developed — say to the extent of 1000 orders — their companies would tool up. Because a market in low-cost used quad-equipment had existed for years, however, there had never been an incentive to make such a basic machine; in the 1-in helical format, the situation may be different.

To the inevitable question, "How soon will the 1-inch helical VTRs replace the quadruplex machines?", Joe Roizen noted that inasmuch as some 10,400 quadruplex VTRs are in use throughout the world the replacement would only follow the well established laws of economics. Replacement would occur as equipment became fully depreciated and worn out or obsolete. There are many quadruplex VTRs of recent manufacture still being sold. Acceptance of the 1-inch formats by production and program distribution houses may well have a decisive influence on the rate of replacement.

Digital Video for Production Use

The first session of the second day of the conference was presided over by Robert McAll (Vital Industries) and was devoted to digital techniques and applications. The lead-off speaker was Robert Hopkins of RCA, who described the SMPTE's working groups' activities towards the establishment of digital standards as soon as possible. The vast amount of activity in this realm makes this a task of large magnitude. Some decisions have been made, others are still in the discussion stage. **The Role of the Fieldstore Synchronizer in the Broadcast Industry** was the subject of a paper by Brian Matley (Micro Consultants). Mr. Matley went to some lengths in expounding the virtues of the fieldstore synchronizer in the broadcast industry vis-à-vis the framestore devices. The fieldstore synchronizer with its much smaller size and lower costs provides more than adequate possibilities for many broadcasters' applications. These include the handling of a number of non-synchronous and unstable signal sources and the elimination of the VTR phasing problems. The very wide window in its time-base-correction application makes it a more logical choice for the broadcaster whose requirements may not extend to the capabilities of a framestore unit.

Kenneth Moore's presentation **Recent Advances in Digital Special Effects** was the "show stopper" of the conference. This was an exposition of the work done by Mr. Moore and his associates, Arthur Kaiser and Henry Mahler, at the CBS Technology Center on the "Action Track." The technology is related to that described in connection with a new digital noise reducer in the March 1978 *Journal*. In effect, this device provides a series of apparently progressive still frames. It provides a means of storing and displaying the past history of moving objects so that the trajectory of the object can be viewed. This can be enhanced by increasing the luminance of the track or caused to blink to enhance the presentation. The rate of comparison, i.e., the number of frames between motion comparisons, determines the effective stroboscopic rate. This device, already dubbed the frame grabber, was demonstrated with startling effect.

RCA's Thomas Gurley entered the lists with **The Television Frame Store as a Production Tool.** When fully equipped with its optional features, this device becomes a highly sophisticated production tool offering such capabilities as picture freeze, animation, size change, positioning and multi-generation quad splits. With the external keyer it can produce, in the full sized picture positioning mode a "hall of mirrors" effect. Each reflection is one pass through the frame store and the keyer. One of the basic keys to this device is the use of $4f_{sc}$ sampling which offers the advantages of greater bandwidth than $3f_{sc}$ sampling as well as greater precision in digital filtering, compression and chroma inversion.

Toshitsune Yoshida's presentation of a paper coauthored with Messrs. Kohnoh and Shimizu, **A New Master Control Switching System with a Frame Synchronizer,** described the use of Nippon Electric's device at the Mainichi Broadcasting System of Japan. The employment of the frame synchronizer is quite similar to its

Fig. 6. The opening paper—Fred Remley's overview of 1-in technology—drew an attentive crowd.

Fig. 7. From opening to closing, the exhibit area was busy.

Fig. 8. The Friday luncheon was also a time for recognition to be given. Left to right: Bill Hedden, Hugo Bondy and Gene Myler.

Fig. 9. Many papers drew comments and questions from the audience.

uses in the U.S. However, use is made of a second synchronizer within the system as well as at the output to the master switcher, i.e., within the mixing system.

Eric King of Vital Industries presented a paper authored by Robert McAll, entitled, **An Integrated, NTSC, Teleproduction Switching Facility, Capable of Performing "Film Type" Optical Transitions in Real Time.** This system is capable of performing the transitions indicated in the title and in addition it can be "taught." The results are remembered and made available to either manual control (e.g., news and sports applications) or computer control (e.g., post-production applications). The system is implemented with standard hardware and has software programmability.

John Baldwin of Britain's Independent Television Authority in his **Digital Television Recording — When?** attempted to look into the future on the basis of ITA's attempts at the development of helical-scan digital VTRs. The trials and tribulations of doing this were many although it was concluded that all three existing systems, NTSC, PAL and SECAM would fall within its capabilities. Several tape clips of material digitally recorded on a digitally converted BCN and then reconverted to analog format were shown. In 1975, the answer to the question When? was "probably in 1978." Now, the answer is "soon."

Joachim Diermann of Ampex in **Digital Television Recording — An Analysis of Choices** looked at the digital VTR problem from the manufacturer's standpoint and was less optimistic than the preceding speaker. He went to great lengths in demonstrating not only the video problems but also the difficulties providing areas for digitally formatted audio. All of this is predicated on a system based on a $4f_{sc}$ or 14.32-MHz sampling rate. Mr. Diermann's conclusions were that digital VTRs are in our future but that their emergence would be evolutionary rather than revolutionary.

Recent Advances in Video Still Store and Slow Motion

The afternoon session on 4 February, the last of the Conference, was presided over by Al Chismark, Meredith Communications. The first speaker was Robert Mausler of NBC whose **From Graphic Artist to Composite Scene — The Digital Way** was an exposition of NBC's methods of using magnetic storage devices to completely bypass the slide- or film-making steps in the production of graphics, especially for news.

William Justus of Ampex, in his paper, **New Developments on the ESS Digital Video Recorder,** carried the magnetic storage subject further by describing the ESS-2. This machine is capable of being used as a true variable-motion device, i.e., it has the ability to record real-time video. ESS-2 can record consecutive fields as fast as 60 fields/s. In this mode it can provide up to 27 s of real-time material. It is a variable-speed machine for slow motion, animation or detailed frame-by-frame replay. A ten-event memory makes it possible to set up production sequences in advance and recall them for execution on demand.

Lee Stratton of Arvin-Echo addressed the subject of **Video Slow Motion and Frame Storage Using Flexible Magnetic Discs.** He provided an introduction to the flexible disc storage method. Included were graphics to demonstrate the theory and operational requirements of the EFS1-A. The storage applications of this device are continually expanding. The Slo Mo #1 can be used for frozen-frame, slow-motion or real-time playback.

Jesse Blount of ADDA Corporation reported on his company's ESP series of still-store disc pack devices as a digital means of storing video information which previously would have been stored in the 35mm slide format. The product line has an on-line storage capacity of 200 frames for the ESP-100 to 3000 frames for the ESP-750/2. Comparative cost figures for these devices vs the conventional 35mm slide system were given.

Isaac Hersly, ABC, gave his network's experiences with the disc-cassette format under the title of **Utilization of a Video Still Store Recorder at ABC.** The ABC network has completely integrated this device into their operations. Examples were given of its applications during the Montreal Olympics and other sports events. Special application interfaces to character generators and computers were described.

Type-B (BCN) Film-Style Editing Using a Digital Store was the title of Juergen Heitmann's paper. The subject was a bi-directional high-speed search/slow motion and stop motion display of recorded sequences on a BCN Special System consisting of a Type-B BCN studio editing VTR and the BCN stand-alone digital store. As noted by Hans-Peter Maly, non-technical film personnel should be able to use this system as they would the common Moviola technique in editing film. Full color rendition is held in the continuously variable forward/reverse slow motion displays down to eight frames/s.

Akito Iwamoto of the Toshiba Research and Development Center in Japan presented a paper entitled, **A Large Capacity, High Retrieval Speed, Holographic Still Picture Filing System.** This development was undertaken for closed circuit television to be used by public services. It is a system which files, in analog form, holograms on photographic sheet film. It accepts either optical or video inputs, and it has a capacity of 200,000 images. The cycle time averages 1 second in the random access mode and the average access time is 0.4 s. An argon laser is used.

The last paper, added to the schedule on the spot by Carlos Elmer of L-W International, was entitled, **Freeze Frame and Slow Motion by Television Chain Projectors.** The presentation featured a novel means of providing slow speed synchronized film material from a 16mm film projector.

Equipment Exhibit

One of the goals of the Conference Planners was to provide an equipment exhibit that complements the program. The idea was for attendees to hear the papers, and then inspect equipment of a kind that was described on the papers program. The plan worked extremely well. Indeed, despite the proviso that only companies with equipment that supports the program (i.e., one-inch tape equipment, digital video equipment, and electronic still-store and slow motion equipment) be permitted to display equipment, 17 companies participated in the show.

The companies that participated in the exhibit are:

Adda Corp.
Ampex Corp.
Arvin/Echo
Consolidated Video Systems
Digital Video Systems
Infotechnics
Lenco, Inc.
Memorex
Micro Consultants, Inc.
3M Co., Magnetic A/V Products Div.
NEC America, Inc.
RCA
Sony Corp. of America
TeleMation, Inc.
Thomson-CSF Laboratories
TV Equipment Associates
Vital Industries, Inc.

Reports on Engineering and Standardization Committee Activities

A number of SMPTE committees, study groups, etc., took advantage of the Conference as an opportunity to convene and prepare reports of their activities. These reports are published elsewhere in this issue of the *Journal*.

Social Activities

Though this was only a two-day meeting, there were several social activities in which attendees and their spouses could participate. On Friday night of the Conference there was a Wine and Cheese Party that was held at the historic Fox Theater, near the hotel. Friday afternoon there was the Get-Together Luncheon where a representative of the Satcom Div. of Scientific Atlanta was guest speaker. And finally, for the spouses, there was a tour of Atlanta.

Acknowledgments

The Society thanks a number of companies for their generosity. For the opening films, thanks go to Modern Talking Picture Service. For the Wine and Cheese Party thanks are extended to: WAGA-TV, WXIA-TV, WSB-TV, WTCG-TV (all of Atlanta); TVC Laboratories (New York); Motion Picture Laboratories (Memphis); and Russell Film Laboratories, Inc. (Jacksonville, Fla.). Video Supply Co. supplied the projectionist. Eastman Kodak Co. is appreciated for their presentation *Salute to the Broadcast Industry*.

120th SMPTE Technical Conference and Equipment Exhibit

29 October–2 November 1978, Americana Hotel, New York City

Program Chairman John Zeman, Eastman Kodak Co. is assembling a wide-ranging program of high-quality technical papers related to the general theme, *Imagery—Today, Tomorrow!* He is being assisted by the **Associate Chairman for Film, Edward J. Messina, ABC-TV,** and two **Associate Chairmen for Video, C. Robert Fine, Fine Communications Corp.,** and **L. Merle Thomas, Public Broadcasting Service.**

The program will be organized into sessions scheduled during the week as follows:

Monday, 30 Oct.
- General Overview
- PMPEA Hands-On Session

Tuesday, 31 Oct.
- Laboratory Practices
- Satellites
- Video Equipment

Wednesday, 1 Nov.
- Laboratory Practices
- Sound
- Video Processing
- Video Transfers

Thursday, 2 Nov.
- Film Production
- Video Production
- Film Special Effects and Editing
- Video Special Effects and Editing

Engineering and administrative committee meetings will be scheduled for Friday, 3 Nov.

A number of Topic Chairmen have been selected to collect papers in their several areas. Anyone interested in offering a paper for presentation on any of these subjects should contact the appropriate Topic Chairman. They are:

Film Laboratory Practices
Harold Freedman
Technicolor, Inc.
321 West 44 St.
New York, NY 10036
(212) 582-7310

Frank McGeary
Motion Picture Laboratories
P.O. Box 1758
Memphis, TN 38101
(901) 774-4944

Don Donigi
Du Art Film Laboratories
245 West 55 St.
New York, NY 10019
(212) 757-4580

Sound for Film
Norman Prisament
Magna-Tech Electronic Co., Inc.
630 Ninth Ave.
New York, NY 10036
(212) 586-7242

Ralph Friedman
Magno Sound
723 Seventh Ave.
New York, New York
(212) 757-8855

Film Production
Dan Sandburg
TVC Labs
311 West 43 St.
New York, NY 10036
(212) 397-8600

Richard DiBona
General Camera
471 Eleventh Ave.
New York, New York
(212) 594-8700

Satellites
Daniel R. Wells
Public Broadcasting Service
475 L'Enfant Plaza SW
Washington, DC 20024
(202) 488-5000

Video Manufacturers Program
Robert Tenten
Home Box Office
Time/Life Bldg.
Rockefeller Plaza
New York, NY 10020
(212) 556-2433

Forms for submitting a paper at the Conference are available from any of the above, or from SMPTE Headquarters. Author forms, author information sheets and synopses are due at Headquarters by 1 June. All manuscripts are due by 14 August for review by the Program Chairman.

The Equipment Exhibit space will be considerably enlarged compared with previous meetings at the Americana. Exhibits will fill Albert Hall at the street level and will also be found in the Royal Ballroom on the sessions rooms floor. Full details and order forms for space can be obtained from **Jeffrey B. Friedman** at SMPTE Headquarters (914) 472-6606.