

film. Frequently several plants will be featured in the one film.

Once in the plant, the story is gotten under way by making pictures of the products manufactured there. Then follows a tour of the factory, starting at the raw-material and emerging at the finished-product end. Presenting the suggestions which have been put into practice at their respective locations in the plant's manufacturing process tells the story in simple continuity.

In addition to illustrating the value of the employee suggestion system, this format is more interesting than one in which the film hops from one suggestion to another for the sake of the suggestions themselves. This type of movie also serves to increase viewer knowledge of the products manufactured by the entire Remington Rand organization.

Employees as Actors

Plant personnel are used as actors, dressed the way they are on the job. The entire project is handled by one man: direction, photography, cutting, timing,

script writing, sound recording and eventually showing the films in supervisory sessions. One of the vital points is to be extremely careful not to disrupt plant production too much when shooting. By operating this way the photographer is far more popular in the plant than if he came in with a crew and started rearranging production lines and equipment.

This hit-and-run technique has other advantages. These films are shown to plant supervisors, a highly critical, informed and vocal audience. If the job were too polished, the photographer could be accused of frosting the cake.

To avoid the drabness of showing one improvement idea after another, an attempt is made to weave the suggestions story into a yarn by telling something about the location, the people, the products and the production processes of each plant, plus anything else that helps to create audience interest. Then, in the course of a thirty-minute meeting of plant supervisors, they may be shown films of three or four of the company's distant plants. Thus they may see the final assembly of

products for which they have been making parts for years. They see people they have written to and talked with over the phone for years but whom they have never met. They get a better picture of the company and its size. They see the benefits of the Employee Suggestion System and pass their enthusiasm along to the employees.

Here as in many other companies the maker of low-cost movies in business is doing an indirect selling job for the professional. He is getting people in his company conscious of the benefits of audiovisual programs, he is whetting their appetites. The high-quality 16mm cameras, magnetic-optical projectors and the new, faster film emulsions now available have increased the possibilities for business and industry to use low-cost, internally produced training films. Many of these films will be produced by plant photographers and employee camera "experts" who will be opening the door for the professional cameraman to take over later.

Filming for Educational Television

By DAVID W. JOHNSON

The varied subject matter of educational TV programming dictates a flexible approach to filming. The techniques differ from those used in commercial TV filming in that they must meet individual situations as they arise, with no sacrifice in quality. Further, the budget for an educational program is frequently less than one-twentieth that of a commercially filmed program of the same length produced by comparable techniques. The Staff Production Unit of the University of Southern California, Department of Cinema, has produced four series, totaling 44 half-hour programs for educational TV. Some of the unique production problems presented by each of these series are discussed, together with their solutions.

IN THE PRODUCTION of program material for educational television, the producer is faced with two basic problems. First, he should create a product which is of the highest possible quality in both content and technical considerations. Secondly, he must do this within a budget which is ridiculously inadequate for the purpose.

The *content* of an educational program must be presented in such a way that it will first attract, and second, hold the viewer's attention. Historically, television is primarily an entertainment medium, but there is no reason why an educational program cannot also be entertaining, providing the entertainment values do not overshadow or confuse the educational content.

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Many educational programs (too many, perhaps) are set in the "lecture" format. Here the burden of success or failure falls upon a single personality. It is not enough to take an "expert" on a particular subject, put him in front of a camera, let him expound in the same way that he has been doing for years in front of a captive audience in his classroom.

The TV audience is anything but captive — one little flick of the wrist and it is gone. The TV lecturer, therefore, must not only be thoroughly acquainted with his subject, but he must also be a performer. He must have the talent to communicate his knowledge and ideas in a manner which will interest and excite the viewer.

The success of Dr. Frank Baxter's many series seems to bear out this premise. On many subjects Baxter is no scholar, nor even an "expert," and he is the first to admit it. But he is a performer.

He has a personality which can attract and hold an audience.

It is, then, the responsibility of the producers to inject those elements of showmanship which can make an educational program both an exciting and an enlightening experience.

All this must be done within a budget which is frequently less than 5% of what the "competition" is spending for a product of comparable length produced by comparable techniques. The 15 half-hour Baxter programs produced at the University of Southern California, for example, cost less than one *I Love Lucy* show.

Educational vs. Commercial Techniques

From the *technical* standpoint, an educational program must be, at the very minimum, as good as the poorest commercial TV film recording and preferably as good as the best filmed program. The advent of video-tape recording has improved the average picture quality of *commercial* television, but in all likelihood it will be some time before every educational TV station can afford this equipment. Educational stations, therefore, must rely on 16mm film for their recorded program material — either as TV film recordings or as direct film productions. It is generally conceded that an image recorded directly on film is superior to that of an image recorded secondhand from the face of a



Fig. 1. Typical camera setup for shooting to playback, *Musical Forms* series. The lighting is more like that for motion-picture films than for TV.

TV tube. Direct production on film, therefore, seems to offer the greater possibility for high technical quality program material.

The "stop and go" technique of shooting provides the opportunity for retakes if necessary, and the ability to exercise more precise control over such factors as lighting, camera placement, movement and sound recording. These advantages plus the care and precision of the film editing process all add up to a more polished final presentation. Control plus quality are the elements of film-production technique which make it the most appropriate for TV programming.

At the University of Southern California, Department of Cinema, complete 16mm film production facilities are intended primarily for the use of students enrolled in the academic program. Through a sometimes rather hectic process of coordination, these facilities are also made available for productions by the Staff Production Unit. This group is made up of faculty and staff members, already on salary, who are given production assignments as a part of their duties. Under this arrangement, four series, totaling 44 half-hours, have been produced in cooperation with the Educational Television and Radio Center of Ann Arbor.

Filmed-Program Techniques

The first series, produced in the summer of 1955, consisted of 6 half-hour programs called *Musical Forms*, on the subject of Music Appreciation. This series featured the Paganini String Quartet (at times augmented) and its leader, Henri Temianka. These programs were more nearly "films," as they are usually thought of, than any of the later series, simply because the nature of the subject permitted almost exclusive

employment of film techniques in production.

For this series there were no scripts. There was an outline for each program listing the music and, in general, the comments of the narrator. The music itself became the "script." The director, and later the editor, were guided by the scores in determining camera angles and cuts. This permitted a complete breakdown of the 35 musical numbers making up the 6 programs into camera angles which could then be grouped for economy of shooting. This "out of continuity" method of production is pure film technique.

The musical selections, averaging about three minutes each, were all pre-recorded and the film was shot to playback. The musicians, not being thoroughly acquainted with this process, were frequently more concerned with hearing their performance on playback than in maintaining synchronization. As an aid to the editor in correcting these discrepancies and also as a time-saving factor in shooting, most camera angles were shot all the way through each musical selection. The connecting explanatory narration was photographed with synchronized sound after the photography of the musical numbers was completed. The music was recorded in 6 half-day sessions and the photography in 9 eight-hour days — 6 on playback to shoot all the angles on the music and 3 days of synchronized sound with the narrator.

Equipment Used

For this series a 16mm Mitchell with 1200-ft magazine was mounted on a dolly. Twelve-hundred-foot rolls of film were used to lessen reloading time. A majority of the standard motion-picture lighting units were rigged overhead to clear the floor for rapid changes and to allow as much camera mobility as pos-

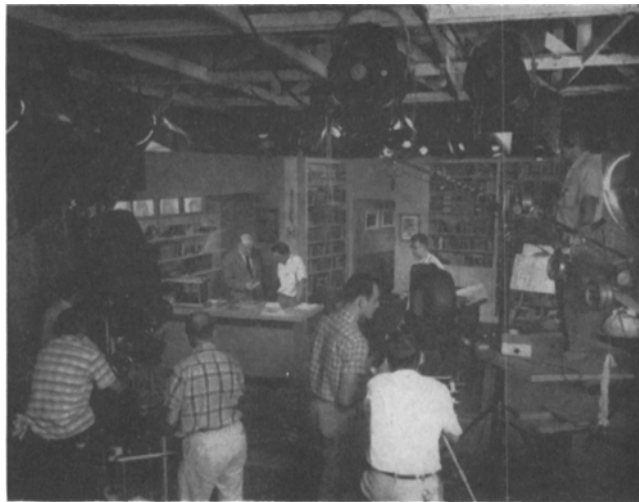


Fig. 2. A moment in the production of *The Written Word*. Majority of lighting units were rigged above the set to facilitate mobility of cameras and mike boom, but typical "flat" TV lighting was avoided.

sible (Fig. 1). A dimmer-bank saved more than enough time in lighting to offset the rental cost of this equipment. Stencil Hoffman S5 16mm magnetic equipment was used for both sound recording and playback. The crew consisted of a director, production manager, three-man camera crew, two electricians, two grips, make-up man and sound crew.

The major problems in this series were really those of scheduling and planning. It was quite a task to try to schedule the services of 15 very busy (and at times temperamental) musicians in an efficient manner and stay within the very limited budget.

In the summer of 1956, the second USC series, *The Written Word*, was filmed. These 15 half-hours on the history of written records with the old master himself, Dr. Baxter, were essentially filmed TV programs. He felt at home before the live TV cameras, but had some trepidation about the prospects of having to break the continuity of his lectures by shooting them in little bits and pieces. We compromised by shooting in bigger bits and pieces, using a multicamera setup. Basically, then, we were using TV methods with the added controls permitted by film techniques. Since we were working with no scripts whatsoever, the decisions — arrived at, incidentally, immediately prior to shooting — as to where to break each lecture into shooting scenes were based on what he was going to *do*, rather than on what he was going to *say*. The number of setups per show ranged from as few as 2 to as many as 12, depending upon the action and the type of graphic material being used. No attempt was ever made to shoot an entire program in a single run of the cameras.

In shooting *The Written Word*, two 16mm Mitchells with 1200-ft magazines

and blimps were used, running simultaneously. One camera was mounted on a crab dolly (which might be called the greatest innovation since the invention of the wheel). This dolly not only provided complete mobility of the camera during shooting, but perhaps more important, saved immeasurable time in permitting rapid and accurate camera positioning for a new setup. The second camera was mounted on a hydraulic tripod which could be locked down to provide a steady fixed support, but which permitted the rapid movement of the camera to the next setup (Fig. 2).

Synchronization

The technical problem of synchronization was solved simply by running both cameras all the way through the program. This meant the use of twice as much film as necessary, but the added expense was justified by the time saved later in the editing process and in giving the editor more freedom in cutting.

The major problem was from the director's point of view. Without a nice little monitor on which to see the action at all times as the camera saw it, the best he could do was to hop from viewfinder to viewfinder, peering past heads, trying to see what was going on.

In general, one camera was used as a medium-to-long-shot camera, primarily to cover any unplanned or unexpected moves of Dr. Baxter. There were never any rehearsals. There was no time for such luxury. This camera was on the dolly so it could be moved if desirable.

The other camera was set up for a medium close-up including both Baxter and whatever graphic material he was using. Unfortunately, since Baxter is a great disrespecter of cameras, he would frequently play to the wrong camera, but the problem was minimized by placing the two cameras as close together as possible. Since only he, and never the director, knew in advance what was in his mind, any kind of red-light cue on the cameras would have been pointless.

Frequently, close-up footage was required of Baxter pointing out various things on charts, pictures and the blackboard. When possible, these inserts were made simultaneously by the second camera. On other occasions these inserts were shot to a playback of Baxter's own dialogue to which he was able to time his movements very well.

This series was shot on one set, simulating his study, on our sound stage at the rate of one program per day. Actual shooting time was about six hours per program. The set was lit by standard units rigged overhead with only the fill lights on the floor. A high lighting level was used so that lenses could be stopped down to $f/5.6$, producing a depth of field which helped to minimize follow-

focus problems created by unpredicted subject or camera movement.

On-Location Production Problems

The Merrell Gage series, *Visits with a Sculptor*, presented some entirely new problems. In the first place, these 10 half-hours were shot entirely on location, primarily at Mr. Gage's studio, some 17 miles from the University.

The working area measured 16 ft square with 13 ft to the rafters. This space was already half filled with pieces of sculpture, large and small, in various stages of completion. By the time the production equipment was added, to say that it was crowded would be a gross understatement. After the first day's shooting, the two-camera technique used on the Baxter series was abandoned simply because of the physical limitations of space. The remaining programs were shot with a single Mitchell for the dialogue and a Cine Special for wild insert footage.

Again there were no detailed scripts, only rough outlines. The nature of the subject dictated that each program had to be shot in continuity, but broken down into sections. One just does not carve a head of Washington out of a block of marble in half an hour. As a result, the opening of the program was made first, another section two or three weeks later, and so forth until the completion of the bust, perhaps two months later. However, shooting for several programs progressed simultaneously.

Working with a single camera and with this type of subject matter at times presented serious problems of continuity. Frequently it was impossible to use the standard film technique of repeating part of an action in a new camera angle to provide the editor with an overlap of action on which to cut. There is difficulty in keeping plaster used in making a mold from hardening, so that it could be wiped off and splashed on again for the benefit of the camera. Also, with no written dialogue, there would have been a double problem for the editor in trying to make sense out of both picture and track. For these reasons, we resorted to what we called the "bridging insert." At the end of a take the cameraman would dash in with the Cine Special and shoot an insert of the material on which Mr. Gage was working, in order to bridge between the previous take and the new setup (Fig. 3). This might have been at the place where it was planned or simply where Mr. Gage, as he put it, "ran out of gas." The technique worked quite successfully.

Shooting in such a confined area presented a number of problems, but finding ways to vary the camera angle to avoid monotony was perhaps the biggest problem.

Lighting, which might have been the major concern, was aided by the pres-

ence of a large north skylight which flooded the room with a soft, diffused light. In order to raise the intensity to 250 ft-c, two 5-light Colortran units diffused by spun glass were rigged and operated through a transformer off the regular house power. A few "babies" were rigged for backlights and kickers, and a fill on the floor completed the rather simple lighting arrangement. This type of lighting gave the soft "skylight" feeling desired and presented few difficulties.

The problems of the sound department were those usually found on location — the mockingbirds in the garden, the neighbor's cat on the roof, and a room designed with little concern for acoustics.

Lecture Series Presentation

The fourth series, currently in release, is *Patterns of Life*. These 13 half-hours deal with the chemical nature of the basic processes of life and are presided over by a young biochemist of Univ. of Southern California, School of Medicine, Dr. Paul Saltman. In this series a rather "offbeat" approach is used to make what is essentially a lecture into something interesting and exciting. Everything about the series was designed around the personality and teaching techniques of the speaker which, to put it mildly, are hardly those of the "college professor" stereotype.

The set was designed simply to provide a rather neutral background for the action. By incorporating a rear-projection screen into the set, we were able better to integrate the presentation of a great deal of the visual material.

From a production standpoint, the two-camera technique was again used. Once again, the outlines only remotely resembled scripts and the crew never knew in advance what was going to be said. With this particular personality, anything could happen, and it frequently did.

Much fuller use was made of the camera movement made possible by the crab dolly. Even with some rather complicated dolly shots which consumed more production time, each program was completed in one day (Fig. 4).

Lighting and sound-recording problems were complicated by the unusual design of the set and the fact that Saltman is 6 ft 6 in. tall, the set only 9 ft high and the trusses of the stage only 2 ft above the top of the set. Rear-screen projection incorporated as a part of the set presented some problems because of the inadequacies of space. Lighting balance and the elimination of hot spots on the rear screen were considerably simplified through the use of a Polaroid camera. By shooting Polaroid stills of each setup involving rear-projected slides, we were able to immediately see any discrepancies between the intensity



Fig. 3. On location in sculptor's studio for *Visits With a Sculptor*. Emphasizes compressed nature of production area. While the author shoots an insert with the Cine Special, the Mitchell is set up for the next dialogue take.

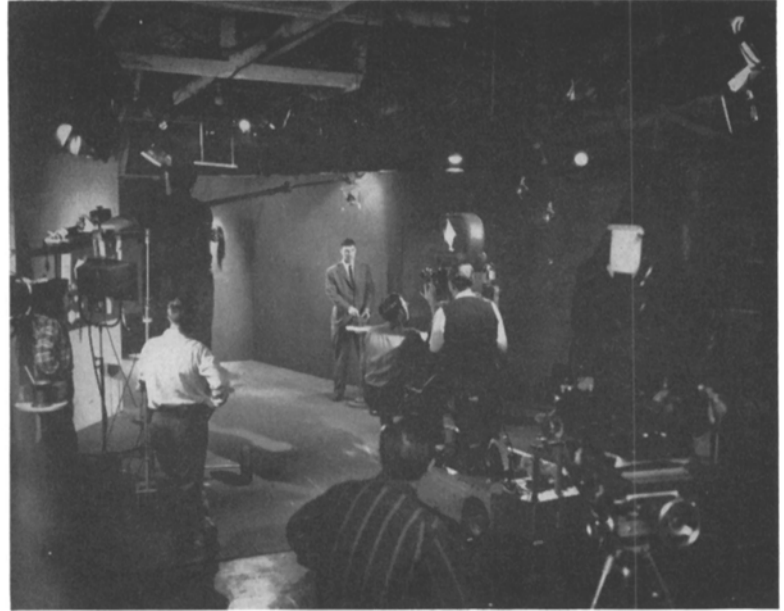


Fig. 4. Preparing for an involved dolly shot for the *Patterns of Life* series. The crab dolly permitted complex camera movement without loss of valuable production time.

of the image on the screen and the foreground illumination and could make adjustments in the lamp intensity of the slide projector to compensate. This technique also showed up any unevenness or "hot-spots" in the projected image on the screen.

The relative importance of sound is frequently underestimated in television. The unsightly levelier or hand microphone takes much less time and effort than a boom mike or fish pole with its attendant lighting problems and extra personnel. More frequently, perhaps, the advantages of dubbing, in smoothing out and equalizing dialogue and in adding music and effects, are eliminated in the interest of economy. Although at times these procedures seemed like solu-

tions to economic crises as they arose, other steps were taken to circumvent this extreme.

Timing of each program to fit a slot of 29 minutes \pm 5 seconds was another problem. Although this problem ultimately falls into the editor's lap, it is helpful if some sort of rough timing is done during shooting. It is essential to provide the editor with more than enough footage for each program, but not too much more. In spite of the best efforts, one of the sculpture films ended up in a first cut to run 45 min. It was time-consuming to determine what could be eliminated and still end up with a program of the right length and which made sense. Conversely, on a few occasions, the mental editing during shooting

turned out to be a little too inaccurate, and a program ended up two or three minutes short — a little too much to make up with titles. In these cases, it was necessary to shoot more material, which did not help the budgetary problem.

Educational television is a growing concern. With more than 30 stations now on the air with an estimated total audience of twelve million viewers and with the probability of a network within a few years, educational television is a power for good which cannot be neglected. Regardless of the future role of the motion picture, video-tape or TV film recording, the essential elements for the improvement of this important educational medium are significant content, better technical standards and showmanship.