

# 8mm Sound Film: A Professional News Medium for Television

By RICHARD B. RAWLS

**8mm single-system sound-on-film techniques have been adapted to the production of on-the-spot news film inserts for TV programs. Available equipment has been used and new techniques developed. Advantages of the professional use of 8mm sound film are cited with particular reference to economy. The use of 8mm sound film to supplement existing methods of producing TV news programs is recommended, and the suggestion is made that such use would tend to stimulate development of equipment in the 8mm field.**

## Introduction

Television as an industry is still the baby of the entertainment family and needs continuing parental guidance from its elders to bring it up into more productive manhood. The author, in his capacity as day-to-day operating manager of a TV station in Phoenix, Ariz., has recognized that new techniques for improving the tools for the medium must be approached with imagination and enthusiasm. Costs for 16mm, single-system, sound-on-film TV news film work are quite high, and thus any new approach which will tend to reduce these costs should be given serious consideration.

This paper discusses the author's experiences and observations in the use of 8mm sound film for news work at KPHO-TV in Phoenix. Rather than an engineering approach, the paper presents a general discussion of the operational performance of 8mm sound film as a medium for day-to-day TV news work on the local station level.

Before the advent of television, all news work was produced with 35mm facilities. With the development of television, news gathering on film fell into two categories: the first was news film for theatrical release to be projected on large screens which employed the 35mm technique; the second was news film to be presented on miniature screens for television which employed the 16mm technique. These categories still exist and, with minor exceptions, all theatrical news film still employs 35mm techniques. Television, however, uses the simpler and less expensive 16mm technique for news gathering. It may be argued that the 35mm technique for theatrical viewing in theaters and the 16mm technique for home viewing on television are equally pleasing to the viewer.

All of us resist change and are inclined to be unwilling to substitute a new technique for one we have been using and consider adequate.

All important techniques in the development of television have been improvements of basic ideas through evolution over a period of time. Improvement of techniques waits only for sufficient demand to provide the motivation for development.

In television at CBS in 1939 we used to say, "Wouldn't it be great if we could ever get a television picture with the quality of a 16mm home movie?" That was in 1939 and, as you all know, great strides in the development of 16mm motion pictures have been made, motivated, I think, by the baby in the family — television. It is not, however, proposed in this paper to compare TV quality to that of a 16mm home movie. Probably due to the known quality of 35mm film and equipment in the early days, television broadcasting employed it first, while 16mm film was dismissed as inadequate.

In 1939, 35mm film facilities were used in television almost exclusively; today 16mm film has all but replaced 35mm film, through a developmental evolution.

8mm should not be dismissed as inadequate. It is almost certain that 8mm will have its day in television, and soon. Papers on the subject of 8mm presented at the Society's Spring and Fall Conventions at Toronto and Lake Placid will stimulate the interest necessary to create the demand to get engineers and industry working together to produce a simpler and more economical film technique for television. (See the August, 1961, *Journal*, pp. 581-627, for 14 papers on the 8mm sound film.)

It would seem that the time we are devoting to the development of the 8mm field is indicative of the need to give this matter our serious consideration. Perhaps in several years 8mm will be a tremendous factor not only in television, but in other industrial applications as well.

## Economics

In the initial consideration of the possibilities of 8mm sound film for TV news work, the average chief engineer will assess it critically from the viewpoint of available equipment and current

quality. The operating manager, on the other hand, may be inclined to place greater emphasis first on the reduction of operating costs, and second on available quality. George McClanathan, Director of Engineering at KPHO Radio & Television, joined in my enthusiasm for 8mm sound-on-film experimental work for TV news. We think we have produced sufficiently good results to justify further development in the field. It is obvious that 16mm film and equipment are much more economical to use than the more expensive 35mm; it also seems obvious that there is a large area for cost reduction in the use of 8mm over the more expensive 16mm.

Early in 1960, when the new Fairchild Cinephonic Eight camera was announced, we consulted Ray Hennessey of the Fairchild Camera and Instrument Corp. to explore the possibility of his firm's experimenting with us on a project contemplating 8mm sound-on-film.

Wide experience with 16mm sound-on-film had made us aware of the savings which could be effected if we could develop the 8mm technique to the point of being an acceptable medium for insertion into our live news programming. While we were fairly certain the 8mm technique would be immediately suitable for news work, we were equally certain that the technique at this stage of development could not be applied to documentary films or TV film commercials.

In considering the savings which can be realized through the use of 8mm instead of 16mm, there are several points to be noted, including: savings in basic equipment such as camera, projector and processor; in accessories, including lenses and tripod; savings in personnel, storage and transportation; and possible savings in raw stock. Although we had hoped for substantial savings in raw stock, this item was minimal due to the added cost of magnetic prestripping.

It should be pointed out that the 8mm sound-on-film equipment used in the experiment was originally conceived as a general consumer product; the pricing was, of course, controlled for this kind of distribution and thus would be less expensive than similar equipment improved and redesigned for rugged professional TV use. The camera and projector we used successfully were originally designed for the amateur, but the small processor is a

Presented on October 3, 1961, at the Society's Convention at Lake Placid by Richard B. Rawls, Meredith Broadcasting Co., KPHO Div., 631 N. First Ave., Phoenix, Ariz.  
(This paper was received on September 11, 1961.)

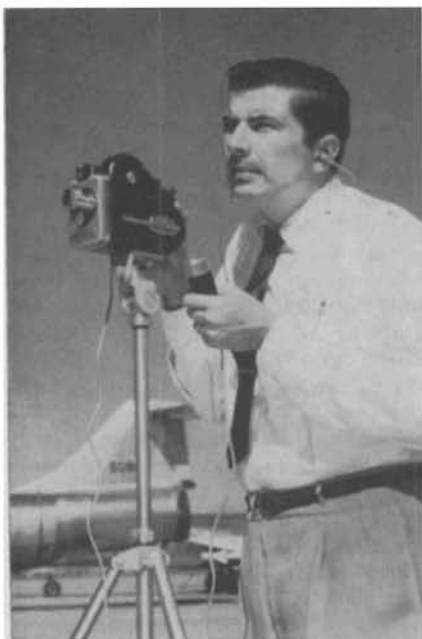


Fig. 1. Newsmen in field with Fairchild Cinephonic 8mm sound camera.

professional piece of equipment originally designed to process 16mm negative.

In all areas of cost, including personnel, the 8mm technique has resulted in something over a 50% savings in the cost of our TV newsreel work. As in 16mm, 8mm does not require prints of the negative produced by the camera. Polarity is reversed electrically, producing a very satisfactory positive TV picture. Due to the limited period of use and future needs for improved 8mm equipment, and in order to continue this technique, it would not be much value at this time to go into the details of cost. It seems more important to discuss a philosophy of operational changes easier to apply to an 8mm approach than it has been to a 16mm approach to news work.

#### Philosophy

The underlying philosophy in using the very small, lightweight, self-contained 8mm equipment is to make a newsmen

a photographer, and not try to make a photographer into a TV newsmen. This statement, however, needs expansion and explanation. Generally, in covering a news assignment with 16mm sound-on-film equipment, it is necessary to send on each assignment a photographer, a sound man, and a newsmen. With 8mm equipment, in many cases, particularly with simultaneous commentary, it is possible to cover the assignment with only one man—the newsmen. Although the advantages of the know-how of the photographer and the sound engineer are lost, much of this deficiency is overcome by the fact that the equipment is very simple and the newsmen can also act as cameraman, sound man, and interviewer. In some instances where it is necessary to have the newsmen interview a personality on screen, it is best to set up the camera first and establish the picture field and the sound levels; then the newsmen can ask an assistant to push the camera button to start the 8mm sound film rolling. With the great strides made in 8mm and 16mm amateur equipment, which is practically automatic in operation, it is relatively simple to train a newsmen to take very satisfactory short sound films which may be inserted into the live TV news program.

It should be emphasized that our experience during the last year does not suggest that 8mm sound-on-film procedures, in the present state of equipment development, are satisfactory for other than limited news work. Should it become necessary to train a newsmen to act as production or commercial film cameraman for television, we would hastily suggest a full crew of 16mm specialists to accomplish the desired result.

#### Technical Equipment

It is not our purpose at this time to discuss all of the 8mm sound-on-film equipment which may be available for adaptation to television; instead, this

discussion will be limited to the actual equipment that was used.

**Camera.** The 8mm sound camera (Fig. 1) is equipped with a fixed-focus 8.5mm  $f/1.8$  wide-angle lens. It is driven by a 12-v centrifugally governed motor powered by a hermetically sealed nickel-cadmium rechargeable battery which also supplies power to the fully transistorized amplifier. A separate stage is provided in the amplifier to permit monitoring sound through a headset. A low-impedance omnidirectional dynamic microphone is used. It has a capacity of 50 ft, yielding 100 ft of processed 8mm film, and runs at 24 pictures/sec. The magnetic soundhead is placed 56 frames ahead of the picture aperture, and sound is recorded on the film simultaneously with the action. The entire unit weighs something less than five pounds and may, if desired, be hand-held during operation.

**Processor.** The Mini-Rapid 16 Processor (Fig. 2) is a relatively small (13 by 13 by 27 in.) and lightweight (65 lb) table-top unit capable of handling up to 400 ft of 16mm or double 8mm film at a single loading. It is a negative processor and requires that, in television, the image be reversed electrically upon projection.

The machine, leaderless and self-threading, passes the film through the developer, the fixer, and two water rinses. The stainless-steel solution tanks are heated electrically and thermostatically controlled to permit processing of films with prehardened emulsions at elevated temperatures. A typical example of processing speed and temperature for Du Pont 931A is 105 F at 6 ft/min.

The processed film is dried by hot air circulated through the drying chamber unit which contains a 600-w heater and a 350-cu ft/min blower motor. A thermostat permits regulation of the drying air temperature between 95 F and 165 F.

Since the equipment processes 16mm film, it is necessary to slit the double-8mm width to a single 8mm width. This is done easily with a small roller-shear slitting tool held between two rewinds (Fig. 3). For accessories such as viewers, tripods, etc., we used stand-

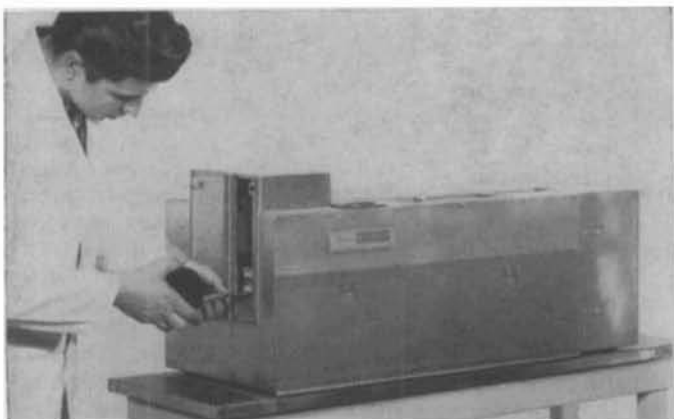


Fig. 2. The Mini-Rapid table-top processor made by Fairchild Camera & Instrument Corp

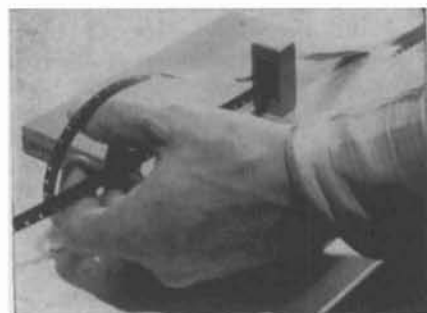


Fig. 3. Double-8mm to 8mm slitter.

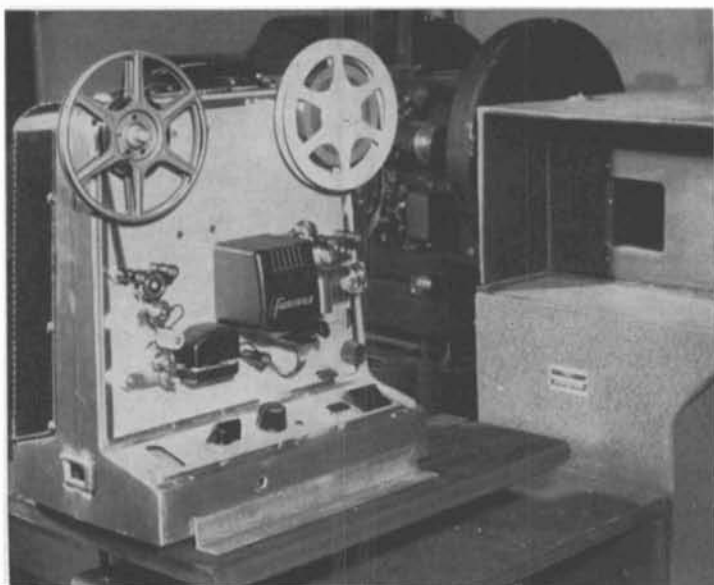


Fig. 4. 8mm projector in multiplex position.

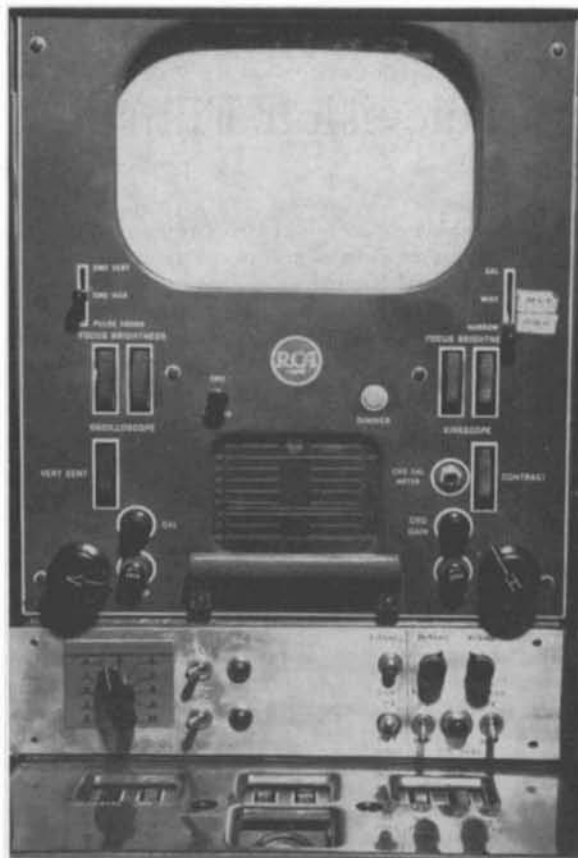


Fig. 5. Remote TV operating position.

ard amateur equipment available anywhere. Available 8mm equipment for TV purposes has not been found entirely adequate; but it seems a safe prediction that as soon as the demand is indicated for sturdier, more precise equipment, it will be provided for the industry just as it was provided in 16mm work.

In passing, chemicals for the developing process should be mentioned. One of our great apprehensions was that we might get a negative with a grainy condition. We managed to produce some very undesirable grain in our first efforts by either using a solution that was too "hot," or by making the mistake of pushing the stock through the processor too fast. By experimenting we found, however, that we could develop solutions and control the speed of transport and temperature to obtain the best possible practical results. The eventual procedure was to use standard darkroom developer and hypo with variable transport speeds, calculated by eye from the test strip coming out of the processor ahead of each roll.

**Projector.** The standard Fairchild Cinephonic 8mm sound projector (see the August, 1961, *Journal*, pp. 590-592) accepts 400 ft of film and is housed in an aluminum die-cast housing. This standard machine has been modified for use in TV broadcasting in the following ways.

(a) Its shutter has been redesigned with a five-bladed shutter to permit projection into a vidicon chain without causing "shutter bar."

(b) A synchronous motor is used in place of the standard motor to ensure

precisely controlled speed. In this connection, miniature timing belts were substituted for the smooth-belt drive to the shutter.

(c) An accessory remote dimmer serves as an operating "gain" control.

(d) It should be noted that the focal length of the lens required is just half that used on a 16mm machine located at the same distance from the vidicon face.

Figure 4 shows the projector mounted in its position at the TV multiplex unit. Cabling connects the lamp and motor off-on and lamp gain control to the remote TV operating position (Fig. 5). At the lower left are the on-off switches and the lamp gain control switch.

While the magnetic system of sound recording offers some problems in connection with prestripping raw stock and provides an undesirable cost factor, we believe that this burden is very well equalized with the facility offered by magnetic tracks. When the newsman returns to the station his film can be reviewed on a preview projector. Should the audio portion be deemed in any way undesirable for broadcast use, it can be erased very simply and post-dubbing of new audio in the form of commentary or music can be substituted. Naturally, in the same way short sequences or terminal points of audio can be erased to suit the news editor's taste.

### Conclusion

The economies available in the use of 8mm sound-on-film are readily evident, and also evident is the considerable amount of development work still to be accomplished by the industry. Today, 8mm sound-on-film techniques cannot be substituted for other methods of producing sound-on-film, but we believe that 8mm has sufficient developmental potential to warrant its acceptance as a supplement to existing services. All of the basic tools are on hand for those who would pioneer as we have done.

**Acknowledgments:** Acknowledgment is gratefully made to Ray Hennessey and Kenneth LiDonnici, Industrial Products Div., Fairchild Camera and Instrument Corp., who contributed technical assistance in the KPHO-TV project; Neal Keehn, General Film Laboratories, for his counsel and laboratory assistance; George McClanathan, Director of Engineering, KPHO-TV; and Frank Fogarty, Executive Vice-President, Meredith Broadcasting Co., for his encouragement in the development of this project.

**Edit. Note:** At the Convention the author showed some scenes taken on 8mm sound-on-film which had been broadcast by the KPHO-TV news department. This was a demonstration of 4 min and 40 sec made by projecting a 16mm transfer from a video-tape recording.