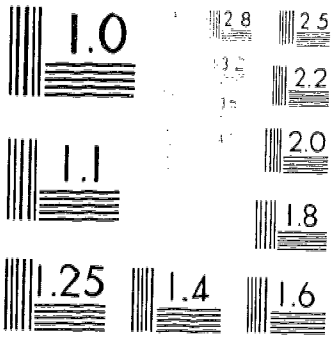
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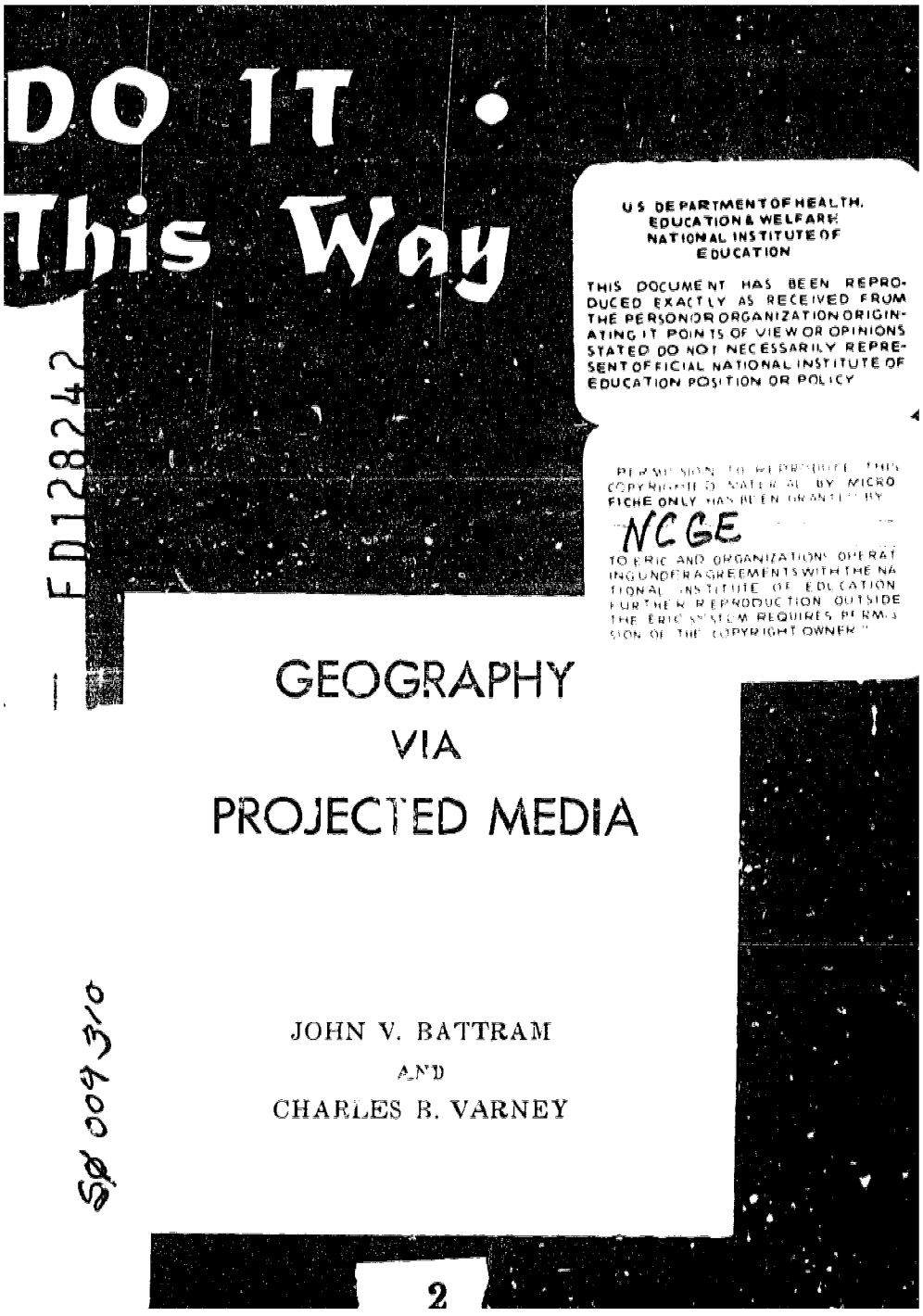
ABSTRACT

The booklet is designed to acquaint geography teachers with a variety of projected media materials and with effective techniques for their use in the classroom. Projected media include slides, filmstrips, opaque and overhead projections, and motion pictures. The use of projected media helps teachers simplify, clarify, analyze, and synthesize relationships between man and his environments. Using media in the classroom helps students form clear mental pictures of geographical principles, patterns, and concepts. One major advantage in using projected media is that teachers can prepare materials in advance that are specifically suited to the presentation of a particular topic. For media to be used successfully, teachers must adequately plan and relate the medium to the chosen topic. This booklet is divided into sections on various media, each containing discussion of the nature of the medium, advantages, disadvantages, special considerations, and selected references. Slides are flexible, available, inexpensive, easy to use, and combinable with other projected media. Filmstrips require a minimum of commentary, present a sequential development of an idea, are inexpensive, and contain informational captions. Overhead projectors allow the teacher to maintain eye contact with students, project many objects, and control the pace of the presentation; however, they are costly, require special storage facilities, and create distortion of images. Although motion pictures add realism to learning, offer technical flexibility, and are easily available; they are complex and expensive. The use of projected media involves principles of selection, introduction, facilities, presentation, and follow-up. (ND)



GEOGRAPHY VIA PROJECTED MEDIA

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VIA
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6. Richason and Guell; GEOGRAPHY VIA AERIAL FIELD TRIPS; 1965
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CONTENTS

PREFACE

Geography Via Projected Media replaces *Geography Via The Use of Slides, Filmstrips, Motion Pictures, and Opaque Projectors.* This earlier publication was written by Dr. Stuart M. Rich of the Wisconsin State University at Whitewater, Wisconsin, and Mrs. Lavinia G. Young of the Fenwick Grade School in Fenwick, West Virginia. When consideration was given to the revision of their booklet, Dr. Rich recommended Dr. John V. Battram of the same University. We are indeed fortunate to have Dr. Battram, a media specialist with an interest in geography, write and illustrate an entirely new publication. Dr. Battram selected Dr. Charles B. Varney, a geographer with an interest in educational media, as co-author.

The Publications Committee wishes to thank Dr. Battram and Dr. Varney for writing *Geography Via Projected Media.* They also prepared and selected the illustrations. Teachers and students will find this booklet valuable in using projected media more effectively in their classrooms.

KERMIT M. LAIDIG
Director of Publications

ACKNOWLEDGEMENTS

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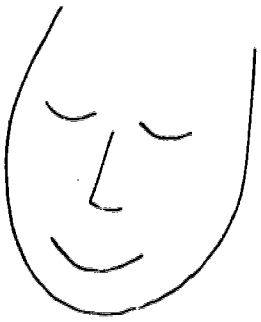
INTRODUCTION

Geography as a study of the earth as the habitat of man can, and should, make use of projected media in a wide variety of teaching situations and subject matter that will help simplify, clarify, analyze, and synthesize the relationships between man and his environments. The rapidly expanding volume and variety of materials and techniques of projected media—including pictures, slides, filmstrips, films, transparencies for overhead projection, opaque projection, television, self-teaching stations—calls for an organized, up-to-date summary of materials, techniques, and combinations found most effective for general use and in specialized types of uses in the teaching of geography. This booklet presents such a summary.

The use of projected media in the teaching of geography should help the student form a clear mental picture of one or more of the following:



(1) a principle of geography—for example, temperatures tend to decrease with increase in elevation;

(2) characteristics of the natural environment—types of landforms, climatic and weather phenomena, types and communities of biota;

(3) man's economic and aesthetic activities as related to the physical environment—fishing, farming, forestry, mining, manufacturing, recreation;

(4) patterns of physical phenomena or of human activities by which an area may be identified as a region;

(5) concepts in political geography—how international relations may be influenced by differences in the areas, shapes, locations, resources, accessibility, and populations of political entities;

(6) aspects of cultural geography—population distribution and characteristics, religious beliefs and expressions that influence the cultural landscape, distributional evidences of the cultural heritage.

One major advantage in using projected media is the ad-

vance preparation of materials specifically suited to the presentation of a particular topic or concept.

Howard C. Koverman, Jr.[1] describes three categories of use of "visuals":

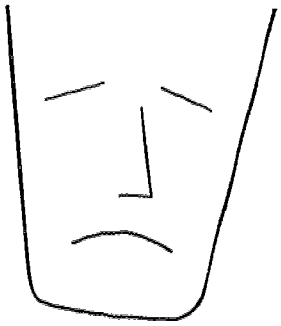
(1) those used to supplant the speaker mainly—as in the use of sound films or captioned filmstrips;

(2) those used to supplement the speaker—conveying ideas and relationships that can be shown much more effectively on the screen than they can be related verbally;

(3) those used to complement the speaker's remarks by emphasizing or clarifying certain points.

To these should be added the developing use of media in programmed self-teaching stations.

Probably the greatest weakness in the use of projected materials is lack of adequate planning and relating their use most effectively to the topic presented. The user should ponder the question: "Which medium or combination of media available will present most effectively the proposed idea or topic?"



In answering this question consideration should be given to:

:the specific objectives of the presentation

:the quantity and quality of material available for use

:the manner and timing of projection and its relation to the teacher's commentary

:the possibility of using—alternately or simultaneously—two different types of projections

:the possibility of arranging a situation in which students, individually or in small groups, might use more effectively the projected material by themselves outside of class.

There will be some relation between decisions on these items. If a film is selected, then the manner of presentation is clear and there is little or no need for commentary from the teacher during the showing—only pre- and post-showing integrative comments. If the choice is between filmstrips, slides, and transparencies for overhead projection, the situation is

[1] Koverman, Howard C., Jr., "When and How Should We Visualize?", *The Professional Geographer*, Vol. XIII, No. 4, July, 1961.

more complicated. Haemer[2] suggests as general guides for selecting material:

:be direct

:be simple

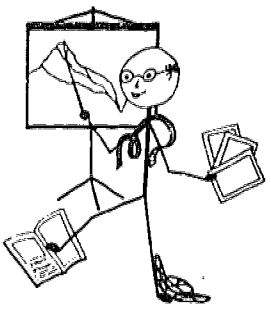
:be clear

:be accurate.

Students are limited in comprehension by their background of experience and imagination. Even their mental image of an area or geographic situation gotten from a verbal description may be quite erroneous. Therefore, use of colored pictures in teaching geography is the only way many students may be given a realistic impression of the many parts of the world outside their realm of experience.

[2]Haemer, K. W., "Making the Most of Charts, An ABC of Graphic Presentation," American Telephone and Telegraph Company, New York, 1960, p. 40.

PROJECTED MEDIA

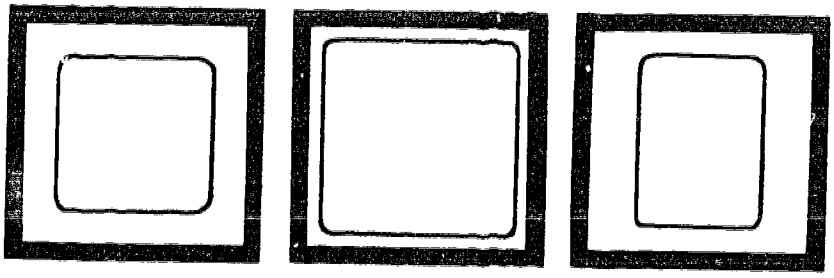


SLIDES

Nature of the Medium

In the early years of production and use of slides, two sizes were common—2" x 2" and 3¼" x 4" size, which required special preparation, handling, projection, and storage facilities. A few sets of very good quality physical and cultural geography slides of the 3¼" x 4" size in black and white were produced and may occasionally be available but their acquisition is not recommended for general classroom use if the school is just beginning development of a collection and is on a very restricted budget.

The 2" x 2" size designation refers to the outside measurement of the cardboard mount which holds the small pieces of film. The three most common film sizes that are put in the



2" x 2" cardboard mounts are 35mm, 127 film, and the Instamatic (126). Each of these produces a slightly different size projectable film within the 2" x 2" mount (See illustration).

Projectors for 2" x 2" slides are available in a variety of price, quality, and performance characteristics, both manually operated or with varying degrees of automation. The projector that changes slides automatically with a present timing or by remote control, either forward or backward, is found more and more frequently in use and is recommended. This type of pro-

jector usually requires a slide tray, either straight—which holds up to 40 slides per tray—or circular—which holds 80 to 100 slides. Some projectors will handle both straight and circular trays. Trays by different manufacturers are not necessarily interchangeable.

Advantages of Slides

(1) *Flexibility.*—Selection of any *number* of slides to be shown in whatever *order* is desired before or during the period of showing is a marked advantage over filmstrips or motion pictures. This advantage is greater as the collection from which a selection may be made is larger.

Howard Gregor[3] has suggested several different bases for slide arrangement each having its own unique contribution to make in the teaching of geography. (a) *Area familiarity sequence*—showing features and relationships of a local or known environment to establish a basis for recognizing and understanding similar features or relationships in a foreign or unfamiliar area. (b) *Scale sequence*—illustrating settlement size in cultural geography from a hamlet through village and city to the large metropolitan area, or, in physical geography, from a small rivulet in the yard or garden during or after a rain and its erosive and depositional characteristics to a major river. (c) *Course progression sequence*—showing the progression of topics in the course whether from agricultural production of wheat, through transportation, milling, and baking to consumer, or the sequence of assembly of various materials for the manufacture of a given item. (d) *Historical sequence*—(which should be self-explanatory).

(2) *Availability.*—There are many commercial sources for slides produced specifically for teaching of geography (See suggestions at end of this booklet). Also a teacher may easily build a slide collection from pictures taken personally. Completely automatic cameras are available for around $50 or less. The user merely points the camera and shoots. Commercial processors of color film will make slides or color prints, or both, as directed. Duplicates of color slides are made with no damage to the slide duplicated and with negligible loss of color or detail in the duplicate. The cost is nominal.

[3]Gregor, Howard F., "Slide Projection Techniques in the Geography Class," *The Journal of Geography*, Vol. LV, No. 6, September, 1961, pp. 299-302.

(3) *Easy and inexpensive to use.*—Compared to a movie projector, a slide projector is inexpensive. Projection is relatively simple and damaged or lost slides may be replaced for a modest cost (fifty cents per slide, approximately) if the original source is known and still accessible.

(4) *Combinations with other projected media.*—Two slide projectors may be used simultaneously to permit comparisons of similar features or landscapes in widely separated parts of the world or of markedly different cultural adaptations to similar climatic and topographic regions.

The combination of slides—showing actual scenes of land and people—and an an overhead projection of a map of the area is an excellent way of fixing in the student's mind a mental picture of the geographic character of a country.

(5) *Use in extended discussion and testing.*—Slides may be projected for unlimited periods of time during which fruitful discussion and discovery may continue and slides previously shown may be reviewed for study as often as desirable. Using slides for testing recognition of distinctive aspects of geographic phenomena is very effective if carefully planned. The slide may be projected for a limited time (thirty seconds or one minute) and, if time permits, some of the more difficult ones may be shown a second time during the test.

Disadvantages of Slides

Usually more time, thought, and organizational effort are required for the effective use of slides than for filmstrips or films. Selection, arrangement, cataloging, and replacing after using in the cataloged storage facilities may tend to limit use of slides. If care is not taken, the slide collection can become badly mixed up and slides damaged or lost. The limitation in still presentation is an obvious disadvantage over films when motion sequences are necessary for a clear conception of an idea as in a manufacturing process.

Special Considerations

Making slide copies of maps and pictures involves complex technical knowledge and equipment. It is advisable to consult

with or obtain the collaboration of a photographic specialist before attempting such copy work. Then there are the legal and ethical aspects of possible copyright infringement.

Production of stereo slides requires use of a stereo camera which takes two pictures of each shot, each at a slightly different angle. A stereo projector is required as well. Stereo projection gives a vivid, three-dimensional effect which can add significantly to the teaching of geography, as in the case of viewing effects of erosion and the relief of the landscape. Consultation with a reliable photographic store is recommended before launching into stereo slide production and projection.

A very recent development is the "over slide projector," which combines projection of a slide and an overhead transparency simultaneously. This medium will be discussed in a later section.

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Dennis, Donald A., "Preproduction Planning: Key to Successful Slide Shows," *Audiovisual Instruction*, May, 1965, p. 401.

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Miller, E. Willard, "The Use of Color Slides As a Geographic Teaching Aid," *The Journal of Geography*, October, 1965, pp. 304-307.

Wittich, W. A., and C. F. Schuller, *Audiovisual Materials, Their Nature and Use*, Harper and Row, New York, 1967, Chap. 12, "Still Projection."

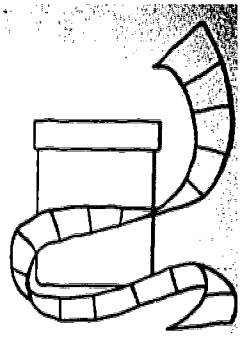
Films and Filmstrips about Slides

Handmade Lantern Slides, 35-mm filmstrip, color, 50 frames, Ohio State University, 1954.

High Contrast Photography, 16-mm film, color, 21 minutes, Indiana University, 1947.

Photographic Slides for Instruction, 16-mm film, black and white and color, 10 minutes, Indiana University, 1952.

Still Projectors, 2 x 2 inch Slide Projectors, 8-mm film cartridge, 3 minutes, 33 seconds, Chandler Publishing Company, 1965.



FILMSTRIPS

Nature of the Medium

A filmstrip is a length of 35-mm film with transparent still pictures or images on it, each of which is called a "frame." The pictures are almost always in a related sequence and are usually in color. There is often an explanatory caption with each frame. Filmstrips usually have from 20 to 50 frames. Storage is in a round metal or plastic container. Range in cost is from three to fifteen dollars per filmstrip so that it is economically feasible for a school to build a collection with quite limited expenditures.

Projection is from the back of a darkened room onto a good screen. Some projectors can be remotely controlled from the front of the room.

Advantages

Filmstrips may be used by the teacher in the classroom and by students individually with the availability of individual filmstrip viewers. A useful practice is for the teacher to show a filmstrip to the class with only a minimum of commentary and then to make it available for the students to view individually at their convenience. This procedure gives students time to study pictures, sequences, and captions, and to make notes or outlines on the topic presented.

Filmstrips present an organized, sequential development of an idea or concept that is the same each time it is viewed, which may not be true of the use of slides for a similar purpose.

Being a still picture medium, filmstrips share with slides the advantage of unlimited viewing and study of an individual picture.

Filmstrips are inexpensive and are available for a wide variety of subjects. Storing and using them is simple and most projectors are relatively inexpensive and easy to operate.

Many filmstrips have captions preceding, below, or following the pictures. This arrangement provides clear, concise points of information and makes the filmstrip particularly adaptable for use by a student individually. Geographical terms may be more readily comprehended by use of a filmstrip than the explanation of them without accompanying illustrations.

Disadvantages

Damage of a filmstrip may make it unusable since there is practically no easy and inexpensive way of repairing or replacing damaged sections.

Changes due to scientific development, political, military, or economic action concerning the subject of a filmstrip may render it obsolete or make some frames irrelevant.

Using Filmstrips

Filmstrips permit pacing the presentation to fit circumstances of time, composition of the audience, and relative importance of the subject presented, an advantage over motion pictures.

Previewing filmstrips is important so the teacher will know the captions and can be prepared to make additional comments and to anticipate questions from the students.

The question of whether the teacher should read aloud the captions can be answered only with reference to a local situation, and perhaps then, only by trial and testing. Instead of captions on the frames, some filmstrips are accompanied by a printed frame-by-frame commentary for the teacher.

An advantage over most motion pictures is that filmstrips may be used in part quite readily and effectively. Often filmstrips are divided into several subsections, only one or two of which might be pertinent to a particular showing.

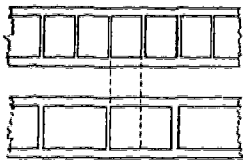
In supplementing and reinforcing learning from books, filmstrips are particularly useful. In a number of instances, filmstrips are published to correlate with a specific textbook, workbook, or to be a part of a programmed learning package. In connection with field trip preparation or review, filmstrips can heighten interest and augment the educational value of the trips.

Special Considerations

Sound Filmstrips.—Some filmstrips are accompanied by a recorded narration, either on a disc or on tape. It should be recognized that in the use of sound filmstrips the teacher no longer controls the pace of the presentation. Of course, sound filmstrips can be used without the recorded narration. There are available special combination units which involve a filmstrip projector and a record player in one unit.

Projecto Maps.—One major filmstrip producer, Encyclopaedia Britannica Educational Corporation, has available filmstrips known as "Projecto Maps." These are map sets in filmstrip form intended for use where wall maps are not available. They represent an interesting innovation relative to the problems of housing extensive map collections in individual buildings.

Their use is quite limited due to the necessary procedure of pulling down a screen, darkening the room, turning out the lights, turning on the projector, and finding the particular frame of the filmstrip each time the teacher wants to make reference to a map in the course of a class.



Combination Projectors. — Filmstrip projectors that are presently in schools will show single frame filmstrips and will possibly have an attachment so that they can also show 2″ x 2″ slides. Many filmstrip projectors will not show double frame filmstrips. There are filmstrip projectors on the market that will show all three.

Filmstrips—Selected References

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Children Learn from Filmstrips, 16-mm film, black and white and color, 16 minutes, McGraw-Hill, 1963.

Enriching the Curriculum with Filmstrips, 35-mm filmstrip, black and white, 60 frames, Society for Visual Education, Inc., 1952.

Introducing Filmstrips, 35-mm filmstrip, black and white, 29 frames, National Film Board of Canada, 1947.

Slidefilm in Teaching, 35-mm filmstrip, black and white, 46 frames, Young American Films, 1946.

Still Projectors, 35-mm Filmstrip Projector, 8-mm film cartridges, 3 minutes, 10 seconds, Chandler Publishing Company, 1965.

Teachers Consider Filmstrips, 35-mm filmstrip, color, 27 frames, Eye Gate House, 1950.

Teaching with a Filmstrip, 35-mm filmstrip, black and white, 50 frames, Society for Visual Education, Inc., 1953.

OPAQUE PROJECTION

Nature of the Medium

Opaque, flat materials, such as pictures, maps, photographs, a page of a book or magazine, or objects like a coin or slide rule, may be used in an opaque projector. A more common use in teaching geography is the projection of maps, charts, graphs, and pictures, often from the most recent publications.

Materials up to a 10" x 10" size can be projected at one time. Larger materials, such as a page from *Life*, must be shifted to get the whole page projected.

The opaque projector must be used toward the front of the room (but not as close to the screen as an overhead projector) with a good screen. In the opaque projector, light is reflected from the opaque material to be projected, consequently projected material, such as colored pictures or black and white photographs, often appears as a rather, dull, lack-lustre screen image.

Opaque projection requires an almost totally darkened room and a very strong lamp in the projector, usually of 1,000 watts. Some projectors have a built-in pointer and a roller feed for introducing materials into the projection position. Side trays for holding and receiving materials are usually available as an accessory.

Advantages

Readily available materials, such as current books, magazines, students' work, and snapshots can be projected without special preparation. Small pictures can be greatly enlarged. However the greater the enlargement, the less distinct the screen image becomes. The opaque projector is very useful in the rapid enlargement and copying of diagrams, simple maps, charts, and other types of illustrations used for making posters, permanent enlargements, cut-outs, or for preparing drawings for the chalkboard.

Basically the operation of the opaque projector is easy and simple. But when a variety of materials differing in size, composition, thickness, and weight is to be projected in sequence, the management of the projection program is difficult for most elementary students.

Disadvantages

The requirement of a well-darkened room may cause inadequate ventilation resulting in audience drowsiness with a prolonged projection program. On the other hand, if the students are not drowsy, discipline or control may be a problem in the dark. The use of the chalkboard and wall maps is not possible while using the opaque projector.

The high-wattage lamp poses heat problems. Projected materials tend to curl (especially photographs) and may scorch if kept under the lamp too long. A piece of glass may be placed over the projected material to keep it flat but unless it is of a special heat-resistant type, heat from the lamp may crack the glass. Opaque projectors on the market now (1968) have the heat-resistant glass built-in or available as an accessory. Also, improved cooling arrangements, some employing two fans, have considerably reduced the problems of heat.

Opaque projectors need a moderately high support and are sometimes in the students' line of sight to the screen. This possibility is complicated by the necessity of the projector being within about twenty feet of the screen, so a deep room may have many viewers behind the projector.

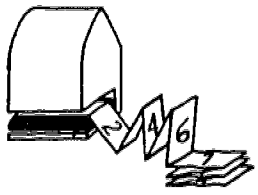
Opaque projectors, being heavy and large, are cumbersome to lift and carry.

Using Opaque Projection

Operation of opaque projectors is relatively simple and easy. The only functions are adjusting the focus and tilt, turning on the projector, and placing and removing the material to be projected.

Map assignments may be corrected effectively by projecting the correct map or key and having the students compare an assigned map with it. Or a map with errors may be projected and the students asked to identify the errors.

Strips for use in the opaque projector may be prepared from a roll of shelf or wrapping paper by mounting the materials (pictures or other graphic materials) on the paper in sequence and making accordian folds between the mounted items.



Accessories that are available include side trays, a pointing device, a roller feed arrangement, and a heat-resistant glass plate directly above the stage. When purchasing an opaque projector, it should be clearly understood whether these accessories are standard equipment or are extras.

It is emphasized that satisfactory use of the opaque projector requires a well-darkened room. In too many instances, schools have been dissatisfied with the purchase of an opaque projector because the school building did not possess the proper darkening facilities.

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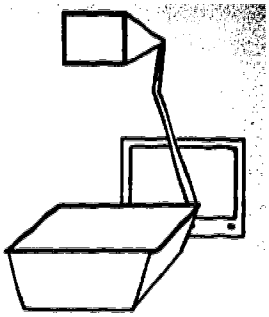


OVERHEAD PROJECTION

Nature of the Medium

This is a still projection using transparent materials placed on a translucent glass horizontal surface with the source of the light below. The "transparency" usually is mounted in a cardboard frame with a transparent area of 7½" x 10".

Black and white or colored transparencies can be produced in many schools through a variety of processes relatively inexpensively. Additionally, there are commercial sources that have a wide variety of transparencies in geography.

The occasional statement that transparencies are nothing more than very large slides has an element of truth, but in use, transparencies permit control of information—with additions or deletions—and attention that is not possible with slides. Details on techniques involved will be presented later.

The overhead projector is used in the front of the room allowing the teacher to maintain eye contact with students. The teacher faces the class and can read the transparency on the projector table beside him, point to particular aspects of it with a pencil or finger, and make additions to it with a felt-tip marker, or introduce overlays.

Overhead projection is effective in a moderately lighted or semi-lighted room, particularly if the screen is free of direct light. Overhead projectors come in several levels of light output permitting their use with varying sizes of screens and rooms. The average classroom projector is light, compact, and easy to use.

Advantages of Overhead Projection

The teacher maintains eye contact with the students from the front of a lighted room. The projector is light and easy to carry from one place to another and easy to set up and use. There are no moving parts in the operation of the projector, except an adjustment for focusing.

Numerous objects and devices are available for projection. These include slide rules, electrical meters, compasses, thermometers, abacuses, mock-ups, maps, graphs, and charts. In addition, transparencies are easy to make locally, and a basic map, diagram, or outline can be added to and expanded while it is

being projected. Cut-outs and silhouettes can be used on overhead projectors as well.

The teacher has complete control of the order and pace of presentation. Numerous attention control techniques are available such as sequential revelation of one (or several) transparencies, adding overlays, manipulating objects, and turning the projector on for a few seconds then checking the students' scope of observation.

Disadvantages

Purchase of commercially prepared transparencies is expensive. Even though it is easy to make your own transparencies, the materials are still expensive.

Transparencies are large and require special filing facilities. As with all projection devices, some people experience fatiguing glare as a result of operating the overhead projector.

As overhead projectors are tilted upwards, the rectangular outline of the projector image becomes a trapezoid. This effect is known as keystoning. This creates distortion of images and should be corrected. It can be corrected by mounting screens away from the wall at the top. This then permits slanting the screen back toward the wall at the bottom. When the correct angle is established, the outline again appears rectangular. This is another matter where a salesman or vendor can be of assistance.

Special Considerations

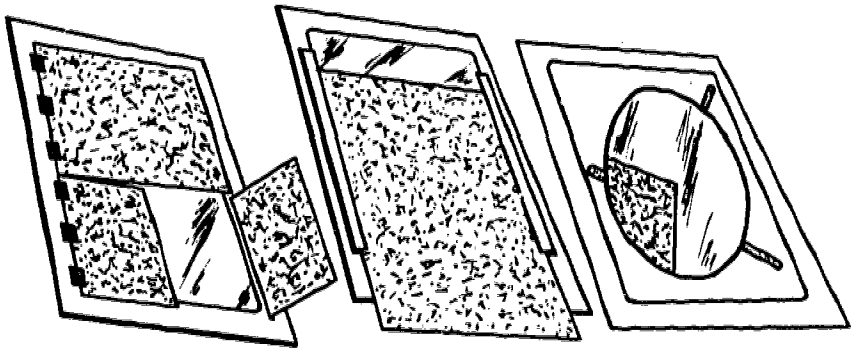
In the teaching of geography, overhead projection offers an excellent means of impressing on the students developmental and relationship ideas, facts, and concepts. For example, on a transparency of the physical features of the United States, the head of navigation on the Atlantic Coast streams could be indicated as sites of water-powered saw-mill and grist-mill development. Later the formation of significant settlements at these sites served as the focus of land and water transportation culminating in the string of cities existing on the Fall Line. On a transparency of the physical features of an area, one could place an overlay of climate, another of natural vegetation, and yet another of the major land uses, such as cultivated agriculture and grazing. Still another type of developmental idea is a transparency of deposits of coal, iron ore, and limestone with added overlays stressing the transportation of these materials—showing modes of transport and distances—to a common point for the production of steel. Population distribution with respect to climate, topography, and types of economic activity can be stressed effectively in a similar manner. The students' under-

standing and appreciation of the relationships of a relatively complex map, graph, or chart involving several distinct variable phenomena is greatly increased if they can see how it was developed, either by the teacher illustrating it with transparencies plus overlays, or adding information as the transparency is being viewed. Students may benefit by preparing a series of sequential transparencies and overlays (or ideas for them), culminating in a developmental or relationship concept.

Overhead projection is most effective when used for presenting line drawings, maps, and charts and not for full dimension color, which is best presented in 2" x 2" slides.

Creditable transparencies can be made using colored inks or pencils and transparent, translucent, or opaque colored, stick-on material. The marking instruments come in a variety of makes and styles. Most of them will write directly on clear acetate sheets and are water soluble making them undesirable for permanent transparencies.

Because the elements on the stage of the overhead projector can be manipulated, there are several attention control techniques possible. Revelation is the technique of keeping information covered until the teacher wishes to reveal it to the viewer. This is done most simply with a sliding mask or sheet of white paper covering the part of the transparency to be revealed. By using a white sheet of paper, the image is projected on to the back of the sheet so that the teacher can see the unrevealed material and know exactly what follows.



Material may also be hidden by hinged flaps on the transparency and removed as desired. By experiment, the size and attachment of the flaps can best be determined.

The overlaying technique is generally familiar. Additional sheets of clear acetate with images on them can be dropped into place over the basic transparency and in this manner visual

elements in a variety of colors can be added one step at a time. Overlaying can be done discretely or sequentially.

In discrete overlaying, an overlay transparency is introduced on a basic diagram or map and then removed before another discrete transparency is introduced. This requires the hinging of the overlays on separate sides of the basic transparency. If the projector is one with a corner post for support of the lenses, four discrete overlays can be employed on each basic transparency.

Sequential overlaying involves the step by step sequential adding of visual information that fits together to make a completed image. Some complicated transparencies may use as many as ten such overlays. In sequential overlaying, the hinging is usually done from one side, usually the left.

In geography, discrete and sequential overlaying may be combined or alternated depending upon the circumstances and the desires of the teacher. For example, a basic transparency of topography of an area might have overlays of drainage, transportation, land use, climate, and settlement pattern, each of which can be used singly or in various combinations and sequences.

Instead of hinging overlays that may be used in varying sequences, a frame that has poles about one-half inch high on two corners can be placed on the projector stage. The basic transparency as well as the overlays are then punched with holes so that they slip over the poles thus insuring the correct registry.

It is possible to silhouette items and manipulate objects or cut-outs on the stage of the projector. Several manufacturers are now producing objects and moving plastic mock-ups for use in overhead projection.

Overhead projection can do most things that can be accomplished by use of the chalkboard or the opaque projector with the distinct advantages of the teacher continuously facing the students and being able to quickly present much more material than is possible by limited chalkboard space, and to return to previously presented material quickly should a belated question arise.

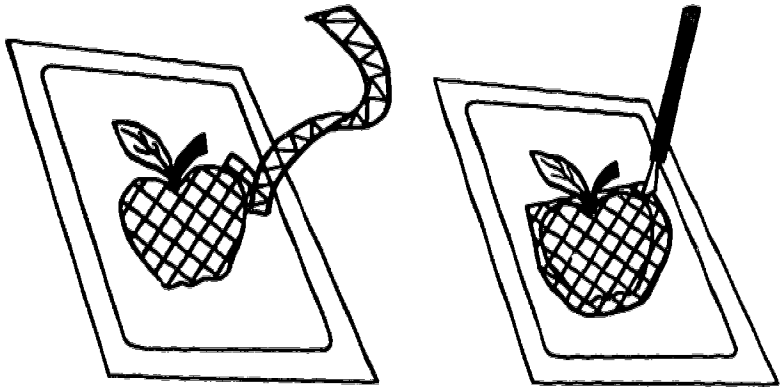
Published transparencies are becoming available from a variety of sources. Most major publishers of maps and classroom instructional materials now produce transparencies.

Making Transparencies

There are several processes by which transparencies can be made. They are: (1) handmade, (2) heat process, (3) color lift, (4) photocopy: wet and dry, and (5) diazo processing.

1. *Handmade.*—It has already been mentioned that it is

possible to produce color transparencies through the use of colored inks and colored pencils. There is another coloring medium which proves most satisfactory. Once a person has achieved a black-line drawing, either by hand or by one of the following processes, color can be introduced through the use of adhesive color material. This transparent material comes in a variety of



colors and has an adhesive on the backing. To use it, the protective backing is removed. A piece of it is then fixed in place over the image and a small, sharp knife is used to cut out the outline and to remove the unwanted portions of color. Some trace the image on the backing sheet, cut it out with scissors and then stick the adhesive color in place. This works with simpler visual outlines, but it is often difficult to start the separation of the backing sheet once the item has been cut out. The handmaking of transparencies can often be assisted by vendors and salesmen of the materials to be used and fellow teachers.

2. *The heat process.*—The heat process prepares a good black-line transparency image in about four seconds. A specially treated transparent foil is passed through a copying machine with the drawing to be copied. This is an easy process to use but it has its limitations. A major limitation is that this process will only reproduce black-line copy or masters. However, black-line image masters are becoming readily available from a variety of sources which will be mentioned later. These black-line images can be colored by the techniques mentioned above.

3. *Photocopy: Wet and Dry.*—Almost any machine that provides office copying of letters and documents will also make transparencies. This is true for both wet and dry photocopy processes. The best approach is to contact the company or salesman that sold the machine and have them inform you about materials and techniques in making transparencies. These processes will yield transparencies that have black or gray images.

4. *Color Lift.*—Color lift can be accomplished by several different approaches. Essentially it is a procedure of taking a color photograph from a magazine that has been presented on clay glaze paper (most photographic magazines are printed on such paper), and fusing the face of the picture to a piece of clear or translucent acetate. After a good bond has been established, the paper portion of the picture is soaked away. A wetting agent in the form of household detergent facilitates this soaking process. After the paper has been removed, the remaining clay residue is removed with a cotton swab. The result is that the ink from the printed page is lifted by the acetate and is then available for projection. Manuals can be consulted for the preparation of projected materials or consult a vendor or salesman who sells the materials for this process. This color lifting can be accomplished with most machines that do plastic lamination. These include such devices as dry mount presses, cold lamination devices and heat processing copiers.

5. *Diazo processing.*—Diazo processing is perhaps the most sophisticated of the processes listed here, and is also the most satisfying in its results. It has available in it 18 different colors. Again, it is recommended that interested persons seek assistance from vendors of materials and equipment. A number of producers of published transparencies use diazo processing for making their transparencies. However, with a little instruction and the proper equipment, it is possible to produce good diazo transparencies in individual school buildings. If a school has blueprint facilities in an industrial arts department, it is often possible to do diazo reproduction with this equipment as diazo reproductions of transparencies are very closely related to blueprinting. The basic process is one of exposure with ultra-violet light and development by ammonia fumes.

Heat Process Masters

It was mentioned previously that heat process masters are becoming available from a variety of sources. One manufacturer of heat process equipment and materials has now produced in excess of 100 packets of about 25 masters per packet; each of these can be easily converted into transparency form using the proper transparent material. At least eight packets in this group had been devoted to geography. Text book publishers are beginning to produce masters for heat process transparencies which correlate with their text materials. Scholastic magazines are including maps and economic charts, etc., for reproduction by the heat process.

A weekly current events master service is now available which provides weekly a set of masters for transparency pro-

duction. This is a joint venture of *Newsweek* magazine and *3M Visual Products*. It is called *News Focus* and it is sold much as magazine subscriptions are sold. This service usually contains maps in each issue.

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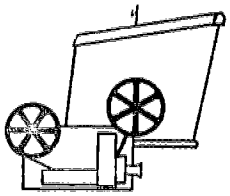

MOTION PICTURES

Nature of the Medium

The sound motion picture is a synthesis of several simultaneous effects. The motion picture relies upon an illusion. When a series of still pictures are rapidly flashed before our eyes, we perceive continuous, smooth motion due to our "persistence of vision". In order to flash these pictures before our eyes at the rate of 24 frames per second, the sound motion picture projector utilizes a projection system of light and lenses similar to other still projection devices. At the same time, an ingenious mechanism flashes these pictures on the screen at sufficient speed that the viewer does not perceive the change of pictures. Actually, the screen is dark without any picture as much of the time as there is a lighted image present. The projection system, the transport system, plus a sound recording on the film, known as a sound track, comprise the sound picture. These three systems working together produce a synchronized program of sound and motion picture images simultaneously.

Motion pictures are generally projected from the back of a room onto a good projection screen. As a result of numerous refinements, motion picture projectors today are of high quality and reliability. Among the more recent and continuing improvements in motion picture projectors are those of automatic threading, transistorized amplifiers, and improved light sources. Due to its technical nature, the motion picture medium permits a number of special effects such as slow motion, time elapse, stop action, animation, photomicrography, and others. These special effects, along with the high development of the art of the motion picture, combine to give us an instructional medium which is dynamic and powerful in its ability to bring outstanding learning experiences to the classroom. Color films have been developed to a high degree of excellence. There are now sound motion pictures available on almost every subject and topic imaginable. Most schools now have several motion picture projectors for the presentation of these materials.

Advantages

Motion pictures add realism to learning through the dimension of motion which commands the attention of the viewer. In geography, motion makes more vivid and impressive action and

processes. Examples include transportation, manufacturing, mining operations, and various kinds of constructional activities, such as terracing a field to prevent erosion.

The possibility of viewing inaccessible or distant scenes is a marked advantage in teaching geography. The comprehension of a foreign area, its physical environment, and the way people live and work is greatly enhanced by motion pictures. The addition of sound further improves this teaching medium.

Techniques, such as slow motion and time lapse photography, make possible the viewing of things that, in reality, are either too slow or too fast for the human eye to perceive. The impact of a raindrop—greatly enlarged—on bare soil appears like a bomb burst and is convincing evidence of the great erosive effects of a heavy downpour. The growth of a plant in response to light, soil conditions, and water and fertilizer through time lapse photography fascinates students.

Motion pictures have technical flexibility which permits the smooth and logical unfolding of the story or sequence of ideas. Projectors may be slowed or accelerated, or even stopped on a particular scene, for study or discussion of what has been shown, what the current scene discloses, and what might be expected to follow.

Motion picture films are readily available in all curriculum areas for purchase and rent. There are over 3600 film libraries in the United States alone.

Disadvantages

The order of presentation is generally inflexible. Motion pictures are a controlled presentation package in which order of presentation, pace, and narration are predetermined by someone other than the classroom teacher.

Films sometimes contain materials irrelevant to the teacher's purpose. This irrelevant material must be shown along with relevant material in the film.

Parts of films may be shown but it is time-consuming and awkward to arrange, and often the full significance of the part shown is not apparent because of the relatedness of the film as a whole. Good documentary films are often too long for class periods.

Films are expensive to produce and to purchase. There are numerous sources from which a large number of films may be borrowed free or rented but many of the better films require several weeks to several months advance booking to assure their availability. Motion picture projectors also are quite expensive.

The relative complexity of the motion picture projectors

requires knowledge and training in setting up and operating, and in knowing what to do when something goes wrong.

How to Use Motion Pictures

Motion pictures require the most careful use of all projected media due to the fact that they are a complex and dynamic medium. Once the medium takes over, the teacher steps out. Therefore, the teacher's influence in connection with the effectiveness of film learning must occur before and after the film presentation Films require careful attention to all of the following steps.

1. *Selection.*—It is important that films be previewed before they are shown in the classroom. Only through preview can the teacher make an accurate judgment concerning the contribution of the film, the quality of the film, and its pertinence to the subject.

2. *Introducing the film.*—In the introduction of the film materials, the skillful teacher can interest the learner in the film viewing experience. The teacher can help the learner structure the learning experience by raising questions that are to be answered as a result of viewing the film. Sometimes these questions will be presented by the teacher, other times they can be developed jointly with the students as a result of viewing the film. Greatest learning from film viewing occurs when the students know why they are viewing the film. The teacher can anticipate vocabulary problems in advance as result of the preview and can discuss key words and their specific meanings with the students so that when the word is presented in the film it will not provide a stumbling block.

3. *Prepare the viewing environment*—Since motion pictures are almost always shown in a darkened room, particular attention should be paid to heat and ventilation so that students do not tend to become drowsy. The room should be well darkened, particularly for color films. A good quality screen should be used. It is always advisable to pretest the equipment since a minor problem in any one of the three systems can interfere with the film learning experience.

4. *Showing the film.*—To be smoothly and effectively presented, films should be run by an experienced projectionist. Most teachers are now knowledgeable in this respect. Films can be run with or without the sound track. If the sound track is too complex for the learners, the teacher can provide narration. It is not necessary to show all of the film if the portion which is applicable to the teacher's purpose is one continuous segment, either at the beginning, in the middle, or toward the end. An important research finding in the presentation of films has

to do with the taking of notes. It has been established that students who take notes in film viewing learn less than those who do not take notes. The reason for this is that the students taking notes miss important material while they are not looking at the screen. Therefore, students should not be permitted to take notes until after the film is completed. Some teachers now provide students with a copy of an outline of the film telling them that the only notes to be added to this would be specific points of interest to them and that this should be done only after the film has been viewed. Such an outline can also incorporate the questions presented introducing the film.

5. *Follow-up.*—Research has shown that film learning is most effective when there are follow-up activities in connection with the film learning. Sometimes such follow-up will involve discussing the questions originally posed. Sometimes the follow-up will involve a test. Students will look at film materials more seriously if they are told that they will be expected to know the information at a later date. At times, a second showing of the film may be suggested as a result of follow-up discussion. There are a variety of other follow-up activities which can be utilized by a creative teacher. A few of these are reports, reading assignments, oral reports, art projects, field trips, etc. In geography, this follow-up can include work with maps or globes, filmstrips, slides, or other projected media.

When to Use Motion Pictures

Motion pictures should be used when the power and uniqueness of the motion picture adds to the learning experience. In geography, this is particularly true when one wishes to view another culture, another way of life, or another part of the world. The motion picture film can show such dimensions in all their color and realism. In geography teaching, motion pictures can provide examples of topography starting with grand overall views taken from the air and developing to minute views and close-ups of specific topographical features. The sound film can:

1. bring the world outside into the classroom
2. bring the remote and distant world to the classroom
3. recreate the world of the past
4. present the world of the present
5. present the world of the future through animation
6. bring the inaccessible and unseeable world to the classroom.

Motion pictures should be used when these dimensions make a contribution to learning.

Special Considerations

There is one technical development that should be mentioned in connection with room darkening and so-called daylight screens. In some schools that do not have adequate room darkening facilities, there are now in use rolling units in which the projector projects the picture into a box and onto what is known as a "rear projection" screen. The size of the picture in such units is substantially smaller than is usually the case when the projector is used with a projection screen. Many people feel that these pictures are better and brighter. It should be noted that if a motion projector is moved closer to any screen a smaller and brighter picture results. These rear screen projection units are extremely convenient for rolling from classroom to classroom. However, teachers should recognize that they are presenting the student with a smaller image than is possible with larger screens.

Teachers should weigh carefully whether a film needs to be in color or whether black and white is sufficient. Color films add significantly to the realism. In geography, color is significant in recognizing soils, vegetation, and clouds.

Films can be recorded from the face of a television tube and in this form are referred to as kinescope recordings. Evaluation of films should take into account the quality of the photography, the quality of the sounds, and the content and organization of the film. Many films now have correlated materials such as study manuals, filmstrips, records, etc.

In appraising the value of the motion picture, it is helpful to be aware of the special techniques possible with the motion picture film. These techniques are what the Encyclopaedia Britannica Film Corporation has chosen to call "unique contributions." The film producer has at his disposal a number of techniques. There are films on the market whose purpose is to orient the teacher to the nature of each of these techniques. One such film is entitled, "The Unique Contribution." Another is entitled, "Making Films That Teach."

Direct Photography.—Direct photography, such techniques as fades and dissolves, permit the producer to achieve effects unattainable with other media. Direct photography utilizes the dimension of motion.

Changing Speed Photography.—Changing speed photography includes slow motion, stop motion, and time lapse. The use of slow motion permits seeing in detail movements that occur too fast for the eye to see. Stop motion permits the stopping of motion to evaluate the position of things at various points in the motion process. Time lapse photography speeds up motion that

is too slow to be seen and thus permits the seeing of things otherwise unseeable. A good example of time lapse photography is the familiar opening of flowers.

Animation.—Animation is a truly unique aspect of the motion picture. It permits the film maker to use the artist and his imagination in such a way as to create motion in the artist's drawings. This permits visualization of abstract ideas, hypotheses, or things that are expected to occur in the future. Animation has been used effectively in explaining the way in which space vehicles will work. Animation has also been used effectively in the telling of stories. It is often useful in explaining concepts that cannot even be captured with time lapse photography. Animation in geography becomes very useful in explaining how land forms occurred over a long period of time, how sunlight, fertilizer, and water combine in plant growth, or how individual raindrops work for or against man in their journey from where they fall to the sea.

Changing Size Photography.—Changing size photography is comprised of photomicrography and telephotography. Photomicrography presents in motion things too small to be seen by the naked eye. This usually is done through a microscope so that composition of soil particles or the crystalline structure of rocks may be revealed, for example. Telephotography permits the close-up viewing of things too far away to be seen clearly or studied in detail.

These techniques are all available to the film maker. Each makes its own contribution, and taken in an over-all view, they combine to make the motion picture the truly unique and powerful medium it is.

Classification.—It is useful in developing an awareness of the film medium to classify films into several types. There are numerous lists of such film types. One of the simplest, and yet useful for teaching purposes, is that provided by Wittich and Schuller in their audiovisual textbook, *Audiovisual Materials.* They classify films as follows:

Basic Teaching Films.—The basic teaching film is a film that has been made with classroom learning in mind. Wittich and Schuller list the following points that identify a basic teaching film:

1. it visualizes
2. it employs motion
3. it includes environmental sounds
4. it employs narration
5. it employs color when it is useful
6. it is related to the school curriculum.

Supplemental Teaching Films.—Films produced for purposes other than for classroom instruction often have application in the classroom. These films are often produced by governmental agencies, industrial concerns, associations, and special interest groups.

Documentary Film.—The documentary film is a film that focuses its attention upon people and the way in which they react to the forces of society and nature. The documentary film is often useful in learning about peoples, both in our own culture and the culture of others.

Sponsored Films.—Sponsored films are usually produced by commercial enterprises for the purpose of telling a specific story in connection with their product, either having to do with manufacture or use. It is usually part of an advertising or informational program. One large concern produces a motion picture each year for presentation at its annual stockholders meeting. A number of these films from this company have proven useful in classroom instruction.

Entertainment Films.—There are times when entertainment films, either full length or in excerpt form, are useful for classroom instruction. One agency in particular, Teaching Films Custodians, has been active in the excerpting of appropriate classroom sequences from major film productions.

8-mm Motion Pictures

The development of 8-mm film has brought with it new patterns and approaches in the use of motion pictures. These 8-mm films are usually shorter in length and are intended to project smaller images. They are used by individuals and small groups. The films are available in easy to use cartridges with much simplified equipment. These films are less expensive than 16-mm film and give promise of becoming less expensive as the volume of sales and use increases. It is expected that 8-mm films will provide new dimensions in the individualization of instruction.

At present, there are several systems being developed. One system uses small continuous loop cartridges which run from three to five minutes in length. These contain silent films. Several other systems using larger cartridges provide film from ten to twenty minutes in length and have the advantage of sound. Cartridge handling of the film without the need for rewinding the film is common to these systems.

Many companies are now engaged in the production of 8-mm films in various forms. Single concept silent films are available

on a wide variety of subjects. The Technicolor Corporation is publishing a directory of film subjects and sources (See Selected References).

Some school districts are preparing their own 8-mm films for use in cartridges. Equipment for making 8-mm film is well automated, easy to use, and relatively inexpensive. Local production of 8-mm film is useful for both instruction and for informing the community about the school program. This possibility is worthy of attention.

Development of 8-mm materials has resulted in new thoughts and techniques of film use, such as:

1. extreme ease of handling the materials with cartridge loading
2. short single concept films, 3 to 5 minutes
3. immediate repetition of the film if desired
4. international exchange of silent film materials
5. use of films for individualized instruction due to reduced cost for materials and equipment
6. local production of instructional films by and for school districts.

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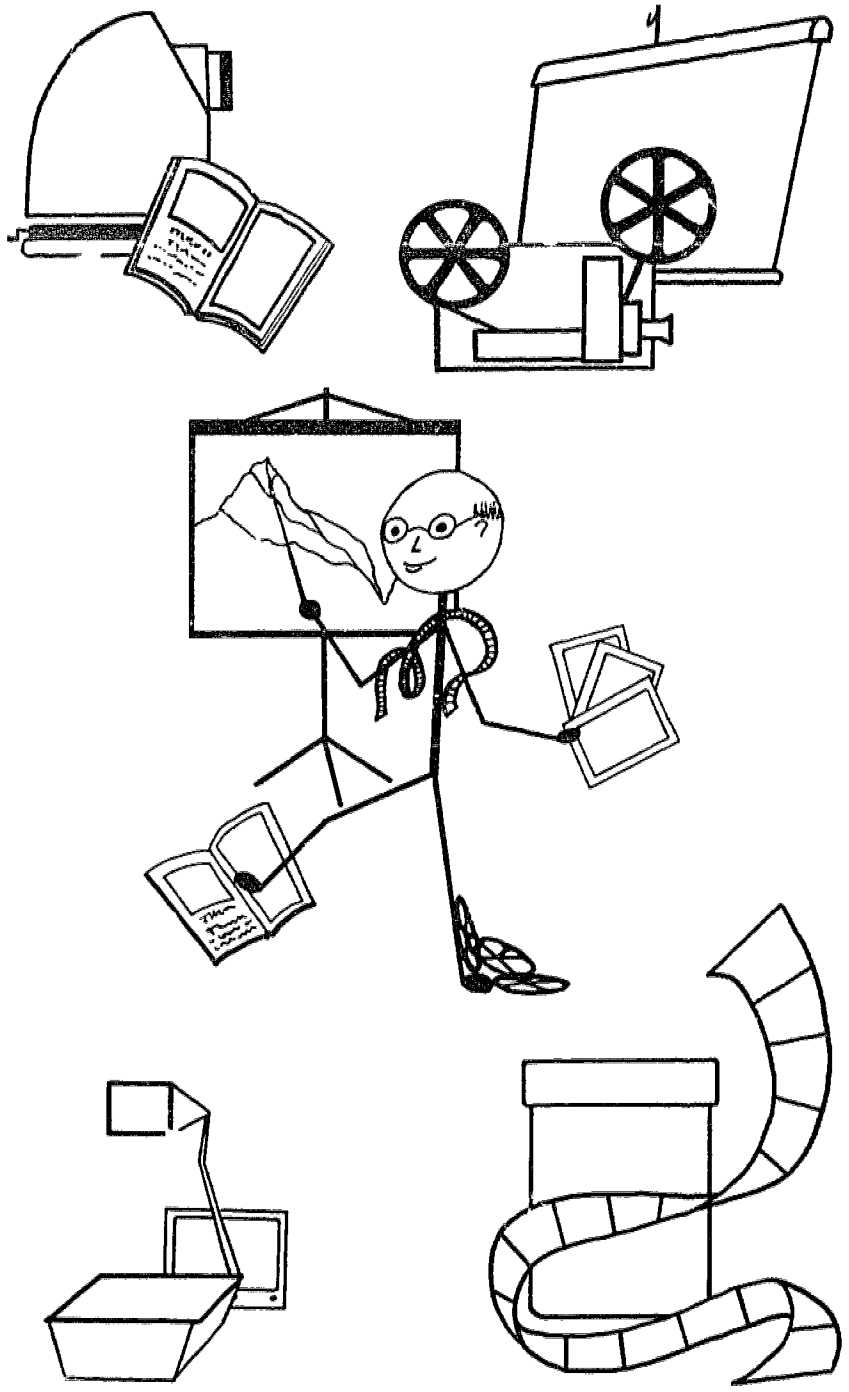


USING PROJECTED MEDIA

Extensive research supports the value of using projected media in teaching. Research has further shown that there are certain desirable principles to be observed in the most effective utilization of projected media. These principles are common to the use of the projected media discussed here; but they also apply to other learning experiences, for example field trips. These principles were also treated in some detail in the section on motion picture films. Motion pictures require careful and sometimes special consideration with regard to the utilization principles that follow.

Utilization Principles

1. *Selection.*—Any learning experience, whether by projected media or otherwise, must be previewed by the teacher in order that a careful judgment can be made of its *pertinence, quality,* and *contribution* to the desired learning. There are times when such preview and selection can be done effectively by a student committee.

2. *Introduction.*—

Interest the learner. A skillful teacher can generate interest in the viewing experience before it occurs. In the case of motion pictures and sound filmstrips, this is particularly important with those projected media where the teacher steps aside during the actual presentation. This can include a statement of purpose for the viewing experience.

Structure the learning experience. Research has shown that when students have a specific set of questions to be answered they make maximum use of the learning experience. In the case of the motion picture film, if students are shown a film without any introduction, they view it in terms of their own past experience and awareness. This results in a wide variety of experience and learning on behalf of the students. When the learning experience is structured through a series of questions to be answered, the students tend to have a common experience in terms of the questions posed and, in addition, the variety of experiences determined by their own background and awareness. It is an effective technique to provide the student with a sheet of questions with spaces for him to write in his answers after the experience is completed.

Anticipate vocabulary problems. A sensitive teacher can anticipate those vocabulary items which might present an impediment to the viewing experience. A brief discussion of problem words prior to presentation of the material will help students over this hurdle, and the viewing experience will then help them build additional meaning for the vocabulary items, rather than present a distracting factor which will divert their attention for a period of time.

Anticipate distracting factors. Students can be readily distracted by the age of cars, the period of clothes or hairstyles, and other similar visual distractions. If they are not warned in advance, this can often become a source of distraction which results in distracting and interruptive reactions such as giggling. A skillful teacher can draw these matters to student's attention before the viewing begins by pointing out that although the material is somewhat dated, the basic principles involved are still pertinent and accurate and that the questions posed can be effectively answered by the viewing experience.

3. *Prepare the environment.*—Careful attention should be given to such matters as heating and ventilation, room darkening, and the proper alignment of the projector and screen. It is also important to pretest equipment and to anticipate problems such as burned-out lamps, etc. It is highly desirable to set up equipment and materials prior to the time rather than have students sitting idly while this preparation is being done.

4. *Presentation.*—The actual presentation step varies in terms of the projected medium that is being utilized. In those instances when the teacher steps aside during the presentation, the opportunity is present to watch students carefully to determine that their attention is being effectively held. Teachers should always view the materials with their students. They should never leave the room at this time. Often as the result of repeated viewings, teachers and students begin to see additional information and subtle points.

5. *Follow up.*—

Evaluation. Students should be given an opportunity to evaluate visual experiences. Viewing experiences are more effective when students know that they will be responsible for the information presented. Such evaluation can take the form of discussion, written evaluations, or oral and written tests. As a result of such evaluation, it may be desirable at times to repeat the viewing experience, either for review or for clarification of ideas. Sometimes a visual presentation package has so much information in it that at a second viewing the learners see things that were not even apparent to them the first time.

Review main points. It is important to complete the setting created in the introduction by reviewing the purpose originally set forth and the questions that were developed to be answered. It is also important to review the vocabulary items which were originally anticipated as problem points, and to determine if there are other vocabulary items that presented unanticipated problems.

Development of related projects and readings. As a result of discussion and evaluation, it may become apparent that the viewing experience leads naturally to reading assignments, arts and crafts projects, written and oral expressions, and other similar activities. It is also useful to capitalize upon the learnings by relating to other media such as maps, globes, transparencies, slides, etc. (See the section on cross media utilization for a further discussion of this point).

Utilization Patterns

Instructional media research has shown that projected media are effective for introducing a unit, for presenting basic information in a unit, and for summary and review. In some cases the same materials can be used as introduction and then again at the end of the unit for summation. In geography teaching, slides, transparencies, and filmstrips which were presented during the course of the unit can also be used in testing for that unit.

Cross Media Utilization

The greatest learning from the use of instructional media occurs when the student has several media experiences, and these experiences are related to other materials and learning experiences. Perhaps there are two dimensions here to be considered, that of multi-media use and simultaneous use of several media. Generalizations developed from a variety of experiences facilitate students' comprehension. Therefore, when a student has a concept presented in a text, then by the teacher via a chart, then in a film, and later clarified and explained with slides or transparencies, he has a broader foundation for developing generalizations and for assimilating information. The skillful teacher will take into account the fact that different individuals in the class learn in different ways. Multi-media concepts can effectively address these differences.

Also coming into more common use is the simultaneous use of several media or several projected images. An example of this would be the use of an overhead projector to present a map and the simultaneous use of 2″ x 2″ slides to show pictorial information that would help the student put meaning into the various locations indicated on the map. The use of multiple

screens or images permits the showing of a picture and to one side of it a close-up of an element in that picture. This has proven to be an effective technique in the study of topographical features. More sophisticated installations for multiple screen work utilize rear projection screens with a projection room immediately behind the screen. Such projection rooms provide a variety of projection equipment, including filmstrip projectors, several slide projectors, motion picture projectors, television projectors, opaque projectors, and others. Such facilities are beginning to be developed in elementary and secondary schools.

Which Medium to Use

This booklet has presented several projected media that are available for classroom instruction. It is difficult to designate specifically when a certain medium should be used. This really is the teacher's prerogative and must be measured in terms of purpose, objectives, and the resources available in the individual school. This publication has intended to present sufficient information so that the reader can build a background which will enable him to make intelligent judgments and choices of the media in terms of the information to be presented and the resources of the individual school building.

Special Utilization Patterns

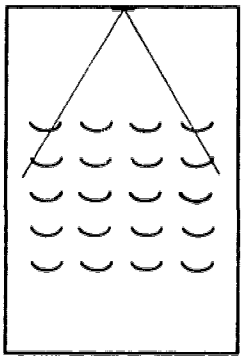
A number of pilot projects are being conducted to study high-level utilization patterns of projected media. Professional journals are reporting these with regularity. One such project is known as "Project Discovery" in which an individual school building is provided with an extensive collection of films, filmstrips, and other projected media. In this particular project, each classroom was equipped with its own set of projected media so that the use of these materials was as easy as possible. It was found that students and teachers will use these materials in new and creative ways when they are readily available and easy to use. Utilization patterns in classes changed. Films were used more often and repeated use of films by the total group or by small groups of students became commonplace. Students and teachers began using films without the sound track so that students could demonstrate their learning by replacing the sound track with their own narration. Students used films and filmstrips individually and in small groups on a regular basis. Students began taking filmstrips and projectors home to share with parents and brothers and sisters. It is envisioned that such pilot projects are charting the course of instructional media in the years to come. It becomes the responsibility of the classroom teachers to maintain an open mind regarding utilization patterns with instructional media and to keep as aware as possible

of effective utilization techniques and developments in his or her own teaching field.

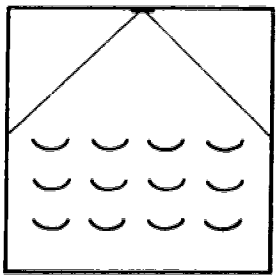
Screens and Screen Surfaces

Too often the screens in classrooms are not adequate. It is recommended that screens be as large as possible. Very often they are too small. For the average classroom of 25 to 30 students, it is recommended that the screen not be smaller than 70" x 70". There are times when the projected medium will not use all of this screen; however, overhead projection and opaque projection require a large screen. In the case of other projected media, the larger the image, the better the viewing, assuming that the room can be adequately darkened. For larger instructional spaces reference to a manufacturer's screen size chart or the help of a salesman or vendor is strongly recommended.

There are three basic screen surfaces available. Each one has its own unique characteristics; they are: (1) matte, (2) glass beaded, and (3) lenticular. These surfaces vary in the optimum viewing angle that they provide. This is an important consideration, particularly for those seats down front and to either side of the room.



Matte Screen.—The matte screen has a wide viewing angle of approximately 90 degrees. Matte screens give an even light over their viewing area. Matte screens are recommended for classrooms which are square or close to a square. With good room darkening, and improved projection equipment that is available today, the matte screen is a good all-purpose screen.



Glass Beaded Screen.—The glass beaded screen gives a comparatively narrow viewing angle, approximately 60 degrees. Within its viewing area, the image is brilliant but outside its viewing area the quality of the image and the amount of light falls off rapidly. A beaded screen is most effective in long, rectangular rooms. If a beaded screen is used in a square room, it is likely that the seats on the front corners are outside of the effective viewing area. This can be checked visually by walking around the room and checking the various seats when an image is on the screen.

Lenticular Screen.—Lenticular screens are similar to matte screens in their viewing angle. Sometimes they have a wider viewing angle than the matte screen. A close examination of

the surface of a lenticular screen will show that it has little depressions in it. This feature permits the reflection of ambient light away from the viewer's eyes; therefore, it is generally considered that a lenticular screen is useful in a room where complete room darkening is not available. One drawback to lenticular screens in the eyes of many teachers is that the screen surface must be pulled tight by some tensioning device. This tensioning is not necessary with the matte and glass beaded surfaces.

Teaching Geography—Selected References

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SELECTED SOURCES FOR MATERIALS OF PROJECTED MEDIA

	Slides	Filmstrips	Motion Pictures	Transparencies
American Friends of the Middle East, Inc. 1607 New Hampshire Ave., N.W. Washington, D.C. 20009			x	
American Map Co., Inc. 3 W. 61st St., New York, N.Y. 10023				x
American Museum of Natural History Central Park West at 79th St. New York, N.Y. 10024	x			
The Asia Society 112 E. 64th St., New York, N.Y. 10021		x	x	
Association Films, Inc. 12435 Euclid Ave., Cleveland, O. 44106			x	
Audio Film Center 2138 E. 75th St., Chicago, Ill. 60649			x	
Bailey Films, Inc. 6509 De Longpre Ave. Hollywood, Calif. 90028		x	x	
Blackhawk Films (The Eastin-Phelan Corp.) Davenport, Iowa 52808	x		x	
Stanley Bowmar Co., Inc. 12 Cleveland St., Valhalla, N.Y. 10595	x	x		
Brandon Films, Inc. 221 W. 57th St., New York, N.Y. 10019			x	
Herbert E. Budek P.O. Box 307, Santa Barbara, Calif. 93102	x		x	
Chandler Films 124 Spear St., San Francisco, Calif. 94105			x	

	Slides	Filmstrips	Motion Pictures	Transparencies
Churchill Films 6671 Sunset Blvd., Los Angeles, Calif. 90028			x	
Contemporary Films, Inc. 614 Davis St., Evanston, Ill. 60201			x	
Coronet Instructional Films 65 E. South Water St., Chicago, Ill. 60601		x	x	
George F. Cram Co., Inc. P.O. Box 426, Indianapolis, Ind. 46206	x			x
Walt Disney Productions 16-mm Film Div. 350 S. Buena Vista St. Burbank, Calif. 91505			x	
Encyclopaedia Britannica Films, Inc. 1150 Wilmette Ave., Wilmette, Ill. 60091		x	x	x
Eye Gate House 146-01 Archer Ave., Jamaica, N.Y. 11435		x		
Farm Film Foundation 1425 H St., N.W., Washington, D.C. 20000			x	
Field Enterprises Educational Corp. Merchandise Mart Plaza, Chicago, Ill. 60654				x
Film Associates, Inc. 1159 Santa Monica Blvd., Los Angeles, Calif. 90025			x	
Filmstrip House 347 Madison Ave., New York, N.Y. 10000		x		
Ginn and Company Statler Bldg., Back Bay, P.O. 191, Boston, Mass. 02117				x
C. S. Hammond and Company 515 Valley St., Maplewood, N. J. 07040				x
Theodore Holcomb 902 N. Kings Rd., Los Angeles, Calif. 90069			x	
T. N. Hubbard Scientific Company P.O. Box 105, Northbrook, Ill. 60062				x

	Filmstrips	Motion Pictures	Transparencies
Indiana University, Audio Visual Center Bloomington, Indiana 47401		x	
International Communications Foundation 870 Monterey Pass Road, Monterey Park, Calif. 91754	x	x	
International Film Foundation 475 Fifth Ave., New York, N.Y.10017		x	
Jam Handy Organization 2821 E. Grand Blvd., Detroit, Mich. 48200	x	x	
Learning Thru Seeing P.O. Box 1225, Chadron, Nebr. 69337	x		
Life Filmstrips, Time & Life Bldg. Rockefeller Center, New York, N.Y. 10020	x		
McGraw-Hill Book Co., Text-Film Div. 330 W. 42nd St., New York, N.Y. 10036	x	x	
Moody Institute of Science 12000 E. Washington Blvd., Whittier, Calif. 90606	x	x	
National Educational Television and Radio Center 10 Columbus Circle New York, N.Y. 10019		x	
National Film Board of Canada 680 Fifth Ave., New York, N.Y. 10019	x	x	
NEA-Dept. of Audiovisual Instruction 1201 16th St., N.W., Washington, D.C. 20036	x	x	x
New York Times, Office of Educational Activities 229 W. 43rd St., New York, N.Y. 10036	x		
A. J. Nystrom and Company 3333 Elston Ave., Chicago, Ill. 60618	x		x
Outdoor Pictures Box 1326, Escondido, Calif. 92026			x
Popular Science Publishing Co. 355 Lexington Ave., New York, N.Y. 10017	x		x

	Slides	Filmstrips	Motion Pictures	Transparencies
Rand McNally and Company P.O. Box 7600, Chicago, Ill. 60680		x		x
Silver Burdett Company Morristown, New Jersey 07960		x		
Society for Visual Education, Inc. 1345 Diversey Pkwy., Chicago, Ill. 60600	x	x		
Teaching Film Custodians, Inc. 25 W. 43rd St., New York, N.Y. 10000			x	
Technicolor Corp. 1300 Frawley Drive Costa Mesa, Calif. 92626			x	
Technifax Corporation 195 Appleton St., Holyoke, Mass. 01040				x
3-M Co.—Visual Prod. 2501 Hudson Road, St. Paul, Minn. 55119				x
U.S. Dept. of Agriculture, Motion Picture Service, Office of Information, Washington, D.C. 20250			x	
U.S. Dept. of Interior, Bur. of Mines Washington, D.C. 20240			x	
U.S. Dept. of Interior, Bur. of Sport Fisheries and Wildlife 1006 W. Lake St., Minneapolis, Minn. 55408			x	
Universal Education and Visual Arts 221 Park Ave., So., New York, N.Y. 10003		x	x	
Ward's Natural Science Establishment P.O. Box 1712, Rochester, N.Y. 14603	x	x	x	x
Western Publishing Education 1220 Mound Ave., Racine, Wis. 53404				x