

THE USE OF MAPS AND GLOBES IN THE
INTERMEDIATE GRADES

by 4589

LOIS C. SAMPSON

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INTRODUCTION

"Vital steps on the road to mature geographic understandings must be taken during the intermediate years of schooling. These are the years when the child, by nature of his interests and abilities, is predisposed toward geography."¹ To maintain his interest and channel it into a gradually maturing ability to "think geographically", the teacher must avoid abstractions and be alert to every possibility of reducing them to the level of the child's concrete experiences. Problem solving must substitute for rote learning. Constant use must be made of maps, and the pupils themselves must gain experience in map making; only in this way will they learn to recognize the patterns of areal relationships which maps reveal.

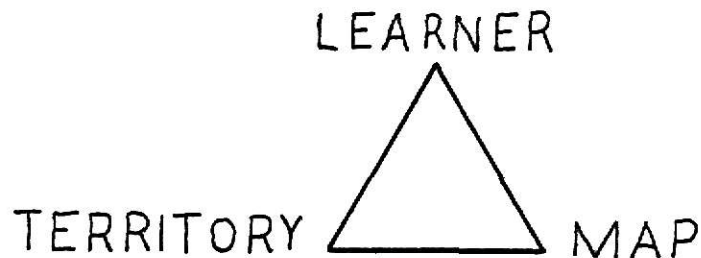
A person who merely looks up a place on a map is not reading a map. He learns no more by merely reading the name on a map than he would learn by reading the name anywhere else. A single map symbol, by itself, means nothing. The whole map is made up of symbols. The arrangement of the symbols gives the map meaning. Map reading, therefore, means more than recognizing names or symbols. It means understanding the relationship between symbols for the real landscape.

A skilled map reader gets much of the information from a map without carefully searching out individual symbols. He understands the map as a whole almost as soon as he glances at it. Then he is ready to use the map for more

¹Dorothy W. Drummond, "Developing Geography Concepts in the Intermediate Grades," Social Education, Vol. 30 (December, 1966), p. 631.

detailed study when he needs the detail.

The initial requirements that must be met by anyone who wants to engage in effective map instruction are those of understanding and remembering the message in the accompanying diagram.



This triangle expresses the essential relationships underlying map communication. The triangle asserts, first, that a map has a basic equivalence to a territory, relating to it as a substitute. Second, the triangle tells us that the learner can enter into direct relationships with both map and territory. Third, the triangle tells us that the learner can mediate between map and territory, as a handler of information.²

Map reading and studies with globes should be incorporated in the geography and social studies programs to clarify and expand each teaching unit. However, maps and globes have a symbolic language of their own and children should not be expected to get information from them until they have been taught how to interpret the symbols. Therefore, each teacher should have a definite and systematic plan for building the concepts of natural and cultural features that are represented by the symbols on each type of map and for developing map-reading procedures. The student should understand that a map symbol does

²John Jarolimek and Huber M. Walsh, Readings for Social Studies in Elementary Education (Toronto, Canada: The Macmillan Company, 1969), p. 115

not stand for a word but for something real (though not necessarily visible) on the earth. People study maps and globes to understand the earth and people and things on it.

Maps and globes, like textbooks and other teaching materials, should suit the needs, interests, and abilities of the students at every stage of their development. Interest in earth-space relationships has been stepped up by the launching of rockets and satellites. Basic information has greater significance for most children. In a well-balanced program, study with maps and globes is essential and frequent reference to them is a means of integrating individual, committee, and class work in current events, geography, and the social studies.

The following groups of map skills and geographic abilities have been selected for sequential development within the context of the coordinated social studies program:

1. The ability to observe systematically and to identify and note the location and distribution and density of features of the landscape.
2. The ability to orient self and to note directions in space and on maps and globes.
3. The ability to locate places, distributions, and densities on maps and globes.
4. The ability to use scale and to judge or measure distance in space and on maps and globes.
5. The ability to use and understand symbols and to visualize the realities for which they stand.
6. The ability to use cartographic principles of map composition and graphic expression.
7. The ability to recognize and express relative location.
8. The ability to use and understand basic map projections.
9. The ability to understand and relate areal distributions.

10. The ability to use and understand the globe as a model of the earth.³

Maps and globes afford the means of visualizing large or remote areas. They reduce broad patterns of earth features to a size small enough to be seen in one view. They are a kind of shorthand description of the earth; a way of looking at distant places as if they were in the palm of the hand.

Maps and globes are highly condensed compilations of information. To the person who knows how to read them, they reveal a variety and wealth of data. "The principal function of school maps is to expose geographic, economic, climatic, political, historical, and other facts for the sake of the pupils."⁴ This kind of information is presented so that one may actually teach from maps and globes alone rather than by using them only as supplementary materials.

Also, Drumheller states that the development of map skills serves two functions. First, maps can provide the teacher with a medium through which he can teach many concepts--historical, political, economic, social, cultural, etc. Here we are viewing map skills as a medium for reaching educational ends much as Griffin did. When this is our focus, we immediately turn to a set of map skills related to reading and interpreting of maps. A second set of concerns can be viewed in terms of ends--of practical skills needed by the citizen. From this perspective, map imagery is probably the most important of the skills. Other such skills might be reading a road map, reading a map

³Paul R. Hanna and others, Geography in the Teaching of Social Studies--Concepts and Skills (Boston: Houghton Mifflin Company, 1966), p. 12.

⁴Paul R. Griffin and Robert R. Freeman, Map and Globe Activities for Children (San Francisco: Fearon Publishers, Inc., 1957), p. 2.

accompanying a news story, orientating a local map, etc.⁵

Maps and globes show the locations, arrangements, and distribution of selected physical and cultural features in the environment. They are aids to learning, and sometimes they are the only means by which certain facts can be presented.

Map-reading skills and abilities are developed gradually. Constant practice, frequent review, and reteaching are necessary. Instruction in the use of maps and globes should be given at the time when the pupils need to use them for a specific purpose; it should be correlated with the work that the pupils are doing in the social studies area or in geography classes.

STATEMENT OF THE PROBLEM

The purposes of this study were: (1) to review literature and studies concerning the use of maps and globes in the intermediate grades; (2) to survey what has been suggested as appropriate activities in the use of maps and globes in the intermediate grades; and (3) to suggest possible techniques and exercises that may be adapted to the needs of students in classrooms equipped with standard maps and globes.

IMPORTANCE OF THE STUDY

Maps are an essential tool of today's world. In every line of business and government, maps are needed. Learning to read maps is as essential as learning to read words. A program of map-using and map-making skills needs to be an integral part of any program of study in geography. Jarolimek expressed

⁵Sidney J. Drumheller, "Conjure Up A Map--A Crucial But Much Neglected Skill," Journal of Geography, Vol. 67 (March, 1968), p. 140.

the need of teaching children the use of globes and maps in this way:

Social studies has a special responsibility to teach youngsters the skills of reading and interpreting globes and maps. While this had been one of the purposes of social studies instruction for many years, the need for skill in the use of these tools has taken on additional importance in modern times because of the course of world events. When the United States entered World War II, it became immediately apparent that Americans did not know their geography as well as they might. Suddenly Americans were reading newspaper headlines carrying the names of places of which they had never heard. Young men found themselves in stations around the world which had been previously unknown to them. Since 1945 Americans have maintained a continuing contact with nations of the world--some of them well known, others obscure. Because international affairs demand the attention of the American citizen to the extent that they do, he had genuine need for skill and facility in the use of the basic tools of geography--globes and maps.⁶

Today's child probably has greater need for learning the skills of map and globe reading than any other previous generation of children. The modern child travels more. It is not uncommon to observe a child studying a road map in the back seat of an auto parked at a road-side park. An increasing mobile population travels widely over the earth. The accurate and intelligent use of maps in getting from one place to another require map reading and other abilities related closely to it.

One cannot understand local, state, national, or international events and conditions without reference to maps. Television programs, news broadcasts, newspapers, books, and magazines concerned with news worthy issues rely upon maps for the communication of ideas.

Almost anything may be shown on a map if one has the required statistics--rainfall, temperature, surface features, distribution of people, size, distribution of animals, crops, and vegetation. When building highways, engineers and construction workers must have maps showing the topography, and the kinds of soil and rock along the route. All of these conditions affect the

⁶John Jarolimek, Social Studies in Elementary Education (New York: The Macmillan Company, 1965), p. 247.

location of the highway and the materials that will be used in the construction of the highway.

Maps are needed by public utilities for the establishment of power sites and power lines, water supply, telephone lines, and sewerage.

Ocean study and air travel as well as the exploration of space would be next to minimal without the use of maps. Thus, as an important means of understanding the world, maps are indispensable today.

METHOD OF PROCEDURE

The method of research used for this report was primarily library research. The references for this study were obtained from the Kansas State University Library, the Manhattan Public Library, and a personal file of educational materials.

LIMITATIONS

In this study the material was surveyed in terms of its use at the intermediate grade level with emphasis on the fifth grade due to the experience of the writer. No attempt was made to report every activity that could be associated with maps and globes, but only those appropriate and unique to the intermediate grades.

DEFINITION OF TERMS

Social Studies. The area of the curriculum that includes history, geography, sociology, political science, anthropology, economics, and psychology.

Geography. Geo means "earth"; graphy means "description of"⁷;
 Geography is the study of the distribution of things over the earth and the reasons why they are there; it is also the study of the differences from place to place over the earth's surface.

Cartography. The art or business of drawing or making charts or maps.⁸

Intermediate Grades. This term refers to grades four, five, and six in this paper.

REVIEW OF THE LITERATURE

I. Map Skills

In a study made by Sabaroff, it is suggested there are five skills most necessary for the pupils if one is to have the kind of literate citizenry our times demand. First, one must be concerned with location, including orientation and direction. The second basic skill is a knowledge of symbols, both physical and cultural. The third requisite is some understanding of scale. Fourth, pupils need to develop an awareness of relative location. Fifth, the globe should be recognized as a model of the earth.⁹

The purpose of a study by Davies was to develop a program of map skills and understandings that contributed to children's abilities to use maps as a geographic tool in the intermediate grades.

The research methodology for this curriculum proposal involved an analysis of the following: maps and their functions in society, disciplines of

⁷Merriam Webster, New Collegiate Dictionary, (Springfield, Massachusetts, G. and C. Merriam Co., 1961).

⁸Webster, loc. cit.

⁹Rose Sabaroff, "Improving the Use of Maps in the Elementary School," Journal of Geography, Vol. 60 (April, 1961), pp. 184-90.

cartography and geography to establish the essentials of content and skill performances, and characteristics of the learning process and the learners.

The major objectives were formulated from an analysis of cartography and geography. Objectives identified for development were: (1) ability to reorganize data gathered from firsthand and vicarious experiences and translate these data into map symbols: orientation of maps, application of scale to the reduction of area, use of symbols for map documentation; (2) ability to read data recorded on maps and globes: translation of symbolic representations into patterns of landscape imagery, reading skills in obtaining information from special maps; (3) ability to interpret the locations and distributions represented on maps and to reason about things geographic: the ability to interpret maps, to make comparisons and inferences about data recorded on two or more maps.

Achievement growth in these three objectives depended upon the development of the following skills and understandings: (1) ability to observe and note features in the landscape; (2) ability to orient self and note directions; (3) ability to locate places and distributions; (4) ability to compute distances and use scale; (5) ability to use and understand symbols and to visualize the realities for which they stand; (6) ability to use cartographic principles of map composition; (7) ability to recognize and express relative locations; (8) ability to understand areal distributions; (9) ability to use and understand map projections; (10) ability to use and understand the globe as a model of the earth.¹⁰

Gengler tested ninety-one boys and ninety-seven girls in the sixth-grade

¹⁰Gordon Francis Davies, "Map Skills and Understandings in Intermediate School Social Studies," Dissertation Abstracts, 23:948, September, 1962.

in twenty-three Oregon schools on their ability to apply the terminology of geography to the symbolism on atlas maps. The students were asked to point to map representations when each geographical term was announced. In cases of doubtful identification, the students were asked to define the term or point to another part of the map to locate the same symbol. Eighty-five per cent of the students were unable to point to a cape, the least identifiable symbol on the map. Fifty-one per cent of the students were unable to identify a valley, though every child could verbally describe a valley. "Lake" proved to be the most translatable term, being pointed out properly by over ninety-five per cent of the pupils. Boys did better on the test than girls, but Gengler found that verbal capability and symbolic conceptualization are different skills for both sexes.¹¹

Arnsdorf was also concerned with map skills in his study. He found that if map-overlays were used and if pupils were encouraged to raise questions, the pupils growth in map skills and geographic understandings was improved.¹²

It was the purpose of a study by Sorohan to review the literature to determine which map skills are to be taught in the intermediate grades, to devise lesson plans to teach these map skills at each grade level (grades four, five, and six), to evaluate the effects of teaching these skills on each grade level, and to determine the most effective grade placement of these map skills.

After a review of the literature, a tabulation was made to determine which map skills were most often recommended by researchers and writers in the field to be taught in the intermediate grades.

¹¹Charles R. Gengler, "The Application of Geographical Terms to Map Symbolism," Journal of Geography, Vol. 66 (October, 1967), pp. 394-396.

¹²Val E. Arnsdorf, "Teaching Map Reading and Geographic Understandings with Projectuals," Journal of Geography, Vol. 63 (February, 1964), pp 75-81.

Sorohan concluded that the skills he investigated do not begin to be mastered by the group as a whole until the mental age of 131 months or approximately in grade five. Since results indicate the mental age at which each skill is mastered, implications exist for teaching based on individual differences, which are more in line with mental than chronological age or grade placement.¹³

A study designed by Farrar proposed program emphasis and related teaching-learning activities relevant to fostering map skills and understandings as an essential facet of social studies curriculum in American upper elementary school grades.

The research methodology was descriptive research of related studies and authoritative recommendations synthesized and structured by means of critical interpretation and logical analysis.

Farrar searched the professional literature of geography and cartography for the basis of proposing individual items and the over-all scope of map skills and understandings for the elementary school social studies program. He also searched the professional literature on child growth and development and the psychology of teaching and learning to determine the limitation upon selected map-related learning experiences for upper elementary school pupils in respect to their level of maturity, capacities, interests, and ascribed needs.

Resulting from this study was the identification of selected map reading, writing, and computational skills and understandings which are listed as the ten objectives which follow:

¹³Lawrence Joseph Sorohan, "The Grade Placement of Map Skills According to the Mental Ages of Elementary School Children," Dissertation Abstracts, 23:2452, December, 1962.

1. Ability to verbalize mapped relationships and concepts and to translate verbalized relationships and concepts into conventional cartographic symbols.
2. Ability to "scientifically read" the many kinds of maps used in comparative studies and regional analysis.
3. Ability to read maps in order to clarify causal relationships.
4. Ability to make large scale field sketch maps which are geographically meaningful and socially useful.
5. Ability to produce appropriately generalized small scale base maps for illustrating selected area distributions.
6. Ability to make simple small and large scale terrain maps.
7. Ability to compute the measurements of sun-earth-movement-time interrelationships and use the resultant data for geographic interpretations.
8. Ability to compute and/or measure global orientations and use global measurement conventions for geographic interpretations.
9. Ability to compute and/or measure commonly used map projection grid systems and use for geographic interpretations.
10. Ability to compile and compute the statistics of man-land activities and use for geographic interpretations.

These ten broad ability-objectives illustrate the general nature of map related component skills and understandings proposed as teaching-learning activities in the social studies program.¹⁴

In a study by Joyce four procedures were followed in developing the statement of skills: (1) identifying the basic skills underlying the ability to read and interpret maps and globes, (2) stating the skills behaviorally, (3) classifying the skills, and (4) submitting the skills to a panel of consultants for further refinement.

Four procedures were followed in validating the statement of skills:

¹⁴Charles Robert Farrar, "Map Skills and Understandings in Upper Elementary School Social Studies," Dissertation Abstracts, 24:1094, September, 1963.

(1) selecting a panel of jurors, (2) designing and constructing an instrument and questionnaire, (3) administering the instrument and questionnaire to the jurors, and (4) organizing and interpreting the data.

One hypothesis in this study was the following: the map and globe skills, as appraised by the jurors, would fall into a grade-by-grade sequential pattern for grades one through six.

An analysis of the skills that had been initially designated for systematic instruction in the elementary grades revealed that the skills fell into a grade-by-grade sequential pattern, with various skills tending to cluster at each of the six grade levels. This analysis provided a basis for constructing a graded list of map and globe skills for instruction in grades one through six.¹⁵

The map reading abilities of college freshmen were compared with those of ninth-grade students by Miller as a means of determining the gains made in map-reading skills during three high school years when no geography is taught. College freshmen were significantly better than the ninth-grade students in map-reading ability, but not as much as the grade difference might suggest. The inference was made that most map-reading ability comes from formal instruction rather than experience. Miller found a high correlation between map reading and I.Q., reading ability, and ability to visualize space relations.¹⁶

¹⁵William Walter Joyce, "The Development and Grade Placement of Map and Globe Skills in the Elementary Social Studies Program," Dissertation Abstracts, 25:6434, June, 1965.

¹⁶Elbert E. Miller, "Map Reading Abilities of College Freshmen Compared with Those of Ninth Graders," Journal of Geography, Vol. 64 (November, 1965), pp. 367-72.

II. Teaching Methods

The purpose of a study by Carmichael was to determine the effectiveness of a conceptual method in teaching map-reading skills and geographic understandings, and the effectiveness of regular classroom teachers using a conceptual method without extensive pre-service or in-service training. Conceptual method for the purpose of this study was defined as an inquiry-discovery approach based on concept attainment.

The sample composed of 352 pupils was assigned randomly to two treatment groups. The experimental group used a unit of study that emphasized the learning of geographic concepts, relationships, and generalizations, and stressed thinking strategies rather than factual knowledge. The control group used an expository textbook centered approach in which the concepts and generalizations were related by the teacher or in the textbook.

Standardized tests of intelligence were used to establish I.Q. and arithmetic and reading achievement levels of pupils prior to the fourteen week instructional period. A standardized map reading test and an unpublished test of geographic understandings were used to measure improvement.

The analysis of improvement scores of the two groups on the map-reading test and the geographic understandings test indicated that the pupils in the experimental group made greater improvement in both map-reading skills and geographic understandings.

Reading achievement was found to be related to improvement in geographic understandings, but not in map-reading skills.

The conceptual method was evaluated by the teachers in the experimental group. There was general agreement that few problems or difficulties had arisen in the fourteen-week instructional period. Teachers said that pupils were highly motivated and made improvements in map-reading skills and geographic

understandings and problem-solving abilities.

Children taught by a conceptual method become more highly motivated and self-directed in learning situations. Elementary level classroom teachers without extensive pre-service or in-service training were effective in the use of the conceptual method.¹⁷

Two hundred thirty-four fifth grade children from ten classrooms in four different schools located in an urban community participated in the study conducted by Arnsdorf. One of the conclusions drawn from this study was that children encountered difficulty making inferences and interpreting data presented on maps; however, an inquiry-discovery approach helped the learners achieve better progress in the social studies.¹⁸

Possien used three teaching methods in dealing with map problems in three sixth-grade classes. Her findings indicate that students trained in the use of inductive procedures exhibit some characteristics of effective problem-solving behavior more frequently than pupils taught by the deductive and deductive-causal methods. These differences were especially great with respect to the students' general approach to a problem, the mechanics of attacking the problem, and their understanding of the ideas contained in the problems.¹⁹

Activities using maps and globes are not limited to the self-contained classroom. Gaskell and Sheridan showed how the concept could be carried out with a team teaching approach at Hebel School, the campus laboratory school

¹⁷Dennis R. Carmichael, "Developing Map Reading Skills and Geographic Understanding by Means of Conceptual Teaching Methods," Dissertation Abstracts, 26:7176, June, 1966.

¹⁸Arnsdorf, loc. cit.

¹⁹Wilma Martens Possien, "A Comparison of the Effects of Three Teaching Methodologies on the Development of the Problem Solving Skills of Sixth Grade Children," Dissertation Abstracts, 25:4003, January, 1965.

of Central Washington State College. The main purpose of the unit on map skills was "to help pupils in the middle grades develop a greater understanding and use of maps, since many kinds of maps are used extensively in social studies in the intermediate grades."²⁰

The study touched upon the following skills:

1. Learning to note directions
2. Using the scale of a map
3. Locating places on maps and globes
4. Reading map symbols
5. Comparing different kinds of maps
6. Using maps to find information

Watts pretested a large group of sixth-grade pupils by an achievement test reflecting most of the geographic concepts that appeared in state-adopted geography and social studies texts for fourth and fifth grades. The researcher used a different presentation in each of five groups to reteach the various concepts. A post-test, using the same instrument, showed significantly greater gains for those pupils having studied three-dimensional models and transparencies. Filmstrips also proved fairly effective; but verbal definitions were least effective of all. The degree of concreteness of the mode of presentation correlated positively with gains.²¹

McAulay made extensive use of maps and map projects in a fourth-grade unit on the Commonwealth of Pennsylvania. He found that fourth graders can acquire map skills and understandings that are integrated in an ongoing social studies unit; that is, it does not seem necessary to teach these skills and understandings as separate entities. McAulay concluded it would seem that maps

²⁰William Gaskell and Jack Sheridan, "Team Teaching and the Social Studies in the Elementary School," The Elementary School Journal, Vol. 68 (February, 1968), pp. 246-50.

²¹Ann Rorem Watts, "Conceptual Clarification of Certain Geographic Terms Through the Use of Five Presentation Models," Dissertation Abstracts, 26:1519, September, 1965.

do help fourth grade children understand social studies content more efficiently and effectively. Maps, properly used, can be a productive instrument in the understanding of the social studies. Also, children may have the opportunity to acquire some map knowledge through the home and community environment but such knowledge must still be directed and coordinated within the social studies program.

The reading and study of maps can be incorporated within the unit organization of the social studies. Such incorporation clarifies and expands the unit if the children are systematically taught how to use map symbols and interpret such symbols to secure particular information. Children enjoy map work, and if suitable motivation is used, the child can quickly assimilate and use map knowledge.²²

Gandy surveyed thirty-eight teachers in eighteen public schools in California to ascertain their evaluation of twenty-three techniques and devices in teaching geography, the extent that these were used, and the availability to necessary facilities, materials, or equipment. He discovered a high correlation between teacher opinion of an instructional procedure and the extent to which it was used. Map exercises and textbook assignments ranked first and second, both according to teacher opinion and use.²³

After identifying 35 principles of physical geography deemed important in elementary school instruction and after assessing the knowledge of sixth graders concerning these principles, Brown concluded that current teaching

²²J. D. McAulay, "Map Learnings in the Fourth Grade, " Journal of Geography, Vol. 63 (March, 1964), pp. 123-27.

²³Willard E. Gandy, "Instructional Patterns and Materials in the Teaching of Geography," Journal of Geography, Vol. 64 (February, 1965), pp. 72-77.

practices fall short in producing mastery of these principles.²⁴

Greenblatt similarly felt that sixth graders can learn more facts and form broader understandings pertaining, in this instance, to the geography of Mexico than is commonly expected. He recommended that social studies programs be examined with a view to broadening and extending the content.²⁵

MAPS AND RELATED ACTIVITIES

Content of Flat Maps

According to Michaelis, maps may be classified according to content into such types as political, physical, physical-political, economic, historical, and special feature. The following list illustrates the diversity of content shown on maps:

Political--boundaries, cities, states, countries, blocs
 Physical--mountains, lowlands, rivers, lakes, oceans
 Climate--rainfall, temperature, winds
 Population--density, relation to surface features
 Economic--resources, crops, occupations, products
 Physical-political--combinations of the above
 Historical--explorations, events, territorial changes
 Travel--trade routes, roads, railroads, air routes
 Community--streets, buildings, agencies, harbors
 Special--parks, monuments, literary works, religion²⁶

²⁴Daniel H. Brown, "Knowledge of Important Principles of Physical Geography Possessed by Selected Sixth Grade Children," Dissertation Abstracts, 24:5072, June, 1964.

²⁵Edward L. Greenblatt, "An Exploratory Study of the Development of Selected Generalizations in Social Studies," Dissertation Abstracts, 24:3640, March, 1964.

²⁶John U. Michaelis, Social Studies for Children in a Democracy--Recent Trends and Developments, (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1968), p. 123.

Distortion of Flat Maps

A map is a representation of the curved surface of the earth upon a flat or developable surface. When one attempts to render a curved surface, such as that of the model globe, to a flat one, something will be distorted, and every flat map is guilty of some distortion. Flat maps of relatively smaller areas will be more nearly accurate.

This concept can be easily shown by using the peeling of an orange or cutting up a soft rubber ball. Neither of these objects will become completely flat, thus showing the distortion. The cartographer will have to contend with this problem everytime he draws the parallels and meridians on a flat piece of paper. Area, shape, distance, and direction are the four types of distortion.

Symbols of Flat Maps

Teachers cannot assume that children can interpret map symbolism even when the students can orally state such definitions as, "A peninsula is a body of land nearly surrounded by water." A teacher must delve further into the child's concept of a peninsula (or other geographical terms) by asking him to identify a peninsula on a map.

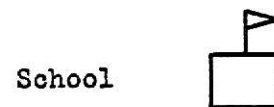
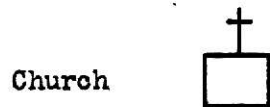
Direct teaching of skills related to interpreting information on maps should be a function of all classroom teachers. Upper-grade teachers cannot anticipate that children have acquired facility in interpreting map symbols, even though primary teachers may have provided basic instruction.

"Cartographers use four different major types of map symbols: (1) those out-of-proportion markings which show the specific locations of one-of-a-kind things such as rivers, houses, highways, and boundary lines; (2) those marks which represent quantities of things concentrated in an area, such as dots used to represent the population in different locations, regions colored

to show levels of activity such as crop production, mining areas, or the major agricultural, desert, and mountain regions; (3) color and/or shading which shows topographic features or land use; and (4) those marks which show the relative flow of goods or people from one place to another, such as air traffic, the migrations of people, the movement of various raw materials from the source to the point of manufacture or distribution."²⁷

The first instructional experiences with maps will be kept very simple. This can be done by using maps of the immediate classroom, the playground, or the few blocks surrounding the school building.

Once this is completed, the students must learn that a symbol represents a real and actual thing. The first symbols used on flat maps will somewhat resemble the real object. Examples of these might be the following:



²⁷Malcolm P. Douglass, Social Studies--From Theory to Practice in Elementary Education, (Philadelphia: J. B. Lippincott Company, 1967), p. 357.

The students should learn to associate blue with water, green with lowlands, brown with highlands, etc. As the children become ready for more abstract symbols, they will be introduced, taught, and used, as will conventional map symbols. In order to stress that the symbols represent real objects, the teacher will want to make generous use of pictures that show the real objects.

A good bulletin board can be developed by collecting pictures of features on the landscape. The symbol for each of these features can be drawn on construction paper and placed beside the picture on the bulletin board.

Activities Using Flat Maps

Michaelis states that children should have many opportunities to make maps. Careful attention should be given to accuracy so that correct impressions rather than erroneous ideas of geographic conditions in places being studied will be learned. A sound procedure is to have children check their maps against comparable commercial and textbook maps as well as against information secured from reading and from audio-visual materials. The following list suggests types of maps that children can make:

1. Floor maps using blocks, boxes, and models, or chalk, tempera, and crayon on linoleum, paper, or oilcloth; simple line maps in the schoolyard.
2. Specimen maps using real items such as wheat, corn, cotton, and rocks.
3. Relief maps of papier-mache, salt and flour, plaster of paris, clay, or moistened sand; large relief maps on a section of the schoolyard.
4. Mural maps with strips of paper for streets, pictures or silhouettes for buildings, and so forth.
5. Wall outline maps made by using an opaque projector.
6. Slated maps and globes, or individual and wall outline maps to show air routes, famous flights, early explorations, trade routes, physical features, boundaries, rivers, etc.

7. Simple political and physical maps using colors to show various features.
8. Transportation maps using various line and dot patterns to show railroad lines, airplane routes, steamship lines, and major highways.
9. Progressive or developmental maps of a region or topic such as the westward movement, colonization, or industrial America.
10. Maps of features of special interest, such as national parks, state parks, major imports, major cities, seaports, and river systems.
11. Historical maps of the colonies, early travel routes, and earth settlements.²⁸

If children have direct contact with maps, more skills will be gained.

From the Grade Teacher comes a list of related activities for learning skills for grade five.

1. Have pupils locate cities using latitude and longitude.
2. Have pupils make representations with salt and flour or papier-mache of the common land and water formations such as a peninsula or plateau.
3. Provide a sample legend for a map and have the class give written explanations of each symbol.
4. Have the class make a collection of various product maps.
5. Have pupils make large cardboard cutouts of the states to use in an identification quiz for the entire class.
6. Present a list of cities in the United States. Have the pupils locate them on a political map and then refer to a geo-physical map to describe the topography of the region surrounding each city.²⁹

Latitude and Longitude. The following exercise will give practice in locating points on a grid and will also have an element of "surprise".

Hand out "Grid A" (page 24 of this report) outline maps with the following list of points to locate according to latitude and longitude. After each point has been located, with a straight edge, draw an outline connecting

²⁸Michaelis, op. cit., p. 455-56.

²⁹"What You Need to Sharpen Map and Globe Skills," Grade Teacher, October, 1966, p. 124.

the points. Next, hand out an outline map of the area (Grid B--page 25) and let the class compare the two. Discussion of the longitude and latitude of the United States and an accompanying United States outline map may be a useful comparison with the above activity.

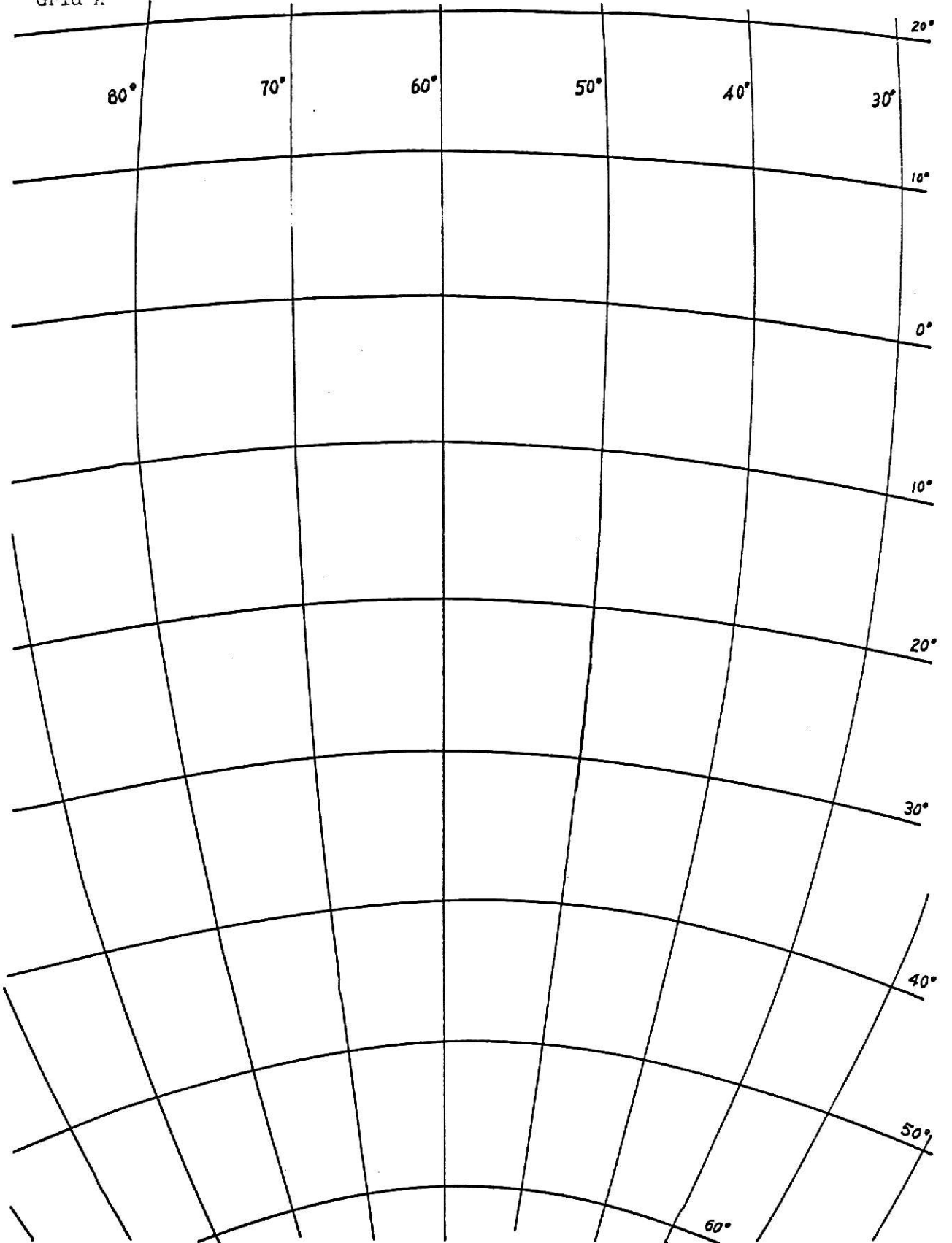
Locations:

- | | |
|---------------|----------------|
| 1. 8°S, 35°W | 11. 12°S, 77°W |
| 2. 5°S, 36°W | 12. 20°S, 70°W |
| 3. 1°S, 48°W | 13. 43°S, 73°W |
| 4. 5°N, 52°W | 14. 53°S, 71°W |
| 5. 7°N, 58°W | 15. 55°S, 65°W |
| 6. 10°N, 65°W | 16. 50°S, 68°W |
| 7. 11°N, 75°W | 17. 39°S, 62°W |
| 8. 4°N, 77°W | 18. 30°S, 51°W |
| 9. 3°S, 80°W | 19. 23°S, 44°W |
| 10. 8°S, 78°W | 20. 13°S, 38°W |

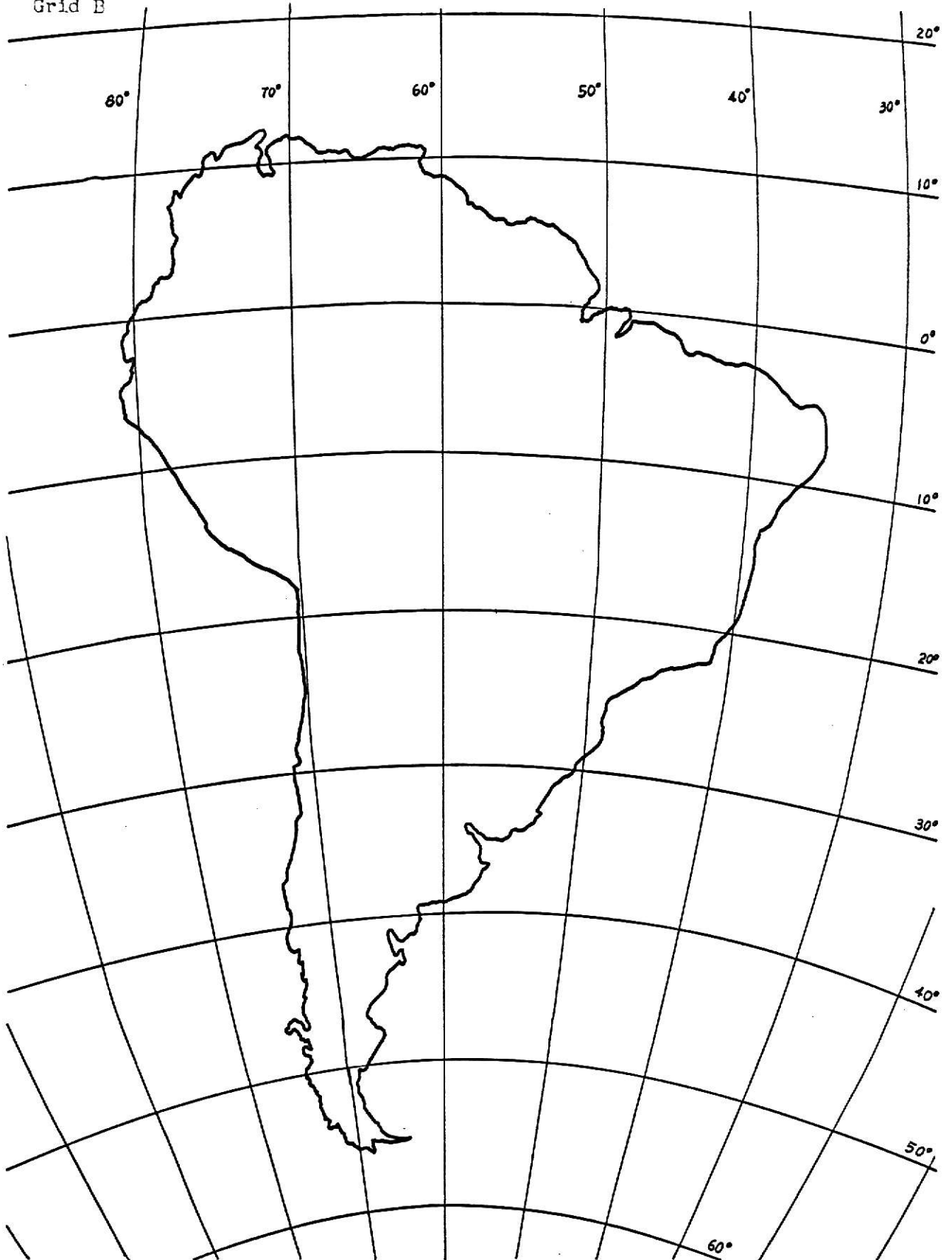
Road Maps. Millions of youngsters have been exposed to road maps if only through being asked by frustrated parents to attempt to refold it correctly. It would seem, therefore, that the social studies teacher who passes up the opportunity to bring into the classroom such a timely teaching device is missing a good bet.

Students could easily be introduced not only to the general notion of what a map is but also become familiar with the characteristics of legend, scale, grid, and symbols. How a geographer uses a map as an analytic device could also be demonstrated nicely by leading students into an inquiry of the relationships between the physical environment and the road pattern; the relationship between the size, number, and spacing of urban places; the interaction which takes place among cities and people; and the impact of culture

Grid A



Grid B



and physical environment on the political divisions represented on the map.

There is much more that the imaginative teacher can extract from a careful study of an ordinary road map. However, even though this be all that students are exposed to, we can hope that they will look a second time before they return the map to its resting place until the next family outing.

Atlas. To acquaint the students with an atlas, construct a worksheet containing questions that can be found by looking in an atlas. It is best if each student can have his own copy of the atlas; thus, it is suggested that a small, paperback atlas is used. By having to look up the various answers, the students will become acquainted with an atlas, and they will become familiar with the material that is included in an atlas.

Make-believe Maps. Sister Donna Hortsch handed her sixth graders a make-believe map, a sheaf of manila paper, and a set of instructions which read:

We are the first people on earth. We have explored and mapped the area in which we find ourselves. Now we must decide where to settle and establish our civilization. Which places on your map will provide most of the things we'll need?³⁰

The map which can be seen in the September issue of the Grade Teacher, 1969, included mineral hills, dangerous animals, forests, creeks, meadows, swamps, wastelands, rivers with good fishing, mountains, walnut groves, partridge patches, and beaches.

Many map skills could develop from such a lesson including making a scale for the map, predicting the climate of the various areas, selecting locations for cities, and selecting possible occupations to name a few.

Historical Series of Maps. The following idea was presented by Dr. Duane Knos, director of the NDEA Institute for Elementary Teachers of Geography

³⁰Sister Donna Hortsch, "Social Studies is a Tribal Affair", Grade Teacher, September, 1969, pp. 103-06.

during the summer of 1966 at the University of Kansas, Lawrence, Kansas.

A city directory, such as the one on the following page, is given to each student along with three city maps, which, in this case, happen to be dated 1870, 1880, and 1890. After the students have had a chance to look these over, a class discussion could follow.

Ideas to discuss could include the following: the orientation of a north-south city instead of an east-west city; building south of the river instead of north; the development of the railroad; the size of the city in succeeding years; the advantages and disadvantages of being a "river city"; the types of establishments built during the twenty year span; and the future of the city.

An activity of this type will involve several class periods. This lesson will also lend itself quite well to creative writing, letting each child speculate on some issue suggested by the given information.

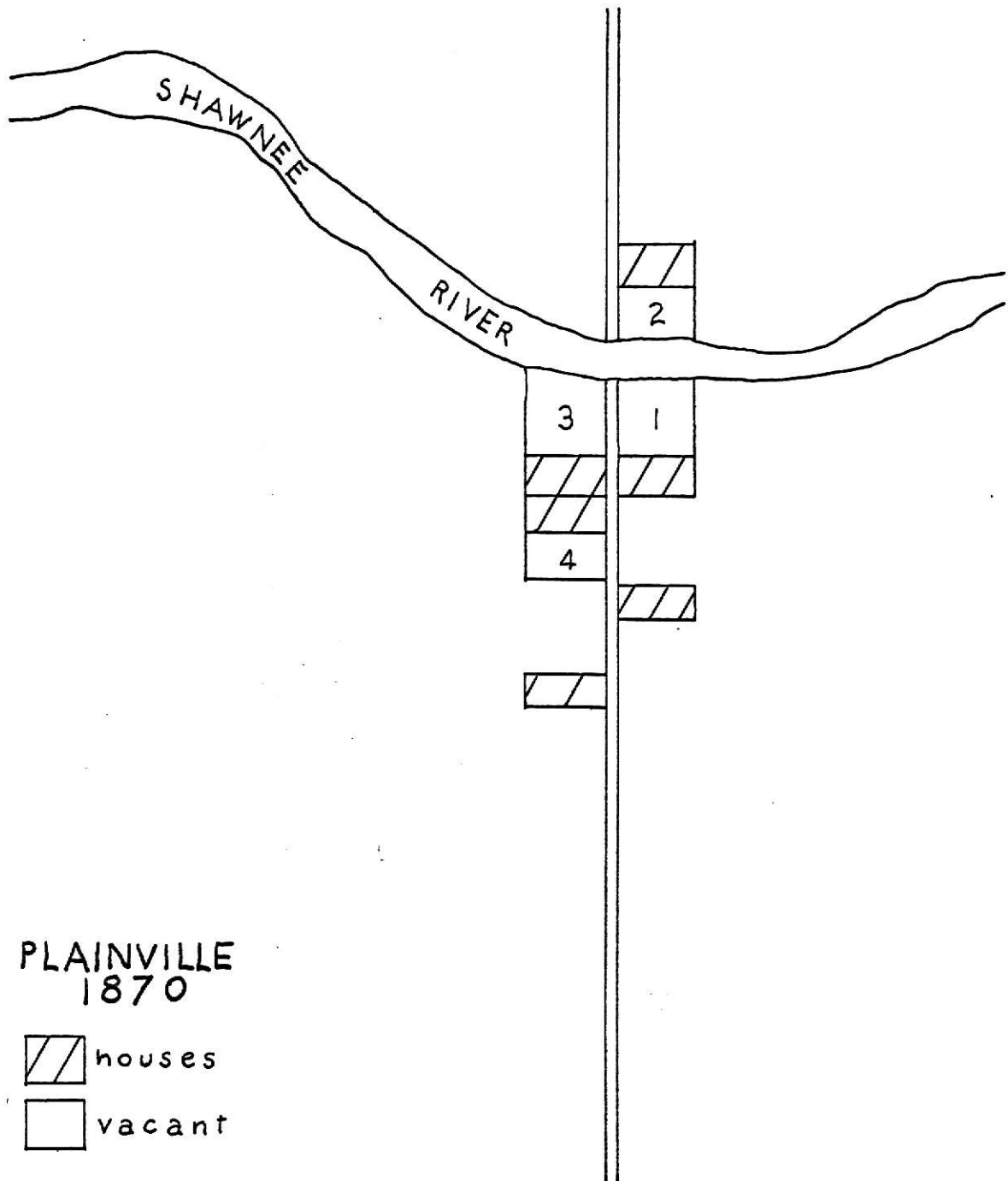
Comparative map study. "The overhead projector is one of the most effective ways for the elementary teacher to teach map skills and understandings. With its accompanying transparencies, it constitutes one of our best means for teaching map correlation and for illustrating one of the fundamental concerns of geography and the geographer--the interrelationship of phenomena within a given region. A series of overhead transparencies, constructed to match a standard base, can make comparative map study an enjoyable and rewarding experience in the fifth and sixth grade classroom"³¹

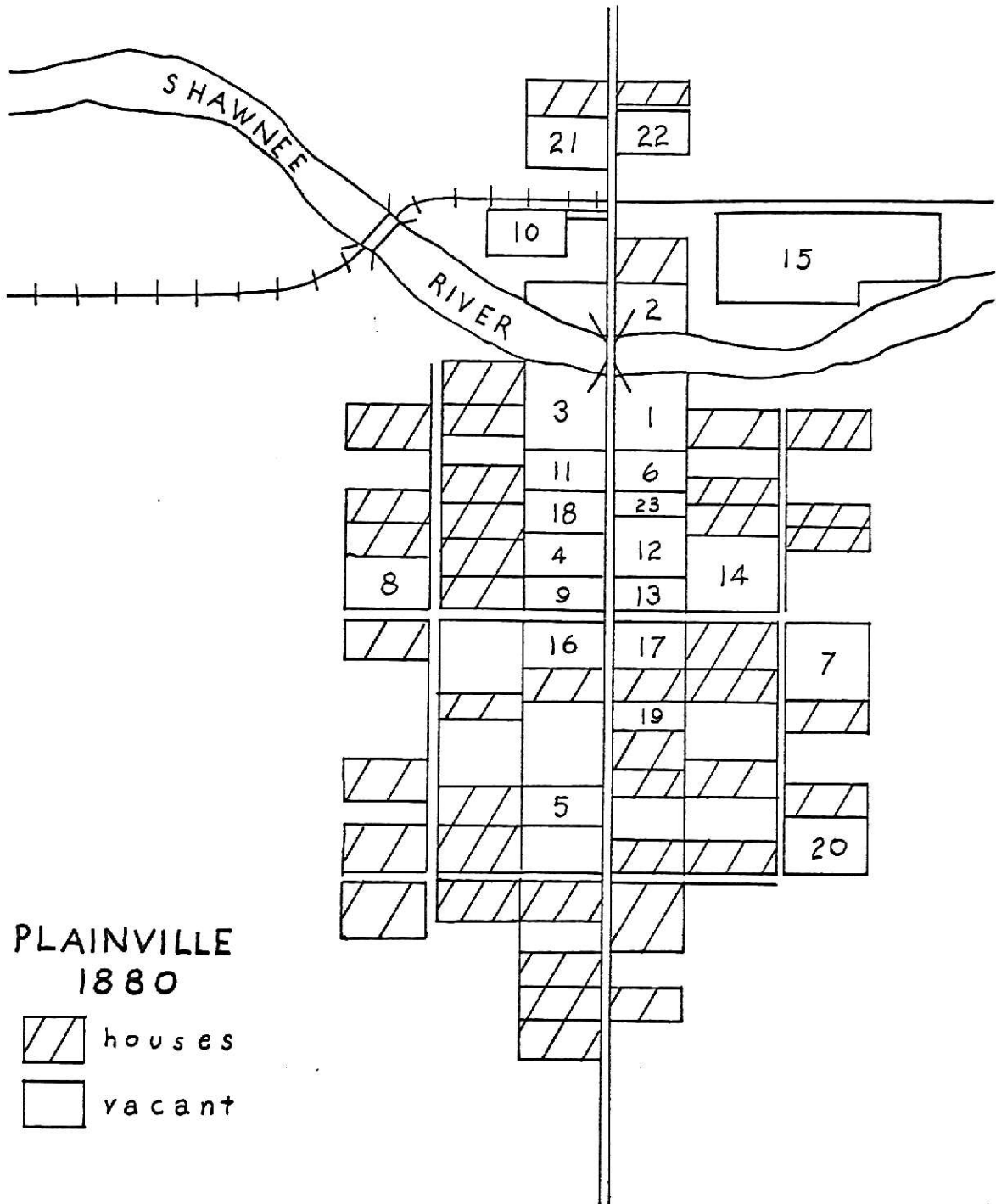
A series of diagrams on page 32 show the procedures of a comparative map study lesson.

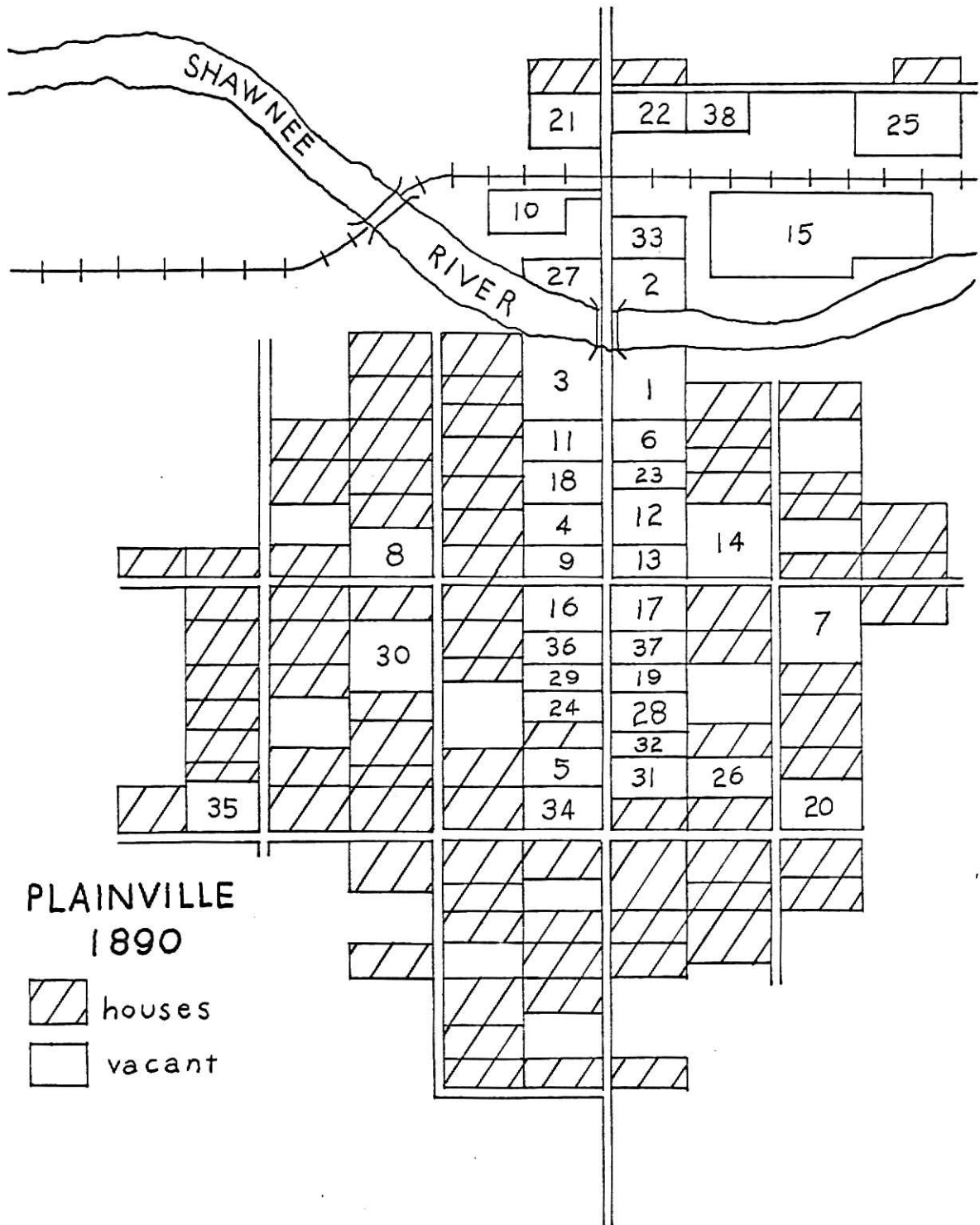
³¹Robert E. Gabler, "Overhead Transparencies for the Upper Grades," Journal of Geography, Vol. 66 (May, 1967), p. 234.

PLAINVILLE DIRECTORY

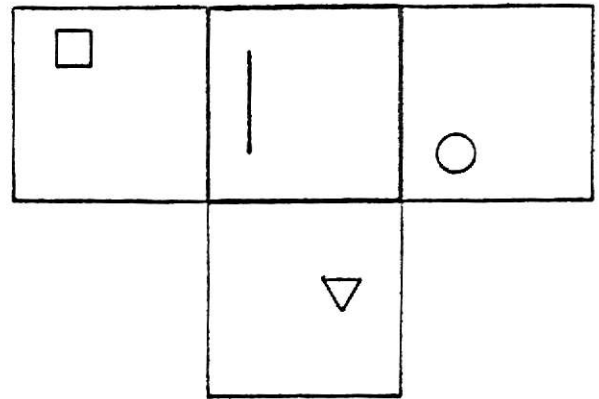
Building	Year Built	Location on Map
Bennett's Mill	1860	1
Fred Jenkin's Ferry	1865	2
John Schmid, Blacksmith	1867	3
General Store	1870	4
Jail	1870	5
Smith's Tavern	1870	6
Bridge	1870	
The bridge put Fred Jenkins out of the Ferry Business so he bought a wagon and a team of horses and became a drayman.		
School	1872	7
Community Church	1872	8
Wake's Tavern	1873	9
Lawrence, Wichita and Texas Railroad Depot	1874	10
Ma's Cafe	1874	11
Plainville Hotel	1874	12
Plainville Saloon	1875	13
Livery Stable	1875	14
Stockyard	1876	15
Plainville State Bank	1876	16
Dugan's Store	1876	17
Hollis Hardware Store	1877	18
Dr. Henley, M.D.	1877	19
Methodist Church	1877	20
Farmer's Feed Store	1877	21
Long Horn Saloon	1878	22
Real Estate Office	1879	23
Finney Cafe	1879	24
Plainville Grain Co.	1880	25
Fritz Muller, Cabinet Maker	1880	26
Sutton Wagon Manufacturers	1881	27
Plainville Grocery	1882	28
William Morris, Lawyer	1883	29
Baptist Church	1884	30
Plainville Journal	1885	31
John Lewis, Lawyer	1885	32
Jenny's Tavern	1886	33
Cattlemen's Hotel	1887	34
St. Paul's Catholic Church	1887	35
Person's Harness Shop	1888	36
Tom O'Dell, Undertaker	1889	37
Carlin Cattle Co.	1889	38



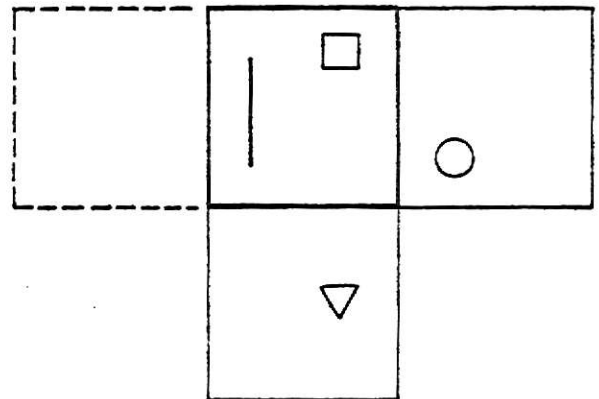




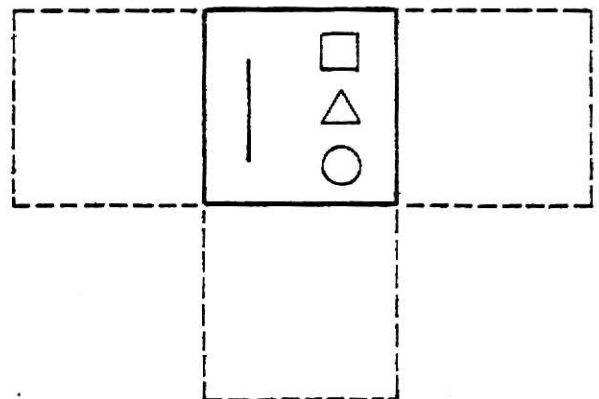
Place transparency on projector.
This image is projected on the
screen.



Flip one of the "overlays" over
to the center. Combined image is
projected.



As the lesson progresses, all
images are combined to complete
the sequence.



Overlays can be taken away, and the sequence can be altered to suit the teacher. Temporary markings can be made on the transparency with marking pens or pencils during the projection.

This teaching aid offers several advantages over use of a chalkboard: "visuals" can be prepared before hand and can be reused; colors can be used for clarity and emphasis; items can be put on, replaced, and erased with a quick motion of the hand, and the flick of a switch can direct student attention to either the visual or the instructor.

Some companies, such as the Millikin Publishing Company, St. Louis, Missouri, publish a transparency-duplicating book. This consists of a transparency for the teacher to use, a duplicating page of the transparency which is identical to the transparency, and other duplicating pages of information that will coincide with the maps. In this way, the teacher can point out an object or area on the transparency and the children can then find the identical point on their duplicated map. In this way, everyone concerned has a copy close at hand.

GLOBES AND RELATED ACTIVITIES

Content of Global Studies

Since the earth is round, the most accurate representation of the earth must be shown on something round, thus, the globe. To see things in their true relationship in every respect, one must therefore use the model globe.

Globes rank among the best of instructional media in geography. They serve admirably to demonstrate the following:

- 1) Shape of the earth
- 2) Size, shape, and relative location of land and water bodies
- 3) Hemispheres
- 4) Grid of the earth
- 5) Directions
- 6) Distances (great circles)

- 7) Time (hours and days)
- 8) Earth as an astronomical body
- 9) Satellite orbits
- 10) Relief and drainage pattern of the earth
- 11) Political pattern of the earth.³²

According to Ragan the globe is the most essential tool for the social studies. Children in the elementary school should acquire the following essential skills in its use.

- 1) To learn the nature of the earth's sphere, the child should observe that the distance around the globe is the same in all directions, and that the surface of the earth is curved. He should discover that the shadow which the earth casts is always round. He should know that one inch on the standard globe stands for 666 miles on the earth. He should realize that blue on the globe stands for water, and brown for land. He should know that there is more water than land and that all the oceans are connected. He should be able to demonstrate the causes of day and night by means of a globe. The child should be able to compare a map with a globe.
- 2) To learn how to locate places on the globe, the child should consider the shape and size of the earth and realize that it is a sphere. He should learn the meaning of scale on the globe and review global direction. He should be able to find distances from the equator, latitude as well as longitude. By the end of the sixth grade the child should be able to convert longitude to miles, and determine exact locations on the globe.³³

Disadvantages of the Globe

Unfortunately, the model globe is often an inconvenient tool to use. It shows such a large area (the entire world) that it cannot be used to show any particular place in very much detail. Just the words "New York" may cover two hundred miles on a globe! The globe cannot be rolled up and put away when

³²Herbert H. Gross, "Globes for Classroom Use," Journal of Geography, Vol. 66 (May, 1967), p. 218.

³³William B. Ragan and John D. McAulay, Social Studies for Today's Children (New York: Appleton-Century-Crofts, 1964), p. 239.

not needed; nor is it very convenient to carry about. You can look at only half of it at any one time. For these and other practical reasons, the model globe is not always the best map to use in the classroom.

Activities Using Globes

Great Circle. The shortest distance between two points on the earth is along a circle whose center is the earth's center. This is called the great circle.

A great circle always divides the earth into exactly two equal parts. The equator, lying midway between the two poles, is an example of a great circle--but only one of many.

Why is the arc of a great circle the shortest distance between two points? This may be a bit hard for students to see at first. Pick two spots on the equator and ask them to point out the shortest route between them. It will be obvious that the most direct route would be to stay right on the equator. Any route that wandered off the equator would be taking a longer way around.

Point out that the same holds true for any other two spots on the earth no matter where they be. The shortest distance between them, other than going through the earth, will always be along a line that's part of a great circle.

The use of a string to locate great circles on globes can be very helpful when calculating distances. Suppose one were to find the shortest distance between two cities at roughly the same latitude such as San Francisco and Athens. The class could debate whether a great circle or a parallel would be shorter. Then one student could point out on a globe the locations falling on the great circle between these two sites and the other students could follow this path on maps. A string on a globe would prove conclusively that the great

circle is always the shorter distance.

Directions "Up" and "Down". Generalizations such as "north is at the top of the map" and "south is at the bottom of the map" should not be taught to children because they are not correct and serve to confuse the child when he uses various map projections. To be safe, "up" and "down" should probably not be taught in connection with either maps or globes. The correct concept of "up" should be "away from the earth" while "down" should be "towards the center of the earth". If the concept of "up is north" is ever mentioned by a student, there is a fairly simple lesson that will prove differently. All the teacher needs to do is construct a stick figure from pipe cleaners. On this figure, have one arm pointing up and the other arm down. Attach the figure to a globe at several positions. The students will be able to visualize that no matter where the stick figure is placed on the globe, "up" will always be away from the earth and "down" will always be toward the center of the earth.

Earth As an Astronomical Body. With the aid of a darkened room and a flashlight, the concept of day and night due to the spinning of the earth in a counterclockwise direction can be illustrated using a globe. The students can observe that while one side of the globe is having day, the other side is having night. By marking a particular location on the globe with the help of a piece of clay or other material and by turning the globe slowly, the concept of sunrise, noon and sunset can be illustrated.

Latitude and Longitude. Latitude is the angular distance or location north or south of the equator. Longitude is the angular distance or location east or west of the Prime Meridian. Parallel of latitude refers to the lines on a globe that extend east or west parallel to the equator and which measure distances north and south. Meridian of longitude refers to the lines on a globe that extend north and south from pole to pole; they always cross the

equator at right angles, and they measure distances east and west.

Motivate enthusiasm for this section with a blank globe. A beach ball or playground ball make good aids. Ask a student to locate a place on it. Have him make an X on it with his finger, then twirl the ball around. Can he find the place he marked with his finger? So that we can find places on the globe and on the earth, men have developed a system of lines, like streets.

The instructor would then proceed with the "lines", first introducing the equator and all "lines" parallel to the equator which are called parallels or parallels of latitude.

The next step would be the "lines" that help locate places in an east-west direction. These make up the set of imaginary lines called longitude lines. The Greenwich Observatory in England had such a good method for keeping time by the stars that people began giving locations by saying how far east or west of Greenwich they were. Consequently, the 0° longitude line is called the Greenwich Line or the prime meridian.

After the concept of latitude has been developed, a chart such as the one on the following page would stress to the children the importance of latitude, and how it affects the life of people due to the differences in climate, growing season, food, homes, clothing, and crops. This chart was developed by James and Crape.³⁴

Hemispheres. Have two clay or rubber balls ready with the equator and poles marked with two colors of tempera paint. The objects will represent earth which is a sphere. Cut the sphere in half by cutting along the equator that is marked. When this is complete, there are two halves, or half-spheres, or hemispheres. One of the hemispheres is the northern half of the earth and

³⁴Linnie B. James and La Monte Crape, Geography for Today's Children, (New York: Appleton-Century-Crofts, 1968), p. 62.

LATITUDE DOES MAKE A DIFFERENCE!		
	Washington	Hawaii
Climate		
Growing Season		
Food, homes, clothing		
Crops		

one is the southern half. The position of the north pole and the south pole should then be noted on each hemisphere.

This basic procedure can also be used for the eastern and western hemispheres. A discussion should also develop concerning the Greenwich Observatory in England.

Earth's shape. Many children will comment that the earth looks flat to them, and they have difficulty believing that the earth is really round. If this should come up in the classroom, the teacher can show why the earth seems to be so flat by drawing three circles of different sizes on the board. Then

mark off a short distance (about three inches) on the circumference of each circle. The students will see that three inches on the circumference of the largest circle is almost a straight line while the same distance on the smaller circle is clearly a curved line. When the students realize that the earth is more like the larger circle (only still larger!), they should see why the earth appears to be flat to them.

SUMMARY AND CONCLUSIONS

The majority of the research shows that map skills should be taught just as other subjects are taught. A person who has had no instruction with map skills will find maps less meaningful than those who have had the proper instruction. Also, research supports the idea of a "logical sequence" when introducing the various skills. That is, work with the simple concepts should be concluded before the more complex ideas are presented.

From the instructor's point of view, research supports the inquiry-discovery approach as well as the use of abundant audio-visual materials. And, as in most subject areas, there is still room for improvement.

The revolutionary changes in communications, in man's view of the world, and in the social sciences pose important new opportunities. Geography now has a challenge and an opportunity to lead in the development of new and improved use of maps. If, indeed, the geographer is the specialist in the use of maps to communicate knowledge, there is a particular challenge and opportunity to lead in the development and improvement of that specialty for the common educational good.

Geographers are challenged to apply the discipline of the map to a fast-growing array of problems. Men want to understand the geographic dimensions of the world: its cities, its nations, its circulation systems,

industries, and physical resources. They repeatedly ask questions or debate issues which can be resolved by study of the evolution of today's geographic patterns and the likely shape of tomorrow's. Let geographic instruction begin whenever possible by stating one of these major questions or issues. Then let geography students be taught to approach these questions and draw inferences or conclusions through the discipline of the map. Generic terms, regional terms, and map interpretation techniques will be best retained and contribute the most to society if they are in the minds of people who have learned to use them to solve intellectual problems or illuminate issues.

Substantive research on evaluation done specifically in social studies education over the past decade is limited. "This might derive from the fact that social studies educators and teachers of social studies, not being 'at home' in this area, are not aware of its potential and, therefore, of the need to utilize that potential effectively. Perhaps the need is acknowledged, but the responsibility is left to professionals in evaluation."³⁵

According to Rushdoony, these limitations in map reading research prevail:

1. Lack of extensive research, especially in map-reading, per se;
2. Lack of any longitudinal research;
3. Few studies involving multiple classes engaged in study for one to two semesters; and
4. Comparative lack of research from the southern portion of the United States.³⁶

One overarching conclusion is warranted: "if improvements are to be

³⁵Robert L. Ebel, Encyclopedia of Educational Research, (New York: Macmillan Co., 1960), p. 1238.

³⁶Haig A. Rushdoony, "A Child's Ability to Read Maps: Summary of the Research," Journal of Geography, Vol. 67 (April, 1968), pp. 213-22.

made in social studies education which relate more effective teaching to developments emerging on both the content and methods fronts, broad research-based and field-tested programs of teacher education need to be conducted and reported nationally."³⁷

The concepts that can be learned from maps and globes are many. Certainly not all of the concepts can be taught with just one map or globe nor can all concepts be taught in one simple lesson. Instead, many experiences with maps and globes over a length of time are needed so that one can learn to read well the comprehensive story that maps have to tell.

Let's re-examine geography as a subject and a discipline to be taught. Let the concern be not only with the dimensions of the field but also with the geographic dimensions of the world and geography's responsibility to spread the thrill and the power to learn and apply a knowledge of those dimensions. For guidance and inspiration let every geography teacher contemplate the topics and disciplines of the maps he uses, the traditions of the field, and the dynamic social environment in which he works.

³⁷Ebel, op. cit., p. 1239.

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THE USE OF MAPS AND GLOBES IN THE
INTERMEDIATE GRADES

by

LOIS C. SAMPSON

B. S., Kansas State University, 1964

AN ABSTRACT OF A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

College of Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1970

It was the purpose of this study: (1) to review literature and studies concerning the use of maps and globes in the intermediate grades, (2) to survey what has been suggested as appropriate activities using maps and globes in the intermediate grades, and (3) to suggest possible techniques and exercises that may be adapted to the needs of students in classrooms equipped with standard maps and globes.

Research included a review of all available books, pamphlets, and periodicals dealing with this problem.

The majority of the research showed that a block of time should be set aside for the teaching of map skills just as time is set aside for other subject areas. These map skills should be taught in a logical sequence when they are introduced to the students, beginning with the simple concepts and then working toward the more complex ideas.

For the instructor, research supported the inquiry-discovery approach as well as the use of abundant audio-visual materials. It was also pointed out that more research in the field of geography is needed especially on the elementary school level.

The content of flat maps, the distortion of flat maps, and the symbols of maps were outlined followed by various activities that could be used to develop map skills that are needed by elementary school children. Some of the activities included had to do with longitude and latitude, road maps, make-believe maps, and maps with an historical approach. The use of the overhead projector was also discussed.

The content of global studies and the disadvantages of the globe were cited. Due to the shape of the earth, the studies with the globe are very important in the intermediate grades. A study of hemispheres, directions, great circle, and longitude and latitude were among the activities cited using

the globe as an instructional device.

Maps and globes have a remarkably comprehensive story to tell anyone who has learned to read them well. They can literally widen our horizons and reveal to us a whole new world of interesting and valuable information that may be significant to us in gaining understanding about places and relationships.