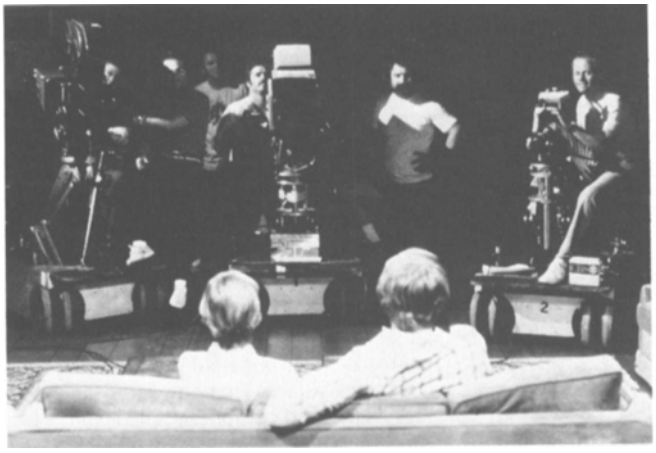

Fig. 15. Test comparing 35mm film with 1-in videotape, using two video cameras. The test was conducted at the Bob Newhart set.

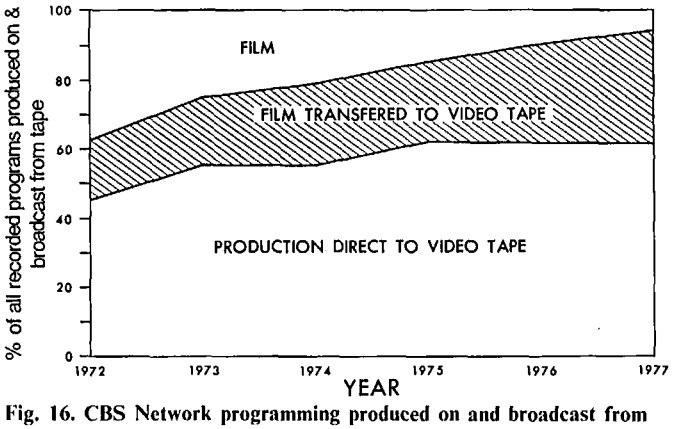

Fig. 16. CBS Network programming produced on and broadcast from videotape.

The post-production switching center, located in the front half of the trailer, is shown in Fig. 13. The lower four picture monitors display the output for the four camera videotapes and the top center monitor displays the switched output. The top lefthand monitor is for a hand-held Microcam™ tape which is sometimes used. A closeup of the switching and videotape transport control panel is shown in Fig. 14. The simple switcher is shown on the left and the transport control panel for the videotape machines, including the SMPTE time code displays, is shown at the right.

The time and cost advantages of using videotape for such production is well established. The question is whether or not such videotape equipment will provide suitable quality to replace the 35mm film production system. We believe that the 1-in helical-scan machines are at least as good as quadruplex recorders in regard to performance and are furthermore smaller, simpler, more reliable, and cheaper to operate.

To compare the end-product quality of this 1-in videotape system with that of 35mm film, a test was made at Studio Center on the Bob Newhart film set and on the "back lot" by a motion-picture crew. As shown in Fig. 15, the Thomson 1515 triaxial cable studio camera was chosen and placed in the set along with the 35mm film camera and the Thomson 8-lb (3.6-kg) Microcam. The scenes were lit for film and shot simultaneously by the three cameras. The output of each video camera was recorded on a separate Sony BVH-1000 1-in VTR. The film was handled in the normal manner. The film print was transferred to 2-in quadruplex tape as is normally done for broadcast, and the 1-in videotapes were also dubbed to 2-in quadruplex for editing. Viewings of these tapes, by both skilled and unskilled viewers indicate that the videotape product is at least as good as the 35mm film product for broadcasting.

In electronic newsgathering, our goal was to produce an electronic system at least as good as 16mm news film. For this project, our goal is to produce an electronic system at least as good as 35mm film, and I think we will meet that goal.

Single-camera electronic photography is next! Lastly the whole production effort ends in the broadcast of the programs. And here the trend to videotape is even further advanced. Broadcasting from a single medium eliminates the need to operate both on-line videotape and on-line telecine facilities during the entire broadcast day. Furthermore, peripheral program elements such as openings, closings, commercials, or promotional inserts may be integrated with the main program on a single videotape, for simple broadcast. Thus, programs produced on film are more and more being transferred to videotape for broadcast. As shown in Fig. 16, the proportion of all recorded network programming broadcast on videotape by CBS has risen steadily over the last four years, and now stands at 95%. When we consider the prime-time portion of the broadcast day, we find that *all* CBS programming for the last year has been broadcast from videotape, whatever its method of production.

The lower curve on Fig. 16 shows the volume of all network-recorded programming which has been produced on tape. Thus the shaded part of the diagram represents the programming which has been transcribed from film to tape prior to distribution or broadcast

As more programming is produced directly on videotape, the need for the transcription effort will decline as the two lines bounding the shaded area approach the 100% mark. The rapid development of high-quality, stable television cameras of reduced size and the availability of the professional quality 1-in helical-scan VTRs — which not only provide full-broadcast-quality recordings but permit post-production editing with film-like flexibility — are changing the face of television production in all fields from ENG through entertainment programming. These developments, combined with the flexibility of videotape playback for broadcast, are rapidly improving the quality and efficiency of the television service. After all, improving this service is the engineer's "raison d'etre."

Errata

Progress Report — Education

May 1977 *Journal*, p. 317

Col. 2, line 6: Instead of "It was a banner year in terms of sales . . ." read "It was not a banner year . . ."

Progress Report — Television

May 1977 *Journal*, p. 300

Col. 3, last paragraph — "Fernseh/Bosch demonstrated an NTSC version of the BCN machine. This segmented-head, non-still-frame equipment is designed in both portable and studio models . . ." This statement is incomplete because Robert Bosch also showed in 1976 a still-frame version of BCN equipment at the International Broadcasting Convention in London and the NAB convention in Washington, D.C. Also demonstrated was jogging and slow motion capability. A more detailed description of the BCN developments including a digital field store for the still-frame mode is given on page 324 of the Progress Report, beginning on paragraph 4 of column 1.