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There are countless ways educators can improve the quality of their educational television offerings. The Guide, planned especially for the television teacher or audiovisual director, particularly those approaching the television medium for the first time, is designed to acquaint the reader with production techniques for effective visuals to accompany television lessons and to suggest production ideas and practices. Though designed primarily for television teaching, these visuals have many applications in any educational situation. Materials and techniques covered include projection materials such as film, filmstrips, slides, transparencies, kinescopes, video tape recordings, and microprojection materials; nonprojected visuals such as posters, all types of graphics, animated cards, maps, charts, still photographs, realia, models, dioramas, and puppets; studio props like easels, all types of display boards (chalk, flannel, magnetic, peg, etc.), transparency boxes, gobos, crawls and drums, and turntables; and finally, special effects inherent in the television medium including electronic, optical, lighting, and audio effects. Information on production, manipulation, and common problems associated with each visual is included. (MT)

CREATING VISUALS FOR TV

A GUIDE FOR EDUCATORS

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A GUIDE FOR EDUCATORS

by James Spear
Production Supervisor
Washington County Closed Circuit Television Project
Hagerstown, Maryland

Division of Audiovisual instructional Service / National Education Association
1201 Sixteenth Street, N.W. Washington, D.C. 20036

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FOREWORD

Among the factors influencing the effectiveness of the TV medium in education, none stands out in bolder relief than creativity. This is especially true when creativity is applied to the design and presentation of materials and resources on television. No ingredient in programming is more essential. Too frequently, educators are lured into producing programs in such volume that quality suffers. This is unfortunate, because in educational TV programming it is excellency, not expediency, that counts.

There are countless ways educators can improve the quality and excellence of their educational TV offerings. These range from simple do-it-yourself techniques costing comparatively little (except a person's time and imagination) to more involved and intricate effects made by manipulation of cameras and studio controls. This publication suggests some of these techniques.

The creative teacher on television, as in the classroom, uses a wide variety of resources for a wide variety of teaching and learning purposes. The TV medium serves as a unique vehicle for maximizing and transmitting visual materials and is ideally suited to enhancing their use for a teaching purpose. Because of the inherent nature of television, effective visual communication becomes imperative. In view of the substantial growth of televised instruction in schools throughout America, it seems necessary to work toward the more effective employment of the TV medium itself when used as an instructional instrument.

This guide is planned especially for the TV teacher or audiovisual director who is concerned with discovering new ways of making his TV programming more exciting and challenging. It should be of particular help to those who are approaching the TV medium for the first time, either on commercial or educational channels or on closed-circuit installations.

While they are designed primarily for TV teaching (instructional television), the visuals described in this guide should be useful to community organizations or educational institutions planning public information programs or programs of an enrichment nature. They also will be useful to school districts planning in-service programs for their personnel, out-of-school programs for children and youth or general education programs for adults.

The author of this publication, James Spear, serves as production supervisor for the Washington County Schools, Hagerstown, Maryland, Television Project, which has become a national showcase for educational television. His own creative ideas have been much in evidence in the visuals used in Hagerstown's programming and have prompted visitors to inquire repeatedly as to whether a source book of these visuals were available. The staff of the Division of Audiovisual Instructional Service, sensing the need for such a recipe book of successful production ideas and practices, prevailed upon Mr. Spear to compile this handbook. It is our hope that this handbook will encourage the reader to experiment on his own with these and other approaches and, in turn, share his findings with others.

It should be recognized that the use of a large number of visuals in itself does not guarantee effective programming. The message is obviously of major concern. However, one cannot readily divorce the medium from the message. Both are part of the same continuum. Form and content are equally significant. One must have something to say and say it well. A poor message cannot be made good simply by using good visuals; likewise, a good message can be rendered ineffectual when poorly communicated.

Finally, in using television, the educator should attempt to create new patterns and dimensions—find new ways of expressing ideas and thoughts—and not just content himself with doing the same things on television he would do in the classroom.

HAROLD E. WIGREN
Educational Television Consultant
National Education Association

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I also want to thank William Brish, superintendent of Washington County Schools, Hagerstown, Maryland; T. Wilson Cahall, assistant superintendent of Washington County Schools; Robert Lesher, coordinator of the Washington County Closed Circuit Project; and George Ropp, supervisor of televised instruction of the Washington County Closed Circuit Project. This publication would not have been possible without their advice and consent.

I wish to acknowledge especially the many TV teachers of the Hagerstown Project who have contributed to the practices described. I also wish to thank them for giving generously of their time in cooperating with Mike Cozzoli who took photographs and for making their equipment available to Jim Brown and Ann Spear, who made first-draft drawings. Among these teachers are the following: Mrs. Anna Harris, elementary science; Downs Hewitt, mathematics 8; Mrs. Louise Hewitt, elementary music; Dorothy Hussey, first- and second-grade arithmetic; Frederick Johnson, U.S. history; Jane Martin, core 8; Bennett Murray, seventh- and eighth-grade mathematics; Mrs. Pearl Snively, core 7; Velora Swoger, reading; Robert Wantz, biology; and Joseph Rockwell, third- and fourth-grade arithmetic.

Finally, I wish to acknowledge the encouragement provided by Mrs. Mary E. Spear, visual information specialist, and the assistance provided by my wife, Ann.

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Contents

PROJECTED RESOURCES

Projected resources are the most frequently used of all audiovisual aids in televised instruction. The most useful projected resources for the TV classroom are films, filmstrips, slides, and transparencies for overhead projectors. Special projected resources include microprojectors, the Cellomatic, and filmographs.

Equipment for using all these resources is not always available at TV stations. Before choosing any projected materials, it is wise to check first with the station. If equipment is not available at the studio (only equipment for 16mm sound film and 2″ x 2″ slides are common), but can be obtained from an outside source, the teacher should bring the equipment to the studio and test the material on a studio camera before deciding to use it.

Since all projected materials require special lighting, they are shown more effectively from the projection room than from the studio itself. If the materials can be shown only from the studio, they should be tested in advance on camera to insure the best possible results while broadcasting.

A discussion of kinescope recording is included in this section. A discussion of video tape recording, although it is not a "projected resource," is also included, since, to a great extent, video tape recording is replacing kinescope recording.

Films

Specially valuable for TV teaching, motion pictures supply action difficult to produce in the TV studio because of time, space, talent, budget, or equipment limitations. Motion pictures also rank high as good visual aids for teaching because they record events for future use as they happen—events difficult or impossible ever to duplicate. As educational tools, motion pictures attract attention, influence attitudes, motivate interest, convey information, and increase retention.

Motion picture film, with or without sound, is commonly used in three sizes: (a) 35mm, (b) 16mm, and (c) 8mm. Most TV stations have facilities for projecting 16mm film, and a few are equipped to handle 8mm silent film. Motion pictures of local events taken by the teacher himself or by his class as a project can be shown on 8mm film.

But not all motion pictures, including those taken by the teacher, are of usable quality or of suitable content; all films should be previewed at a TV rehearsal program before use on television. To check for quality, make sure the images are sharp and of proper contrast to project well on television. The subject matter of the film should be apparent and the approach interesting; the material should be handled with integrity; triteness of content should be avoided. Because commercial advertising is to be avoided on educational telecasts, all sponsored film materials must be cleared with the TV station before using.

Motion pictures may be used as a complete film, from opening to closing titles. However, most adaptable to televised instruction is the film clip, a portion of a complete film. Film clips may be shown with sound or shown silently, with the teacher or guests providing "live" narration. If the sound is to be provided live, the text should be rehearsed before the telecast, with the teacher or guest following the film on a studio monitor.

Film clips make effective lesson openers and lesson transitions. As openers, they set the scene, orient the audience, and establish the mood of the telecast. As transitions, they bridge gaps between segments of a lesson. For example, a film clip of an airplane flying over the Alps can serve as a transition from a core teacher on one set in the studio to a guest from Switzerland in another part of the studio. Film clips also are important teaching tools. Through time-lapse photography, for example, a film clip (or montage) can show changes in successive stages of biological development, demonstrable in no other way.

A vast stockpile of 16mm educational films exists for the TV teacher who wants to make use of motion pictures as an audiovisual teaching aid. Films on every subject imaginable have been produced by private associations and industry, government agencies, and independent producers. Many are designed specifically for use by a teacher. Some are available without charge; others may be rented for only a small charge. Written permission *must* be obtained from producers before any film, or segment of a film, is used on television. Policies vary from one film producer to another, but most require clearance for TV use—some two weeks in advance of broadcast date. For lists of producers of films, consult your AV specialist.

Filmstrips

Filmstrips are a continuous series of still pictures on 35mm film stock, each containing from 10 to 100 pictures or frames, with the average filmstrip, 25 to 30 frames.

Each frame of a filmstrip should be horizontally composed to fit the 3:4 (3=vertical; 4=horizontal) TV screen proportion, and the subject should be well centered in the frame, with an ample margin around it.

Most filmstrips have captions on almost every frame. If, as is likely, the type is too small or too low on the screen to read, the projectionist should focus the frame so that no portion of the type is visible to distract the viewers.

Although filmstrips are not easily edited, if the teacher decides to skip one or several frames, plans should be made with the director to focus on another shot while the frames to be skipped are run through.

Filmstrips are projected on a filmstrip projector or on a filmstrip adapter on a $3\frac{1}{4}''$ x $4''$ lantern slide projector. Most filmstrip projectors show filmstrips and $2''$ x $2''$ slides.

Since equipment for showing filmstrips is not always available at a TV station, a teacher should check with the station before planning their use or supply his own projector. If the teacher supplies his own, the filmstrip must be shown in the studio where the picture is picked up live off the projection screen by the studio TV camera.

Slides

Slides are commonly used in three sizes: (a) $2''$ x $2''$ (35mm slides), (b) $3\frac{1}{4}''$ x $4''$ (lantern and Polaroid slides), and (c) $4''$ x $5''$ (glass slides).

No matter what size slide is planned for use, the following criteria for their selection and preparation should serve as guides:

1. Black-and-white slides should be selected whenever possible. Some color slides will transmit satisfactorily over television without loss of definition, but many will not. Good light–dark contrast is necessary for details to stand out.

2. The dimensions of the TV screen should influence the choice of slides. Pictures should be horizontally composed to conform to the 3:4 ratio of the TV screen.

3. The most important item in a picture should be centered on a slide, and a 10 percent allowance should be made for marginal loss around the picture area. (See Fig. 1.)

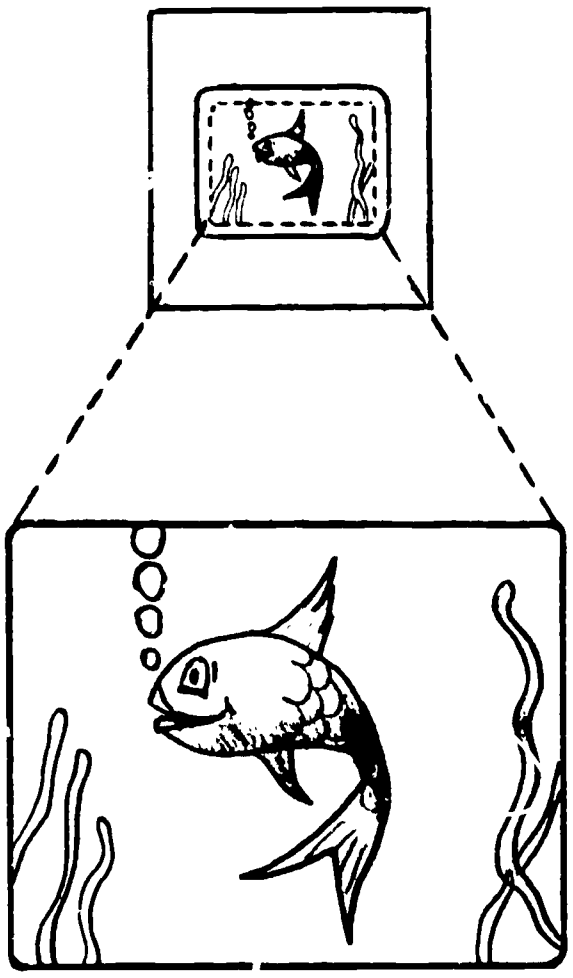


FIG. 1. A horizontal y composed, well-centered 2" x 2" slide.

4. Printed matter on a slide usually should be avoided. If printing is used, the height of the letters should be at least one-quarter of the height of the safe area; the letters should be well centered; and the letters should cover no more than three lines.

If slides are to be shown in a series, to keep "motion" on the screen, the slides should be shown at a rapid rate.

2" x 2" Slides

The most widely used slide in television is the 35mm film transparency mounted in a 2" x 2" frame. Most TV stations are equipped for showing these slides. They have a slide projector which is focused directly on the face of a camera pickup tube or focused through a multiplexer. A multiplexer allows several film or slide projectors to use one TV camera. The safe area on a 2" x 2" slide is 5/8" x 7/8". (See Figs. 2 and 3.)

Before mounts for slides are chosen, the TV station should be consulted regarding their preference. Some projectors will not take metal mounts; they fit too tightly in the slide holders and will tear or bend when the projectionist tries to unload the projector. Other projectors cannot use the cardboard mounts; they fit too loosely in the slide holders and may not stay in place. Most generally usable are glass-mounted slides with edges bound in tape.

Advantages in using 2" x 2" slides include the following:

1. The teacher can make his own slides with a 35mm or Polaroid camera.

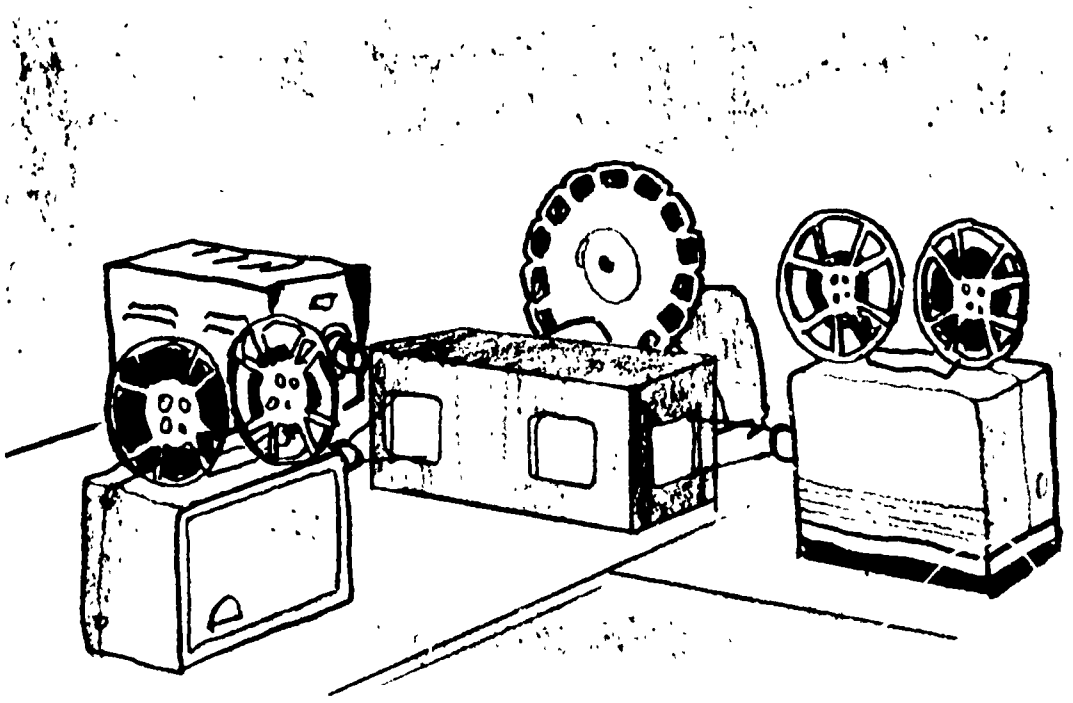


FIG. 2. A multiplexer permits several projectors to use one TV camera.

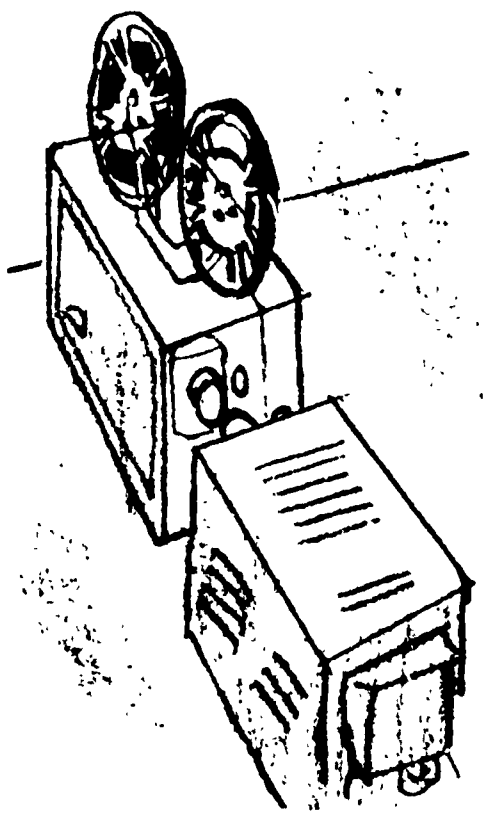


FIG. 3. A projector focused directly on the face of a camera pickup tube.

2. The teacher can leave the slide on the screen for as long as necessary, for examination and explanation.

3. The teacher can edit a sequence of slides to add new material or to take out old material.

4. The teacher can arrange the order of a sequence to suit the material or the audience.

The TV teacher can help the TV projectionist do a better job on a telecast by doing the following:

1. Thumb-dotting the slides by placing a sticker in the lower left-hand corner of each slide to keep the slides from being shown in reverse or upside down.

2. Numbering the slides in proper sequence on the thumb dots, and, as an added check, stacking the slides in order and drawing a diagonal line across the top edge from the first slide to the last. (If the line is broken, the projectionist knows that a slide is out of sequence.)

3¼″ x 4″ Slides

3¼″ x 4″ glass slides (standard lantern slides or handmade glass slides) have long been the standard size slide used for projection in schools, museums, and other institutions of learning. Many institutions have accumulated a sizable library of these slides over the years from which they can draw.

3¼″ x 4″ slides are popular principally for two reasons: the surface area is larger than a 2″ x 2″ slide, and the 3¼″ x 4″ slide can be made easily by hand. However, this slide presents a problem for use on television: most TV stations do not have the equipment necessary for its use. The teacher would do well to check with the studio before planning to use 3¼″ x 4″ slides. A regular portable movie screen or a rear-projection screen picked up on a live camera in the studio is also needed. Care must be taken to light the teacher and the set without any light falling on the screen. The safe area for the 3¼″ x 4″ slide is 2½″ x 3¼″.

Handmade 3¼″ x 4″ slides can be drawn on clear glass, etched glass, carbon paper, and smoked glass. They also can be made by cutting silhouettes and by using translucent materials and Polaroid transparencies.

Drawing on Clear Glass. Before a design is drawn on clear glass, the glass should be washed, rinsed, and dried thoroughly to remove all traces of grease film. The glass should then be kept free of fingermarks.

A design can be traced onto glass with India ink, a china marking pencil, a felt-tipped pen, or even a ball-point pen. Ink will adhere to the glass better if it is coated with shellac, colorless lacquer, glue water, or a gelatin-water solution. Slides may be purchased already coated.

To preserve the slide, the drawing should be covered with another clear glass slide, and the edges should be bound with tape.

Drawing on Etched Glass. An etched slide is a piece of glass that has been frosted on one side. The slide should be placed over a drawing to be projected with the frosted surface up. The design can be traced with a medium hard pencil and then inked in; special slide crayons can be used in place of ink. The etched side of the slide should be covered with a piece of clear glass and the edges bound with tape.

Special care must be taken with etched glass slides to prevent the ink from spreading over the rough surface of the glass beyond the edges of the design.

Drawing on Carbon Paper. To draw on carbon paper, a thin sheet of 3¼″ x 4″ cellophane is placed between a sheet of carbon paper that has been folded in half to insure a sharp image on both sides of the cellophane. Drawings should be made with a stylus or a hard, sharp pencil. The finished slide should be placed between two clear glass slides, and the edges should be bound with tape.

Typewritten slides may also be made using the carbon paper technique, but because of its size and style, typewritten print does not show up well over television, even when enlarged by projection.

Drawing on Smoked Glass. Probably the easiest to make but the least used 3¼″ x 4″ slides are those made by smoking a piece of glass. They are made by holding a clear glass slide over a candle flame until one side of the glass is thoroughly smoked. Designs or writing then are scratched onto the smoked surface with

a stylus or sharp pencil. To protect these easily smeared designs, each slide should be covered with a clear glass slide and the edges bound with tape.

When projected, the smoked glass slide will give the effect of white material on a black background.

Silhouettes. Silhouettes can be made by placing a silhouette (2½″ x 3¼″) cut out of a lightweight sheet of opaque paper in the center between two clear glass slides (3¼″ x 4″) and projecting it.

To produce a white silhouette framed in a dark background, the paper frame from which the pattern has been cut should be mounted and projected.

The Polaroid Transparency. Polaroid transparencies can be made in just a few minutes. Steps include the following: loading the camera, snapping the picture, pulling the tab, removing the transparency from the back of the camera and placing it into a small container to harden the emulsion, removing the transparency, and, finally, mounting it.

Two types of Polaroid transparency film are currently available. They both produce a framed black-and-white image area of 2-7/16″ x 3¼″. Polaroid transparency film 146L is a very high-contrast material specifically designed to make slides from line copy originals; 46L is well suited to making slides from continuous tone reproductions.

By reducing the framed image area to the size used for a 2″ x 2″ slide and trimming it to the proper size for mounting, Polaroid transparency film also can be used to make 2″ x 2″ slides.

4″ x 5″ Slides

The 4″ x 5″ glass slide is used in television primarily for rear-screen projection. Transparent slides, usually with photographic backing, are projected through a translucent screen from a projector behind the screen. The projected image shines through the screen and is seen by the TV camera on the opposite side. As a result, the teacher can stand anywhere in front of the background, without throwing a shadow on the scene. (See Fig. 4.)

This technique of projecting transparent photographs makes for more natural and less

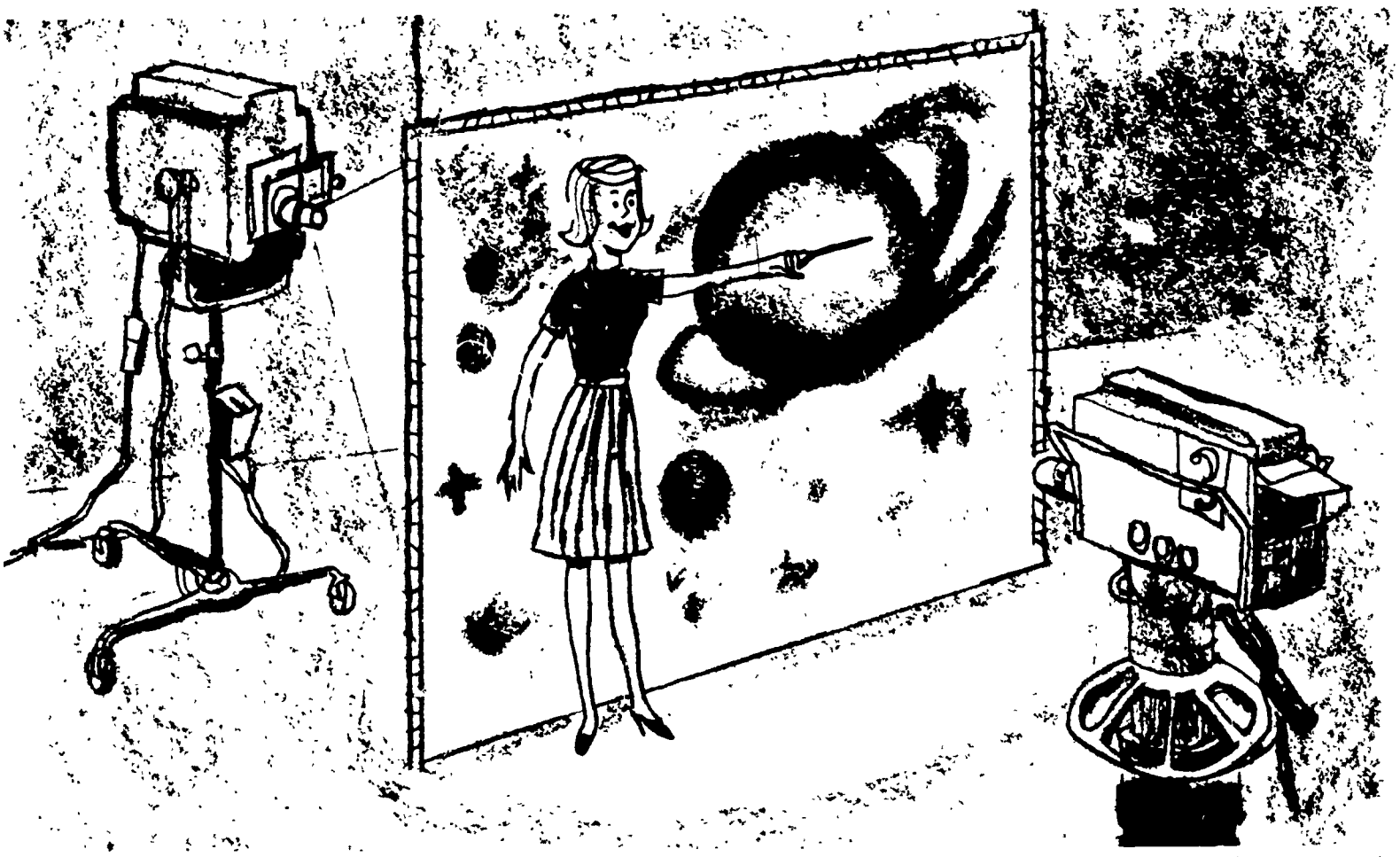


FIG. 4. Rear-screen projection of 4″ x 5″ slides, with the projector at left to the rear of the screen, the screen in the center, and the TV camera at right.

expensive backgrounds than backgrounds that have been built or painted. Sets of glass slides with a wide variety of backgrounds can be purchased or made by hand.

Cardboard adapters can be made for 3¼″ x 4″ slides so they will fit into 4″ x 5″ holders for rear-screen projection. To fill an 8′ x 10′ screen, a distance of 13′ from the lens of the projector to the screen is usually necessary.

A large, commercially made screen is not necessary for rear-screen projection. A small screen is less expensive and may provide a sharper, brighter image. A screen can be made of a large (3′ x 4′) sheet of tracing paper or white koroseal.

If only limited space is available in a TV studio, front projection for 4″ x 5″ slides can be used. Any surface can serve as a screen. To avoid casting a shadow, care must be taken by the teacher not to get too close to the screen. In any case, the farther away the performer is from the screen, the greater the illusion of reality.

Many TV stations have facilities for projecting 4″ x 5″ glass slides for rear projection. Also, they probably have a file of 4″ x 5″ slides to choose from for use as backgrounds.

Overhead-Projected Transparencies

The overhead projector permits a teacher to stand facing an audience and project transparencies onto a screen large and high enough to be seen clearly. It can be used in the following ways: (a) front projection, with the projector on set; (b) front projection, with the projector off set; and (c) rear projection.

Front projection, with the projector placed in the same scene or set with the studio teacher, is necessary if the teacher himself wishes to manipulate the transparencies or the cellophane roll. The teacher must be shown in adequate light, with little or no light thrown on the screen on which the image is to be projected.

By this method, one camera shows the instructor next to the overhead projector, facing the camera and pointing on the transparency, writing on the roll, or manipulating the cells, with the large image projected on the screen in back of the teacher. Another camera is used for closeups.

Front projection, with the projector off set, is used to show only the projected image on the screen. If the teacher wishes to manipulate the cells on the projector himself, he would be shown on one camera, while another camera in another area would pick up the projected image. The latter area is darkened to allow a maximum amount of light from the projector to fall on the screen without washing out the image. The teacher and the front-projected image, then, can be telecast separately, and the overhead projector is never seen by the viewers.

Rear projection is used if the teacher does not manipulate the transparencies or the roll and is shown standing or sitting next to the projected image. The projected image is then picked up by a TV camera on the opposite side of the screen. Adequate light must fall on the teacher without any light falling on the screen. In this way, the teacher can appear anywhere in front of the screen without casting a shadow.

One camera is generally used in rear projection. The camera can show the teacher next to the screen, and then move in to frame the screen. Should two cameras be used, a second camera supplies a closeup of the rear-projected image. In this case, the floor director manipulates the transparencies and the projector.

A screen for showing transparencies can be made from a translucent plastic crib cover or shower curtain or from a large sheet of tracing paper. A 4′ x 3′ frame for the screen can be made, and the material stretched across the frame. Of course, commercially made screens are also available.

The transparency is a flexible teaching device for showing on television growth and development or the cumulative stages in a process. Life and motion can be brought to transparencies through the use of overlays, the cellophane roll, slip-sticks, masks, and Technamation.

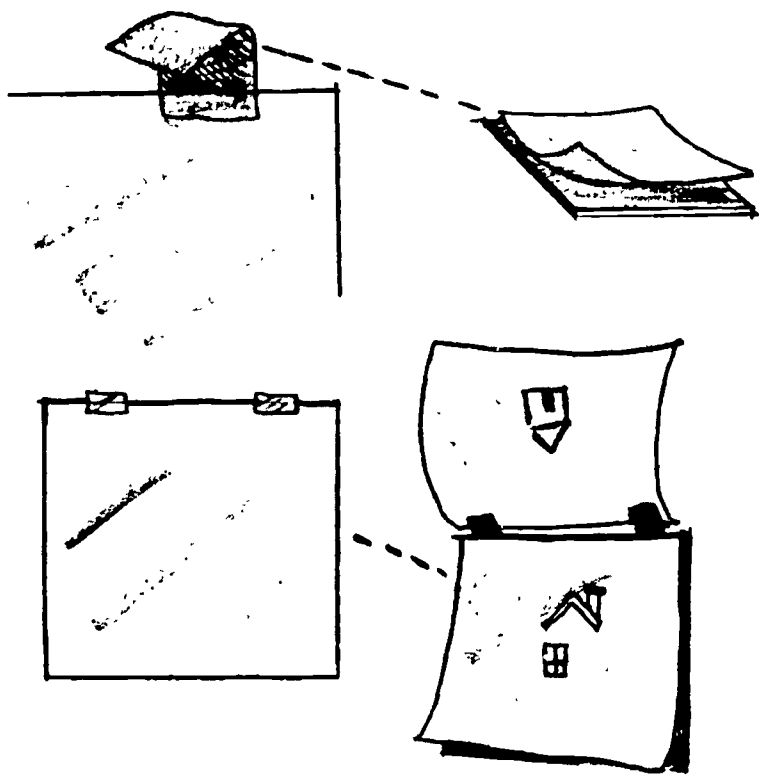
The Overlay

Drawings, figures, diagrams, or notes made on transparent cells often make complicated visual material easy to understand.

A first overlay, or base transparency, shows the first part of a story, the initial step in a process, or the basic position of an object. A second transparency (or cell), placed over the first, presents the next step. For example, to show coal and steel production in the United States, a social studies teacher uses an outline of the United States as the base overlay. Anthracite coal areas form a hinged overlay; bituminous coal areas, the next; and steel plants that use the coal, the last.

Transparencies are easy and inexpensive to make. They are prepared by drawing on acetate sheets, or cells, with grease pencil, India ink, or special acetate ink, or by using the diazo-copy or the photo-reflex processes. The acetate sheets are usually 8½″ x 10″, but they are available in other sizes. Once prepared, the cells are mounted on a cardboard frame for use in an overhead projector or hung by tape on a special transparency easel. Specially designed hinges should be attached to each cell to provide a free-hinging action when mounted and to facilitate the flipping of the overlays. (See Fig. 5.) Finally, the first cell should include two reference marks on opposite corners so that each successive cell can be placed properly.

FIG. 5. Transparencies flipped by means of specially designed hinges.



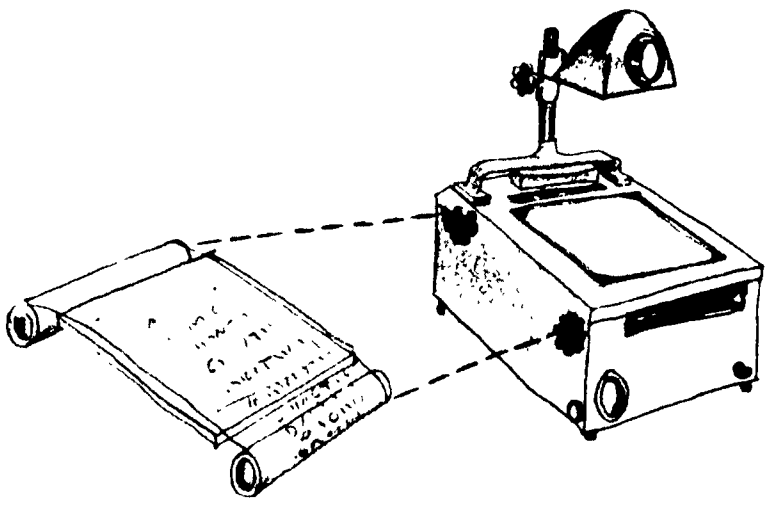


FIG. 6. A cellophane roll for the overhead projector.

The Cellophane Roll

A 100-foot cellophane roll is standard equipment on most overhead projectors. (See Fig. 6.) It provides space for writing on 100 continuous cells (100 individual projections, approximately 8½″ x 10″ each). These cells may be prepared before or during a telecast and rolled into position with a crank.

Slip-Sticks

Slip-sticks are transparent acetate strips of varying widths that can be slid over a cell already on the stage of an overhead projector and then manipulated into any position on the cell.

A slip-stick gives additional motion to a transparency. For example, a slip-stick with a musical note drawn on one end of it can be moved across a musical staff which has been drawn on the base transparency. As the note is played, the note moves on the scale to show how it relates to the sound. (See Fig. 7.) A slip-stick with a small arrow on one end makes an excellent pointer for use on transparencies.

Masks

Masking a transparency permits the TV teacher to disclose sequential information at the proper moment, conceal it if necessary, or leave

the material on the screen to be compared with new information—all on a single cell. The four basic types of masks are: (a) spot masks, (b) sliding masks, (c) accordian-pleated masks, and (d) circular masks.

Spot masks are used to disclose or conceal small areas of a visual. If a series of arithmetic problems is projected on the screen, the answers to each problem can be covered by a spot mask until time for each answer to be disclosed. (See Fig. 8.)

The masking can be made of any lightweight opaque material, such as thin cardboard. Small areas can be masked with masking tape and then stripped off as needed.

If spot masking is planned for use on a transparency, it will work best if the transparency is made on a dark base with the information printed in white.

Sliding masks are used to disclose or conceal in sequence large areas of a transparency. These masks may slide across a visual horizontally, vertically, or diagonally.

In order to insure a straight, smooth pull as the information is disclosed, simple tracks or runners should be placed along the sides of the visual to guide the sliding mask. Tracks can be made by mounting $\frac{1}{4}''$ strips of heavy cardboard to each side of the masked area; then, $\frac{1}{2}''$ strips of cardboard are mounted on top of the $\frac{1}{4}''$ strips to act as retainers for the mask. (See Fig. 9.)

Foldover masks, as far as their effect on the audience is concerned, are very similar to sliding masks. The difference between them is that foldover masks make portions of information appear instantly, whereas sliding masks give the appearance of the raising or lowering of a curtain.

The folder mask is made of a series of opaque strips hinged together with tape, with each strip a little wider than the area to be covered. As information is exposed, the mask folds up on itself. (See Fig. 10.)

Circular masks rotate to reveal information within a circular area. They may be fastened to a transparency with a hollow rivet, a snap fastener, or a thumbtack which penetrates the transparency and the mask and is held in place by piercing a small rubber eraser. (See Fig. 11.)

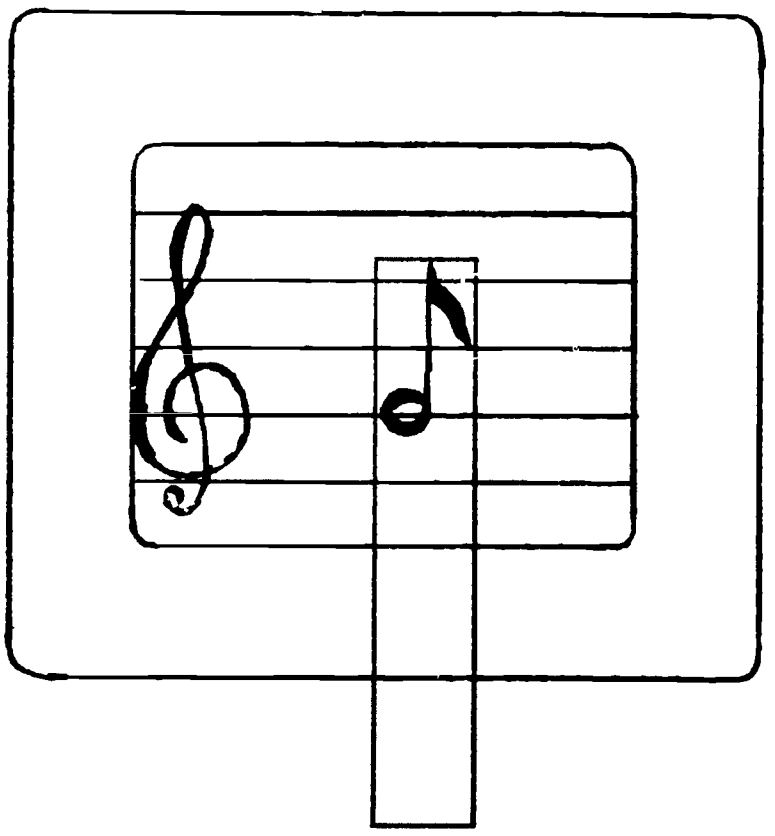


FIG. 7. A slip-stick gives motion to a transparency.

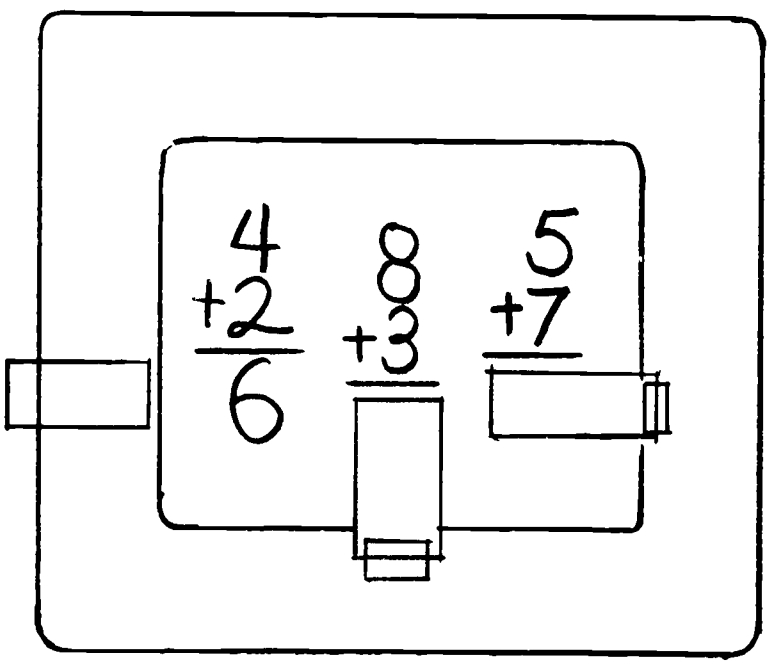


FIG. 8. Spot masks cover answers to arithmetic problems on a transparency.

Technamation

Technamation, or polarization of a transparency, is one of the newest audiovisual resources to create motion without actual movement in what is ordinarily a still visual. Visuals also can be polarized to highlight or subdue specific areas of a transparency or to make dramatic disclosures at the proper moment.

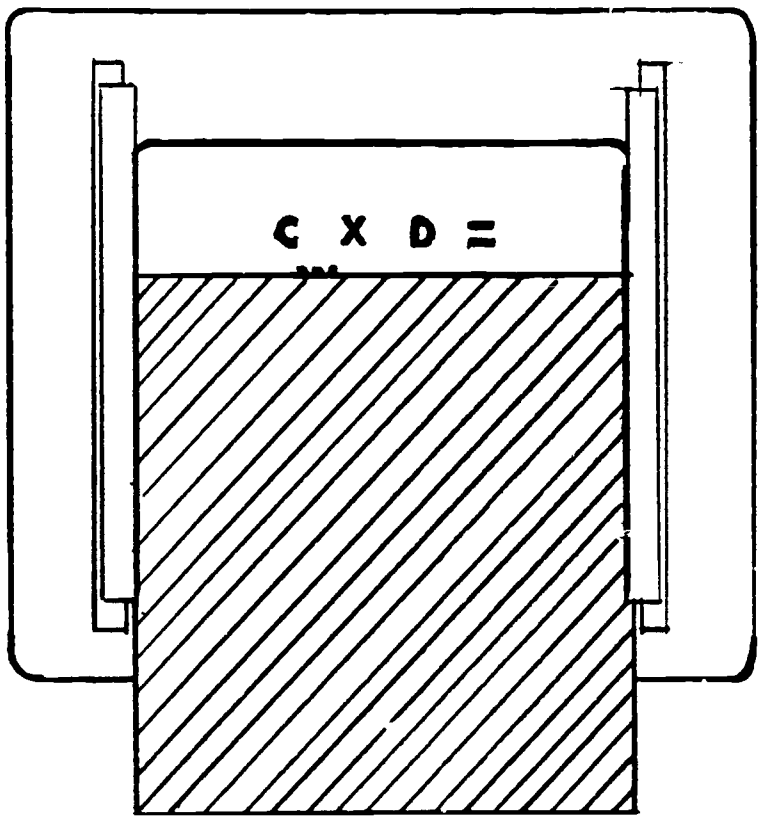


FIG. 9. A sliding mask reveals information on a transparency.

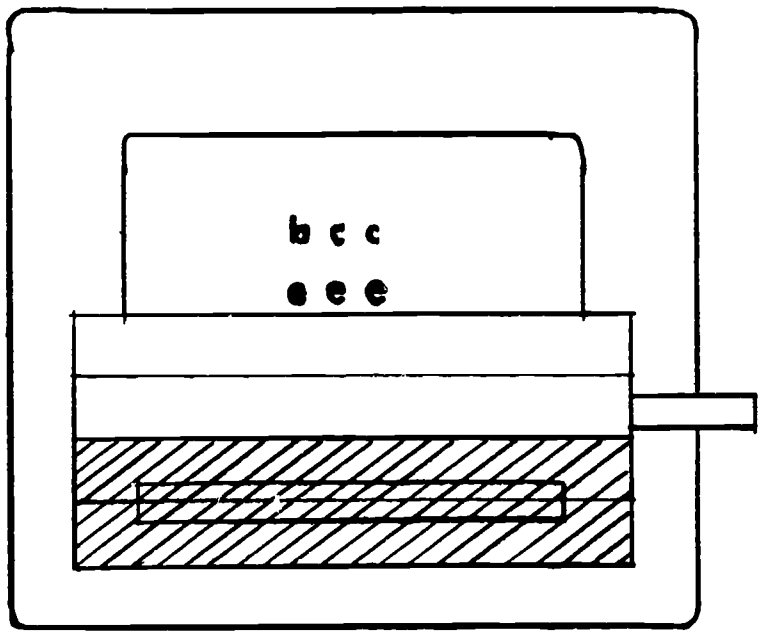


FIG. 10. A foldover mask makes information appear instantly on a transparency.

To create the motion effect on a transparency, cellophane or polyethylene is applied to the visual in the areas where the motion effect is desired. The transparency cell is then placed on the stage of the overhead projector between filters, one filter on the stage under the cell and the other mounted on the lens. The polarized plastic on the lens is rotated to create a predetermined motion.

Different types of motion can be created on the same visual with all the motions going at the same time in their proper ratio. Among the effects that can be created by polarization are the following: an on-and-off blinking motion, an effect of turbulence, a swirling effect, a rotating effect, a flow effect, and a radiation effect.

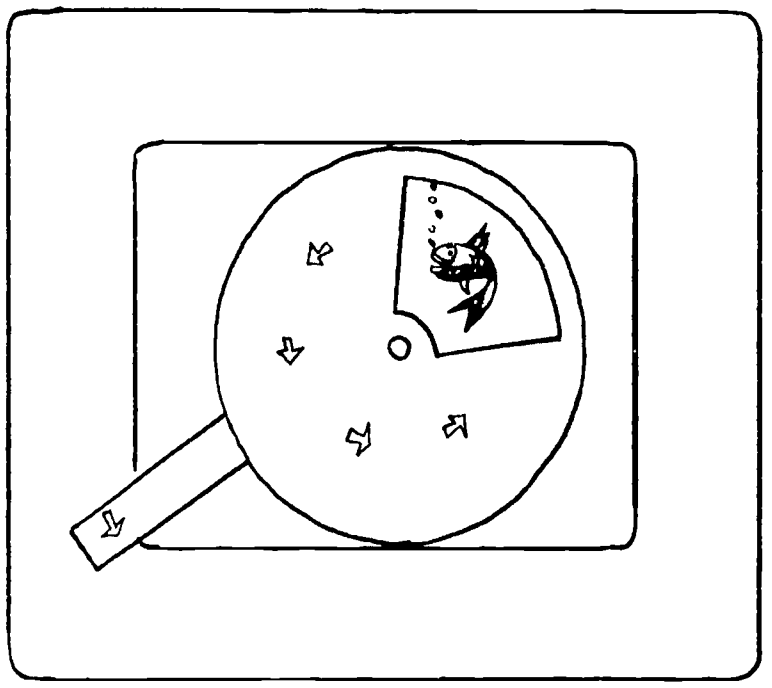


FIG. 11. A circular mask rotates to reveal information on a transparency.

The same general principles for making other visual aids for TV use apply to the preparation of transparencies, including, of course, transparencies to be polarized. (See p. 29-38.) Only the size of lettering on transparencies varies somewhat from other audiovisual aids. Whereas lettering on camera cards should not be less than 1″ in height, on transparencies lettering can be as small as 3/8″ if the transparency is to be projected and enlarged. However, if the transparency is to be used on a light easel and framed from side to side, lettering should be 1″ high. All printed information on transparencies should be brief.

Cellomatic Projectors

A relatively new addition to the long list of audiovisual resources available is an overhead projector called the Cellomatic. This projector differs from the conventional overhead projector in that it has two light sources instead of one. It is also capable of producing most animation and

optical effects previously possible only with high-cost animated film.

The Cellomatic will project either a 3¼″ x 4″ or a 4″ x 5″ transparency, front or rear screen, in sizes ranging from 11″ x 14″ to 9′ x 12′.

Six basic optical effects can be produced by changing from picture to picture: round iris, horizontal wipe, optical cut, horizontal crawl, vertical crawl, and superimposition. A variable speed motor drives both the vertical and horizontal crawls.

Microprojected Materials

A microprojector is used to project microscopic slides onto a screen. Since it has such a limited function, the microprojector is not found in the average TV studio. However, it is so useful in telecasts of biology lessons that teachers should gain access to one, if at all possible.

The microprojector works in a fashion similar to an overhead projector: front projection, with the projector on set; front projection, with the projector off set; and rear projection. However, a much smaller, but brighter, picture is projected with a microprojector than with an overhead projector because the strength of the light source on the microprojector is much weaker than on the overhead projector.

The brightest picture can be best obtained on the microprojector from front projection, off set. The TV camera can get a closeup of a small image so that the microscope slide will fill the entire screen of the TV receiver.

Filmographs

A filmograph is a motion picture of still pictures. A 16mm film is taken of black-and-white photographic stills (usually 8″ x 10″ glossy prints), and the camera is allowed to play on the stills in various patterns of movement. By giving the viewer the feeling of motion in an otherwise still picture, the filmograph technique enables him to study details within a picture in a new and interesting manner.

Camera movement is preplotted in advance over each still, from full picture to a segment of the picture, or vice versa. This is done on an animation or photographic stand by placing each glossy print under glass in order to keep it flat and under uniform lighting. The camera can then move around the picture, as specified in the preplotting, in a northern, southern, eastern, or western direction, depending upon the effects desired. It is thus possible to dolly in and out to give orientation or closeup shots, to pan left or right, or to focus or even defocus.

The usual practice is to shoot the film of the stills first and then add the narration while looking at the picture, i.e., narrate to the picture. The opposite would also be possible, however—i.e., to shoot the picture to the sound track.

Many kinescope recordings are available, free or on a rental or purchase basis. Some foundations kinescope good educational programs as they are broadcast, and then make them available to educational TV stations.

Kinescope Recordings

A kinescope recording is an important projected visual resource. It is a continuous sound film recording of a TV program made while that program is being telecast.

A specially designed 16mm motion picture camera, compensating for the frame differential between the film (24 frames per second) and the TV system (30 frames per second), records the transmitted program as it is received in a TV picture tube known as a kinescope tube—hence the terms *kinescope recording* or *kine*, for short. (See Photo A.)

The kinescope is more economical and easier to make than a direct motion picture. Since a TV program is edited while it is being broadcast, a kinescope of a program saves time and money by doing away with the need for editing

PHOTO A. Foreign students watch a Core 7 telecast being videotaped.

separate sequences of film. Moreover, most studios are not large enough to permit TV and motion picture camera crews to work simultaneously, and, even if they were, lighting requirements for the two types of cameras are not the same.

The quality of a kinescope recording is not yet as good as a live TV broadcast, a video tape, or a telecast of a conventionally made film. However, kinescoping is an excellent method of preserving a TV program for rebroadcast at a later date. And, even more important, since a kinescope is made on 16mm film, the kinescope can be shown wherever a 16mm projector is available, i.e., in schools, churches, clubs, and homes.

Video Tape Recordings

Video tape recording is a newly developed method of recording pictures and sound. Although a projector is not used in video tape recording, a discussion is included here because, to a great extent, video tape recording—especially for TV broadcasts—is replacing kinescope recording.

The video tape recorder uses a magnetic rather than a chemical process to record and retain electrical signals which emerge from a TV camera on a ribbon of magnetic tape 2″ wide. When the same tape is run through a recorder for playback, the information retained on the tape is reconverted from these electrical signals into the original TV picture and sound signals.

Video tape provides a picture of superior quality to a kinescope; it can be replayed immediately without the waiting necessary for processing film; and the same reel of tape can be erased magnetically and reused many times.

Video tape recording gives the TV teacher the opportunity to prerecord a telecast. This enables him to do the following:

1. Judge his own teaching and improve his TV teaching techniques

2. Judge the telecast as a whole, including the quality of the visuals and the pace of the lessons, and edit the tape accordingly

3. Judge audience reaction to his teaching

4. Reduce the pressure of a live presentation, without losing any of the qualities of a live telecast

5. Present guests who cannot be in the studio at broadcast time

6. Repeat a telecast without the necessity of doing a lesson over again

7. Use video tapes of important events or visitors as part of a later telecast

8. Exchange prerecorded lessons with other school systems.

NONPROJECTED RESOURCES

Nonprojected resources useful to TV teachers can be divided into three categories: graphics, still pictures, and demonstration materials.

Graphics include audiovisual aids that require artwork by a studio artist or by a TV teacher. Lettering, maps, charts, posters, and animated cards are considered graphics.

Still pictures include pictures from books, magazines, and other sources that can be used as part of a TV lesson.

Demonstration materials are three-dimensional objects used "live" in the TV studio. Included as demonstration materials are real objects, models, dioramas, and puppets.

Graphics

Before a teacher new to TV teaching can use graphics as part of a lesson, he must consider: (a) the ratio of the TV screen, (b) the size of the visual, (c) the tone of the visual, (d) the problem of glare, and (e) the problem of lettering.

Ratio

All materials for television must conform to the 3:4 proportion of the TV screen. But beyond that, the teacher must be aware of the serious loss of picture on all sides of the TV screen that is created by poor adjustments on some TV receivers. The area within which printed or other matter must be kept is the *safe area.* The total area of the picture is the *camera field.* Information not essential to the total picture—for example, background material—may be included in this latter area.

The one-sixth rule of determining the safe area of a TV screen is easy to understand and a useful guide to follow. If on a card the camera field (usually 11″ x 14″) is divided vertically and horizontally into six subdivisions to form 36 rectangles, each with a 3:4 ratio, the central 16 rectangles formed by this division will be the safe area. (See Fig. 12.)

Size

Visuals may be small enough to handle easily on camera or large enough to use as a background. For example, camera cards that are to be shown close up generally should not be smaller than 11″ x 14″; charts or easels seen in a wide shot with the performer should not be smaller than 27″ x 36″. Whether the visual is large or small, it should *look* simple and uncluttered.

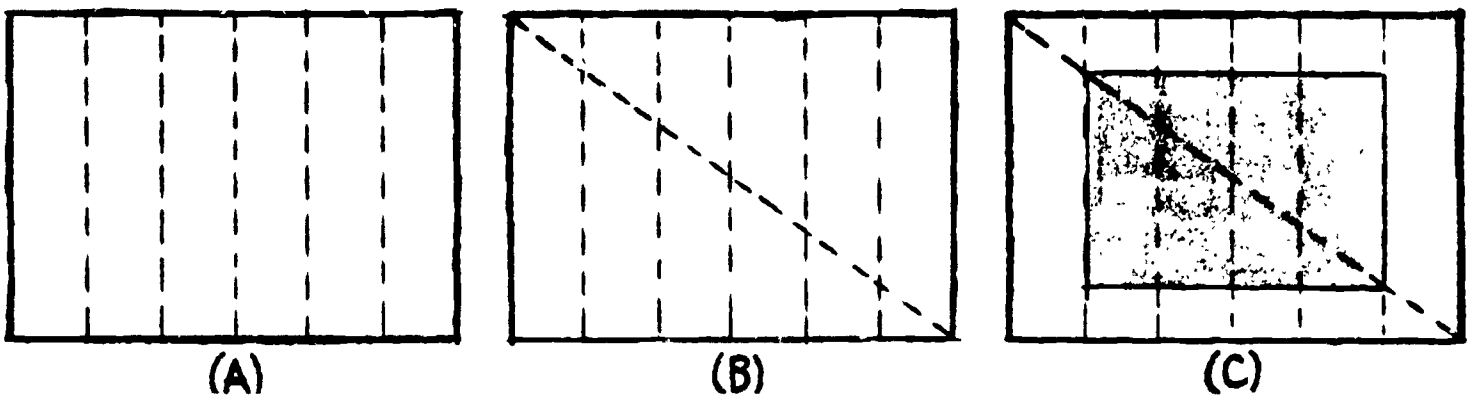


FIG. 12. The one-sixth rulo determines the safe area of a TV screen.

Tone

In television, everything, including all colors, is telecast in shades of gray, varying from extremely dark (black) to extremely light (white). (Purple transmits as solid black; red, dark blue, and dark green transmit as dark gray; yellow, as medium gray; and light blue and light green, as light gray.) While the range of shades is considerable, only five or six tones (including black and white) actually can be distinguished on the TV receiver. This range in tonality is called the *gray scale.* (See Fig. 13.)

FIG. 13. The gray scale indicates the range of tonality on black-and-white television.

In choosing colors for a graphic, there must be contrast, but not too much contrast, between the tonal elements. For example, black lettering shows up well on a yellow card, but black lettering on a white card would create shading problems.

Glare

Whenever possible, a graphic with a matte finish should be used on television. A shiny or glossy surface reflects studio lights and creates a glare problem. If material with a matte finish is not available, tilting the visual on an easel or spraying it with a dulling agent will eliminate glare.

Lettering

Lettering for use on television can either be done by hand or printed. Hand lettering takes less time and may be less expensive.

If a teacher or artist plans to hand-letter for television, no line should be less than one-seventh the height of the camera field. On each card, there should be no more than five lines of copy, with no more than four words per line. The lettering should be bold and clear; simple letters are more legible than decorative letters, although decorative letters are useful at times for creating an effect. (See Fig. 14.)

Words should not be hyphenated. If there is not enough room for a word to be completed at the end of a line, the entire word should be written on the next line. A sentence should not begin on one card and end on another. If there is not enough room for a sentence to be completed on one card, the sentence should be begun on the next card.

Lettering can be done in several contrasting values or tones when a picture from one camera is superimposed on a picture from another camera: for example, off-white lettering on black; black on off-white; black on gray; black on yellow; or white on gray. Also, individual letters or words can be shadowed or highlighted to make them stand out or to separate them from their background.

Many aids are available for teachers who are inexperienced or who lack confidence in their lettering ability. Among them are the following: (a) mechanical guides with which to draw letters; (b) ready-made letters for cutting out, tracing, and sticking on a board; (c) the em-

POOR

AS YOU LOOK AT THIS CARD YOU WILL SEE THAT THERE IS FAR TOO MUCH PRINTED MATTER TO BE CLEARLY READ ON THE

AVERAGE TELEVISION SCREEN.

GOOD

AS YOU LOOK AT THIS CARD YOU WILL NOTE IT IS BETTER SPACED.

THIS VERSION IS MUCH MORE ADAPTABLE TO THE TV SCREEN.

FIG. 14. Lettering for television must be legible.

bos:ograph, a simplified printing-press device; (d) movable type, which is set up and photographed; (e) three-dimensional letters which may be set up on a board to cast a shadow or pinned directly on the board; and (f) typewriters with oversized capital letters.

Animated Cards

Animated cards serve the TV teacher who wants to show movement.

The card in the rear of Photo B shows how a whole may be divided into fractional parts. First, windows are cut from a sheet of antique black 13″ x 10″ railroad board and outlined with poster paint. (These lines are necessary for the fractional parts to be seen clearly on television.) The black card is then mounted with rubber cement on a canary yellow, 14″ x 10¼″

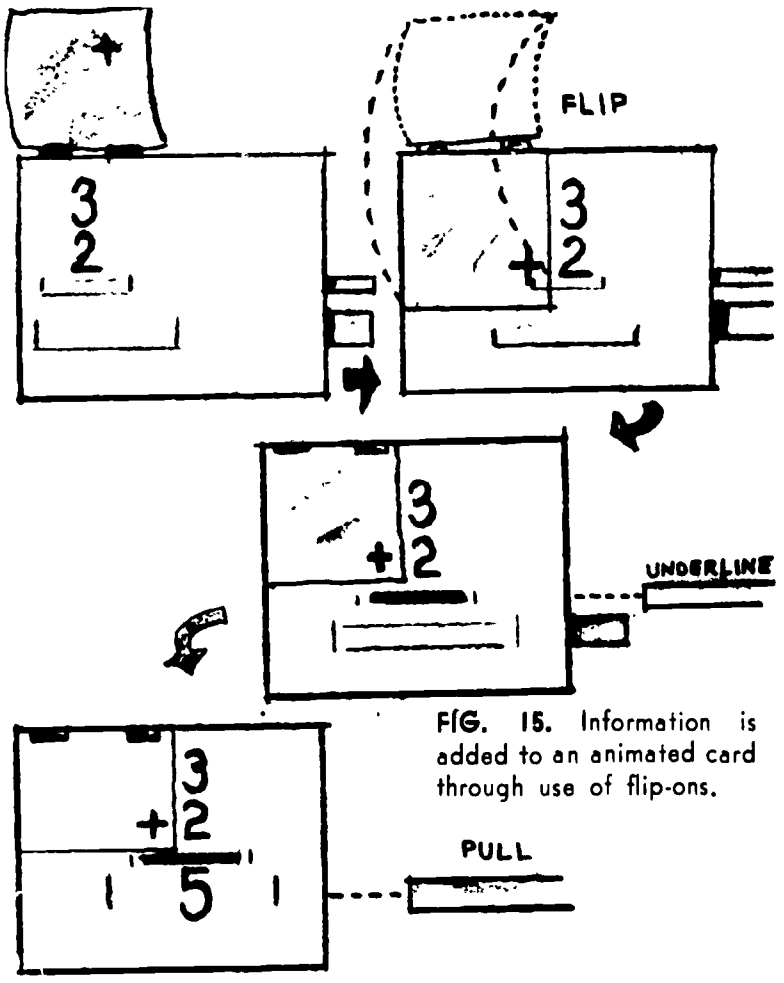


FIG. 15. Information is added to an animated card through use of flip-ons.

showcard. When mounted, the yellow card shows through the cutout windows of the black card. Finally, black pull tabs of railroad board are made a fraction wider than the width and about 2″ longer than the length of the cutout windows. These tabs are inserted between the two cards in the slots created when the cards are fastened together. When the tabs are in position, no portion of the yellow card can be seen. As the floor director pulls a tab (the extra length of the tab is for him to pull without being seen by the TV audience), a horizontal row will seem to grow, as more and more yellow is exposed.

The card in the lower left of Photo B also demonstrates how a whole may be divided into fractional parts. By pulling the tabs, a complete circle of flowers is divided into quarters. (White paper has been inserted under the moving sections to help show how the animated card was made.)

In addition to showing movement, animated cards conceal material until it is needed. This is demonstrated by the card in the lower right of Photo B. The card is made from three sheets of antique black, 13″ x 10″ railroad board. A circle and its radii are painted on a "top" card with white poster paint, and then each radius is cut out. On a second sheet of railroad board, fractions are painted and located so that they will show through the wedge-shaped windows. A slit, corresponding to a fraction more than a radius of the painted circle, is then cut into this card. On a third sheet of railroad board, a circle is cut with a diameter slightly larger than the painted circle. Then, a slit is cut to one half the diameter of this circle, and a tab is attached long enough to extend beyond the edges of the other two cards. This circle is placed between the other two cards so that, as it is rotated to uncover the fractions, it pivots behind the bottom card through the slit that was cut into the card. Finally, the top and bottom cards are fastened together only at the bottom, because the tab must rotate almost 360°. Thus, the circle in the center may be rotated with the tab to expose all of the wedges, without recovering the already exposed material.

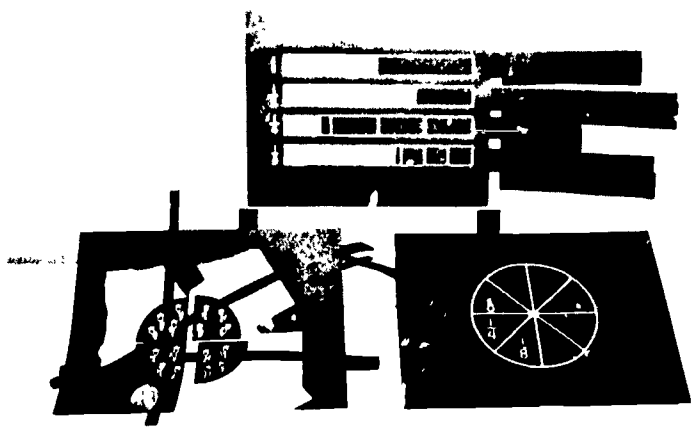


PHOTO B. Animated cards illustrate arithmetical principles.

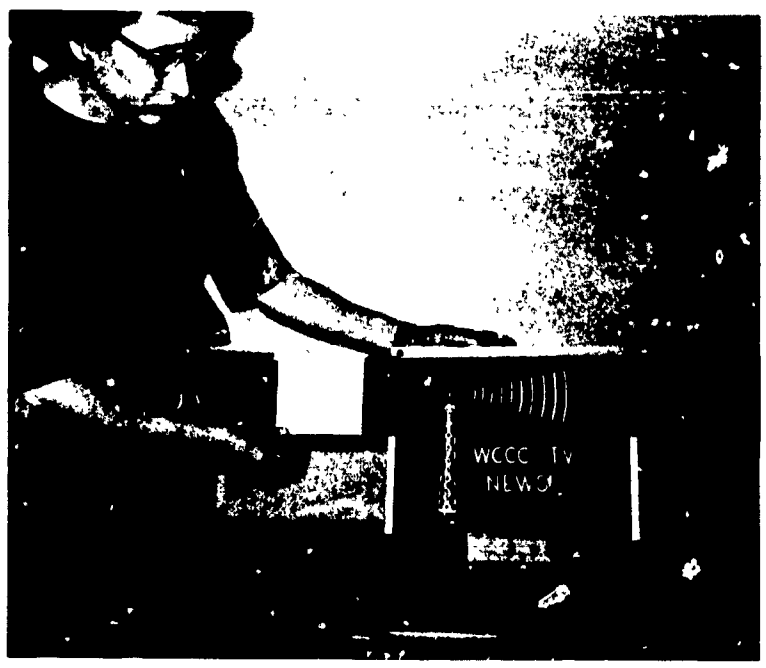


PHOTO C. An animated card shows radio waves.

The animated card in Photo C illustrates another method of achieving motion in an otherwise static card. The card is made by painting the name of the TV station and the tower on a 13″ x 10″ sheet of black construction paper with white poster paint and cutting out the radiations in progressively larger curves. This card is then securely fastened by its corners to a wooden frame. A strip of thin, black cardboard, with squares of white paper fastened to the cardboard at measured intervals, is then passed behind the card. When this strip is pulled across the frame, from left to right, the radiations are alternately blacked out and illuminated, giving the effect of radio waves radiating from a tower.

The animated cards in Photo D illustrate the use of magnets to create motion. The camera cards of the bow and arrow and the ruler are

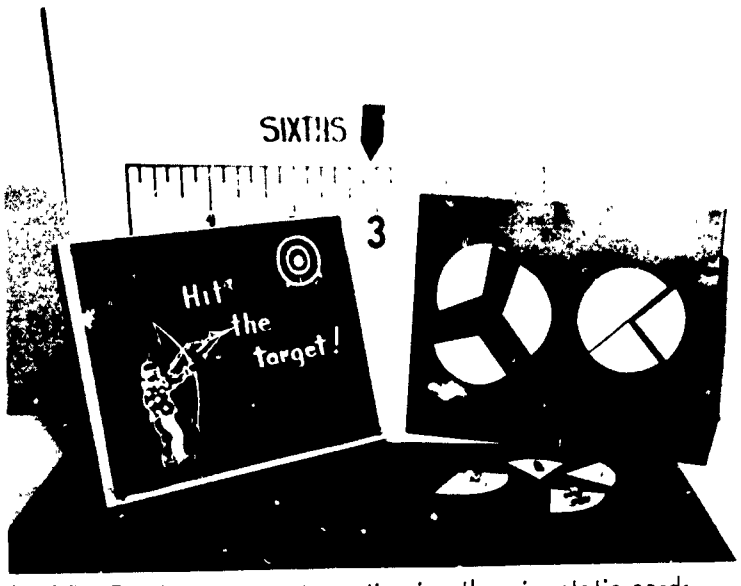


PHOTO D. Magnets create motion in otherwise static cards.

made of lightweight railroad board. Each arrow is mounted on a small magnet, and another magnet on the back of the board holds the arrow in place. The board with the parts of a circle is made of metal. Magnets on the back of the segments of the circle hold the segments to the board.

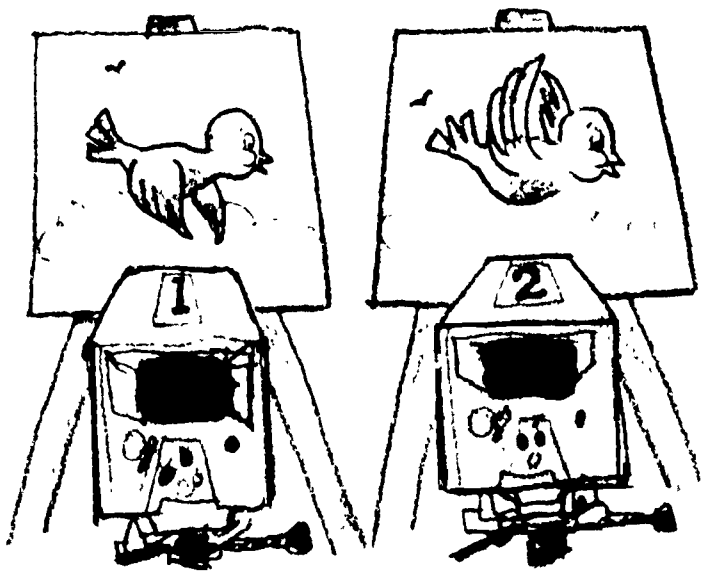


FIG. 16. Switching from one card to another can create limited animation.

The two separate cards in Fig. 16 provide a limited animated effect when each card, on separate easels, is picked up by two different cameras. By switching back and forth rapidly from one camera to another, the effect is created of the bird flapping its wings.

Fig. 17 illustrates another method of adding motion to a static card: A paper fastener attached to the dog is moved back and forth in back of the drawing.

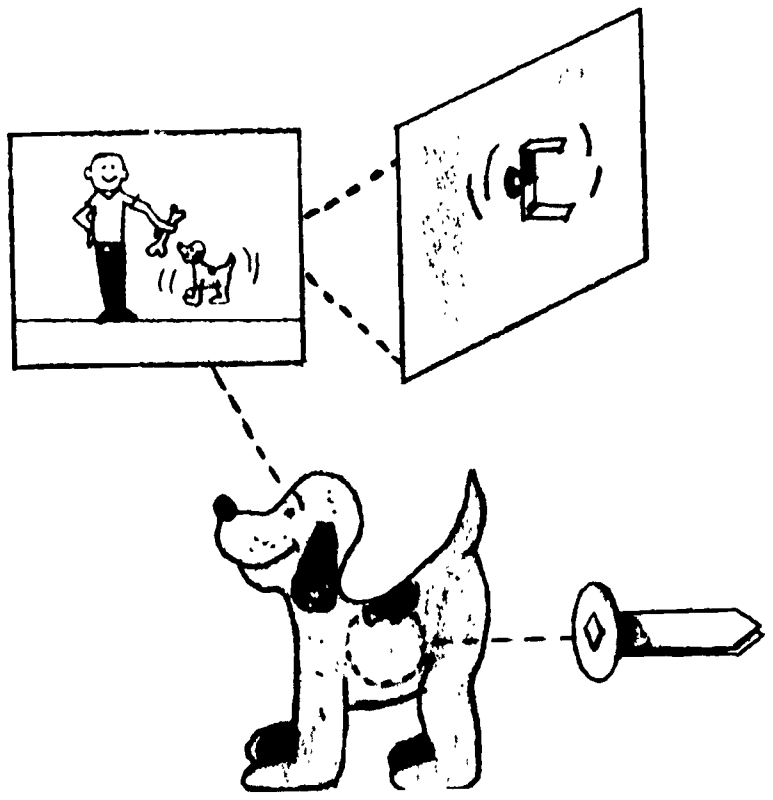


FIG. 17. A paper fastener aids animation.

Posters

Posters are large pictures which tell a quick story. They should be designed to attract attention, to carry only one message, and to be understood at a glance.

For use in TV teaching, posters serve well as openings, transitions, and backgrounds. Panning a series of posters, or one poster, hanging on a wall, is a good program opener or transition. Any appropriate poster or posters are usable for set backgrounds.

Posters are one of the few TV visuals that need not conform to a 3:4 ratio. However, other rules, especially those pertaining to color contrasts, should be observed.

Best sources of posters for use on television are travel bureaus, foreign embassies, and airlines, bus, or train ticket agencies.

Charts and Graphs

Charts are combinations of pictures, diagrams, and numerical and other data designed for the orderly and logical visualization of factual relationships. Graphs are limited to the presentation of numerical data in easy-to-read form.

Charts and graphs made originally for purposes other than television usually contain too much detail and must be simplified. To be used for the most comprehension on television, they must have ample margins and a minimum of words, all in large, bold letters. Like other TV visuals, the material in the charts and graphs should be well balanced. Subjects should be considered in terms of pictures instead of in terms of facts and figures; symbols or representations of the objects they stand for in place of the usual bars and curves provide additional interest.

Inexpensive symbols, covering every subject imaginable, are available to the TV teacher for use in preparing charts and graphs. For good TV reproduction, these symbols may be purchased with a matte finish; they have a pressure-sensitive adhesive backing which makes them quick and easy to use.

These graphic symbols are either opaque and printed on white ledger paper for use directly on camera or they are transparent and printed on a matte-finished transparent plastic for projection. Both types take typing or writing with ink, pencil, or crayon.

Especially designed for making charts and graphs are new matte-surface nonreflective tapes. For those inexperienced in drafting, these tapes are easier to use and more accurate than inking in lines or bars. Even the experienced chartmaker will find them to be timesavers. They are suitable not only for charts and graphs but also for map outlines, borders, plant and office layouts, and even for decoration. (See Photo E.)

Tapes are printed in solid colors or patterns in widths ranging from 1/64″ to 2″. Patterned tapes are available in transparent tape for use on slides or overhead projectors and in opaque tape for use directly on camera. (See Photo F.)

Tape is applied to a chart or graph by unrolling a piece of the desired color and pattern. The tape should be layed about an inch ahead of the starting point and unrolled about an inch beyond the point where the line is to end. The two ends of the tape are then trimmed with a plastic or razor cutter.

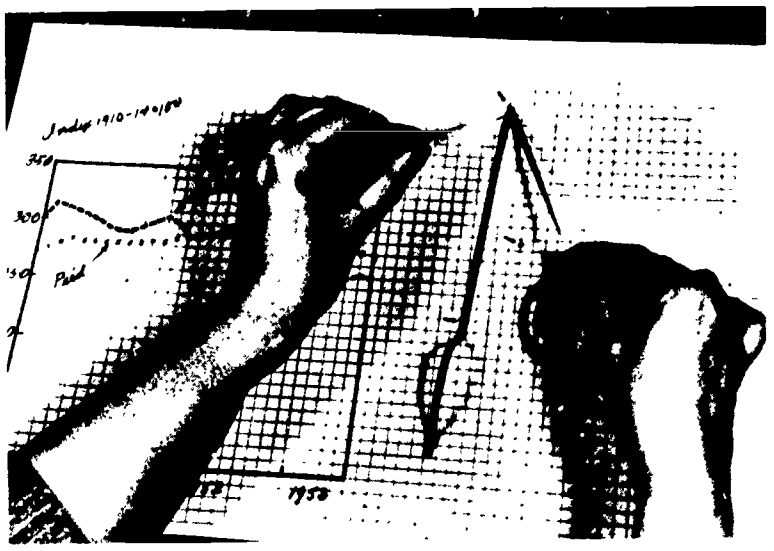


PHOTO E. Tapes are easier and more accurate for making charts than inking in columns or curves.

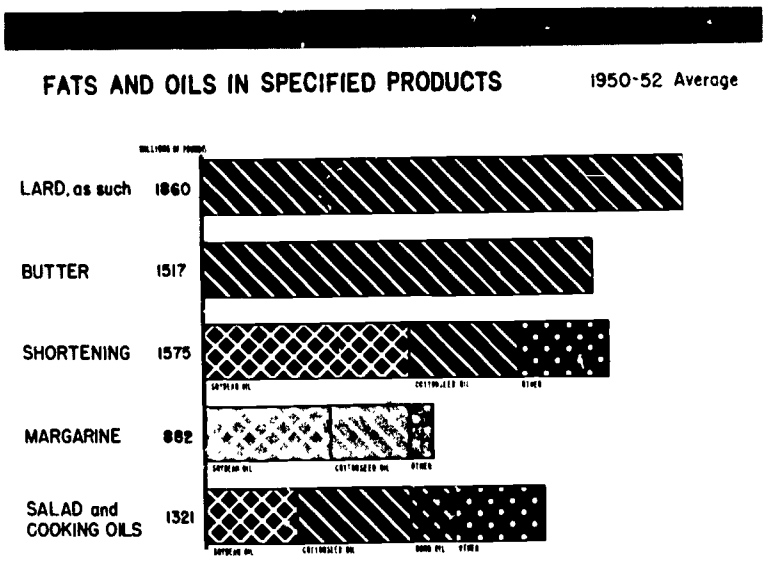


PHOTO F. Patterned tapes have been bordered by a narrow solid-color tape in this bar chart.

If movement on charts or graphs will add to understanding, cutouts or tab pulls or a "strip-tease," in which portions of a chart or graph are uncovered only at the appropriate point in a discussion, can be used.

For TV use, charts and graphs should be mounted on rigid, durable cardboard and should have a semimatte finish. They may be used on an easel off the set or on set, manipulated by the teacher or the floor director.

Maps and Globes

Maps—flat representations of the earth's surface—and globes—spherical models of the earth's surface—provide information on: (a) surface features; (b) geographical locations and

their distances from each other; (c) scientific data; (d) social or cultural data; (e) political data; and (f) economic data.

Commercially made maps are not always the best for use on television. Many maps use colors to distinguish between different areas and features. However, when these colors are reduced to shades of gray on television, they serve no real purpose. In addition, printing on these maps is usually too small to be used on camera. If one of these maps is used and type must be read, it is best to place a label on the map to enable students to read it easily. If folded maps or maps from books or magazines are used, they should be mounted on rigid backing for easy handling. Good maps to use on television are—

1. Wall maps. They allow for motion, i.e., a camera can get a closeup of an area or pan or tilt to another area. One camera can give a full shot of a large area, while another shows a closeup of a specific area on which the teacher wants the students to focus attention. When planning a lesson involving maps, a definite pattern of movement on the map should be chosen so that the cameraman will have no difficulty in following the discussion with his camera.

2. Blackboard maps. The teacher can stand beside a blackboard map and write in names, place on tabs, and shade in areas to add motion and interest to a presentation.

3. Simple outline maps. These maps are drawn on 9″ x 11″ cards and show only essential information. Outline maps can be used with transparent overlays to build up information about the area under discussion.

4. Three-dimensional relief maps. These maps show relationships in the contour of the land. To take advantage of shadows that indicate the difference between mountains and valleys, care must be taken with lighting.

Globes offer the same advantages as three-dimensional relief maps. They come in a variety of sizes and have a variety of surfaces. Since shining-surface globes and transparent globes reflect studio lights, slate-surface and plastic globes are better for use on television. In addition, slate-surface globes can be written upon.

The larger the globe, of course, the easier for a TV camera to get closeups. The more color contrast between different areas, the better the globe for use on camera.

Still Pictures

Still pictures—photographs and illustrations—are used frequently as an integral part of a televised lesson. They are easy to collect and invaluable for showing students what the unfamiliar looks like. Calendars, post cards, magazines, newspapers, travel posters, and textbooks are easily obtainable sources for still pictures.

Most important in a still picture for a TV lesson is appropriateness of material, simplicity of composition, and clarity and sharpness of detail. A picture teaches best when it tells one story or points out only one specific detail. If necessary, time should be taken to show several pictures rather than to point out many details in one picture.

Like other TV visual aids, still pictures should conform to the 3:4 TV ratio. Each picture must be centered on the card-back on which it is mounted. A 10 percent allowance for marginal loss of width and height and a 25 percent allowance for loss around the actual subject content should be made.

Size of still pictures should be governed by ease of handling and viewing. An 8″ x 10″ picture mounted on an 11″ x 14″ card has been found to be best for straight easel-card work. A picture the size of a postage stamp can fill the screen, but the teacher could not point out details in it without obscuring other portions of the picture from view. If a series of pictures are to be shown, all should be approximately the same size.

A dull, or semimatte, finish is best for photographs used on television. Glossy photographs may be used, but only with special lighting or after having been treated with a dulling spray. Dull or glossy, all pictures should be checked to see if they reflect studio lights, and all photographs should be mounted on a rigid

backing to prevent warping under strong TV lighting.

If a color picture is chosen for a TV lesson, the colors must be sharply contrasting so that the main subject stands out from the background. Dark colors against a light background will televise best. Color pictures should be checked on camera before use.

Action can be simulated in a still picture by panning or by tilting within the borders of the picture, a technique which also points out details. To enlarge a picture and to add to the illusion of reality it creates, the picture should be framed through the camera inside its white borders. (For a more complete treatment of this subject, see "Filmographs" on p. 16.)

Mounting Pictures

Once a picture has been selected for use on television, the next step is to choose material for mounting it. A stock which does not warp or buckle and also is durable enough to withstand heavy handling should be selected. Kraft board, showcard board, and other types of medium-weight cardboard are satisfactory. When mounting, a large border should be allowed around the picture so that the TV camera will have ample framing room and so that the picture itself will be less likely to become dog-eared and covered with fingerprints.

Pictures can be mounted permanently or temporarily. Dry mounting and floating are techniques for permanent mounting. Rubber cement, paste, or glue; staples, pins, tacks, or clips; slits and photographic corners, and gummed tapes can be used for temporary mounting.

The dry-mount method is the most satisfactory for obtaining a professional-looking job. By this method, a special dry-mount tissue—a heat-seal adhesive—is sandwiched between the picture and the surface of the mount, and the two surfaces are then literally ironed together.

When a picture is ready to be dry-mounted, a tissue (which can be obtained in rolls or sheets in photography stores) is cut to the exact size of the picture and the mounting board. The picture is then covered with a clean sheet of paper, and, after an iron is heated to about 250°F., the iron is pressed over the surface for about 20 seconds. The heat causes the tissue to affix the picture to the mounting board. A hot press, available commercially, allows for a more even application of heat and pressure than an iron.

Dry-mounted pictures should not be placed under a hot spotlight or in an extremely warm studio. Heat will soften the heat-seal adhesive, and the picture may peel from the surface of the mounting board.

In the floating technique, the entire back surface of a picture is evenly coated with glue and then smoothed onto a mounting board. So that it will dry flat, without curling or ripping, books or other weights should be stacked on the picture while it is drying.

One of the most simple and satisfactory methods for temporary mounting is to place small dabs of rubber cement, paste, or glue in each corner of a picture and then press it onto the mounting material. If the picture is mounted with rubber cement while the cement is wet, a temporary bond will be made. If rubber cement is applied to both the back of the picture and the mounting material, and allowed to dry before mounting, a more solid bond will result.

Staples should be used only in emergencies. They look crude, they make bulges and wrinkles in a picture, and they reflect studio lights. If staples must be used, they should be placed diagonally across each corner of a picture, and not through the picture, so as not to cause punctures or other permanent damage.

Pins and thumbtacks also should be only last-minute measures. The following procedures are best for mounting pictures with pins and thumbtacks without doing permanent damage to them:

1. A thumbtack is inserted in the mounting surface alongside of a picture instead of through it, so that the head of the tack overlaps the picture and holds it firmly in place.

2. A thumbtack is inserted through a butterfly clip, through the eyelet of a small paper clamp, or through a paper clip which is attached to a picture.

3. The corners of a picture are straddled with straight pins to support it on the board.

Diagonal slits and photographic corners are good for mounting photographs or small illustrations to showcard board. Diagonal slits can be cut in the board just inside the point where the corners of a picture fall. Then, the corners can be inserted in the slits without any defacement of, or marking on, the picture itself. Photographic corners serve the same function.

Single-faced or double-faced masking tape of any width can be used for mounting pictures. Any variety of tape is suitable except cellophane, which may reflect studio lights.

If single-faced masking tape is used, a small strip is placed diagonally across the corners of a picture, holding it to the mounting board, or the entire picture can be bordered, with half the width of the tape overlapping the picture and pressed onto the mounting board.

If double-faced masking tape is used, it is applied to the reverse side of a picture, and an invisible mounting is created. An invisible mounting can be made with single-faced tape if a loop is made from a strip of tape with the adhesive side out. It can then be applied in the same manner as double-faced tape.

PHOTO G. By means of a closeup shot, students in a classroom see a live rattlesnake milked.

Real Objects

Better than the picture, model, or representation of an object—animate or inanimate—is the object itself. Its presence adds immediacy and intimacy to a TV lesson. But even more important is that students learn more about the size, the weight, the sound, the movement, and the texture of objects by seeing them live than by seeing representations of them.

If inanimate objects are to be shown, they should be placed on a contrasting background, with enough space between them so that one object can be shown at a time. Objects should be rotated or angled from a fixed position toward the camera; they should not be picked up.

If live objects are to be shown, determine in advance of the telecast the best angle and background to use. Check the size of the set area to be certain the area is sufficiently large to permit adequate display of the object.

Photo G shows a closeup of the fangs of a rattlesnake while it is being milked as the picture appeared on the monitors in a classroom. Television is the perfect medium for such a demonstration; it would be too dangerous for students to have such a closeup view of a rattlesnake in a regular classroom situation.

Models

When the real object is not available, or when the real object is too large or otherwise nonportable or even too small to be shown in a TV lesson, a model should be used. A model is a three-dimensional representation of a real object.

Models are effective for teaching because: (a) they are three-dimensional; (b) they permit easy handling and convenient observation; (c) they provide interior views of objects; (d) they can be stripped of nonessential details so that basic fundamentals can be easily observed; and (e) they can be taken apart and put together in order to demonstrate interrelationships of parts.

Among the types of models a TV teacher can use effectively in a lesson are: (a) a cut-

away model which shows sections of an object; (b) a reduced or enlarged model which is made in exact scale and proportion to the real object; (c) an exact model in both size and detail; (d) a build-up model in which several parts are fitted together to form a complete model of the real object; (e) a solid model which shows only the external features of the real object; and (f) a working model in which the working parts of an object can be moved.

If a model is manipulated on camera, it should be supported firmly on a table, or counter, and then tilted or rotated slowly in one area, to give the viewer ample time to see and comprehend. If several models are to be displayed, the camera should show only one item at a time. A model held in the air may be easily moved out of the camera frame. Any fast or abrupt movement will make it difficult for the cameraman to keep a model in focus if a closeup lens is being used.

When pointing out details on a model, the object should not be blocked by hands or the part under discussion turned away from the camera. A pointer is good to use for showing specific details. When pointing, deliberate motions should be used so as not to catch the cameraman by surprise. Rehearsing with the model before the telecast perfects manipulation, timing, and synchronization of words and action.

Since models will be in color, the background against which they are shown is important. Light objects are set off against a dark background, and vice versa. Whatever the color, the background should be plain; a model can be lost in a confusion of patterns.

PHOTO H. By attaching a gray thread to this tank destroyer on the left in this diorama of a World War II scene, the tank destroyer can be made to move down the road.

Dioramas

Dioramas are three-dimensional scenes of proportionately scaled miniature objects and backgrounds.

A shoe box, a large corrugated cardboard box, a wooden box, or even two pieces of cardboard fastened together at right angles to each other can make a satisfactory frame for a diorama.

To give the illusion of depth in a diorama, objects should be grouped as follows: large objects in the foreground, smaller objects in the center of the diorama, and the smallest objects in the background—all proportionately scaled. Color in background material should not obscure the main subject. (See Photo H.)

The illusion of depth in a diorama is heightened also by angling objects from one corner of the diorama toward the center and by exaggerating the size differences of the objects by cutting the cardboard in forced perspective.

The TV camera can show a diorama in its entirety. However, closeups of an area within the diorama and panning within the scene add interest and motion to the diorama.

Puppets

Puppet shows are valuable because they can be adapted to suit almost any school-age audience and any learning situation. If the type of puppets and the type of skit fit the age and background of the students and the subject matter to be presented, puppet shows provide an excellent medium for learning.

Puppets can be either made or purchased commercially. Types of puppets include: shadow puppets, rod puppets, finger puppets, hand puppets, and string puppets or marionettes.

For use on television, hand puppets can be held over the edge of a table or shown through a gobo, and marionettes can be worked on the floor in front of a drape. However, a puppet stage probably would be helpful. One can be constructed easily of heavy corrugated cardboard fastened around a wooden framework. Many books are available which give full details on the construction of puppet stages. (See Photo I.)

Aside from the usual concerns a TV teacher must have when using audiovisual materials on TV (legibility of printed matter, contrast of color, suitability of background, etc.), most important in a puppet play is the audio portion. Many teachers have found it best to audiotape the play and then play back the tape on the air. In this way, participants have to concentrate only on the motion of their puppets, and there will be no microphone problems. If the participants are speaking "live," adequate mikes must be provided.

PHOTO I. Hand puppets are used in an elementary arithmetic lesson.

STUDIO PROPS

In any TV program—even a talk requiring little in the way of extra aids or audiovisual equipment—some props are usually necessary. Props include easels for simple displays, boards made of assorted materials for more complex displays, and devices with moving parts for writing on television.

Before choosing a prop for use on television, the teacher should check with the TV station to be sure the prop is available.

Easels

The easel is one of the most elementary display devices used by TV stations. Easels prop TV camera cards at an angle and height from which the camera can shoot them. Commonly used on television are art and table easels.

The art easel is self-supporting and may be adjusted to hold a card at several different heights; the table easel must be set on some kind of stand. (See Photos J and K.) To eliminate distortion, the visual center of the card should be on the same level as the camera lens. However, if an art easel is used, with the teacher pointing to the cards, the easel must also be adjusted to the height of the teacher.

Cards may be changed on an easel by the following methods:

1. While a camera is focused elsewhere, i.e., on the teacher

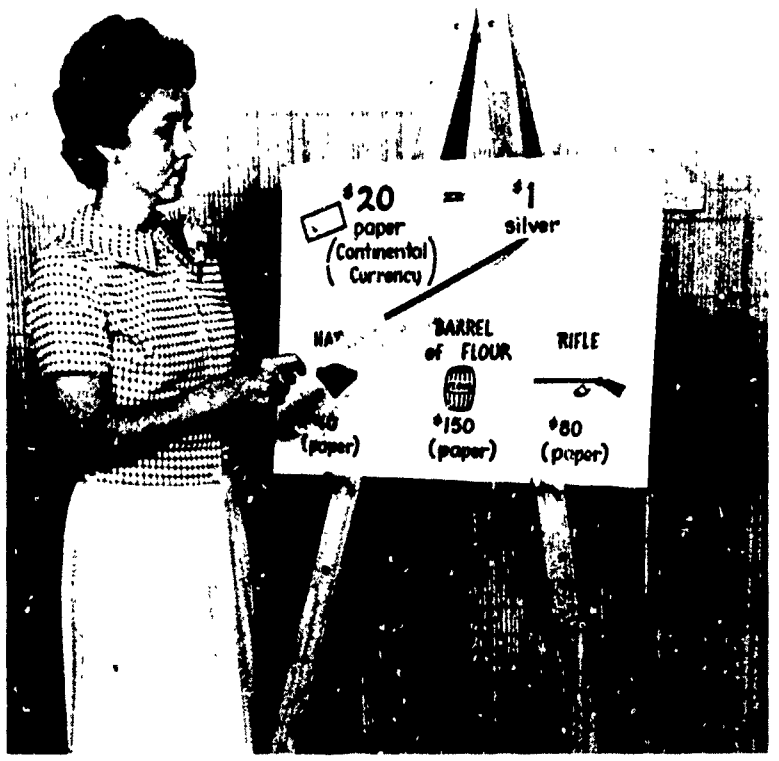


PHOTO J. Art easels generally are used on set by the teacher. In this photo, the teacher points to material predominately light in tone with the dark half of her two-color pointer.

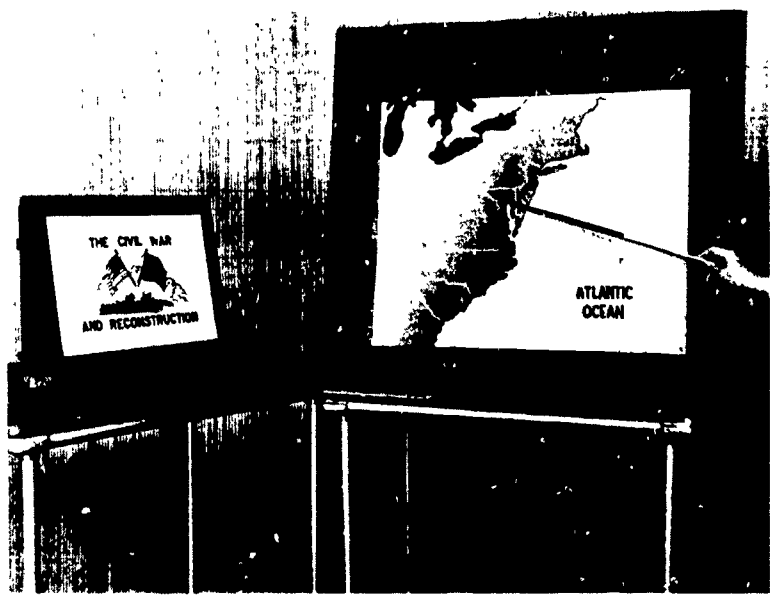


PHOTO K. Table easels generally are used off set. Cards are handled by the floor director, not by the teacher.

2. In a continuous series by alternating TV cards on two easels

3. In a continuous series by pulling them while on the air. (In this method, the audience would see the cards move across the screen, even though they may not be aware of it. To facilitate the changing of cards, tabs should be placed on each card, and each card should be pulled off the easel by the tab; see Fig. 18.)

If more than one card is used, the size and ratio of the material on each card should be the same so that the camera is framed properly for all cards.

If a table easel is used, the easel should be larger than the card to be televised, to allow for a framing area around the card.

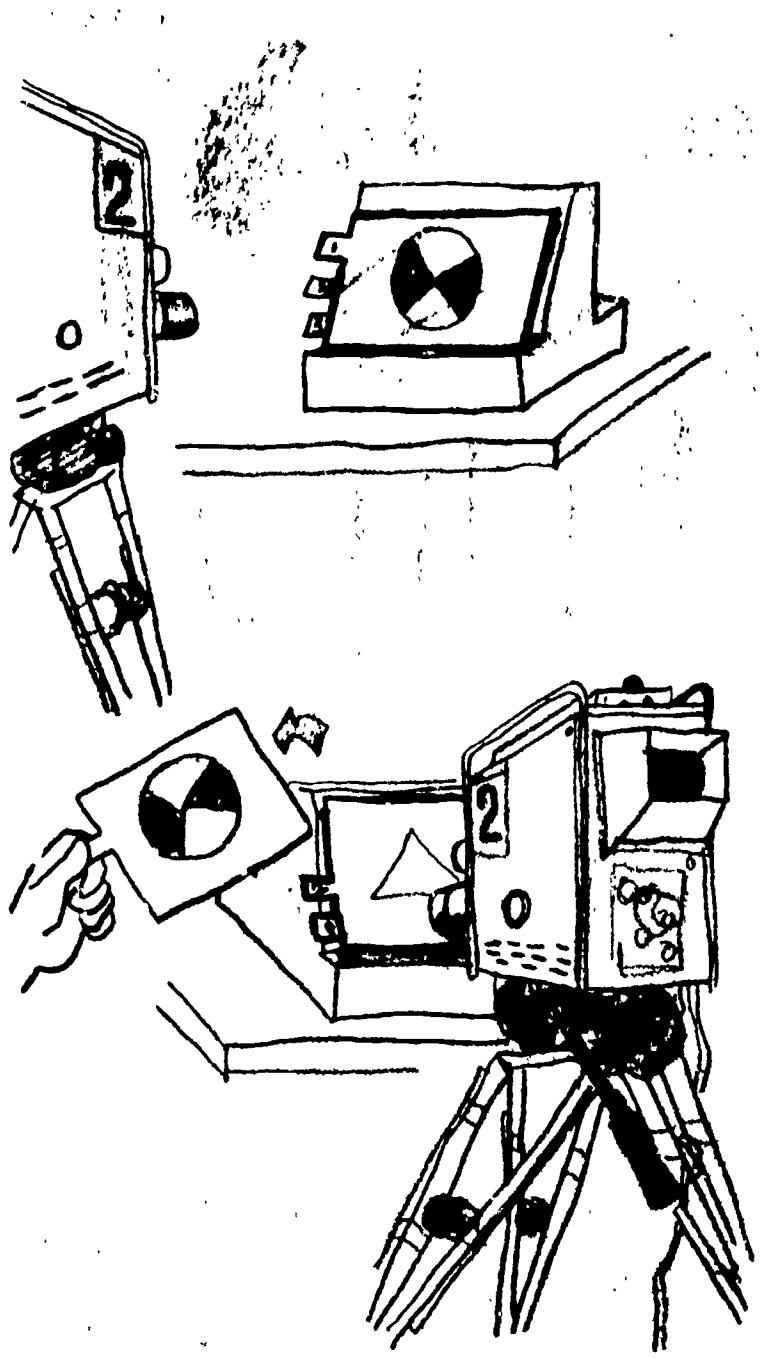


FIG. 18. Cards with tabs on a table easel.

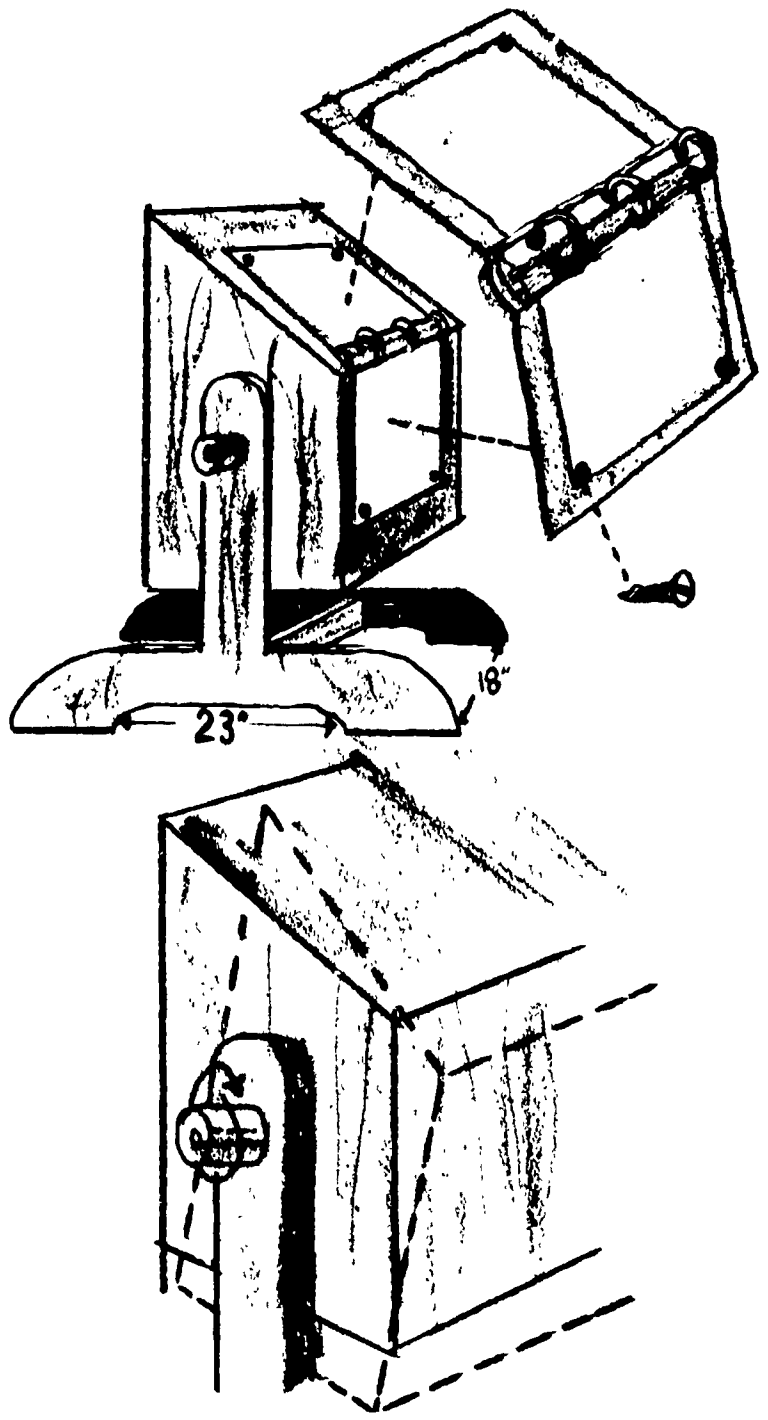


FIG. 19. A flip-card easel is made from a card easel and a loose-leaf notebook.

Another variety of easel used on television is the flip-card easel, on which titles or other cards are mounted in a loose-leaf device. All cards should be of standard size for flipping by the TV teacher, or floor director, and the lettering or pictures on each card should be accurately centered and of uniform size and shape so that the TV camera need not reframe with each flip. (See Fig. 19.)

When the cards are flipped, the effect resembles successive pages of a calendar falling neatly into place. This device is most useful when a series of words or numbers is superimposed over the teacher. Then, the superimposition can be left in throughout the entire series of flips, and words and numbers seem to fall into place.

Chalkboards

Even though the chalkboard is probably the most elementary and most conveniently available teaching tool, it is also useful as a visual device for television. Pastel-green surfaced chalkboards on which soft yellow chalk is used show up well on camera.

Chalkboard drawings should be large and bold and simple in design, and the material should be spaced out so that single or group shots can be taken easily.

Templates, the opaque projector, and the pounce-pattern technique are tracing aids for the teacher to use on chalkboard in place of, or to supplement, teacher-made drawings.

Templates are prepared forms of cardboard, plywood, or other stiff materials around which the teacher can trace outlines.

Original drawings or illustrations from books or magazines can be enlarged through an opaque projector and projected on a chalkboard for tracing. A 2″ x 2″ slide can also be used in the same way.

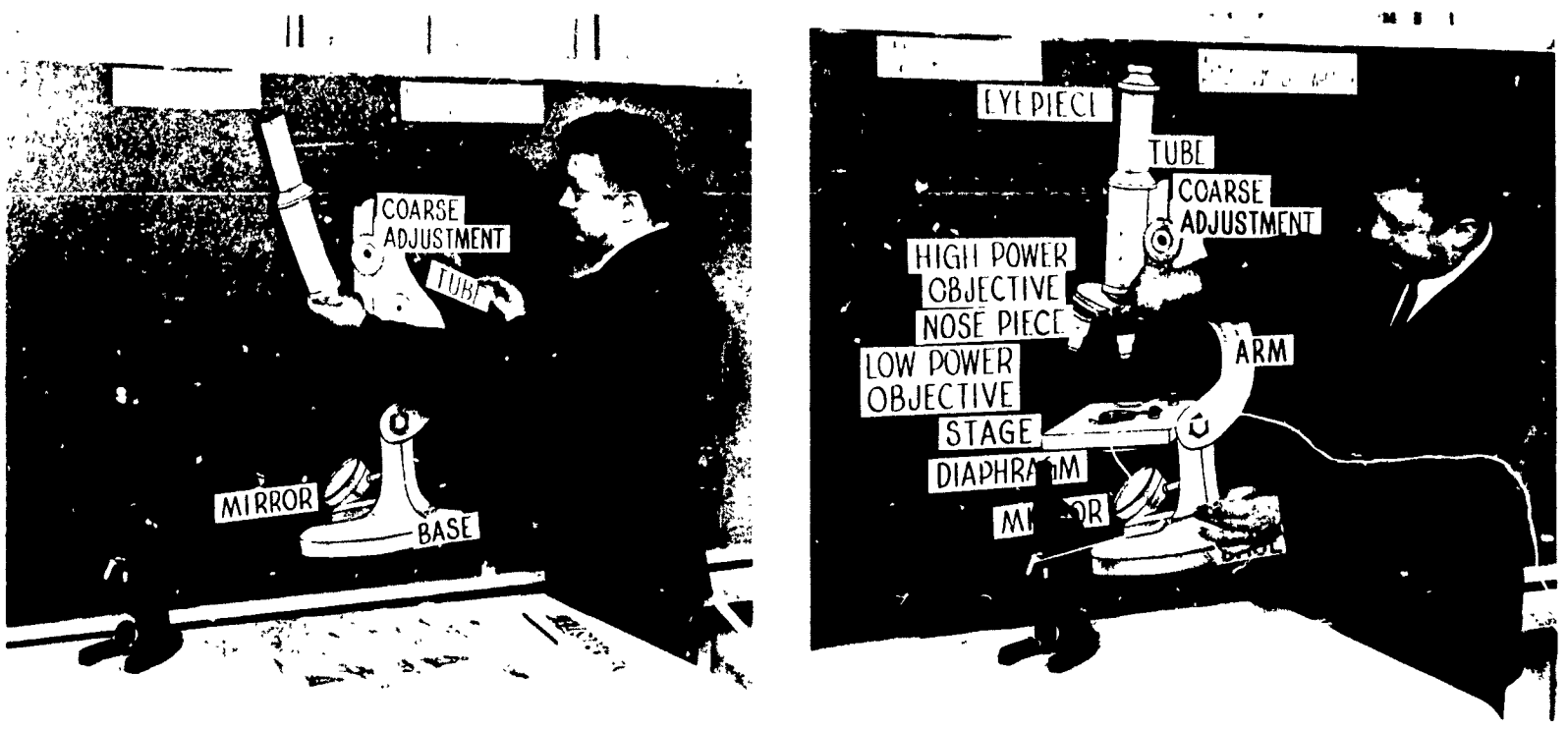
In the pounce-pattern technique, a pattern is transferred to a sheet of tough paper, and holes are punched around the pattern with a leather hole spacer, pin, or other sharp instrument. The pattern is then held up against the chalkboard and patted with a heavily chalk-dusted eraser to transfer the dotted line pattern to the chalkboard. The dotted line then can be filled in.

The chalkboard can also be used as a display device. (See Photos L.) In these photos, the parts of the microscope are made of thin cardboard and are attached to the chalkboard with a loop of masking tape. Since the chalkboard is metallic, small magnets attached to the cardboard can also be used. Note that the lettering on the cards, as well as the model itself, is large enough to be seen in a wide camera shot which would include both the teacher and the model.

Flannel Boards

A flannel board is a board covered with cotton flannel, felt, or some similar fabric. Objects made of flannel or backed with flannel adhere to the high-nap surface of the flannel board without need of glue or tacks.

Flannel boards are particularly good for use in the primary grades. Simple objects can be arranged, rearranged, replaced, or removed quickly by the teacher and can be reused time after time. Teachers can easily supplement commercial forms with objects they themselves cut out from scraps of felt. Cutouts should be at least 6″ in diameter; letters should be at least 2″ high.



PHOTOS L. A biology teacher constructs a model microscope step-by-step on a chalkboard to aid students in learning the parts and functions of the instrument.

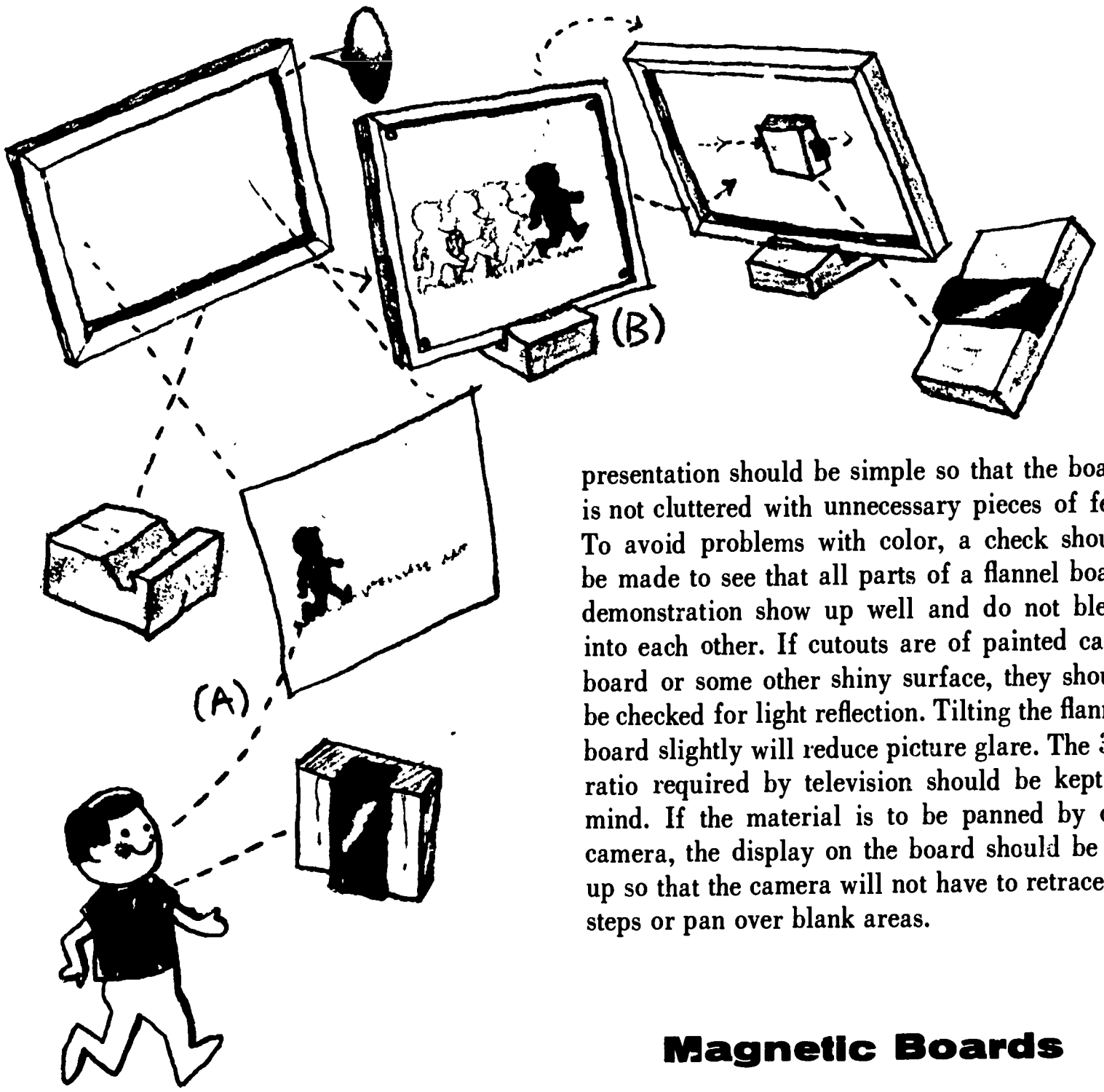


FIG. 20. A boy walks across a painted scene on a magnetic board.

The greatest risk in using flannel board on television is that objects may drop off while the board is being used on the air. To avoid this, each piece should be tested on the board before the telecast. Since felt objects depend on surface contact for adhesion to the board, cutouts should be stiff enough to prevent warping under the heat of the TV lights. If they warp, they will fall.

As with other audiovisual aids and all boards used for display, materials for the flannel board should be arranged in proper order of presentation in advance of the TV lesson. The presentation should be simple so that the board is not cluttered with unnecessary pieces of felt. To avoid problems with color, a check should be made to see that all parts of a flannel board demonstration show up well and do not blend into each other. If cutouts are of painted cardboard or some other shiny surface, they should be checked for light reflection. Tilting the flannel board slightly will reduce picture glare. The 3:4 ratio required by television should be kept in mind. If the material is to be panned by one camera, the display on the board should be set up so that the camera will not have to retrace its steps or pan over blank areas.

Magnetic Boards

The magnetic board is similar in principle and use to the flannel board. Instead of friction to hold cutouts, the magnetic board uses magnetic attraction. The board is usually made of sheet iron to attract small magnets attached to the back of cutouts. Attraction of these magnets to the surface of the board holds the cutouts in place. Paint does not interfere with magnetic attraction, so the board may be painted to contrast with the parts of a display.

Another type of magnetic board is not made of metal, but of stiff cardboard. The cutout is backed, as before, with a magnet, and another magnet is placed opposite it on the reverse side of the board. When the rear magnet is moved, the front cutout follows along. Such cutouts as

ships on oceans and leaves falling from trees can be used on this type of board. Base designs should accompany cutouts. (See Fig. 20.)

A recently developed magnetic board is made of porcelain and steel. Objects adhere to its steel surface without tacking, taping, or marking.

Pegboards

A pegboard is a display board made of sheets of hard-pressed wood (tempered masonite) with 3/16″ holes drilled across its surface at 1″ intervals. Lightweight materials—including three-dimensional objects—can be tacked or stapled to the hard surface of the pegboard by a variety of wire fixtures. These fixtures include shelf supports; book, magazine, record, tool, and dish holders; and spring clips for cards, in addition to "T"-shaped holders for hammers or brooms and test-tube holders.

If a pegboard display is used on television only as a background, the display should be uncluttered. If the items on a pegboard are to be shown individually, the material should be arranged so that the camera can pan smoothly from one item to another.

On the pegboard in Photo M, a junior high-school TV mathematics instructor is illustrating the property of tangency. Metal rings are used to represent circles of various sizes, and the straight line is a length of wooden dowel. Points are located with golf tees and are labeled with metal identifying disks which have a small hook soldered on one side and a letter printed on the other. Rubber bands are used to form the triangle; they can be changed quickly to form another geometric shape.

Bulletin Boards

A bulletin board is one of the least expensive props that a TV teacher can use for display. Monk's cloth or burlap, for example, can be stretched over a frame, and pins can be used to

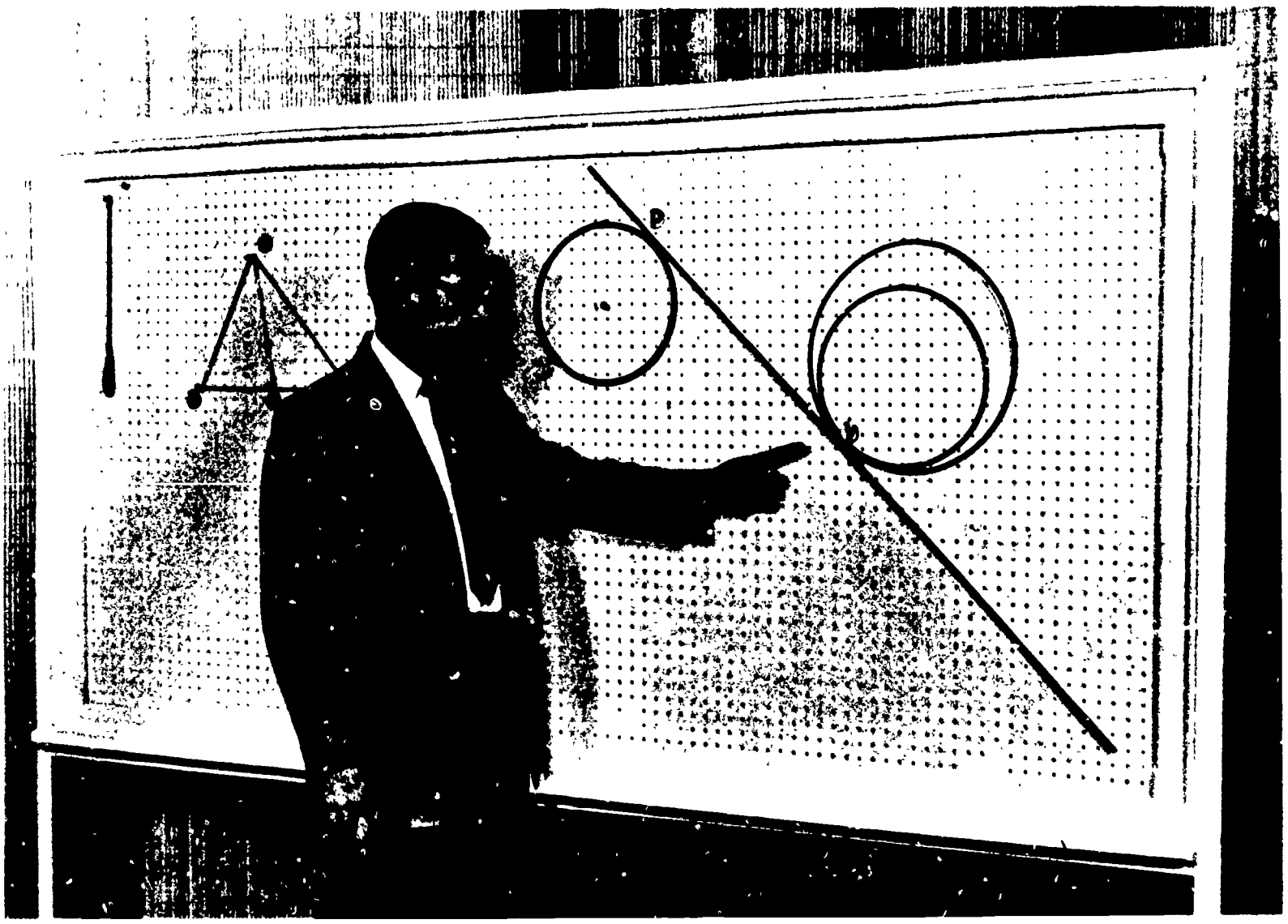


PHOTO M. A pegboard display simply and efficiently illustrates geometric concepts for a junior high-school audience.

tack materials to the surface. Fiber or wall board can also be used.

Menu Boards

Menu boards, also known as spaghetti boards, are excellent when last-minute changes in the lettering of title or other cards are needed. They are framed, grooved boards covered with bla· cloth. Plastic letters fit into the horizontal grooves and are easy to move around. Menu board: range in size from 3″x 10″, for use on a desk, to 18″ x 24″. (See Photo N.)

PHOTO N. A last-minute change on a Science 7 telecast is being set up on a menu board to be used as a superimposed title for the program.

Transparency Boxes

If transparencies are mounted on an opaque card for flipping and then lighted from the front, serious shadows will show on the copy. This would be especially confusing in arithmetic teaching, where lines and numbers must be

PHOTO O. A filmstrip of Alaska is shown by means of a transparency box, with the teacher on camera.

clearly projected. However, if transparencies are hung in a light box where they are lighted from behind, and placed in a darkened area in the studio, no shadows will show on the copy.

If the teacher wants to be on camera while showing a filmstrip or a series of slides, and no rear-projection screen is available, a transparency box can be used. The light bulbs are removed from the transparency box, and the box is placed on the teacher's desk. The projector is lined up the proper distance behind the box for the filmstrips or slides to fill the screen. Then, the floor director can change the filmstrips or slides, and the teacher can point to details. One camera can show wide-angled shots of the teacher and screen, while another camera points to details. (See Photo O.)

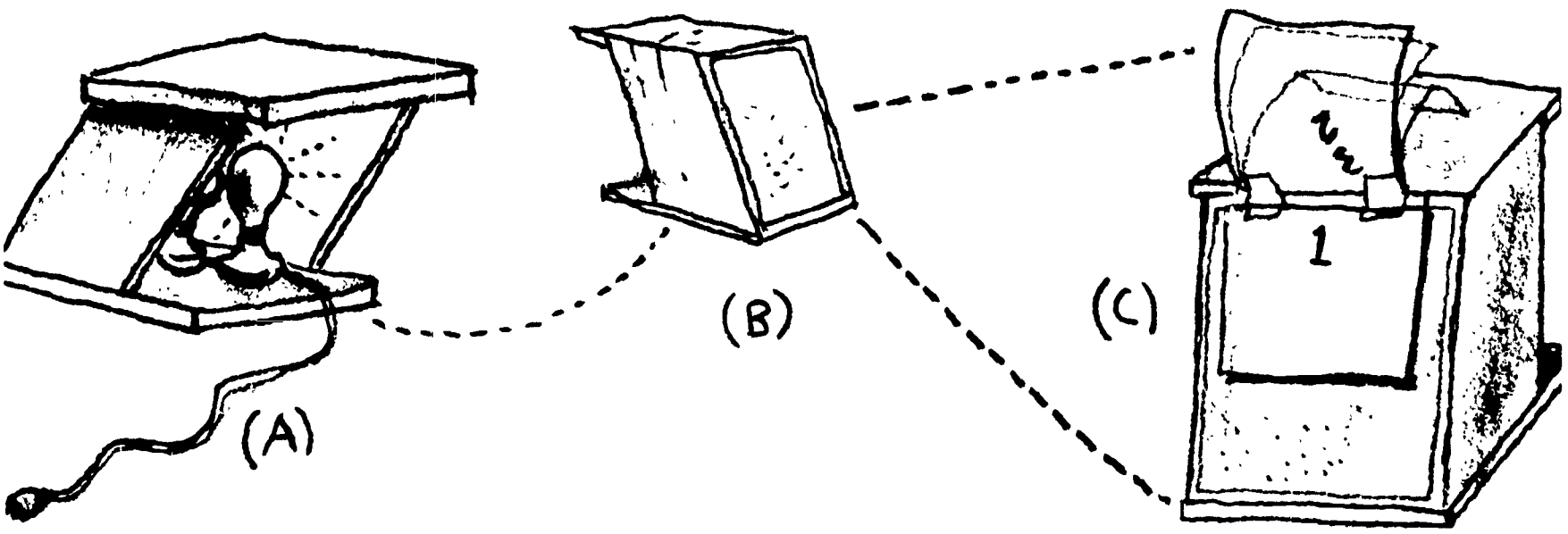


FIG. 21. A transparency box is constructed of (a) a wooden frame and two light bulbs, (b) a sheet of translucent glass, and (c) plastic overlays.

The transparency box can do double duty by acting also as a desk easel on the same lesson. An extra light would be needed to light the easel, but would be switched off when the filmstrip or slides were shown.

A transparency box can be constructed easily at moderate cost. The box consists of a wooden frame (in the proper 3:4 TV proportion) on which a sheet of translucent glass is mounted; behind the glass are two 60-watt bulbs. The plastic overlays then can be mounted by tape on the face of the glass. The TV camera focuses directly on the base cell, and the other cells are dropped into place as needed. (See Fig. 21.)

Gobos

Gobo is a TV term for "go-between," i.e., anything that is placed between the camera and the person on camera or between the camera and the basic set. The gobo usually has a cutout area through which the TV camera can shoot either the person on camera or the basic set.

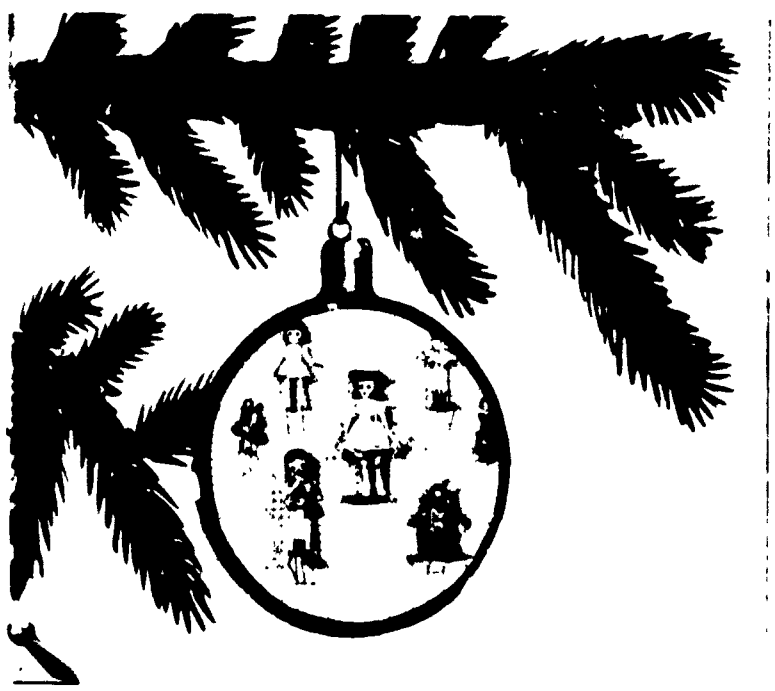
A camera can dolly in toward the gobo until the cutout area fills the screen and the gobo has completely disappeared. For example, a gobo of a Christmas tree ball can be shot through to show a teacher in a set beyond; then the camera can dolly through the opening to show more and more of the set area and, finally, a full shot of the teacher in a toy store.

A double gobo can be used similarly. For example, a top card with no opening and painted to represent a Christmas card is the first gobo. The card is opened to the next gobo, a cutout for the camera to dolly through to the teacher. (See Photos P.)

Crawls and Drums

Crawls and drums are writing surfaces for use on television.

Crawls supply a clear, smooth writing surface. They are made of a frame, with a roller at top and bottom to hold a paper supply. Each roller has a handle for cranking, and the paper



PHOTOS P. An example of a gobo.

can be rolled up or down at any rate of speed. Later-model crawls are motorized so that, with a flip of a switch, the paper rolls automatically. Either the teacher or the floor director can operate this equipment.

Paper rolls are used by TV teachers as classroom teachers use blackboards. For TV purposes, they are better than blackboards because: (a) there are no reflection problems; (b) there is no chalk squeak; and (c) there is no erasing necessary—the teacher rolls to the next clear area.

TV teachers can write on crawls with a magic marker or a similar felt pen. A black marker with yellow paper is the best color combination for use on camera. If the teacher wishes, guidelines for lettering, outlines of diagrams, or answers to problems can be written ahead of time on the crawl in red pencil. These lines, when lightly drawn, can be seen easily by the teacher, but will be invisible on the TV screen. (See Photo Q.)

Drums are used primarily for titles or credits, but TV teachers can also use them for listing subjects, words, or outlines. (See Fig. 22.)

Copy can be printed or hand-lettered on a long roll of paper in a columnar format and mounted on the cylindrical face of a vertically revolving drum. As the drum is slowly turned, the copy is exposed a section at a time, giving animation to static material.

PHOTO Q. A seventh-grade mathematics teacher uses a paper roll to explain a problem to his students. One camera can frame the teacher while another camera frames the information on the paper roll.

Drums are round, square, hexagonal, or octagonal, and they may be used horizontally or vertically. A mat or gobo can be placed in front of the drum to mask or frame the lettering.

Variations of the drum include: (a) the windmill, which holds four cards and rotates copy much like the square drum; (b) the flipper, which holds only two cards; (c) the venetian blind, in which copy is put into slats and the copy is changed by reversing the blind; (d) the spiral

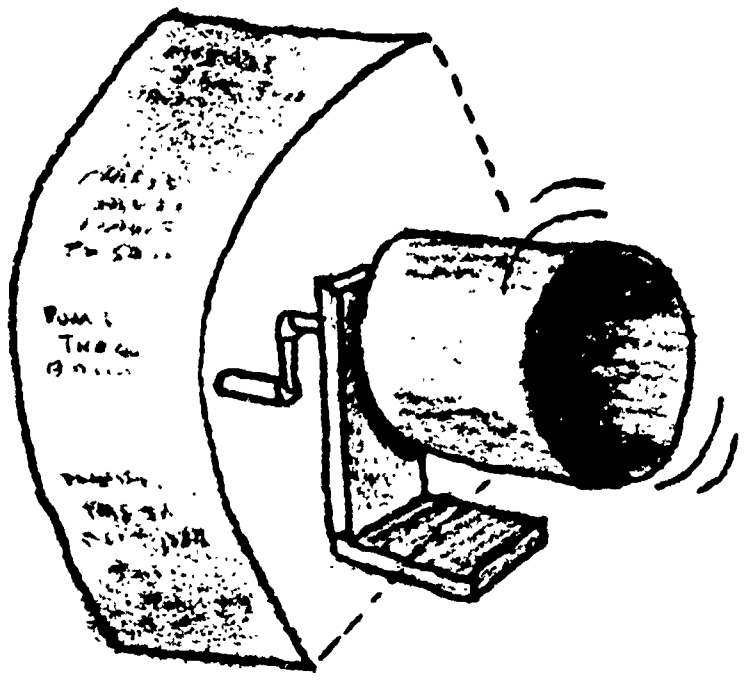


FIG. 22. A drum can be manually revolved at any desired speed.

disk, in which copy or a picture is spun for a continuous spiral effect or spun and then slowed until it stops; and (e) the endless roll-up, which is a motor-driven crawl for holding cards. Some roll-ups hold as many as 35 11″ x 14″ cards. (See Fig. 23.)

Turntables

Turntables permit the TV teacher to display materials on camera without handling them.

The simplest form of the turntable for TV use is the sculptor's modeling turntable. It can be used for displaying a three-dimensional object from all three sides.

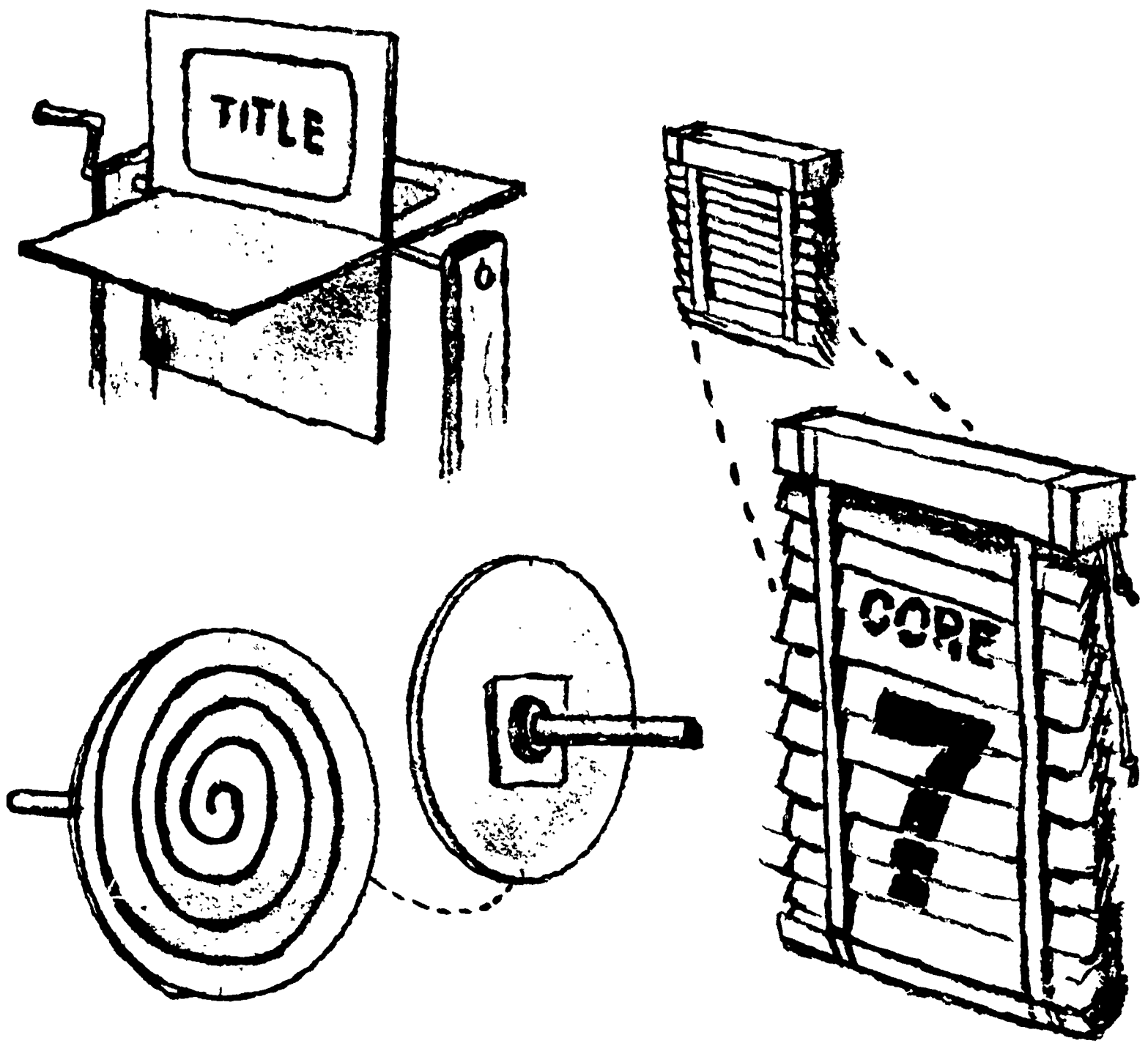


FIG. 23. Variations of the drum include (clockwise, from left to right) the windmill, the venetian blind, and the spiral disk.

By placing a drum in the center of a turntable, a background can be provided to display objects. The studio teacher or the floor director can rotate the turntable while watching the monitor to synchronize the teacher's remarks with the movement of the turntable. A background on a drum can also serve as a moving panorama; a teacher or object, for example, can be superimposed against a panorama of moving clouds. (See Fig. 24.)

A turntable can also be used as a cadizziator, a small revolving stage with six triangular stages. The stages are built with proscenium arches and grooves for holding 11″ x 14″ photographs, pictures, or cards by means of which background scenery can be made interchangeable.

Rotating dioramas, shown one at a time, can be used as a variation of the cadizziator.

Turntables are available commercially. Some motorized turntables allow changes in speed, pauses in rotation, or a back-and-forth movement.

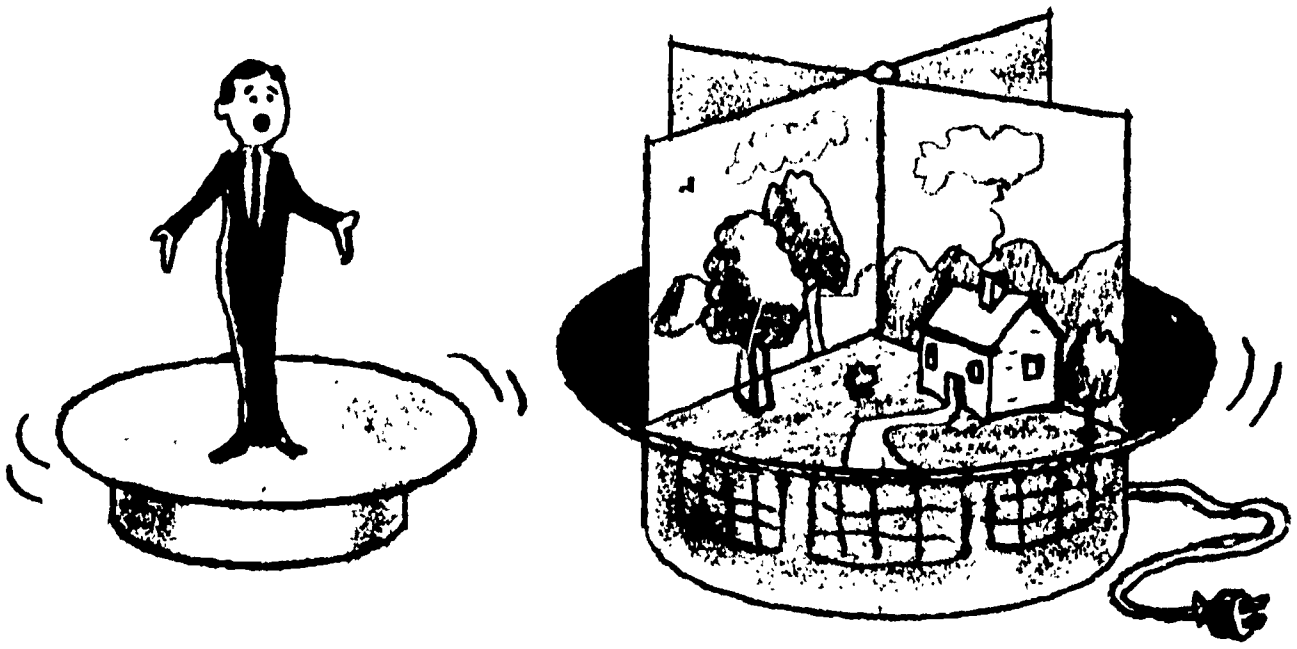


FIG. 24. A turntable serves as a stage for three-dimensional objects and backgrounds.

SPECIAL EFFECTS

The medium of television offers to the teacher the use of a number of special effects which influence the presentation of a visual teaching resource or set the tone or mood for an entire broadcast.

Special effects available for use by the TV teacher include: (a) electronic camera effects; (b) optical camera effects; (c) lighting effects; (d) audio effects; (e) set and background effects; and (f) opening and closing effects.

For the most part, a TV teacher will not actually take part in the technical aspects of producing special TV effects. However, an understanding of these effects and of how they are created will enable the teacher to choose those effects which will make his teaching more dynamic.

A look at a TV control room will be of value to the TV teacher. Photo R shows a typical control-room arrangement for a two-camera studio:

1. At the far left is the turntable which will play 33⅓, 45, and 78 RPM recordings.

2. Adjacent to the turntable is an audio panel which contains the audio controls for the turntable, the film chains, the audio tape recorder, and the studio microphones.

3. Next is the first monitor which carries the picture from studio camera 1.

4. Following is the second monitor which carries the picture from studio camera 2.

5. At the far right is the large monitor which carries the picture that is on the air.

The controls on the audio board and under the first two monitors are usually run by an engineer. The audio controls regulate sounds and adjust the volume to the proper level. The camera controls adjust the proper contrast,

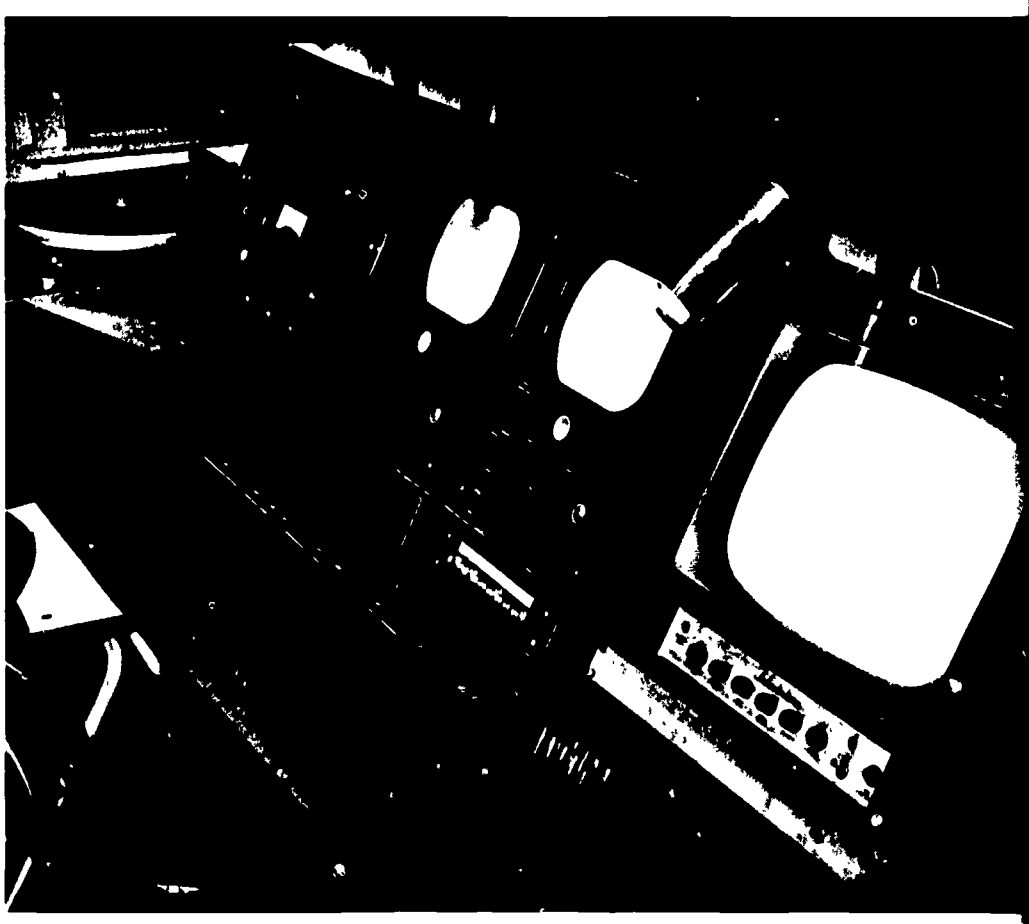


PHOTO R. A TV control room with turntable, audio and other controls, and three monitors.

brightness, and linearity of the pictures from all the studio cameras.

The buttons and lever under the large monitor comprise the switcher and are used by the director or technical director to accomplish electronic camera effects.

Each button of the two rows of buttons on the panel in front of the large monitor controls a camera. When a button is punched, the picture from that camera will be put on the air. The director can change instantly from one camera to another by punching a button, but the button must be in the same row as the present on-the-air camera.

If the director wants to create a dissolve, he punches a button on the other row of buttons. The lever, which is in position toward the bank in which the director has been operating, is pushed to the opposite bank. The speed with which the lever is switched determines the speed at which the dissolve is accomplished.

Electronic Camera Effects

Cuts

The TV cut is the abrupt cutting out of one picture and the substitution of another. It is most useful for changing the mood or tempo of a lesson and for getting a shot on the air quickly. A cut is achieved when a director or an engineer at the control board punches a "take" button.

The responsibility of a TV director is to put himself in the viewer's place and attempt to show the viewer what he wants to see when he wants to see it. Cutting, then, should be done responsibly. It should also be done judiciously. Too much cutting will make a telecast hard to watch and will be irritating to the audience.

Dissolves

The dissolve is a blended transition from one picture to another; that is, one scene fades out and vanishes at the same time as a second picture overlaps it and fades in strong on the screen.

A dissolve may be made at any speed, depending on the required effect. The length of the dissolve will depend upon the mood of the telecast, the length of action behind it, and the pace the teacher is trying to maintain.

The dissolve should be used when fluidity and smoothness are necessary to the continuity of the lesson, i.e., as a transition from one area of time or space to another. It also may be used for less abrupt transitions. For example, in a music lesson, a slow dissolve from the teacher playing a violin to a closeup of the strings of the violin—all in tempo with the music—would be much better than an abrupt cut between the two shots.

Matched Dissolves

The matched dissolve is an exact matching of the positioning of two similar objects, one on each camera, so that when a dissolve is made, a metamorphosis appears to take place. For example, a doll can be brought to life on the TV screen by match-dissolving from the doll to a real person similarly dressed and positioned. (See Fig. 25.)

Defocusing

The defocus is a transitional device that is similar to the dissolve. The established picture becomes blurred and then clears up to reveal a new and different picture.

Defocusing is accomplished by the on-the-air camera going out of focus while still on the air and then dissolving through to a second camera, which is also out of focus and on a different picture. This second camera is now focused up on the air to reveal the new shot.

Because the defocus creates a misty effect, it is particularly useful for introducing a dream sequence or creating a transitional effect through time or space.

Superimpositions

The superimposition (or "super") is a TV term for the superimposition of an image from

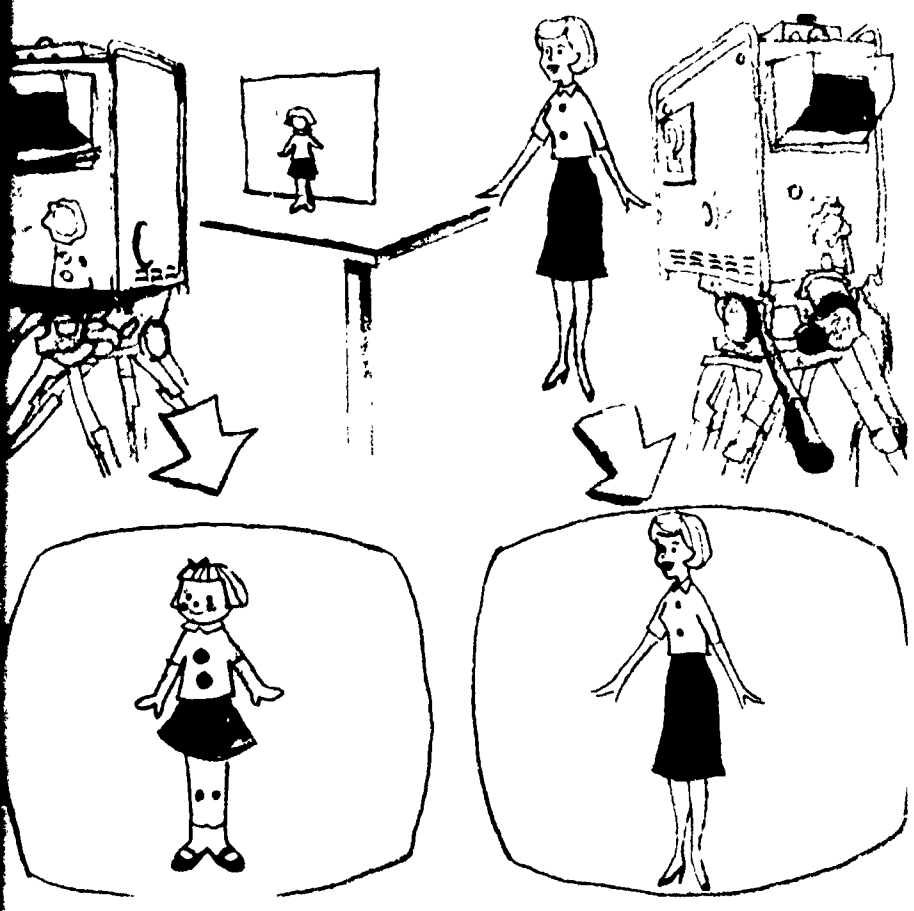


FIG. 25. The director match-dissolves from Camera 1, a doll, to Camera 2, the guest.

PHOTO S. A fourth-grade music teacher shows her class the symbol that means "hold the tone."

one camera over the image from another camera. Usually, when one picture has been established, the other picture is supered in, held for the necessary length of time, and then taken out again.

If a super is to be used, sufficient contrast between the two images is necessary. Normally, a light picture is supered over a darker picture. Lettering, for example, when supered over a teacher, a card, a slide, or any other object, should be white over a darker picture.

If an object is to be supered in beside a teacher, both the supered object and the teacher should be in front of a dark background so that the super will be sharp and clear, without dimming the established picture. (See Photos S and T.)

Matting

Matting is accomplished in the same way as a regular superimposition, except that, in matting, one camera has its lens turret offset so that the lens is no longer directly in front of the pickup tube. As a result, part of the scene will be cut off by the body of the lens turret and will appear black on the screen. The cameraman

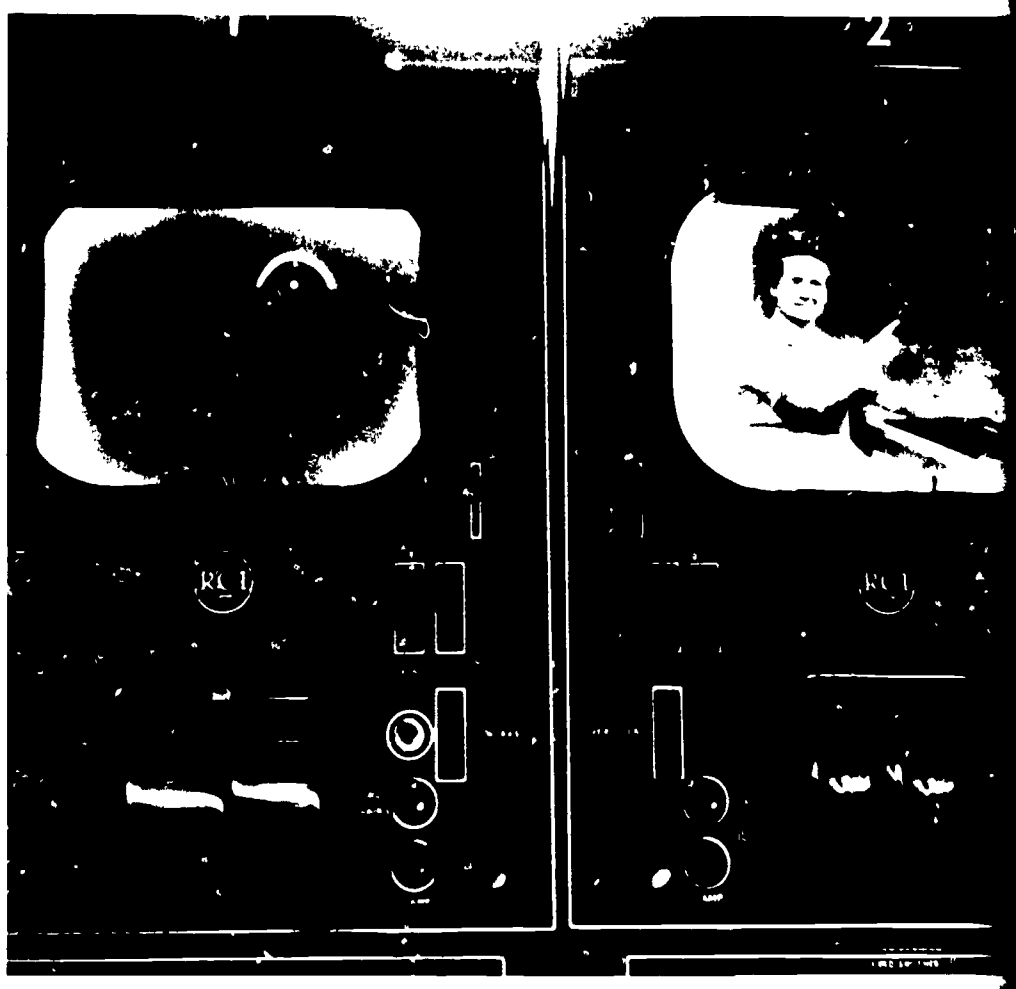


PHOTO T. The symbol is picked up on Camera 1; the teacher is on Camera 2. The director then superimposes Camera 1 over Camera 2 so that the students see the symbol and the teacher at the same time.

must then center the object to be superimposed within this "cracked" area. This object is then superimposed over the shot from the other camera. (See Fig. 26.)

An example of this process is the following: A full and established shot is of a music teacher at a piano. Framed and superimposed to one side of the established picture is a matted shot showing a closeup of a pair of hands clapping in time to the music.

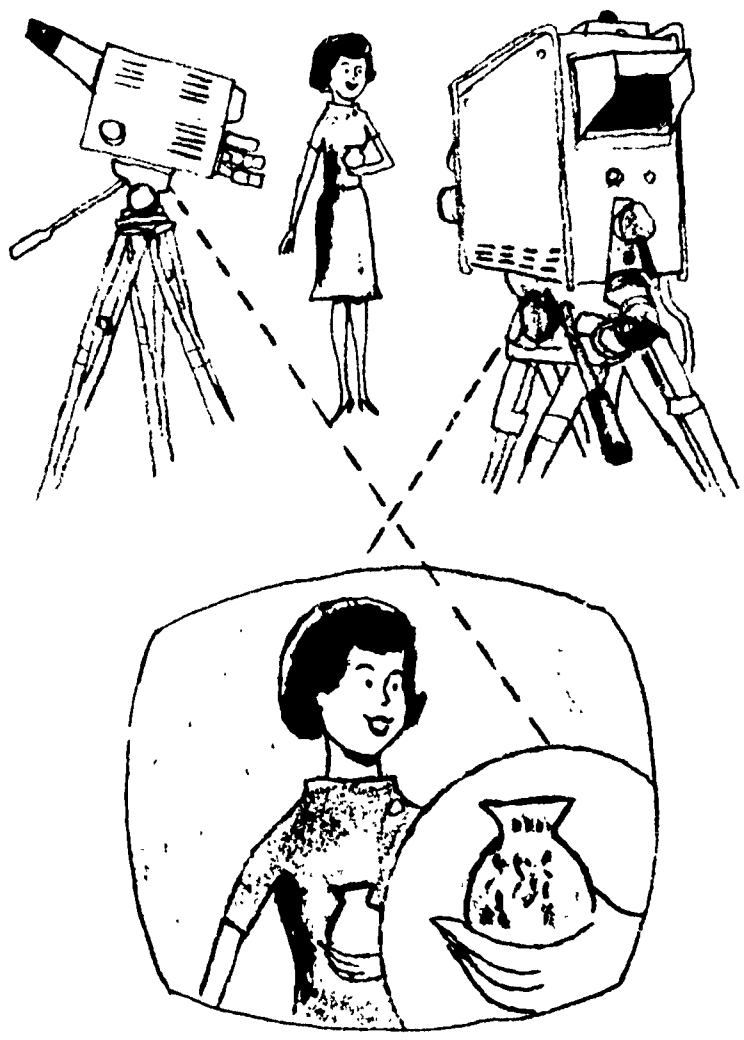


FIG. 26. Camera 2 is superimposed over on-the-air Camera 1 to show closeups of both the teacher and the object she discusses.

Special Effects Amplifiers

With special electronic equipment, the TV director is able to create a great many effects on live television previously possible only on film.

The matting amplifier, for example, takes the picture that is telecast by one camera and places it into the picture that is telecast by another camera through the wipe, split-screen, or key-insertion effect. It is the only TV equipment that can create a clean-cut insertion of a person or article from one scene into another completely separate scene.

The electronic wipe is used as a transition from one picture to another and can be made horizontally, vertically, or angularly. The operator of the matting amplifier selects the pattern to be used.

The split screen is used mainly to hold conversations between people in two separate locations. The picture from one camera is shown on one half of the screen, and the picture from another camera is shown on the other half of the screen. The screen can be split vertically, horizontally, or angularly.

The key-insertion effect permits the insertion of any scene on one camera into another scene on another camera. A teacher, for example, can be keyed into a still photograph or a motion picture so that he appears to be part of the scene.

Another electronic matting amplifier, the Zoom Keyer, allows a silhouette of any shape to expand or contract to any of 70 different sizes. The silhouette can be used as a key insert and fed from the Zoom Keyer into a regular matting amplifier. It is then possible to use the picture from one camera inside the silhouette while the picture from the other camera remains outside the silhouette.

Optical Camera Effects

Mirrors

The mirror is probably the most simple and useful device in the field of special effects. The TV teacher or a scene can be shown from angles impossible without the use of a mirror. Mirrors permit high-angled shots, tilted shots, and reflections.

In an art lesson, for example, the teacher needs closeup shots of his hands from above and behind for students to see from the teacher's point of vantage. It would be very awkward, if not impossible, to place a camera at a high angle behind the teacher; a mirror solves the problem easily. (See Fig. 27.)

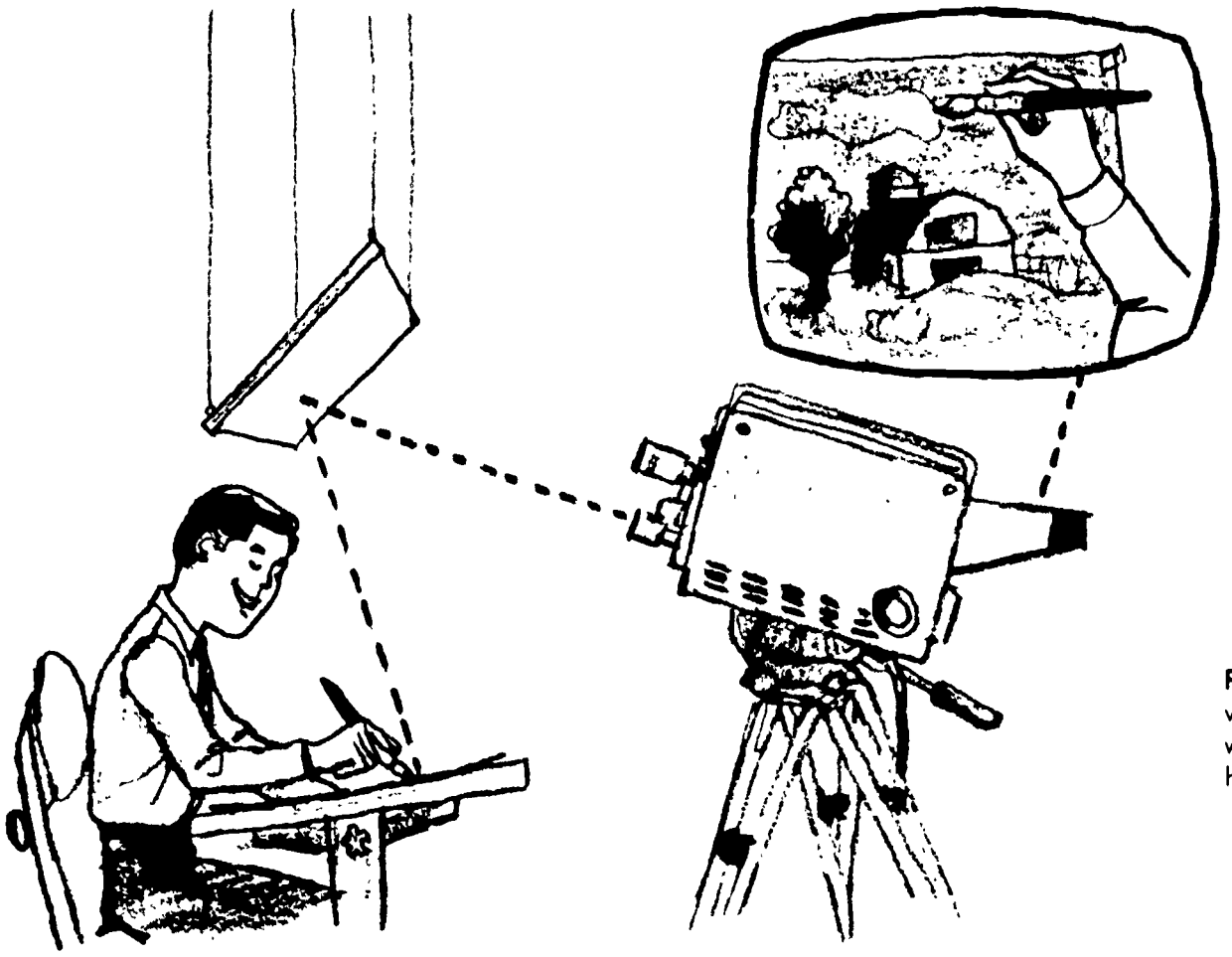


FIG. 27. A mirror provides closeups of the work of the artist from his viewpoint.

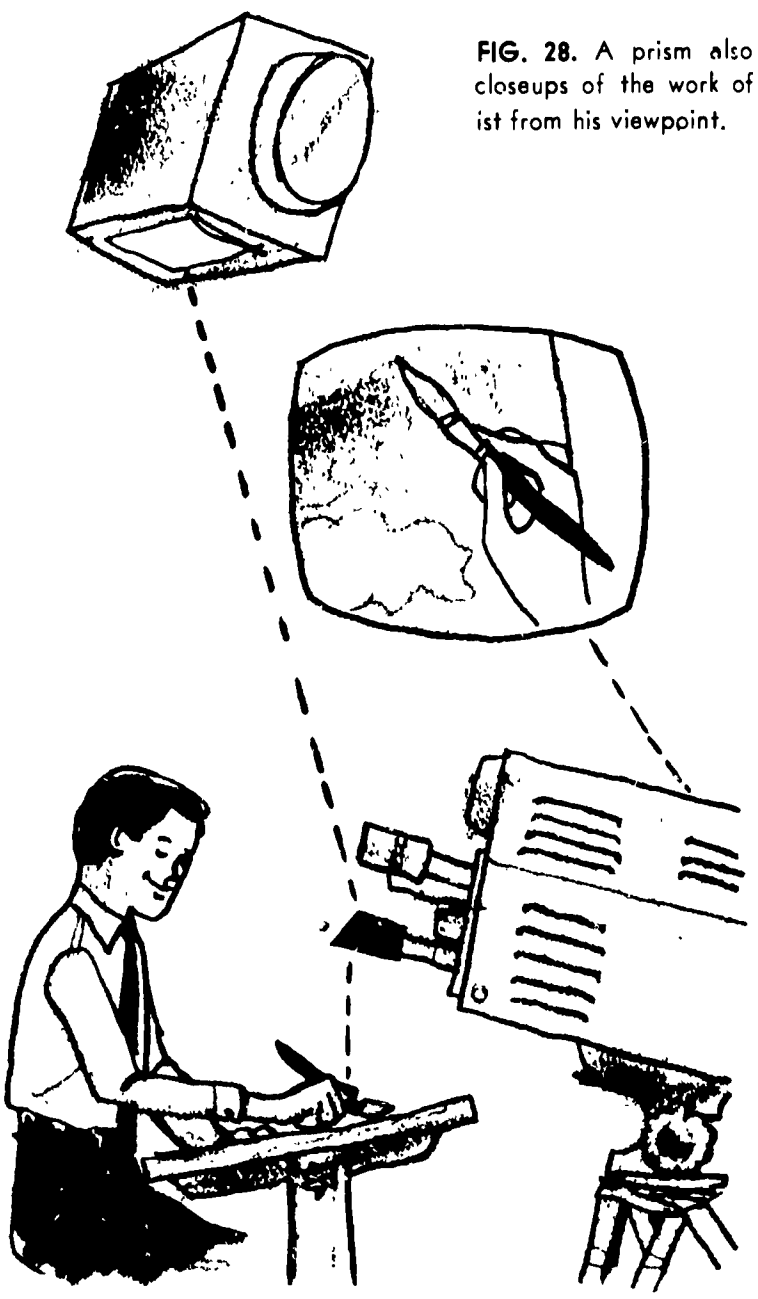


FIG. 28. A prism also provides closeups of the work of the artist from his viewpoint.

Prisms

Prisms can also be used to aid the camera in obtaining shots from different angles. By placing a prism on a lens, for example in an art lesson, a camera can be kept level and still obtain a shot directly on top of the artist's hands. The construction of a prism is such that the picture telecast will be from the viewpoint of the artist himself. (See Fig. 28.)

Multiple-image prisms can be purchased which produce a series of images. When the prism is rotated, the images will revolve in a circular pattern.

Kaleidoscopes

Kaleidoscopes present a continuous flow of abstract patterns. They can be used for transitions and are especially adaptable to musical programs.

A children's kaleidoscope can be purchased commercially. It is mounted directly on a lens of the TV camera, then pointed at a light source, and rotated to produce changing designs.

Teleidoscopes

A teleidoscope is a new version of the kaleidoscope. Whereas the objects making the patterns in the kaleidoscope are self-contained, the teleidoscope creates for the viewer a patterned effect of the object on which it is focused. When the teleidoscope is mounted directly on the lens of the TV camera, and held stationary on any well-lighted object, an eight-sided design of the object is seen. A slight movement of either the subject or the camera will present new designs.

The teleidoscope is an effective opening device for a TV program. For example, by framing an empty card easel with the camera-mounted teleidoscope and sliding the title card completely across the easel from one side to the other, the words or pictures on the card will appear to emerge from the center of the televised image, expand into a light-sided pattern, and disappear at the outer edges of the frame.

The One-Camera Split-Screen Effect

A split-screen effect can be achieved with the use of one TV camera, a mirror, and a pole.

A camera is lined in position so that the main subject falls on the right half of the viewed area. Then, a 12″ x 16″ unframed mirror is mounted to an upright pole, with the center of the mirror at lens level, about 6″ from the lens at a 60-degree angle to the line established by the camera lens and the main subject. The mirror should now be in such a position as to block out the left half of the viewed picture area. The image to be reflected should be at a 60-degree angle to the mirror. (See Fig. 29.)

If the reflected subject is to be the same size as the main subject, the distance from the lens to the main subject should be equal to the distance from the lens to the mirror plus the distance from the mirror to the subject to be reflected.

A pan to the right loses the mirror and

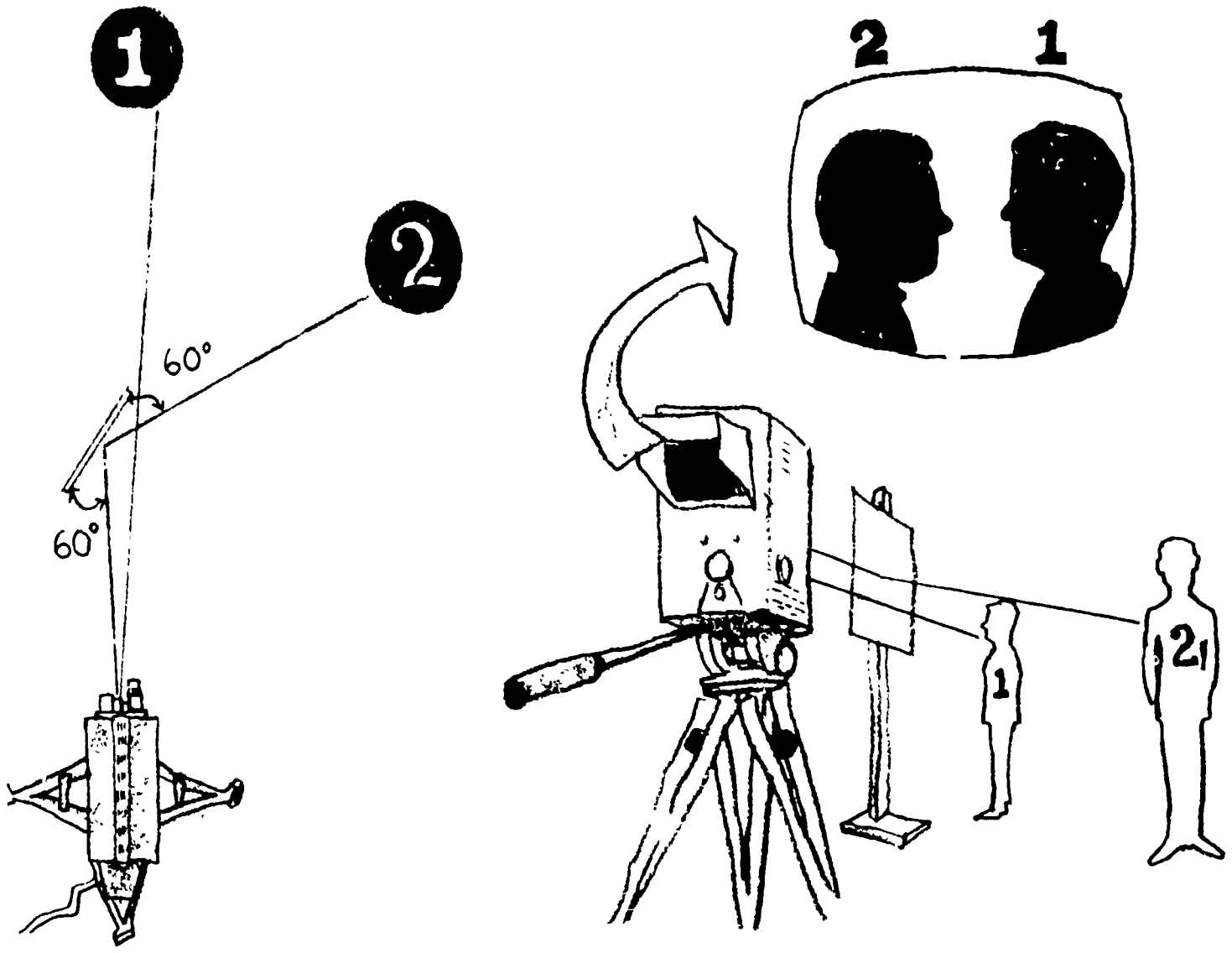


FIG. 29. The one-camera split-screen effect.

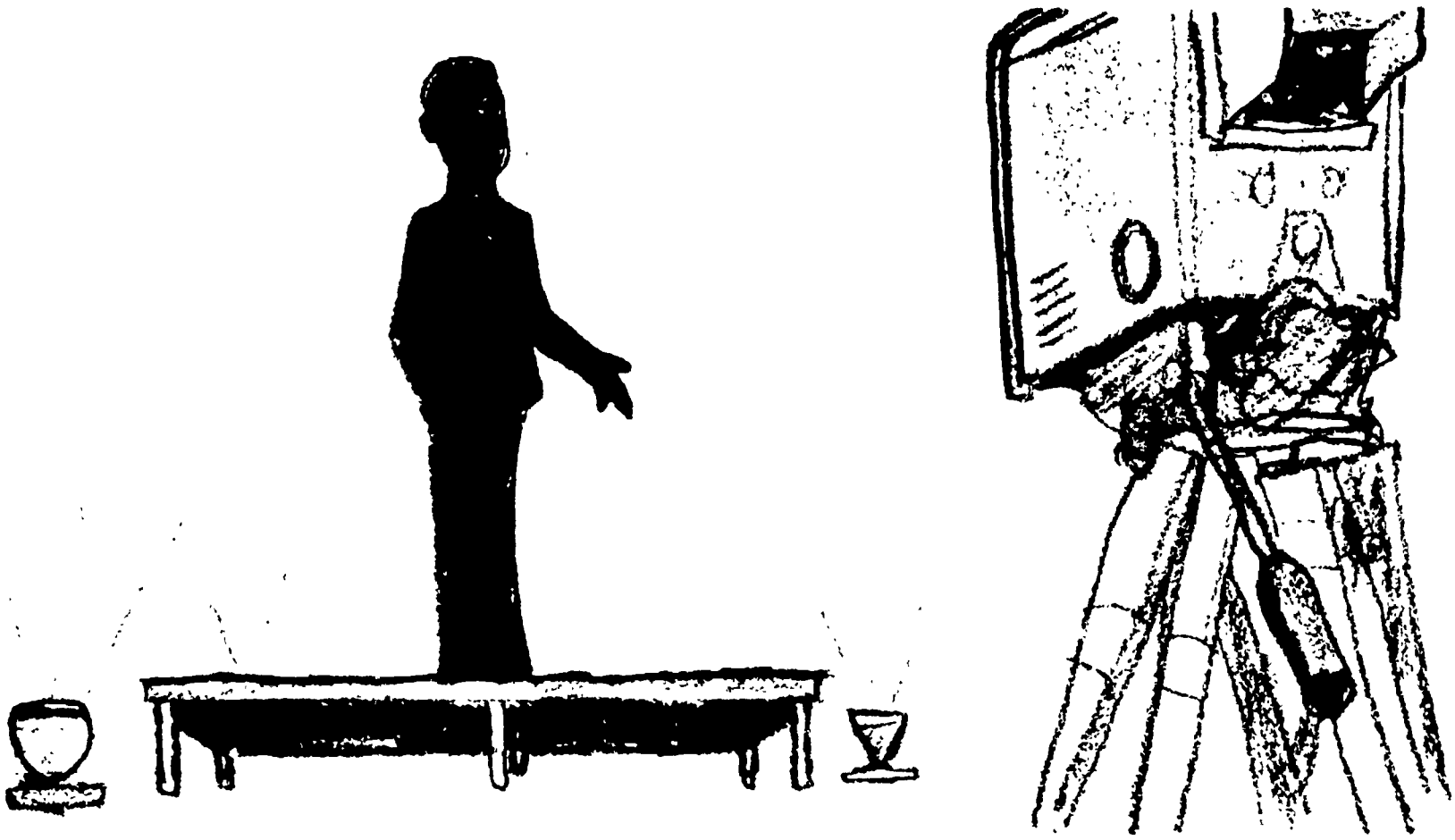


FIG. 30. A TV camera frames a person in full silhouette.

centers on the main subject. A pan back to the left picks up the main subject and its reflected image at the same time.

Lighting Effects

Silhouettes

A silhouette is an unilluminated object seen against a lighted background. It is usually made by lighting the rear wall of a set area, with the performer in front, out of the light. If a person is to be framed in silhouette from head to toe, it is easier to place him on a slight elevation to avoid tilting the camera too much toward the floor. (See Fig. 30.)

Entire plays or skits can be presented in silhouette. Since only the shape of the object matters, less elaborate costuming and scenery are needed, and color and texture are of no importance.

Silhouettes can be adapted for other uses as well. For example, in a social studies lesson, a teacher interviewed a seventeenth-century sailor in silhouette, in front of a painted background of an English harbor.

Cameo Lighting

Cameo lighting derives its name from the NBC series of productions, "Cameo Theatre." This series developed a style of TV production in which the camera concentrates on the actors. With the exception of key props—such as table and chairs—and special effects—such as rain or snow—to set the scene, scenery is left to the imagination of the viewers. (See Fig. 31.)

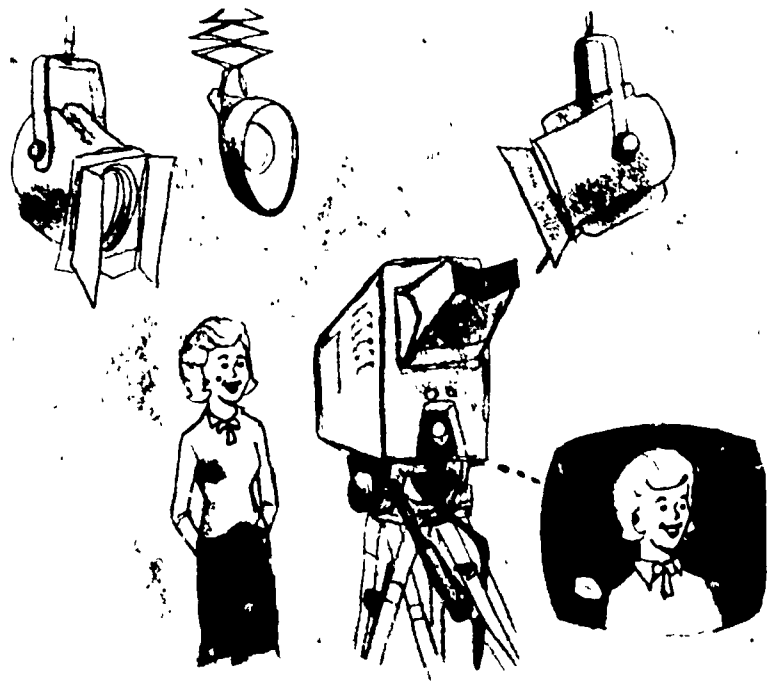


FIG. 31. In cameo lighting, all light should be on the central characters and none on the background.

Elimination of elaborate sets and lengthy rehearsals makes cameo lighting especially adaptable to educational television. Using this lighting, the teacher is illuminated with spots, with a minimum of fill light, keeping the background in darkness. This lighting can also be used on a teacher who is standing or sitting alongside of a front- or rear-projection screen.

Pattern Spots

The pattern spot projects a sharply outlined spotlight and is equipped to project cutout patterns. This spotlight has a slot built into it so that metal cutouts or patterns in color or black and white may be inserted in the slot at the top of the projection lamp. Most units also are equipped with shutters so that the pattern can be shaped and all spill light killed.

Any kind of pattern made of metal or aluminum may be cut out and placed in the spotlight for projection. Their use eliminates the need for painted backgrounds. (See Fig. 32.) For example, in a history lesson on U.S. political parties, a pattern of a donkey and an elephant can be projected behind the teacher.

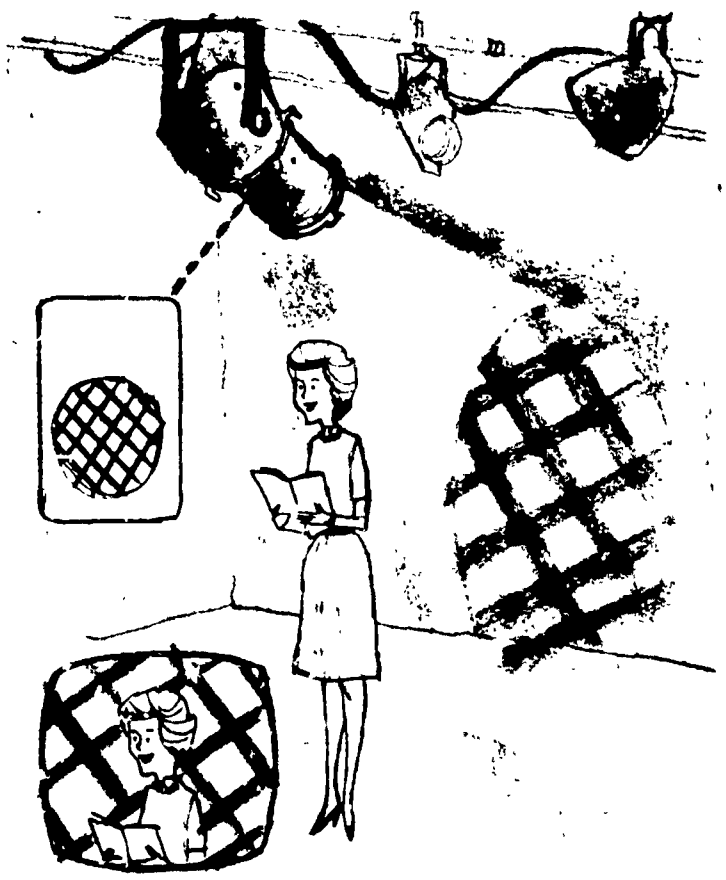


FIG. 32. A checkered cutout pattern produces a checkered background.

Even if a set is not necessary as a background, the addition of a pattern, slightly defocused, will add interest to the picture. (See Photo U.)

PHOTO U. The projected image from a pattern spot makes an effective background as a group of visiting foreign students shows its talents on a 5th grade social studies telecast.

Sets and Backgrounds

Where television is used for direct teaching, less emphasis is placed on sets or backgrounds than in other types of educational and commercial television programming. Since the most important elements in an instructional telecast are the teacher and the subject being taught, to maintain eye contact and emphasis more time is spent on closeups of the teacher and on cards or other visuals than in most commercial programs.

This does not mean, however, that backgrounds should be completely forgotten in educational television. Use of interesting scenery and props does add to the effectiveness of TV lessons. (See Photo V.)

In planning scenery, proper color and pattern contrasts should be provided and fine details avoided. A plain background can absorb

PHOTO V. A set suggesting a florist shop for a third-grade arithmetic telecast.

patterned costumes, while a patterned background needs plain costumes. Large, bold patterns are better than finely detailed designs. Large areas of unbroken, uniform color are monotonous and should be avoided.

The walls of the studio, curtains, or flats can be converted into interesting backgrounds with the addition of a few simple props or decorations or a pattern from a pattern spot. (See Photos W.)

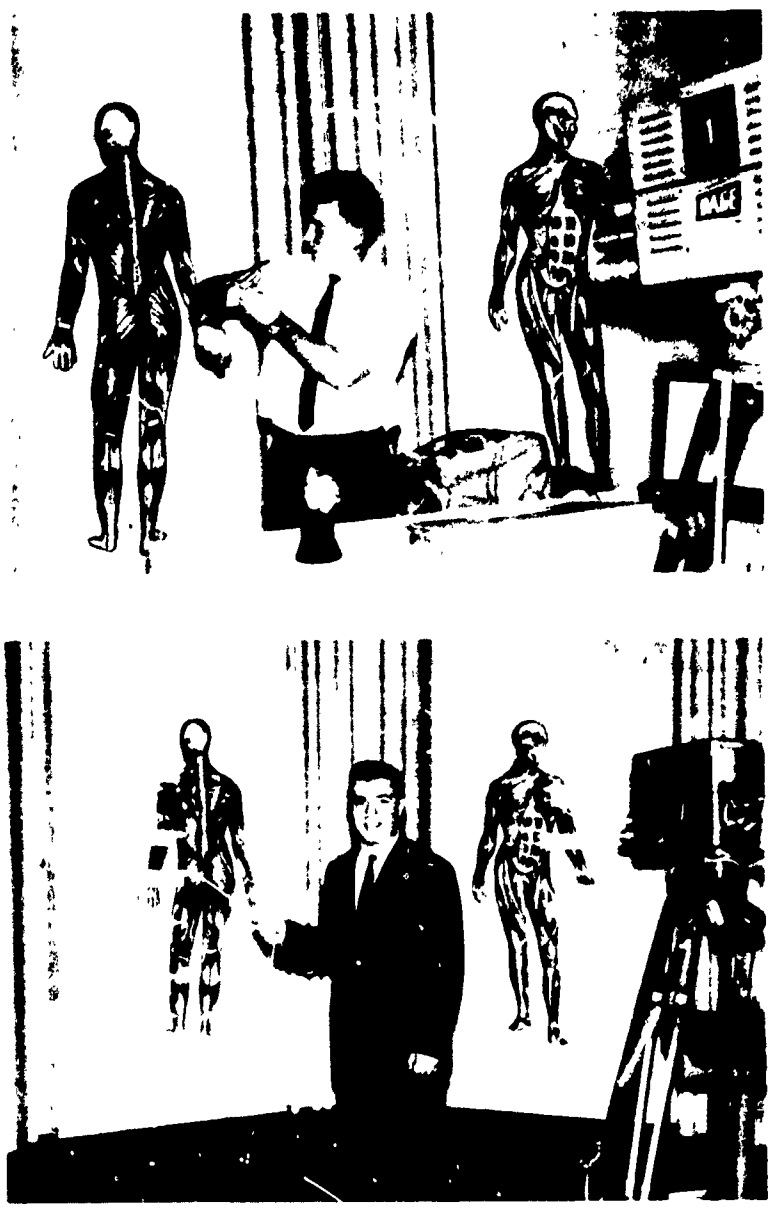
Seamless paper also can make effective backgrounds. The paper comes in 8-foot rolls and may be cut to any length. A scene can be painted on the paper with ordinary poster paints. The main drawback of seamless paper backgrounds is that they tear with protracted use. (See Photo X.)

If backgrounds are put up and taken down many times, it is best that they be painted on unbleached muslin instead of on seamless paper. Muslin will take the paint well, and there is no real storage problem since the backgrounds can be folded and put away.

Opening a TV Lesson

In television, educational or commercial, if the attention of the viewers is not captured during the opening minutes of a program, chances are that their attention will not be captured at all.

Therefore, the opening of a TV program is very important. It should be interesting, fast,



PHOTOS W. A functional background in a TV set aids in the teaching of ninth-grade biology: (a) A biology teacher draws a muscle on his arm; (b) he places the name and function of each muscle on the background; and (c) a second camera takes a closeup shot of the diagram.

moving, and informative, and both video and audio should be closely synchronized. The opening should announce the title and subject of a program as well as set the mood or theme of the lesson; it should give direction to a program;

it should set up a definite progression of action and information.

An outline of some suggested opening devices for use in educational TV programs follows:

1. Title Cards
   a. Flip or pull cards
   b. Lettering superimposed over a picture or photograph
   c. Animated cards
2. Transparencies
   a. Build-up lettering with overlays
3. Slides
   a. A sequence of slides to give motion
4. Crawl or Drum
   a. Rotation of artwork or lettering
   b. Masked crawl or drum
5. Film Clips
   a. Super slides or title cards
6. Live Action
   a. Superimposed slides or title cards or a superimposition from a drum or crawl
   b. A model or experiment
   c. A "live" performance
7. Rear Screen
   a. Establish a shot; then dolly out
   b. Frame picture on screen and superimpose titles
8. Gobo
   a. Any model that can be shot through
   b. Titles superimposed over a gobo before the dolly is started
9. Puppet
   a. Audio introduction
   b. Visual introduction with cards or other artwork
10. Venetian Blinds
    a. Title on one side; information on the other side
11. Book
    a. Pages can be hand-turned or mechanically turned
12. Kaleidoscope or Teleidoscope
    a. Focus in and out of revolving picture
    b. Titles superimposed over pattern
13. Charts or Posters
    a. Closeup of either; then dolly out to show teacher
14. Diorama or Panorama
    a. A scene or picture with appropriate sound effects
15. Audio Effects
    a. Theme music
    b. Background music
    c. Sound effects

PHOTO X. An outdoor billboard poster is used as a background, with pieces from a duplicate poster covering advertising.