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Guide to
**CONSERVATION
EDUCATION**

*in Wisconsin
Schools*

This is the property of School District Number -----

Name of School -----

WISCONSIN COOPERATIVE EDUCATIONAL
PLANNING PROGRAM

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FOREWORD

Natural resources, both physical and human, are the most precious possessions with which any nation is endowed. Instructional work which involves a careful analysis of "wise use" and the development of necessary skills, attitudes and appreciations essential to its effective application is a major responsibility of every teacher.

The preparation of this resource guide is the realization of the purpose and hope of the Statewide Conservation Curriculum Committee which was assigned the task of preparing this fourth State conservation bulletin for use in our schools. Their work has been well done, and I am pleased to compliment them upon it.

It is their hope and mine that this bulletin will provide a tool for all teachers in Wisconsin—it is the teachers, and the teachers only who can most effectively emphasize the rich lessons of conservation to the youth of our land.

In keeping with this vital need, as well as with the mandate of the legislature expressed in 1935 and reaffirmed successively since that time through biennial appropriations, I urgently advise that conservation values be redefined and re-emphasized in every Wisconsin school to the end that each child will recognize his obligation as well as his opportunity in this rich and inviting field.

JOHN CALLAHAN



Frontispiece—The call of the wild

COMMITTEE STATEMENT AND ACKNOWLEDGMENTS

This resource guide is the result of cooperative effort on the part of the Statewide Conservation Curriculum Committee and a number of state and national consultants.

The format of the bulletin is in keeping with the Wisconsin curriculum policies and program which proceed from a consideration of the "Task of the School" to the development of resource guides. It is from such resource guides that teachers may draw sequential suggestions, definite pupil experiences, and other teaching aids helpful to him in the pupil-teacher planning process in the area of conservation.

The committee is especially grateful to Professors E. F. Bean, Aldo Leopold, W. A. Rowlands and O. R. Zeasman all of the University of Wisconsin, Oliver Meusser, U. S. Soil Conservation Service, Hugh Bennett, U. S. Forest Service, R. W. Abbott, Extension Forester, and to Gordon MacKenzie, Edward A. Krug, Dorothy McCuskey and Charles B. Walden, curriculum coordinators during the period in which this bulletin was prepared. For art work we are indebted to Vico Isola and P. Freeman Hein both of U. S. Forest Service. We are indebted also to the State Historical Society for photographs used for the cuts in the section on Recreational, Scenic and Historical Values.

This bulletin was prepared under the direction of the Department of Public Instruction which was represented by State Supervisor R. S. Ihlenfeldt who served as consultant throughout the course of the work on the bulletin. Mary Tuohy Ryan of the State Historical Society assisted in research in developing the section on Recreational, Scenic and Historical Values while Gordon C. Boardman helped in writing as well as served as editor for publication. A. L. Buechner assisted by reproducing in final form two line drawings. Credit is due to Anna May Vold and Irene Newman for bibliographical assistance.

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THE POINT OF VIEW

THE IMPORTANCE OF CONSERVATION

It should be clear to all of us that man is absolutely dependent upon the resources which he can find upon this planet. The everyday needs of his life can be supplied only by drawing upon these resources. Some of them are renewable, but some cannot be replaced as man uses them. Upon their quality and abundance depends the social as well as economic well-being of man.

During the centuries in which our civilization has been developing, the rapid and intensive utilization of natural resources has been the source of the economic power of the nation. History has shown us that the downfall of other and powerful civilizations may be attributed to the exhaustion of their natural resources. Here in the United States, the original abundance of natural resources led to a frame of mind that deemed the storehouse of our treasures inexhaustible. It is only comparatively recently that we have been forced to realize that the forest is not endless, the fertility of the soil is not boundless, the replacement of slaughtered game is not limitless, and the purity of our streams and lakes is not inviolable. The complete loss of some of our resources and the accelerated rapidity with which others are disappearing or disintegrating make it imperative for us to urge proper conservation more forcefully than ever. We need to develop an awareness of this emergency, and to inform those who do, or will, determine future policy of the best known solutions of the problems which beset the utilization of our resources.

The welfare of ourselves as well as of those to come hangs in the balance. It is only through a wise use of our natural resources that we can maintain a happy, prosperous nation. To meet the challenge of teaching this wise use should be the aim of conservation education. From the earliest grades and extending through the high school, conservation education should be carried through the entire curriculum.

THE ROLE OF CONSERVATION IN THE CURRICULUM

Conservation, then, must become a part of the broad, general education of all Wisconsin youth. This conservation resource material can be fitted into the curriculum pattern of our schools in a variety of ways.

A separate course in conservation might be offered on the senior high school level. Since we have stated that conservation education experiences are important for all Wisconsin youth, it would logically follow that such a course ought to be listed as a required subject. The resource units presented in this curriculum guide are of sufficient significance and scope for such a course.

Since many high school programs are already pretty heavily weighted with required courses, there will be those who wish to handle the conservation education program in other ways. One such way would be to introduce units of work concerned with conservation into already existing courses. For instance, the unit on Recreational, Scenic and Historic Resources might well be introduced into the social studies area in geography or history. Other units, such as Soil Resources or Mineral Resources, would seem to fit quite naturally into the science program. This plan would serve equally well in elementary or high school. The materials presented in this bulletin are well adapted to this kind of organization.

A third manner of introducing conservation education into the curriculum is to integrate portions of each unit into already existing courses which bear a close relationship to the field. For instance, certain portions of the unit of Forest Resources would be related closely to the content of the sciences. At the same time, there are implications for Agriculture in the same unit. Social Studies courses would be the natural setting for the consideration of the social implications of a policy of conservation and wise use of our forest resources or the lack of such a policy. All of the resource units in this bulletin lend themselves to this type of organization on the elementary and secondary levels.

Probably no one of these plans can be said to possess merits which recommend it above all others for use in Wisconsin schools. It would seem important for each local system to choose the plan which would best meet its own particular needs and resources. Further, it seems that the introduction of a course in conservation, without some attention to integration of conservation education into closely related broad fields areas would fail to meet adequately the needs of the boys and girls and the society in which they live.

No matter what plan is adopted, careful cooperative planning by the school staff is necessary to insure a sequential development of such understandings, attitudes, appreciations, skills and behaviors as were conceived as the desirable outcomes of conservation education.

THE AREAS OF CONSERVATION

Although all of the resources considered in conservation are inextricably woven together in nature, practical considerations lead to a division of the field into five areas which have been treated in this resource guide. These areas are Soil Resources, Water Resources, Forest and other Vegetational Resources, Wildlife Resources, and Mineral Resources.

Because of its significance in Wisconsin, a sixth area, based in part upon a combination of the resources mentioned, has been given attention. This area is that of Recreational, Scenic and Historical Values.

While this bulletin presents a resource unit for each of the significant areas, the teacher should lose no opportunity for presenting the abundant examples of inter-relationships whenever and wherever she can.

Its subject matter is the natural environment in which pupils live. It would be ironical indeed if conservation, with its consideration of ecology, the study of organism in its environment, should fail to bring the boy and girl into fruitful interaction with their natural and social environments.

Conservation activities are more or less obviously socially significant and should therefore require little build-up with pupils or teachers. With soil erosion and depletion, for example, threatening our future food supply what thinking individual can be indifferent.

Being relatively new among subject fields, conservation has not yet become a vested interest with the necessity for maintaining obsolete methods and materials. First things can therefore be placed first: the educational welfare of children and the needs of society. Where such welfare requires conservation experiences, there these experiences may and should be provided. In this fashion, flexibility of planning may be encouraged, fresh first-hand experiences provided for boys and girls.

While conservation has these natural advantages, good teaching does not necessarily follow. It is still possible to make the teaching abstract and verbal. Great care should be exercised to see that conservation learning experiences maintain all their inherent freshness and vitality.



Learnings begin with the here and now

HOW CONSERVATION VALUES CAN BEST BE LEARNED

1. *The Learnings Should Begin With the Here and Now.* A careful survey of school and community conservation needs and resources should be made by teacher and pupils. This survey, if carefully planned, will not only reveal areas for conservation experiences, but will yield much information about individual pupil's backgrounds.

To carry out the survey, the teacher may begin by listing the important areas of conservation. According to the interest of pupils, the class may then be divided into as many committees or groups as there are conservation areas represented in the community. Through various forms of community research, contact with individuals, organizations, field trips, etc., each committee will catalogue the community conservation resources available for more intensive study.



Learnings grow out of boys' and girls' purposes

2. The Learnings Must Grow Out of the Purposes of Boys and Girls.

Recent experimental studies in learning show that unless the pupil has a need for something and directs that need toward satisfaction (his purpose), learning does not take place. For learning to be purposeful to the learner, he should have a part in planning his learning experiences (teacher-pupil planning).

A survey of interests of pupils in the class may reveal a strong but divergent interest in various forms of wildlife. Through teacher-pupil planning individual pupils or small groups may select forms of wildlife for study in which they have a special interest. The form of study with which individuals or small groups wish to begin their study will be worked out from alternative possibilities provided by the teacher. For example, some groups may be able to study their selected wildlife in natural habitat, some in zoos, and some in individual collections.



Learning experiences are concrete

3. *Learning Experiences Should be Concrete.* If we follow pupil's needs revealed through purposes and begin our study at home with local school and community needs, then the experiences are quite likely to be concrete, specific and individualized. Since, however, it is so easy in school learning to become abstract and verbal, constant vigilance should be directed toward making learning concrete and practical. Field trips and conservation projects involving such activities as exploring, growing, rearing, collecting and constructing should take precedence over regular book learning activities. The latter, when necessary, will be incidental.

The group on the study of soils may begin its study by collecting various samples of different soils available in the community. These samples may be analyzed simply with a view to predicting their suitability for growing different plants. After this analysis a number of experimental growings of various plants in the various soils will serve to check on the preliminary analysis. Additional elements may be added to sample of soils according to their needs to show how worn-out soils may again become fertile.



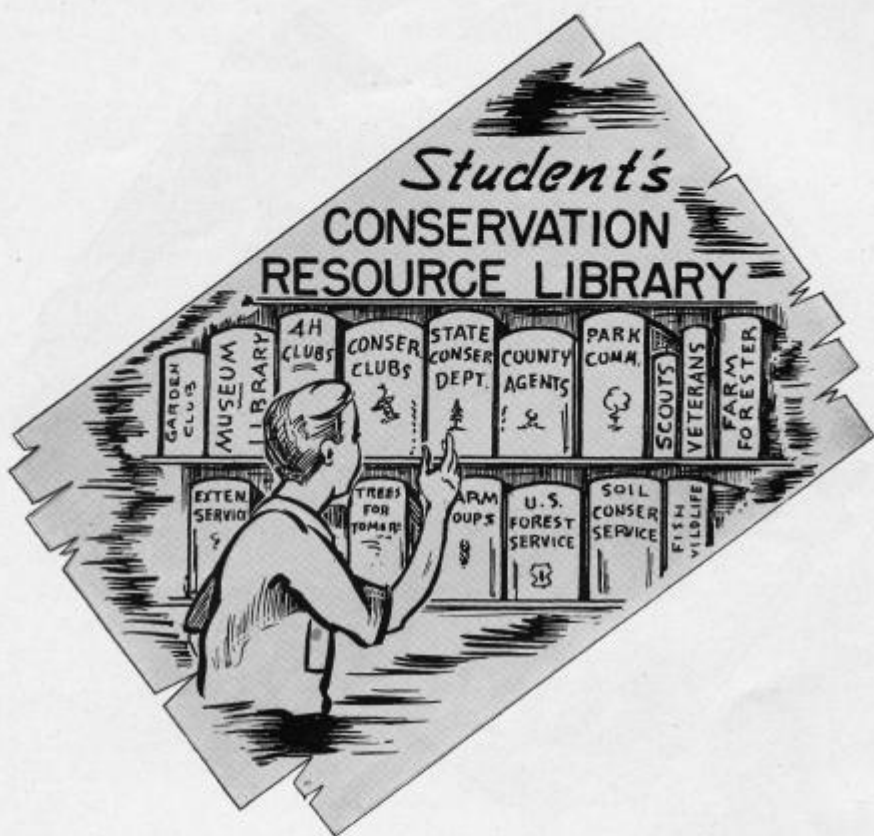
Pupil purposing makes concepts count

4. *Cooperative Planning and Pupil Purposing Should Take Into Account Concept Development and Concept Values.* The acquisition of rational concepts and broader and broader understandings are a major purpose sought by our most successful present-day teachers.

The desire to facilitate learning which embodies these cumulative concepts prompted the listing of these which have been carefully chosen, and which appear at the beginning of each of the six divisions developed in this bulletin. These significant concepts should prove helpful to the teacher in his choice of desirable aims for achievement as well as in the selection of appropriate content for the learning desired.

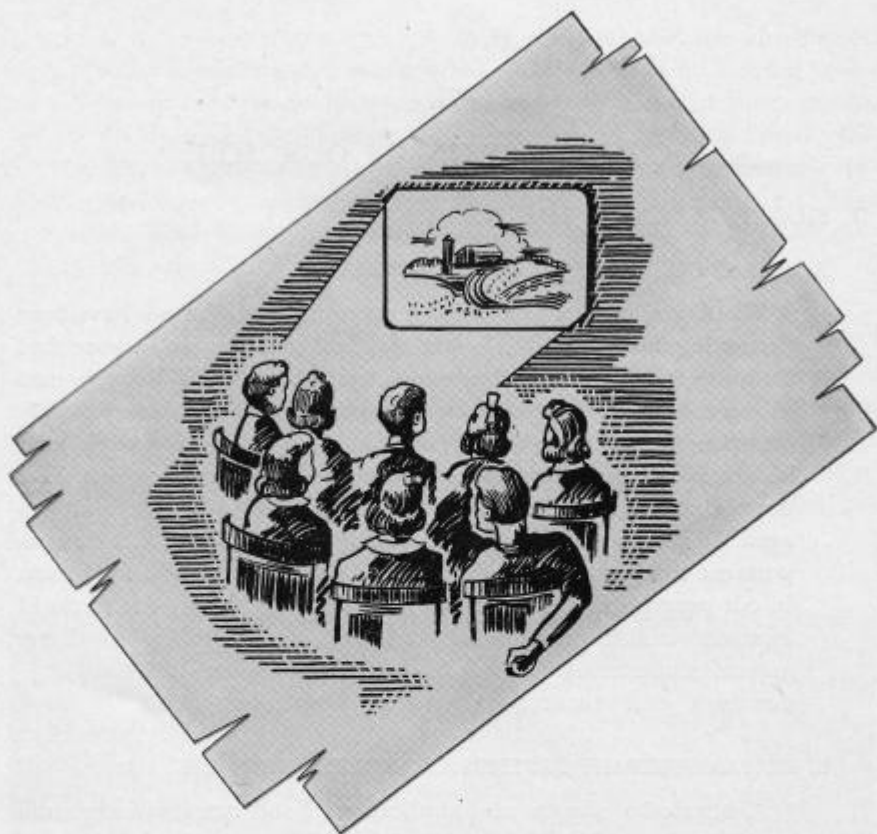
The following suggestion is offered:

Concepts should be taught in a cumulative fashion, each growing naturally out of the learning process.



Vital learning uses community agencies

5. *All related community agencies should be surveyed and made available as resources.* The discovery of these agencies should naturally grow out of the original school and community survey. Farmers groups, local conservation agencies, park groups, service organizations, federal organizations and others should all be drawn into cooperative working relationship with the school. The pupils will then have not only the satisfactions of fruitful learnings but also gain the social reinforcement growing out of actual contributions to the community.



Available teaching aids are exploited

6. *All available teaching aids should be exploited.* Though it is desirable to make the learning experience as direct and concrete as possible, there will be of necessity some indirect learnings. These should always be related to direct learnings and made as vivid and real as possible. Visual and auditory aids will be helpful here. Motion pictures, slides, film strips, opaque projections, recordings, pictures and charts will and should supplement reading research. A good library should contain as much of the above types of materials as possible as well as suitable books, magazines and pamphlets.

CONSERVATION OF OUR SOIL

I. SIGNIFICANCE OF THE TOPIC

A. SOIL IS OUR MOST VITAL RESOURCE

We Americans are just waking up to the fact that we have been destroying our basic capital—our soil. Soil conservation is more than farming. It is a social and economic system that should enable man to use the soil and related resources continuously. To many people the thought is still new, that land can wear out. Farm people have known it as long as farming has been practiced, but even they have not realized that the land need not wear out if it is properly managed. If our soil is to be a continuous resource, it is of great importance that we plan for its wise use NOW as well as in the future. In our progress in Wisconsin we have achieved our present status of apparent wealth through the utilization and exploitation of our natural resources. As we stop and look back, we realize that soil—our most vital resource—was misused and mismanaged.

B. HUMAN WELFARE DEPENDS UPON WISE LAND USE

A practical viewpoint and application of soil conservation should come from a study of this basic resource. Wise use of soils is not an end in itself. In building a sound land use program, human welfare is the first and most important consideration. Productive soils are necessary for economic security, healthy citizens and social stability. A reasonably stable society is our best guarantee of keeping ourselves and our children the privileges and benefits of our democratic system of government. People—happy, healthy and secure in the way of life—are best fitted temperamentally to enjoy the beauty of forested hills, green fields, blue lakes and clear streams.

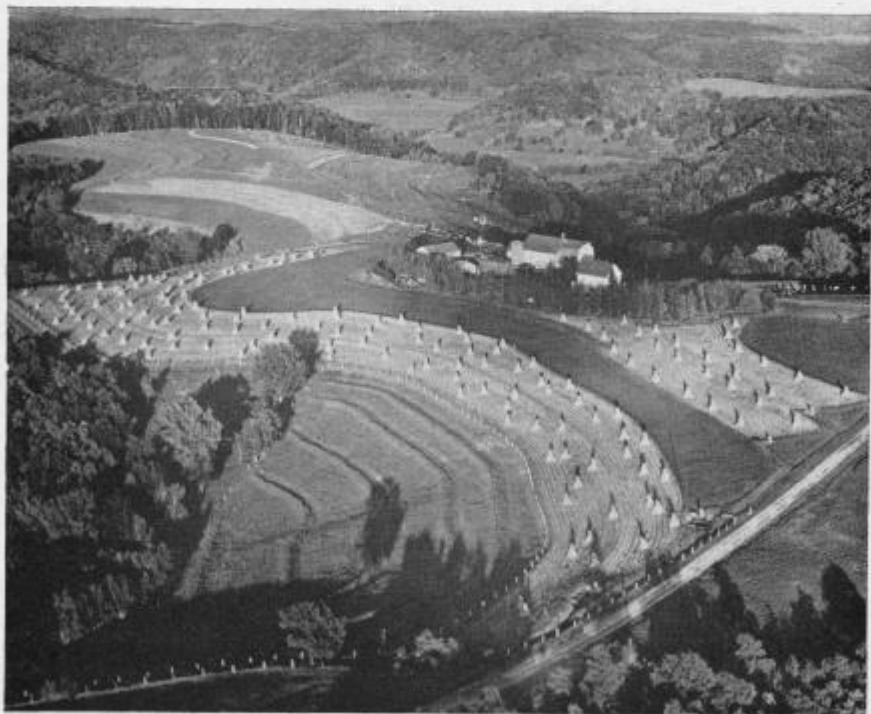
C. ONE THIRD OF OUR NATION'S TOP SOIL IS GONE

Soil can wear out at a disastrous rate. It washes away and blows when it is stripped of its cover of plants. Once the plants are removed, erosion sets in and best soil—on top—begins to wash down hill or blow away as dust. In the United States we have ruined or severely damaged an area approximately nine times that of the size

of Wisconsin. The original mean depth of top soil was nine inches, today it has dropped to six inches. While there is no accurate measure of loss caused by erosion the total, in terms of dust, storms, floods, mined farms and ranches, bankruptcy, and diminished wildlife, has been enormous. It is estimated that current damage by erosion to land, navigable streams and reservoirs, highways, buildings and other improvements costs the American people millions of dollars annually.

D. VEGETATIVE COVER PROTECTS THE SOIL

Trees, shrubs, grasses and other plants form a vegetative cover that holds the soil in place. Where the vegetative cover is destroyed, soil is left unprotected. This fact is the key to soil conservation. As soon as a good plant cover is put back of the soil, erosion stops. Vegetation is nature's own weapon against soil erosion. Man has found no better one.



Looking down on farming looking up

E. AN ULTIMATE GOAL OF SOIL CONSERVATION IS WISE LAND USE

Soil Conservation is essentially a matter of wise land use. On sloping lands suitable for cultivation such soil protection calls for contour farming, contour strip cropping, and contour terraces. Slopes too steep to be safe for cultivation should remain in permanent grass or trees. However, these are only some of the more conspicuous practices included in individual farm conservation plans. About fifty different soil-saving and soil-building measures are used today. They include such things as grass waterways, pasture renovation, drainage, and controlled grazing. The needs and capabilities of each acre of land determine the use and protection needed. This acre-by-acre treatment of our land resources is the basis of our soil conservation program today.

F. SOIL CONSERVATION SERVICES THROUGH LOCAL DISTRICTS CONTRIBUTE MUCH TO SOLVE SOIL CONSERVATION PROBLEMS

About 1800 soil conservation districts have been organized in the 48 states of this nation and Puerto Rico. With the exception of Wisconsin, farm owners, and operators vote in their own district. Democratically elected boards of supervisors, usually five in number, manage them. They accept written applications for farm conservation plans, pass on the plans developed and serve as a clearing house on local soil problems. Districts receive help from many government agencies such as the University Extension Service. The extension service is responsible for the educational program to be carried on among the farmers in the district. The Production and Marketing Administration pays farmers for applying soil conservation measures to the land. The Soil Conservation Service provides technical help to develop acre-by-acre farm conservation plans. Although they are unique units of local self government set up under state laws, soil conservation districts have no taxing power. Those who serve as supervisors receive no salaries. They are interested only in developing a sound conservation program to insure the best use of soil resources in their own communities and throughout the nation.

Wisconsin's enabling act gives the agricultural committee of the county board of supervisors the power to vote in a soil conservation district. When a district is organized, this committee becomes the governing board and is responsible for its management.

II. OUTLINE OF CONTENT

A. WHAT WE SHOULD KNOW ABOUT SOIL

1. Soil—our basic resource
2. Natural processes in soil building
3. Weathering of inorganic materials
4. Parent materials in soil composition
5. Time—a factor in soil composition
6. Soil divided into layers (Top Subsoil—Parent material)
7. Forces constantly at work on soil changes (The soil forming process. Physical-Biological-Chemical)
8. Movement of soil
9. Humus and mineral plant food
10. Source of water in soil
11. Movement of soil water
12. Effects of rain and temperature on soil surface
13. Plant food elements in the soil
14. Land obtained for cultivation
15. Meaning of soil conservation
16. Soil definition

B. CAUSES OF PROBLEMS ARISING FROM LAND USE

1. Wrong agricultural methods
2. Soil losses by water and wind
3. Soil losses by leaching
4. Exploiting type of ownership
5. Practices of tenants
6. Wrong cropping practices
7. Loss of fertility by not replacing soil elements
8. Lack of awareness of the seriousness of erosion
9. Use of submarginal lands

C. SOLUTIONS OF PROBLEMS CAUSED BY IMPROPER LAND USE

1. Land planning and zoning
 - a. Alternate land use (Forest, Agricultural, Recreational land use)
 - b. Using land's natural productive capacity
 - c. Soil Conservation Districts and Services
 - d. Farm Conservation Planning
2. Maintaining soil fertility
 - a. Green manuring crops
 - b. Use of barnyard manure
 - c. Use of mineral fertilizer
 - d. Systematic crop rotation
3. Preventing soil erosion through the use of modern techniques
4. Restoration of proper soil cover



Boys analyze soil

III. POSSIBLE OUTCOMES

A. UNDERSTANDINGS

1. An understanding of the nature of soil and how it contributes to the welfare of living things.
2. An understanding of how soils have been misused, and how such abuse contributes to the weakening of our democratic institutions and to poverty.
3. An understanding of how soil, water and vegetation are interdependent, and how all are essential to the welfare of man.
4. An understanding of principles and practices which will insure for people the greatest good for the largest number over the longest period of time.
5. An understanding that the soil is the richest heritage with which man is endowed.
6. An understanding that basically, soil is made up of organic and inorganic materials, and that these are constantly undergoing changes.
7. An understanding that soil is normally composed of more or less distinct layers, which form the soil profile. These layers differ in color, texture, structure, water-holding capacity, organic content and fertility.
8. An understanding that the formation of soil depends upon the action of natural forces constantly at work over a long period of time.

9. An understanding that soil is the reservoir which holds water.
10. An understanding that the texture of soil is determined by the proportion of particles of varying sizes.
11. An understanding that physical, chemical and biological agencies are constantly at work making plant food in the soil.
12. An understanding that man's actions have developed conditions which accelerated damage to the soil and impaired its fertility.
13. An understanding that man can control erosion by using some of nature's methods and by practicing wise land use procedures.
14. An understanding that poverty, suffering and soil depletion have resulted from the misuse of land and from the settlement of people upon poor land.
15. An understanding that correct land use with a purpose of passing the land on unimpaired or improved for future generations is desired.
16. An understanding that man must adjust himself to right land use through zoning and planning.

B. ATTITUDES AND APPRECIATIONS

1. An appreciation of our soil heritage.
2. An interest in soil conservation literature, such that students will utilize well-founded facts in the promotion of sound soil conservation practices.

IV. INVENTORY OF POSSIBLE ACTIVITIES

A. INITIATORY ACTIVITIES

1. Collect soil samples from different areas for later study of composition; water holding capacity; percent of organic and mineral matter.
2. Make field trips to find soils and soil formations. View soil profiles at roadside cuts and note differences between topsoil and subsoil; note differences between soils in forests, in pastures, in cultivated fields, and in gardens.
3. Find evidences of soil erosion, weathering and leaching.
4. Interview old settlers of the community about natural conditions when the community was first settled and make reports to the class on the interviews.
5. Find out why farms in your locality have been abandoned.
6. Have the county agent talk to the class about the local soil improvement program.
7. Make a survey of the library to determine the materials available on soils and soil conservation.
8. Familiarize yourself with the various agencies producing materials and literature on soil conservation.
9. Show the film "The Story of Soil Erosion in Wisconsin." (Silent, 30 min.)
10. Start a scrapbook to include soil improvement activities in your community and state.

11. Survey the table of contents of available books and pamphlets to find major emphasis centers considered in those materials.
12. Visit farms where commercial fertilizers are used.
13. Collect samples of commercial fertilizers.

B. DEVELOPMENTAL ACTIVITIES AND DISCUSSION TOPICS

1. Developmental Activities.

- a. List basic commodities under food, clothing and shelter to show how many of these are products of the soil.
- b. Arrange a panel discussion to consider natural processes—the following division may prove helpful:
 - (1) Physical forces
 - (2) Biological forces
 - (3) Chemical forces
- c. Bring in evidence of weathering and indicate how weathering helps to build soil—which weathering forces specifically bring about the changes in evidence.
- d. Review conservation articles and conservation books which may be available to obtain evidences of the time factor in soil production.
- e. Plan a field trip to view a soil profile—roadside banks showing different layers of soil, build a soil profile for classroom use.
- f. Measure the depths of soil horizons in an old cemetery and compare with those of nearby cultivated land. Make observation, record data, and draw conclusions. (A soil horizon is one of the layers of a soil profile.)
- g. Plan a field trip to find examples of various types of soil erosion:
 - (1) gulley erosion
 - (2) sheet erosion
 - (3) stream bank erosion
 - (4) wind erosion
- h. If possible, find what has been done by way of preventing such type of erosion noted on the land-area visited.
- i. Make a field trip to study other conservation practices on a farm.
- j. Collect run-off water and determine what it carries.
- k. Make or find pictures showing "before and after" erosion control and mount them. Label each properly.
 1. Test different soils for rate of capillary action.
- m. Test different soils for water absorbing and water holding capacity.
- n. Test a sample of soil for organic matter. Weigh the sample, dry it, burn it, weigh it again to determine weight of organic material.
- o. Test different types of soil for adhesion.

- p. Observe the cutting power and carrying capacity of water flowing at different rates.
 - q. Observe different soils for texture. Use hand lens.
 - r. Obtain several flower pots which may be used for experimental purposes. Fill the first pot with poor soil (Subsoil). Fill the second pot with subsoil to which some organic matter has been added. Fill the third pot with subsoil to which commercial fertilizer has been added. Fill the fourth pot with subsoil to which both organic matter and commercial fertilizer has been added. Plant several wheat kernels in each pot, giving the pots equal care and attention. Note differences in plant growth and draw conclusions.
 - s. Make a diagram to explain the movement of water in the soil and continue by following the movement of water up through the plants into the atmosphere. Can you complete the water cycle?
 - t. Plan a field trip to find evidences of the affect of rain and temperature on the soil surface. Note especially the effect of freezing and thawing on the banks of streams and lakes and also the effect of drying and resultant cracking on low areas of ground.
 - u. Have each member of the class take samples of soil from their farm and test these for plant food elements:
 - (1) How should samples be taken?
 - (2) Where should samples be taken?
 - (3) How should they be labeled? Why?
 - (4) How may the results be used to aid in soil improvement and conservation?
 - v. Illustrate the various ways through which land may be brought under cultivation. Were these land policies in keeping with the greatest good over the longest period of time?
2. Discussion Topics: (These topics parallel foregoing experiences)
- a. Discuss the extent to which the local standard of living is dependent upon soil productivity.
 - b. How is the land of the neighborhood changing, and to what is this change attributable?
 - c. Describe the land of your locality at the time of the arrival of the early settlers.
 - d. What were the primary purposes of the early settlers and how did these purposes affect the early treatment of the soil?
 - e. To what extent has the productivity of our soil been reduced in the past through questionable methods of management?
 - f. What factors are constantly changing the earth's surface (rain, wind, ice, snow, plants, animals, and man)?

- g. Give the results of your study of parent-materials in soil formation and composition. (Obtain results from direct observation as well as from reading.)
- h. Discuss differences in soil using collections made for illustrative purposes.
- i. Give quotations from soil authorities to indicate the time required for soil formation.
- j. How does the texture of the soil affect capillary action and water holding capacity? What is the value of this information to agriculture?
- k. Does water penetrate all soil at the same rate? What are the implications of soil absorption for crop production?
- l. Make a blackboard drawing to illustrate the water cycle, and explain characteristics to the class.
- m. How does the character and quality affect plant growth? Note—In this discussion two characteristics should be emphasized:
 - (1) Plants most suitable for various kinds of soil.
 - (2) Importance of soil quality to efficient production.
- n. What kinds of fertilizers are available for soil improvement?
- o. Discuss factors which influence the rate of erosion.
- p. How can the soil of our community be more effectively conserved?
- q. What private and governmental agencies are contributing to soil conservation? Explain.
- r. Obtain information on the dust storms of the 1930's and present such information to the class.
- s. To what extent has erosion reduced land values in your community?
- t. List and discuss values of erosion-control practices.
- u. Discuss the importance of crop rotation to soil productivity and erosion control.
- v. Present a 3-4-5 year crop rotation plan and justify your choices.
- w. Give the implication of each of the following quotations:
 - (1) 1817—Jefferson—"Fields are no sooner cleared than washed."
 - (2) 1790—Washington—"Neither my overseer or manager will attend to anything but the crops they have usually cultivated. They grow Indian corn wherever they can."
 - (3) 1790—Patrick Henry—"He is the greatest patriot who stops the most gullies."
 - (4) Theodore Roosevelt—"When soil is gone, man must go."

- x. What is the value of plowing under green crops?
- y. How does the productivity of farms upon which dairying or beef raising has been carried on compare with those devoted exclusively to grain farming?
- z. Discuss a practical method of maintaining the fertility of a farm.
 - (1) Name and describe the general type of fertilizer available for soil use.
 - (2) How is the government assisting farmers in maintenance of their soils at the present time?
 - (3) Have three or four students prepare a round-table discussion on the farm tenancy problem and its relation to the soil.
 - (4) What drainage laws have we in Wisconsin, and how do they assist farmers in improving their soil?
 - (5) Give a talk to your class on the method employed in describing the land for titles, deeds, etc. Your town clerk will be glad to assist you in your project.

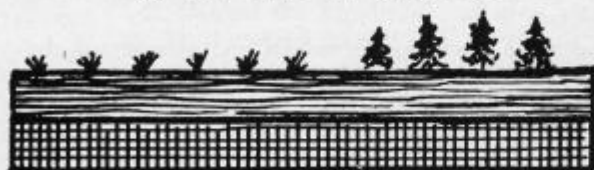
C. CULMINATING ACTIVITIES

1. Assume that four or five of your class members are members of your county board and are delegated the responsibility of mapping out a soil conservation program for your county with county funds. Indicate what the group should include in such a program.
2. Choose and briefly sketch a farm of your community and make specific recommendation as to its most desirable care and use.
3. Bring to class several plants. Include in the group some clean tilled plants such as corn, beets, etc., and also some plants which are not cultivated, such as wheat, clover, etc.,—discuss the difference in the roots of the two groups and how they would likely affect erosion.
4. Arrange a round table discussion in which one member of the group will represent each of the following:
 - a. The Federal Soil Service
 - b. The State Conservation Department
 - c. The county agricultural agent
 - d. The county board of supervisors
 - e. The town board of supervisors
 - f. The local farmer

Have each member of the group present what the unit of government which he represents can do to further agricultural values through a soil conservation program. Concentrate upon specific types of effort rather than upon generalities.

5. Prepare a play on the topic, "Soil, the Nation's Greatest Heritage." Present the play to the P.T.A., or community organization.
6. Discuss ten losses resulting from soil erosion.
 - a. Decreased food production.
 - b. Increased floods taking toll of life and property.
 - c. Dust storms rendering areas unfit for use.
 - d. Periodic crop failures.
 - e. Decreased food for wild game.
 - f. Muddy streams unfit for fish.
 - g. Silted reservoirs rendering hydro-electric power useless.
 - h. Decline of industries, and decay of cities.
 - i. Loss of plant food and added submarginal land.
 - j. Bankrupt farmers, migrating populations, poverty and decadence.
7. Over 50 million acres of soil in the United States has been destroyed by erosion. There are 640 acres in a square mile. What states would equal an area as large as this?
8. Bring to class samples of soil from the top of sloping field which has been plowed, from a wood where the leaves are thick, from a valley where soil washes in, and from a roadside bank. Study the differences in color and feel of the various soils. Which appears the richest? Draw conclusions.
9. Each of the diagrams below represents the land of the United States. The top soil that is missing has been washed away. What kind of plant holds the soil in place? What kind lets the soil wash away? Tell the story of the graph below.

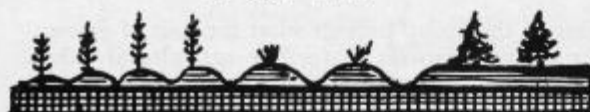
IN THE TIME OF COLUMBUS



 Top Soil
 Subsoil

 Grass

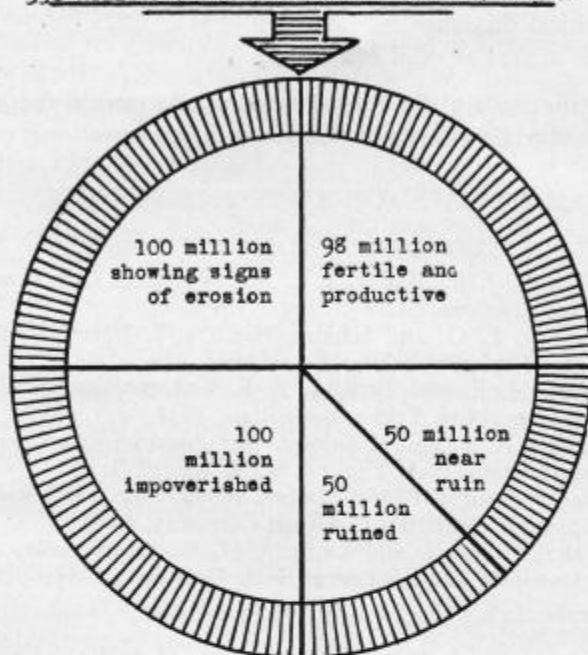
IN OUR TIME



 Crops

 Trees

398 MILLION ACRES USED AS CROPLAND IN U.S.A.



10. Show the film, "Life of the Soil" (Color—Sound)
11. Hold a mock trial—Uncle Sam is charged with washing away his soil.
12. Prepare a radio program on the subject of soil conservation in Wisconsin.

V. EVALUATION SUGGESTIONS

- A. Evaluate on the basis of the twelve major concepts for soils in this unit.
- B. Does the pupil show growth in soil conservation understandings, and does he recognize the importance of conservation to the maintenance of a desirable standard of living, and, in fact, to human survival?
- C. In addition to a desirable conservation background, has the student become inspired to do something about conservation?
- D. Does the pupil evince a desire to gain more information about conservation?
- E. Has the unit contributed to habits which involve:

- a. Careful observation and study
 - b. Critical thinking
 - c. The arrival at valid conclusions
- F. Does the student show a tolerant attitude toward the many kinds of worthwhile effort now underway in conservation?

VI. LIST OF MATERIALS FOR REFERENCE PURPOSES

A. BOOKS—GENERAL CONSERVATION TEXTBOOKS

1. Caldwell, J. E., Bailey, J. L. and Watkins. *Our Land and Our Living*. Syracuse: L. W. Singer, 1941.
2. Cheyney, E. G. and Schantz-Hansen, T. *This Is Our Land*. St. Paul: Webb Publishing Co., 1940.
3. Flynn, H. E. and Perkins, F. E. *Conservation of the Nation's Resources*. New York: Macmillan, 1941.
4. Parkins, A. E. and Whitaker. *Our Natural Resources and Their Conservation*. New York: J. R. Wiley, 1939.
5. Renner, George T. and Harley, W. H. *Conservation and Citizenship*. New York: D. C. Heath Company, 1940.
6. Wales, H. Basil, and Lathrop, H. O. *Conservation of Natural Resources*. Chicago: Laurel Book Company, 1944.

B. BOOKS—GENERAL BOOKS ON SOIL

1. Bennett, Hugh Hammond. *Elements of Soil Conservation*. New York: McGraw-Hill Book Company, Inc., 1947.
2. Graham, E. H. *Natural Principles of Land*. New York: Oxford University Press, 1941.
3. Gustafson, A. F. *Using and Managing Soils*. New York: McGraw-Hill Book Company, Inc., 1948.
4. Van Dorsan, Wm. R., and Graham, Edward H. *The Land Renewed*. New York: Oxford University Press, 1946.

C. CURRICULUM BULLETINS

The following may be obtained from the Department of Public Instruction, State Capitol, Madison 2, Wisconsin.

1. *Teaching of Conservation in Wisconsin Schools*, Vol. 1, No. 1.
2. *Helps in Teaching Conservation in Wisconsin Schools*, Vol. 1, No. 2.
3. *Helps in Planning Conservation Learning Experiences*, Vol. 1, No. 3.

D. WISCONSIN SOIL BULLETINS AND PAMPHLETS

The following publications may be obtained from the College of Agriculture, University of Wisconsin, Madison 2, Wisconsin.

1. *Recreation as a Land Use*, No. 422, 1932.
2. *Rural Zoning Ordinance in Wisconsin*, No. 281, 1936.
3. *Rural County Zoning in Wisconsin*, (special)

4. *Relocating the Isolated Settler*, (special)
5. *Soil Erosion Survey of Wisconsin*, (special) 1941.
6. *Outline for County Land Use Planning in Wisconsin*, (special)
7. *Which Way Now, Wisconsin*, (special)
8. *Rural Zoning Stands the Test of Time*, (special)
9. *Making the Best Use of Wisconsin Land Through Zoning*, (special)
10. *Cropping Systems that Help Control Erosion*, No. 452, 1941.
11. *Grass Waterways Control and Prevent Gullies*, No. 320, 1941.
12. *Strip Cropping to Control Erosion*, No. 317, 1941.

From sources identified with each title, the following additional bulletins may be obtained.

1. *The Cutover Region of Wisconsin*, No. 7, Wisconsin State Planning Board, State Capitol, Madison, Wisconsin, 1939.
2. *A Picture of Wisconsin*, No. 16, Wisconsin State Planning Board, State Capitol, Madison, Wisconsin, April, 1946.
3. *Soil Conservation in Wisconsin*, Soil Conservation Service, 20 North Carroll, Madison, Wisconsin, 1944.

E. NATIONAL BULLETINS AND PAMPHLETS ON SOIL

1. *Guarding a Heritage*, U. S. Department of Agriculture, Washington, D. C., 1942.
2. *The Land We Defend*, Soil Conservation Service—Division of Information, Washington, D. C., 1940.
3. *Acres Are Acres*, Soil Conservation Service, Washington, D. C., 1943.
4. *New Landmarks of Soil Conservation*, Supt. of Documents, Washington, D. C., No. 486, 1942.
5. *Teamwork to Save Soil and Increase Production*, Soil Conservation Service, Washington, D. C., No. 486, 1942.
6. *Lessons From the Old World to the Americans in Land Use*, Government Printing Office, No. 3756, 1944.
7. *Thomas Jefferson*, Soil Conservationist, Supt. of Documents, Washington, D. C., No. 548, 1944.
8. *Soil Conservation*, Teachers' Manual, Missouri Conservation Commission, Jefferson City, Missouri, 1942.
9. *Classifying Land for Conservation Farming*, Dept. of Agriculture, Washington, D. C., No. 1853, 1943.
10. *Prevention and Control of Gullies*, Dept. of Agriculture, Washington, D. C., No. 1813.
11. *Terracing for Soil Conservation*, Dept. of Agriculture, Washington, D. C., No. 1789.
12. *Strip Cropping for Soil Conservation*, Dept. of Agriculture, Washington, D. C., No. 1776.

3. *Education in Conservation of Soil and Water*, Report of Northern Great Plains Conservation Education Committee, State Capitol, Lincoln, Nebraska.
14. *An Outline for Teaching Conservation in Rural Elementary Schools*, Education Section, Department of Agriculture, Washington, D. C.
15. *Health from the Ground Up*, Karl B. Mickey, Public Relations Dept., International Harvester Company, Chicago, Illinois.

F. FILMS

The following motion pictures are suitable for the study of soil conservation. No attempt has been made to include all films on this subject. They may be obtained free, save the cost of transportation from:

Division of Information and Education
U. S. Soil Conservation Service
4650 North Port Washington Road
Milwaukee 12, Wisconsin

1. *After the Storm*, sound, color, 20 minutes
2. *Board Base Terracing*, sound, color, 15 minutes
3. *For Years to Come*, sound, color, 25 minutes
4. *Food and Soil*, sound, color, 15 minutes
5. *Green Acres*, silent, color, 30 minutes
6. *Harvest for Tomorrow*, sound, 30 minutes
7. *Farming on Sloping Fields*, sound, color, 15 minutes
8. *Roots in the Ground*, sound, 30 minutes
9. *Terracing with a Moldboard Plan*, sound, color, 1 minute
10. *Life of the Soil*, sound, 15 minutes
11. *Wet Lands*, sound, 15 minutes
12. *Story of Erosion in Wisconsin*, color, silent, 30 minutes

Other films on soil conservation such as *America, the Beautiful* may be obtained from:

Bureau of Visual Instruction
Extension Division
University of Wisconsin
Madison 6, Wisconsin

WATER CONSERVATION

I. SIGNIFICANCE OF THE TOPIC

A. ALL LIVING THINGS ARE DEPENDENT UPON WATER

Areas near springs, brooks, streams, rivers, lakes or oceans have, since his first appearance on earth, been the location of man's homes. People recognize the necessity of water for their existence and for the plants and animals upon which they rely for food. During the wanderings of early man the distribution and supply of water were important factors which determined, as they do today, whether his life would be poor or prosperous, whether his crops would flourish or perish, or whether his stay would be short or long in duration. The water supply also is one of the determiners of the abundance and type of plant life which make possible the provision of much of the food supply for wild life. Gregarious by nature, man congregates in the areas where soil and water work together to provide the essentials which are necessary for an abundant supply of living things.

B. WE SHOULD CONCERN OURSELVES WITH THE RIGHT USES OF WATER

Even though three-fourths of the earth's surfaces is covered with water, conservation minded people today are concerned about its misuse. Water is unique among the earth's resources in that it is constantly returning through the process of evaporation and precipitation. While the overall quantity is not noticeably diminished, man's unwise use in certain areas does greatly affect the local supply. Throughout much of the country the water table has declined steadily and in some places seriously. Water properly managed can render repeated services in many ways, all of which directly concern the general welfare of people.

C. WATER CONTRIBUTES TO OUR PHYSICAL AND EMOTIONAL HEALTH

In daily life some things are so commonplace that we become concerned about them. Water is one of these things. Yet this resource to which we pay so little attention is the life blood of the earth. It is necessary to the production of the food, to the convey-

ance of food and waste, to the regulation of body temperature, and to the cleansing of both the body and environment of man. The use of water for recreational purposes contributes greatly to man's physical, mental, and emotional health.

D. WATER BELONGS TO EVERYBODY

Regardless of who has responsibility for the management and control of our water resources, the ultimate motive must be the greatest good for the largest number over the longest period of time. The development of hydroelectric plants for our increased use of electricity, the converting of many arid regions to agriculture through irrigation, the great use of water for wildlife production and recreational development, all indicate the multiplicity of uses which make this resource of such great significance to everyone. To gain an understanding of the entire scope of water conservation, adults and students must be made to see the basic relationship between it and the conservation of our forests, soils, wildlife, and recreational resources and how each of these affect our daily lives.

II. OUTLINE OF CONTENT

A. SOURCES OF OUR WATER SUPPLY

1. Lakes
2. Wells
3. Springs
4. Artesian wells
5. Streams
6. Ocean

B. THE USES OF WATER

1. To support human and animal life.
2. To support plant life.
3. Water used for agricultural purposes and irrigation.
4. Water used for the generation of power.
5. Water as a means for transportation.
6. Water as a medium for the removal and purification of waste.
7. Water as a recreational asset.
8. Water as a determiner of political boundaries.

C. THE WATER OR HYDROLOGIC CYCLE

1. A continuous process.
2. Sources of atmospheric moisture.
 - a. Evaporation
 - b. Transpiration
 - c. Respiration

3. Precipitation
4. What happens to rainfall?
 - a. Runoff
 - b. Evaporation
 - c. Absorption
 - d. Percolation

D. PROBLEMS OF OUR WATER SUPPLY AND THEIR SOLUTION

1. Floods and Flood Control
 - a. Flood destruction
 - b. Conditions affecting floods
 - (1) Rainfall
 - (2) Slope
 - (3) Soil types and rock structures
 - (4) Lack of vegetation (over-grazing—fire—overcutting of trees, etc.)
 - c. Why Flood Damage is Increasing
 - (1) Uncontrolled run-off water.
 - (2) Poor land practices.
 - d. Flood Control
 - (1) Correct land use (contouring, stripping, terracing, etc.)
 - (2) Forests and other vegetation.
 - (3) Correct land use.
 - (4) Protection levees.
 - (5) Spillways and floodways.
 - (6) Retarding basins.
 - (7) Storage reservoirs.
 - e. Flood control practices in Wisconsin and the United States.
 - f. The responsibility for flood control lies in the cooperation of individuals, counties, states, and nations.
2. Low Water Conditions
 - a. Importance of maintaining the flow of streams during dry seasons for water supply, vegetation, etc.
 - b. How we can increase the flow of streams.
 - c. What is being done in your area to maintain uniform stream flow?
3. Water Pollution
 - a. Causes of water pollution.
 - b. Effects of water pollution.
 - c. How can water pollution be reduced or eliminated?
 - (1) Analysis of water for purity.
 - (2) Modern treatments for the disposal of industrial wastes and sewage.



Bleak outlook of streams with denuded banks

4. The Quality of Water—A Factor in the Use Made of It
 - a. For industrial purposes.
 - b. For human use.
 - c. Purification of water.
 - (1) Filtration
 - (2) Aeration
 - (3) Chlorination
5. Conservation of Water Power
 - a. Early uses of water power.
 - b. Importance of our power resources.
 - c. Why only a small portion of our potential power is used.
 - d. Some local sources of power in Wisconsin.
 - (1) Prairie du Sac
 - (2) St. Croix Falls
 - (3) Grandfather Falls
 - (4) High Falls on the Peshtigo River
 - e. Some existing sources of power in the U. S.
 - (1) T.V.A.
 - (2) Grand Coulee Dam
 - (3) Boulder Dam
 - (4) Roosevelt Dam
 - (5) Niagara Falls

6. Our Waterway Resources
 - a. The use of the Great Lakes.
 - b. Recent developments in the use of the Mississippi and its tributaries.
 - c. Economic value of water transportation.
 - d. Use of canals in the U. S. .
 - e. Present and past use of waterways in Wisconsin.
7. Water for Recreation.
 - a. Bathing, boating, fishing and hunting, etc.

E. PLANNING FOR WATER CONSERVATION

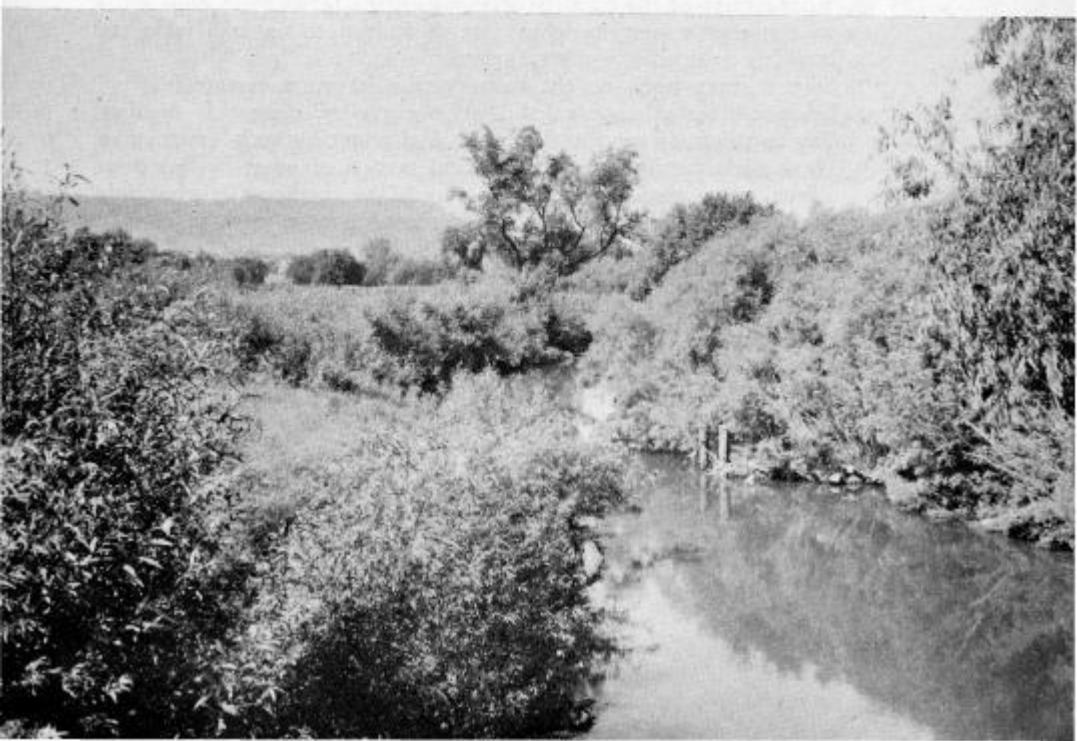
1. The importance of correct land use.
2. The influence on watershed by forests and other vegetation.
3. The consideration of the entire drainage basin in planning.
4. The questions of legal control as a problem area.

III. POSSIBLE OUTCOMES

A. KNOWLEDGE AND UNDERSTANDINGS

1. Knowledge of the availability of water in the locality, and the various uses to which it is put.
2. Knowledge as to man's dependence upon water for his life and living—transportation, power, fishing, consumption, etc.
3. Knowledge as to the relation of water to other natural resources.
4. Knowledge as to stream care and protection to safeguard streams from floods and pollution.
5. Knowledge of plans and proposals for wider use of streams for power, navigation and recreation.

A similar stream with supporting vegetation



B. ATTITUDES AND APPRECIATIONS

1. An appreciation of the contribution of water to the early exploration and development of the country.
2. An appreciation of the contribution which water makes to man's recreational life.
3. An appreciation of lake and river beauty in its many manifestations.
4. An appreciation of man's custodial responsibility in reference to our lakes and streams.

IV. INVENTORY OF POSSIBLE ACTIVITIES

A. INITIATORY ACTIVITIES

1. Make a study of the water resources of your community, and draw a map of the area locating lakes, streams, dams if any, water power plants, etc.
2. Make a survey of your library to locate books, magazines, newspaper articles, etc. that contain information which will be helpful in your conservation study.
3. From your scanning of books, articles, etc., related to water conservation, list a dozen or more major headings under which water conservation values might well be studied.
4. Interview early settlers to gain information as to how the water table has changed during past years. Have dug wells gone dry? Have lakes lowered? etc.
5. Have a representative of the class write the Agricultural Extension Division, University of Wisconsin, Madison, Wisconsin, for bulletins on—rural water installations—rural sanitary sewage disposal plants—helps in developing drainage plans and programs.
6. Visit a farm of the locality upon which the farmer has done work to conserve water, moisture, etc. Ask him to explain why and how his protective work was done.
7. Start a scrap book on the conservation of water resources.
8. Go out after a heavy rainfall to observe evidences of washing. Try to think of ways and means of eliminating such destruction.
9. Have each pupil start an anecdotal record of what he has done about water conservation. This should be continued throughout the work, and if possible after he completes the work in class.

B. DEVELOPMENTAL ACTIVITIES AND DISCUSSION QUESTIONS

1. Developmental Activities

- a. Visit an urban water supply plant, obtain information as to its source and distribution of water, and explain its service using blackboard drawings for illustrative purposes.
- b. Make drawings to illustrate the various types of water systems in rural homes.
 - (1) The gravity system with suspended tank.
 - (2) The shallow well type.
 - (3) The deep well type.

- c. Make a drawing of a deep well pump, and explain its operations.
- d. From a weather map, explain the significant elements included upon it. Explain particularly the high and low areas, and the effect of air movement to higher altitude and higher latitude.
- e. Make a drawing to illustrate the various movements of moisture and water in the water cycle.
- f. Have the class, or a committee of it visit a water power plant and explain its operation.
- g. Have students perform various experiments to show evaporation and condensation.
- h. Show through experimentation the differences between hard and soft water. Explain the value of evaporation and condensation to land, plant, and animal life.
- i. Make a diagram of a water softener, and explain its operation.
- j. Plan a program for the purification of the water of your home and community.
- k. Visit a publicly owned city or village sewage disposal system, and with illustrative drawings, explain its operation.
- l. Develop a chart with illustrative pictures showing the functions and operation of the T.V.A.
- m. Develop a balanced aquarium in the classroom, and show how water, fish and vegetation may be kept in balance.
- n. Show by diagram the engineering features developed on the Mississippi to improve the situation in reference to water.
- o. Study your locality, and indicate characteristics conducive to floods, and those which serve as preventive and control features.
- p. Draw the section of the U. S. which includes the Great Lakes. Indicate specifically the location of the proposed deep sea channel. Explain the differences of opinion in reference to this proposed project.
- q. Make a diagram upon which you locate the arrangement of rock strata and soil layers which make possible an artesian well. Locate the place or places where, through drilling, one might be obtained.
- r. Write the story of a river. Tell of its source in high lands; how it passes through cities, and its contribution to each; of the life which it maintains; of the unwise treatment which it receives along the way, and of the extended use which could be made of it with proper treatment. Indicate where it flows out into the sea, and the result of the change of its movement at its mouth.

2. Discussion Questions

- a. Discuss the water resources which are available in your community as to (1) adequacy (2) use (3) treatment to assure long range effectiveness.

- b. Review the sources of water supply, and indicate those which are most likely to be free from contamination.
- c. How did the streams and lakes contribute to the life of the early settlers?
- d. Explain the formation of frost, snow, hail, rain and dew.
- e. Explain the hydrologic cycle.
- f. In what ways has water been wasted in the past, and in what ways do we continue wasteful practices?
- g. Why has the use of our streams for navigation fallen off so greatly in recent years?
- h. Explain why it is of value to keep streams at an even flow?
- i. Explain the relation between forests and the even flow of streams?
- j. Flood damage is said to be on the incline. Explain why.
- k. Has civilization increased or decreased the amount of water stored in the earth? Explain.
- l. What flood control measures are being taken by the state? by the nation? How can we contribute to the movement?
- m. Explain ways in which water is being polluted at the present time, and tell of its disastrous results.
- n. Suppose you were running for a state or national legislative office; list the planks which might be included in your platform for the elimination of pollution.
- o. What characteristics should good drinking water for household use possess, and how can it be improved under certain circumstances for domestic use?
- p. Explain the early uses of water power, and how engineering has helped to improve its uses.
- q. Why is the use of water power so limited at the present time?
- r. Give a report on the following existing sources of power in the U. S., and if possible, the extent to which the source is now contributing power.
 - (1) T.V.A.
 - (2) Grand Coulee Dam
 - (3) Boulder Dam
 - (4) Roosevelt Dam
 - (5) Niagara Falls
- s. Give a report on Wisconsin's sources of power:
 - (1) Prairie du Sac
 - (2) St. Croix Falls
 - (3) Grandfather Falls
 - (4) High Falls—Peshtigo River
- t. Discuss the use of the Great Lakes for transportation purposes.
- u. Explain recent engineering developments in the Mississippi River which enhance the use of the river for commercial purposes.

- v. Report on the recent developments in muck forming.
- w. Discuss the contribution which water makes to the tourist industry of Wisconsin.
- x. Do you favor Federal Government participation in water power projects? Explain.
- y. Elaborate upon the significance of the following points taken from Conservation and Citizenship—pp. 181–182. Renner and Hartley.

C. CULMINATING ACTIVITIES

1. Arrange a panel discussion in which one member represents agriculture, another industry, a third a recreation director, and a fourth commerce. Have them discuss the question, "What does a desirable water conservation program include?"
2. Arrange a panel discussion in which is reviewed "Wisconsin's Northern Waters merit conservation for their recreational values".
3. Have one group of students prepare articles on the contribution of Wisconsin's waters to human welfare in the past. Have another group prepare articles on the contribution of the waters to the present.
4. Have pupils arrange a bulletin board upon which the following is shown:
 - a. Damaged and neglected water values.
 - b. Water values protected and efficiently used.
5. Arrange a panel discussion in which each of the following is represented:
 - a. The farmer.
 - b. The engineer.
 - c. The legislator.
 - d. The teacher.
6. Have each representative indicate what he can do to improve water conservation.

V. EVALUATION SUGGESTIONS

- A. Have each pupil evaluate himself on the following:
 1. Have I gained added interest in conservation?
 2. Have I worked effectively—
 - a. Independently?
 - b. With a number of groups?
 3. Have I learned to use books more effectively?
 4. Did I accept criticism willingly?
 5. Have I applied some of the things I learned?
- B. Have each pupil list concepts relative to water conservation which merit retention.

- C. Have pupils list things each plans to do in the future which are in keeping with values learned.
- D. Question for elaboration—
"Are there water frontiers in 1947 which merit consideration?"
- E. What was the quality and extent of work on
 1. The scrap book
 2. The anecdotal record.

VI. LIST OF MATERIALS FOR REFERENCE PURPOSES

A. BOOKS

1. Cheyney and Schantz-Hanson, *This Is Our Land*, Webb Publishing Company, St. Paul, 1940.
2. Flynn & Perkins, *Conservation of the Nation's Resources*, Mac-Millan, Chicago, 1940.
3. Pryor, W. C. & Pryor, H. S., *Water-Wealth or Waste*, Harcourt, 1939.
4. Renner & Hartley, *Conservation and Citizenship*, Heath & Co., Chicago, 1940.

B. PAMPHLETS AND BULLETINS

1. *Basic Education Science Series*, Row Peterson & Co., Evanston, Ill., Soil, Water and Man, and Others.
2. *Toward Better Teaching of Soil and Water Conservation*. Southwest Mountain States Regional Conservation Education Conference, University of New Mexico. University of New Mexico Press. 1947. pam. \$.25.
3. *Stream Pollution Hazards of Wood Pulp Mill Effluents*, U. S. Fish & Wildlife Service, B. A. Westfall, Chicago 54, 222 North Bank Drive, 8 p., 1946 8 p. mim. (bibl.) (Fishery leaflet 184)
4. *Water and Our Forests*, U. S. Forest Service, Bernard Frank and C. A. Betts, Supt. of Doc., 1946. 29 p. Illus. maps, (Dept. of Agric. misc. pub. No. 600) \$.10.
5. *Water Conservation Conference*, State Planning Commission, 115-B State Office Building, Lansing, Michigan, 1944, 118 p., Illus. tables, and chart.
6. *The University and Conservation of Wisconsin Waters*. Bulletin 1977, University of Wisconsin, Madison.
7. *The Waterpowers of Wisconsin*, Smith, Leonard, Wisconsin Geological and Natural History Survey, Science Hall, University of Wisconsin, Madison.
8. *Little Waters*, Persons, H. W., U. S. Govt. Printing Office, Washington, D. C., \$.10.
9. *Tennessee Valley Authority*, 1933-1937, U. S. Govt. Printing Office, Washington, D. C.

10. *Teaching Conservation of Water Resources*, Bulletin 3, Missouri Conservation Commission, Jefferson City, Mo. 1941.
11. *Inventory of Wisconsin Lakes*, Dept. of Agriculture, University of Wisconsin, Madison, Wisconsin.

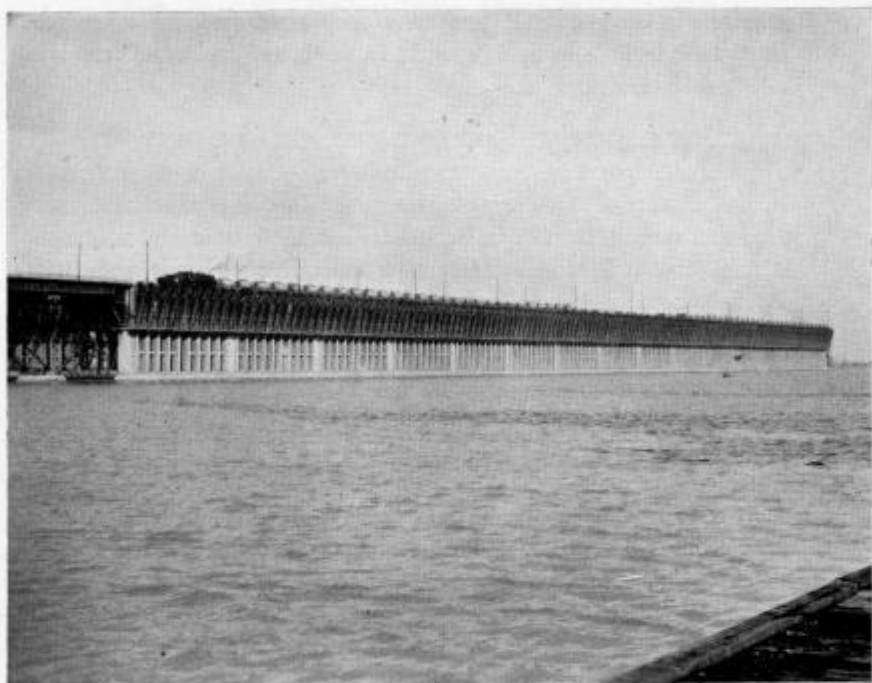
C. FILMS

1. *Waterways and Agriculture*, Atlas Educational Film Co., 1111 South Blvd., Oak Park, Ill., Free.
2. *Power*, Stone and Webster Engineering Corp., 49 Federal St., Boston, Mass. Free.
3. *The River*, sound, 33 minutes, "Notable film dramatization of the story of the Mississippi from pioneer days of river commerce to recent floods and erosion disasters. Conservation work."
4. *Water Power*, sound, 11 minutes, "Reveals the potential power of water by a description of the water cycle. The development of water power, chiefly in the United States, from the small mill of the early colonist to such modern projects as Niagara, Boulder Dam, and the TVA. The transformation of potential energy of the waterfalls into kinetic energy through the hydro-electric plant is seen in animation. A world survey of potential water power is provided."
5. *Water Power*, silent, 15 minutes, "Relationship of water power to electricity. Water Wheels; high and low head developments, hydro-electric generators, the principle of the turbine, the transmission and use of electric power."
6. *Stream*.
7. *T.V.A.*, sound, 10 minutes, "Story of the TVA project, what it means to the immediate region, and the issues it aroused throughout the country. Preparations made for the building of Norris Dam. Model town of Norris, each house completely equipped with electricity and surrounded by its own garden. Continuation of the project, in spite of much controversy during construction of the dam. Plans of the program; cheap electricity; also flood control, reconditioning and conservation of soil, reforestation, elimination of submarginal lands from cultivation, distribution and diversification of industry. Wheeler and Pickwick dams shown in the process of construction. End, showing Supreme Court declaring constitutionality of TVA." (March of time)
8. *T.V.A. at Work*, sound, 15 minutes, "Explanation of the authority's water control program. Music by the United States Army Band."
9. *Work of Rivers*, sound, 11 minutes, "Treats the erosion cycle of water on the earth's crust. Animation which illustrates the undermining effect of waterfalls. Stream table demonstrations of the formation of oxbows, sand bars, and deltas. Examples of different forms of erosion, young and old river valleys, deltas, ox-

bow lakes, meanders, rejuvenated rivers, water gaps, alluvial fans, sand bars, the water cycle in nature, and flood control work."

10. *Transportation on the Great Lakes.*
11. *Roosevelt Dam*, silent, 7 minutes, "Building the great dam. Tens of thousands of acres of arid desert land in Arizona turned into fertile farms by the Reclamation Act; the farms, the finished dam, Colonel Roosevelt at the dedication of the dam in 1911." (Roosevelt Memorial Assoc.)
12. *Wasted Waters*, sound, 18 minutes, "An over-all picture of the TVA's unified development program in the Tennessee Valley. It describes briefly progress made by the Authority toward the improvement of navigation, control of floods, provision for national defense, and generation of power. It reveals how soil erosion is being combatted and also shows how recreational development becomes a valuable by-product of such a unified program."
13. *Water Cycle*, silent, 15 minutes, "Graphic presentation of the continuous circulation of water, from earth to sky and back to earth. Examples of evaporation, condensation, precipitation, storage, and run-off."
14. *Niagara Falls*, silent, 8 minutes, "Summer and Winter scenes."
15. *New York Water Supply*, silent, 14 minutes, "Typical sanitary water system for a large city. Scenes and animations picturing methods used in bringing water from the Catskills, through the mountains, and under the Hudson River to New York City."
16. *Learn to Swim*, sound, 18 minutes, "Follows the progressive step method to build confidence in beginners and to teach swimming."
17. *Battling Muskies.*
18. *Salmon Industry.*
19. *Bass Fishing.*
20. *Outdoor Recreation.*

(Films Nos. 3 through 20 may be obtained from the Bureau of Visual Instruction, University of Wisconsin Extension Division)



Largest ore dock in the world (Superior, Wis.)

MINERAL CONSERVATION

I. SIGNIFICANCE OF THE TOPIC

A. MINERALS ARE THE BASIS OF OUR PRESENT CIVILIZATION

Our present civilization is absolutely dependent upon the availability and utilization of mineral resources. The bewildering variety of uses not only of metals, but also of fuels such as coal, oils, and natural gas and of many other minerals for so many purposes in our complex civilization make us dependent upon the exploitation of the mineral resources of the world. Exhaustion of even a few of these resources would force major changes in our ways of life.

B. MINERALS ARE NON-RENEWABLE RESOURCES

The alarming rate at which our mineral resources are becoming exhausted is rapidly making the people of the United States aware that some may be completely depleted within our lifetime. Unlike forests which can be regrown, or soils which can produce crops generation after generation if kept in good condition, the supply of

minerals in the ground is limited. Once the minerals are taken from the ground the supply is gone. There is no means of renewing mineral resources.

C. MINERALS CAN BE CONSERVED BY PROPER MEASURES

Whenever possible, non-critical minerals should be substituted for critical minerals. For example, lead used in paints cannot be recovered and reused, but the less critically available titanium can be substituted and the lead used for other more necessary purposes. More careful practices to save scrap metals and to reuse the above ground supplies will also make it less necessary to mine more new ores. Less wasteful methods of mining and of uses of minerals will also make our supplies last longer.

D. EXHAUSTION OF MINERAL RESOURCES WILL SERIOUSLY AFFECT THE FUTURE

As the readily available supplies of any mineral become exhausted, the greater difficulty of mining or otherwise obtaining the resource will cause the cost to rise. Eventually the supplies will become completely exhausted and future generations (not in the distant future) will have to seek substitutes if they can be found. If no such substitutes can be devised there must be major changes in the type of civilization enjoyed by man.

E. INTELLIGENT CONSERVATION OF MINERAL RESOURCES IS NECESSARY

The problem in mineral conservation is to so direct the utilization of mineral resources that their exploitation and exhaustion does not impede the progress of man.

II. OUTLINE OF CONTENT

A. SIGNIFICANCE OF MINERAL TO OUR WAY OF LIFE

1. Actual mineral reserves in Wisconsin
2. Our demands as compared to our limited supply
3. Identification of local minerals and other common types
4. Nations which have a varied mineral supply may have better commercial possibilities for international trade

B. THE KINDS AND CHARACTERISTICS OF MINERALS

1. Those found in Wisconsin
2. Those found in other areas and consumed in Wisconsin
 - a. Mineral fuels
 - b. Metallic minerals
 - c. Non-metallic minerals



Examining Wisconsin's mineral ore

C. THE FORMATION OF MINERALS INVOLVED A LONG AND COM-
PLEX NATURAL PROCESS

1. Those found in Wisconsin
2. Those found in other areas and consumed in Wisconsin
 - a. Mineral fuels
 - b. Metallic minerals
 - c. Non-metallic minerals

D. MAN'S PAST USE REFLECTS LESSONS FOR THE FUTURE

1. Past attitude toward minerals and the results
2. Wisconsin's problems of the present—remedial measures
3. Our country's present mineral problems—remedial measures

E. TRENDS OF THOUGHT TOWARD MINERAL VALUES

1. Sociological
 - a. Possibilities of new discoveries
 - b. Possibility of free movement among nations
 - c. Private versus public ownership
 - d. The use of water power and electricity versus use of exhaustible fuel resources
 - e. The use of oil and gas lines versus the use of exhaustible fuel resources

F. MODERN SCIENTIFIC RESEARCH

1. Treatment of minerals for preservation
2. Manufacture of nylons, rayon and other plastics
3. The use of substitutes for minerals
 - a. Soybeans and peanut products

4. The use of by-products
5. The use of atomic energy as a means of conserving exhaustible fuels, etc.

III. POSSIBLE OUTCOMES

A. KNOWLEDGE AND UNDERSTANDINGS

1. Knowledge as to the kinds, the location and the extent of mineral resources in our state, in our nation, and in the larger deposits of the world
2. Knowledge as to the variety of ways in which man puts this resource to his use
3. Knowledge of the dependence of human welfare upon mineral resources in this age of power and machinery—conservation is necessary to continued prosperity
4. Knowledge of the distribution of mineral resources, and of the nearness of certain kinds of manufacturing to certain centers of resource supply
5. Knowledge that Wisconsin's most significant minerals of commercial value in the order of productive value are building stone, crushed stone, gravel, mineral water, clay products, iron ore, zinc ore, shale, sand and lime
6. Knowledge that the United States, in addition to being the greatest producer, is the greatest consumer of mineral products, and probably the greatest waster

B. APPRECIATIONS AND ATTITUDES

1. A desirable attitude toward the care and desirable use of the things we utilize in our everyday life to the end that contributing exhaustible resources will be available for a larger number over a longer period of time
2. Appreciation that wise distribution is a significant factor in the maintenance of a more permanent peace
3. An appreciation that the government has a custodial responsibility in reference to mineral conservation
4. Such attitudes (toward and interest in current literature about minerals) which will stimulate the student to continue reading in the mineral area whether for enjoyment or as a means of solving problems in connection with mineral values.

IV. INVENTORY OF POSSIBLE ACTIVITIES

A. INITIATORY ACTIVITIES

1. Figure how much it costs to heat your home. What kind of fuel is used? What economics might be started which would conserve some of the fuel you are now using?

2. Make a survey of the kinds and amounts of fuel used in your community, and indicate the locality from which each was obtained.
3. Survey your library, and list books and articles on minerals, their sources and use.
4. Visit a coal dealer, and obtain samples of the different kinds of coal he supplies, and the source and cost of each kind.
5. Visit a gravel pit, quarry or iron mine, and write an account of the evidences of waste.
6. Visit the local filling station, obtain the name of the company from which he receives his oil products, and have one class representative write the company for literature on the source, the refining and the distribution of oil.
7. Explore the school, and list the kinds of minerals used in the building.
8. Make a collection of the different kinds of rocks and minerals found near your school.
9. Bring to class samples of as many kinds of metals you can for later identification.
10. Prepare or obtain outline maps of your state upon which to locate mineral resources available.
11. Have a student write the Bureau of Mines, United States Department of Interior, for a list of publications. Send for some of these for class use.
12. Visit your cement dealer, and obtain, if possible, literature on the manufacture and distribution of cement.
13. Visit your local fertilizer dealer, and obtain samples of fertilizers on sale and literature on the ingredients of each kind and the source from which it came.
14. From the pictures of coal mining, draw a cross section of a coal mine, and explain how it is mined.

B. DEVELOPMENTAL ACTIVITIES AND DISCUSSION PROBLEMS

1. It is estimated that 250 million tons of coal is wasted annually through incomplete combustion. What is this worth at the price you pay per ton for coal in your community.
2. It takes 1.6 tons of coal to make a ton of coke by the beehive method. The retort method, however, is about 10% more efficient. If 200,000 tons of coal were converted into coke, how much coke would be obtained by each process? How much more by the one than by the other?
3. Survey your locality and state to obtain information on location and extent of mineral resources. How long will these resources last?
4. On a map of the world locate the various minerals which are used in your everyday life.

5. Draw a map of the United States and indicate the sources of coal.
6. Obtain as many kinds of minerals as you can and place them in the three major groups—mineral fuel, metallic and non-metallic; identify each.
7. Plan field trips to a mine or quarry.
8. Group minerals under three major groups:
 - a. Mineral fuels
 - b. Metallic resources
 - c. Non-metallic resources

(Mineral fuels include coal, peat, petroleum, and natural gas. Metallic resources include iron, copper, lead, zinc, gold, silver. They also include such subordinate metals as manganese, chromium, mercury, vanadium, and tungsten. Non-metallic resources include sand, gravel, slate, clay, arsenic, borax, gypsum, salt, sulphur, asbestos and asphalt.)
9. Plan a scrap metal drive. Collect old metals and sell them. Compare prices for old metal with prices for new metals.
10. Prepare presentations which will explain the formation of minerals found in Wisconsin and so far as possible, those found in other parts of the world.
11. Obtain and explain evidences of man's misuse of various minerals during Wisconsin's early history.
12. Obtain evidences to show the rapidity with which minerals are consumed during war periods.
13. Make a list of substitutes and list the minerals they replace.
14. On a map of Wisconsin locate:
 - a. Water power plants which are serving as a means of conserving fuel resources.
 - b. Places where water power plants may be located to advantage.
15. Interview a qualified person who is interested in the promotion of oil and gas lines to obtain information as to the advantages of oil and gas over Wisconsin's fuel resources.
16. Prove that minerals played an important part in the early history and settlement of Wisconsin.

C. CULMINATING ACTIVITIES

1. Have each member of the class give the implications of a major concept included for minerals in this area and justify it.
2. Present a panel program in which you show how minerals contribute to life in your community:
 - a. Food
 - b. Shelter
 - c. Clothing
 - d. Labor

3. Suggest ways of improving our attitudes toward the conservation of minerals.
4. Have a member of the class present the significant elements of each following phase:
 - a. Significance of minerals to our way of life.
 - b. Kinds and characteristics of minerals.
 - c. Formation of minerals.
 - d. Man's past misuse of minerals.
 - e. Trends of thought toward mineral values.
 - f. Some interesting result of scientific research.
5. Take a position for the TVA and justify such a position.
6. Use for culminating discussion such problems as follows:
 - a. Positive and negative aspects of atomic energy.
 - b. The devastating effect of war upon our mineral resources.

V. EVALUATION SUGGESTIONS

- A. Have the students draw up a list of generalizations or conclusions which grew out of their study of minerals. Compare with concepts stated.
- B. At the beginning of the unit have pupils list the questions which they would like to have answered concerning minerals. At the conclusion of the unit have the pupils answer briefly but effectively the questions proposed.
- C. Develop a factual test with your group covering the learning values included in this unit.
- D. On the basis of student studies have them plan a program of mineral conservation for their locality.
- E. Following effort under "D" have students write editorials enlisting community support of this program.

VI. LIST OF MATERIALS

A. BOOKS

1. Caldwell, Bailey and Watkins, *Our Land and Our Living*, L. W. Singer Co., Syracuse, New York, 1941, pages 273-293.
2. Cheyney & Schantz-Hansen, *This Is Our Land*, Webb Publishing Co., St. Paul, 1940, pages 247-292.
3. Flynn & Perkins, *Conservation of the Nation's Resources*, Macmillan, 1941, pages 203-233.
4. Perkins and Whitaker, *Our Natural Resources and Their Conservation*, Wiley and Sons, 1936, pages 409-475.
5. Renner & Hartley, *Conservation and Citizenship*, D. C. Heath & Co., Chicago, 1940, pages 217-243.

B. PAMPHLETS

1. Basic Education Science Series, Row Peterson & Co., Evanston, Ill.
America's Minerals
Buried Sunlight
The Earth—A Great Storehouse
Stories Read From the Rocks
2. *The Mineral Position of the United States*, Krug, J. A., Washington 25, D. C., Department of the Interior, 1947, 13p.
3. *Rock and Minerals*, Vol. 21, No. 3, New York State College of Agriculture, Cornell University, Ithaca, New York. (Good for Jr. High Level)

C. FILMS

1. American Museum of Natural History, 77th Street & Central Park West, New York, 16 mm. Free
Anthracite
Story of Gasoline
Bituminous Coal
Story of Copper
Story of Sulphur
2. Goodyear Tire and Rubber Co., Akron, Ohio, 16 mm. Free
Modern Coal Mining
3. University of Wisconsin, Bureau of Visual Instruction, Madison, 16 mm. Rentals
Limestone and Marble, silent, 15 minutes, "Relationship between limestone, chalk and marble. Quarrying, carving, and the use of natural limestone; manufacture of artificial limestone; quarrying and use of marble."
Sculpture in Stone
Aluminum: *Mine to Metal*, sound, 17 minutes, "Use of aluminum in transportation, in the home, in building, and in industry. Mining bauxite, crushing ore, making ore ready for fabrication."
Know Your Coal, sound, 18 minutes, "Mining, cleaning, and analysis for heat and ash of coal. How to get the most out of the coal you buy."
Iron Ore to Pig Iron, silent, 15 minutes, "Outlines the mining of ore in the Mesabi range; its transportation to Duluth through the Soo canal to Gary where it is smelted and cast into pigs."

FOREST CONSERVATION

I. SIGNIFICANCE OF THE TOPIC

A. FORESTS CONTRIBUTED MUCH TO WISCONSIN'S HISTORY

The original forests of Wisconsin have contributed an important era in our history. From small beginnings the lumber industry grew and expanded until in the period of 1899-1904 our state produced more lumber than any other in the nation.* As the timber was stripped from the land and the soil broken to the plow, the lumber industry provided employment for many men. The period in which the "green top of Wisconsin" was removed is one of the most interesting chapters of pioneer history.

B. WISCONSIN'S ECONOMIC FUTURE DEPENDS GREATLY UPON ITS FORESTS

It is only through careful forest management of our remaining forest resources that we can hope to continue to employ nearly one fourth of Wisconsin's industrial wage earners in wood-using industries. If Wisconsin is to continue to go forward industrially, the full use of forest lands which can supply the raw material for these industries must be encouraged. Our failure to recognize this will not only prove harmful to the wood producing sections of the state, but for the residents of Wisconsin as a whole and for the future prosperity of the state. Much land suited only for forest purposes but now unproductive should be restored to forest productivity.

C. INTELLIGENT PUBLIC INTEREST IS VITAL

Much of Wisconsin's industrial future may be dependent upon the attitude of the public toward the proper use of forests. Five primary wood using industries are numbered among the twenty largest industries in Wisconsin. It is economically less wasteful to have Wisconsin forests supply raw materials upon which these industries depend. Box factories, sash and door factories, wooden ware factories and planing mills are using millions of board feet annually. To this must be added the timber needs of furniture, paper and pulp excelsior and other wood using industries, as well as the large

* All statistics derived from authority of the Wisconsin Conservation Department, Madison.

amount of lumber used in building trades. A considerable amount of the prosperity of Wisconsin may depend upon citizen understanding of the importance and of the wise management of Wisconsin forests.

D. SOUND FOREST MANAGEMENT IS ESSENTIAL TO A HIGH STANDARD OF LIVING

Since, for the most part, the merchantable timber of this state has been removed, Wisconsin faces the problem of managing and restoring our forest lands. We have used and are still using wood fibre faster than we produce it. The paper industry is one of the chief present day consumers. Definitely, sound management of Wisconsin's second growth stands of timber will determine the economic well being of the paper and other industries fifteen to twenty years hence and of the future. In order that industry may have its raw materials readily available, our forests must be put under management and protected from fires, insects, and disease. The development of cooperatives sustained yield and improved methods of harvesting is necessary. Without the products, uses and services of the forest it will be more difficult for the people to maintain their present standard of living under our present technical knowledge.

E. FORESTS CONTRIBUTE DIRECTLY TO HUMAN VALUES

In addition to trees which are harvested as a crop for industrial purposes, our forests must also be managed in such a way that our people may be able to continue to enjoy them for their beauty and the recreational opportunities they provide. While economic forest benefits are of primary concern, the security and satisfactions of individuals, families and communities are equally important. Intelligent forest management enhances security through full time vocational occupation, while the aesthetic contributions of animals, birds, flowers and trees contribute much to stability in human life. A well adjusted personality is a highly desirable attribute of each person in our complex industrial life. Forest recreation and appreciation contribute to these values.

History shows it to be an important fact that nations which have had adequate acreages of productive forests have prospered. We can assume that the forests of Wisconsin and of this nation will be an important factor in our social and economic progress in the future.

F. FORESTS CONTRIBUTE TO OTHER CONSERVATION AREAS

Many other areas of conservation are dependent on forests. They help anchor the soil, conserve the supply of water, act as havens for wildlife and contribute markedly to recreational aesthetic values.

II. OUTLINE OF CONTENT

A. FOREST RESOURCES OF OUR COMMUNITY, STATE AND NATION

1. Actual forest reserve
2. Supply in comparison with demand
3. Identification of common tree species

B. THE USES OF OUR FORESTS AND TREES

1. Products
2. Water shed protection
3. Wildlife habitat
4. Recreation
5. Windbreaks and Shelter Belts

C. PRESENT PROBLEMS AND COSTLY PRACTICES

1. Wasteful lumbering
2. Uncontrolled fires
3. False conceptions of land use
 - a. All wooded lands would become suitable for cultivation
 - b. All woodlands were suitable for pasture purposes
 - c. Forest ownership involves no responsibility to the public
4. Exploitation
5. The belief that forests are inexhaustible

D. FOREST CONSIDERATIONS FOR THE PRESENT AND FUTURE

1. Modern forest management policies and practices
2. Enemies of the forest, and modern methods of control
 - a. Diseases
 - b. Insects
3. Forests in relation to land use
4. The forest crop law
5. Modern zoning
6. The farm woodland, its care, management and use
7. Private versus public ownership
8. School and community forests
9. Trees for ground beautification

III. POSSIBLE OUTCOMES

A. KNOWLEDGE AND UNDERSTANDINGS

1. Knowledge of the variety and extent of forest resources—local, state and national, and of their commercial and non-commercial value.

2. Understanding of the relationships which exist between forests and other resources such as water, soil, wildlife, etc.
3. Understanding as to the implications of "wise use" in reference to forests, and results which follow the abuse of this natural wealth.
4. Recognition of the wide variety of materials which come from our forests, and something as to the productive process involved in the production of paper and other wood products.
5. Recognition of the significance of a local forest conservation program and of the availability and kinds of assistance which may be had from various local, state and national forest agencies to carry out such a program.

B. ATTITUDES AND APPRECIATIONS

1. An appreciation of the contribution which forests and trees make to man's cultural, recreational and aesthetic life.
2. Permanent reading interests in current forest conservation content, and ability to weigh and evaluate conservation values.
3. The will to engage actively in some phase or phases of forest conservation activity.
4. An appreciation of natural forest beauty, and a recognition of the contributions which poets and artists have made in the interpretation of such beauty.
5. A recognition that personal control from within as well as legislative enactment and obedience to law are essential to the best forest conservation interest.

IV. INVENTORY OF POSSIBLE ACTIVITIES

A. INITIATORY ACTIVITIES

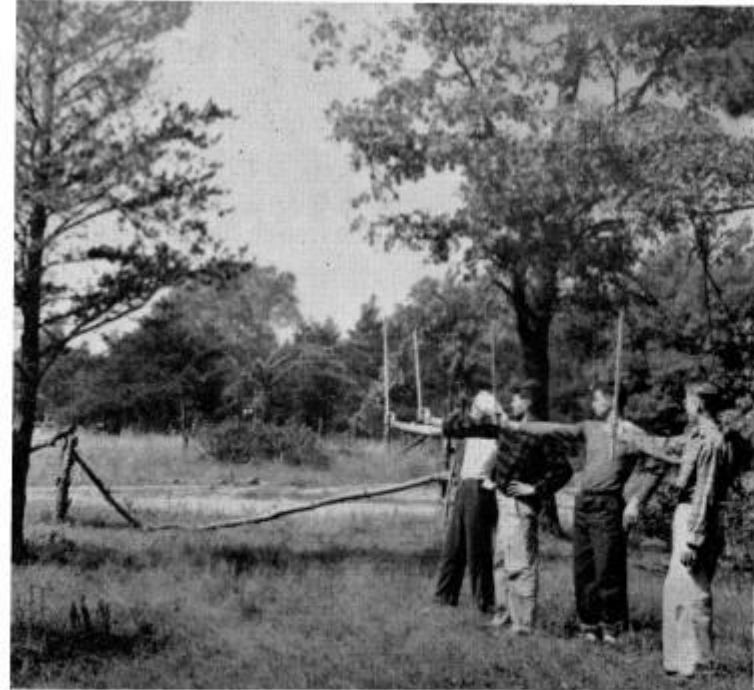
1. Explore the community to determine the kinds and the extent of the trees commonly found.
2. Indicate on a map sketched of the local area where the various species of local trees are found.
3. Find out what industries of the community are dependent upon trees and what specific products are produced?
4. Interview old settlers to find out what changes have occurred in the population and industries of the region during the last fifty year period.
5. Survey the library for interesting articles and resource books on forests and forestry.
6. Interview a forest ranger to find out the responsibilities and work of such official.
7. Visit a tree nursery and obtain information on seed planting, and also on the care and propagation of seedlings.
8. Take a trip to a farm woodland which is pastured, and one which has been kept free from grazing. Note the comparative conditions for growth.
 - a. The forest floor.
 - b. The growing trees.

9. Visit a recently burnt over area to note the destruction by fire. Note the effect of fire on tree destruction, on the forest floor, and on the susceptibility of the area for erosion. Also, check for hidden damage from fire in a lumbering operation on an area burned in the past.
10. Collect pictures of trees, of forests, of conservation activities and of articles on forestry for a scrapbook. Maintain this scrapbook for current pictures and articles.
11. Sketch a map of the school grounds, and indicate upon it landscaping possibilities. This project should involve the selection and placement of trees, shrubs, and the location of parking area, driveway, and well placed play areas.
12. Visit a local or state park to observe the care, management and use of such park. Make recommendations for its improvement.
13. Gather information on school forests, and if possible visit one to observe its use for laboratory work.
14. Scan the tables of content of books, magazines and articles on forestry to note the various phases of forestry emphasized.
15. Cooperate with class members in writing forest agencies for available materials. Do not have more than one person send to the same agency for desired materials.

B. DEVELOPMENTAL ACTIVITIES AND DISCUSSION QUESTIONS

1. Developmental Activities

- a. The bulletin, "A Picture of Wisconsin" prepared by the State Planning Board, contains an account of both the original and present status of our forest resources. Review and report the substance of these articles.
- b. Explain the contribution which forests make to life and living at the present time.
- c. How did the forests aid in the early settlement and development of America?
- d. Prepare a map of Wisconsin showing the present distribution of forests. Indicate the national and state forests and parks on this map.
- e. List some of the major industries which are dependent upon forests, and indicate the contribution of such industries to mankind.
- f. Make a list of recreational activities which people may enjoy in the forest.
- g. How does the forest indirectly benefit and protect the soil, streams, lakes and our wild life?
- h. Describe tree growth, and indicate the importance of the bud and cambium layer.
- i. What natural factors contribute to tree growth?
- j. What is man doing by way of using the total tree?

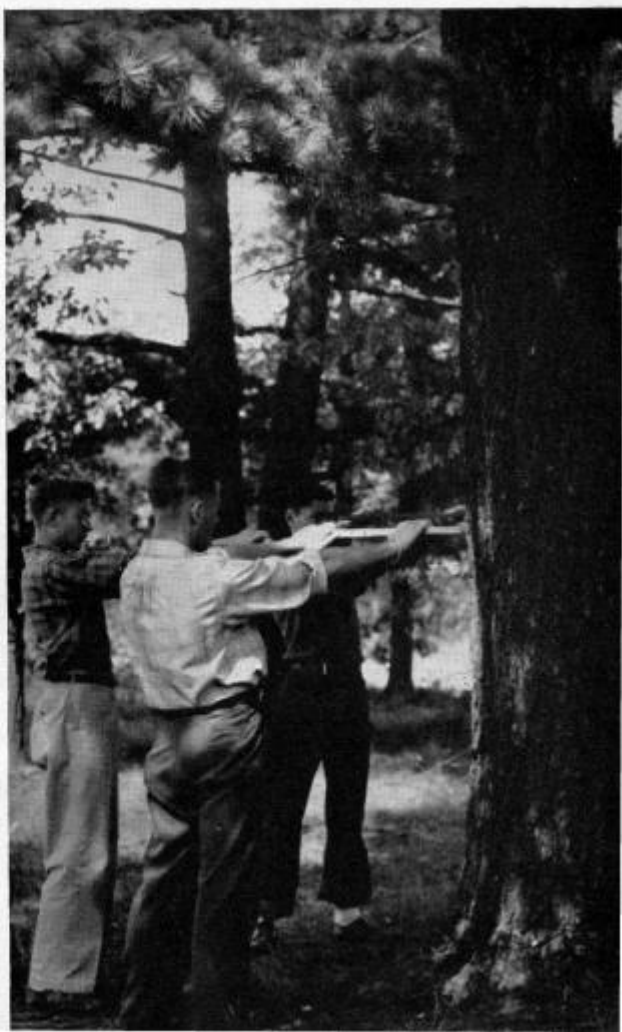


Estimating height of tree

- k. Give a review of man's exploitation policies of the early and later past.
- l. Give an account of the present paper industry, and explain the steps in the production of paper. A field trip should be taken to a paper mill if this can be done.
- m. Demonstrate how to build a camp fire, and indicate how it may be extinguished to safeguard life and property.
- n. Collect a cross section of a tree trunk damaged by fire. Note the scar, and damage caused.
- o. Make a transplant board and demonstrate its use. See Circular 4H, 1935 by Extension Service, College of Agriculture, University of Wisconsin. This bulletin was written by Wakeland McNeel (Ranger Mac).
- p. From the bulletin listed in previous question, make a Biltmore stick for obtaining the diameter of trees. Demonstrate its use.
- q. From the bulletin, "Measuring and Marketing Farm Timber," Bulletin 1210, U. S. Department of Agriculture, Superintendent of Documents, Washington, D. C., make and demonstrate the use of a hypsometer to measure the height of trees.
- r. Cruise and estimate the timber on a given piece of land. Obtain instructions for such estimate from the bulletin suggested in Activity q.
- s. Check on natural reproduction of trees in a farm woodland or school forest. What kinds of trees are reproducing themselves, and how will the forest change as maturity is reached?

- t. Start a school grounds or a school forest planting program which is in keeping with preliminary plans made.
- u. Visit such forestry interest centers as the following and describe operations and services of each:
 - (1) Forest Products Laboratory
 - (2) A saw mill
 - (3) A pulp mill
 - (4) A tanning factory
 - (5) A veneer or plywood factory
 - (6) Some other wood using industry—chair or other furniture factory, etc.
- v. Make a chart which will show the kinds of naval supplies marketed, and if possible, obtain figures indicating the production and consumption of each.

Checking tree diameter



- w. Make an exhibit of the effects of tree diseases and use specimens and pictures to show the effects of damping off of nursery stock, white pine or jack pine blister rust, and the decay caused by typical fungi.
 - x. Make an exhibit of insect enemies of the forest, and include in this exhibit evidences of the insect damage done.
 - y. Prepare and exhibit samples of various kinds of wood finish and treatment.
 - z. Obtain information on the use of Christmas trees and greens in your community, and give the forestry implications.
2. Discussion Questions
- a. How do the forest possessions of your community and state compare with those of earlier times?
 - b. How did the forest help and hinder the early settlement of the state and nation?
 - c. Indicate the extent to which people are dependent upon forests for
 - a. Occupational pursuits
 - b. Recreational expression
 - c. Consumer goods
 - d. How do the forests indirectly benefit and protect soil, streams, lakes and wild life? What contributions do our forests make to our food supply (various kinds of nuts, maple syrup, pastured stock, wild game)?
 - e. Explain how man, trees and other plants, and animals are interdependent. Will industry become more or less dependent upon forests as time marches on?
 - f. What are the causes of forest fires, and what are man's responsibilities in reference to them?
 - g. Discuss "Glimpses into the life of a forest ranger."
 - h. What can we learn from the early exploitation of forests that will enable us to guard against the recorded abuses? Forest industries sometimes claim they cannot afford to practice conservation. To what extent are they right?
 - i. What governmental agencies are concerned about the conservation of forests? Explain the activities of each. Find out what precautions are taken to prevent importing forest insects and forest diseases from other countries.
 - j. Conservation is a required school offering. Is this legislative action justifiable?
 - k. What improvement can you suggest which might be made in cutting and milling practices?
 - l. Describe the process of paper making, and indicate the importance of this industry.
 - m. To what new uses have wood pulp and paper been recently put?

- n. How do shelter belts contribute to life and living in certain areas of this state. Indicate where they are of most use in the desired protection.
- o. Why is selective cutting so essential to efficient management?
 - (1) Discuss the difference in the treatment of a forest as a crop, and its treatment as a mine.
 - (2) Distinguish between the meanings of devastation and exploitation.
 - (3) Indicate ways in which harm is sometimes done to the vegetation in parks. How can these harmful acts be eliminated.
 - (4) Why are large tracts of land which originally contained valuable timber allowed to revert back to the government. Explain.
- p. Why is the woodlot so strongly advocated for farm units, and what consideration and care should be given them for maximum benefit? Why is cutting with a high stump still practiced when the lowest log (first 16 ft.) is the most valuable?
- q. Justify, if possible, the statement that forests contribute their greatest service in soil building and water regulation.
- r. Scientists at the U. S. Forest Products Laboratory are engaged in the solution of the following projects:
 - (1) Fireproofing wood
 - (2) Prevention of decay
 - (3) Prevention of shrinkage
 - (4) Joining and gluing
 - (5) Veneering
 - (6) Pulping
 - (7) Uses to be made of cellulose
- s. Give what information you can on the need for this research, and results obtained.
- t. Discuss the manufacture of cellophane and rayon—two of the newer uses of wood which scientists have made known.
- u. Review the contributions of some of the past and present forest conservation leaders.
- v. Think about the various occupational possibilities of the field—choose one from it, and discuss it using the following outline:
 - (1) Occupation chosen
 - (2) Reasons for selection
 - (a) Need to society
 - (b) Possibility for individual growth
 - (c) Permanency of occupation
 - (d) Remuneration
 - (e) Opportunity for leadership
- w. Some people advocate the use of wood substitutes as a means of saving wood. Take a stand for or against this thesis, and try to justify it to your classmates.

C. CULMINATING ACTIVITIES

1. Arrange a panel in which you have two students representing each of the following:
 - a. The past in forestry
 - b. The present in forestry
 - c. The future in forestry
2. Arrange a panel in which a representative of each of the following expresses his concern about forests:
 - a. The farmer
 - b. The manufacturer
 - c. The resident living on the bank of a large river
 - d. The fisherman
 - e. A person engaged in river transportation
3. Arrange and stage a program on "A Forest Conservation Program for our Community."
4. Arrange a bulletin board upon which one of the following is shown:
 - a. Our forests then and now
 - b. Our forest losses. How can the forest losses be reduced?
 - c. Our forests and what they mean to us.
5. Organize a Conservation Club.
6. Establish a school forest.

V. EVALUATION SUGGESTIONS

- A. Do pupils react more effectively in reference to conservation interests with
 1. More voluntary reading about local, state and national forest problems
 2. Increasing understanding of specific forest problems?
 3. Willingness to initiate or to participate in the more formal and inclusive forest conservation pursuits?
 4. Application of good forest conservation practices for the everyday problems of his life?
- B. Is there evidence of understanding of the implications of the major forest concepts listed as outcomes?
- C. Do pupils respond meaningfully to such problems as—Suppose you were given the direction and control of forest conservation in your community and state? Indicate some of the policies you would advance in your administrative work.
- D. Do pupils give evidence of beneficial vocabulary growth by showing an understanding of such terms as: forest, coniferous, deciduous,

altitude, timber, board foot, water shed, hardwood, softwood, erosion, pulpwood, wood pulp, resin, rosin, piling, veneer, naval stores, plastics, saw log, veneer log, cut-over land, cord wood, timber line, reforestation, exploitation.

- E. Do pupils have a reasonable knowledge of the effect of the destruction of forests on:
1. Wood supply?
 2. Floods?
 3. Washouts?
 4. Droughts?
 5. Waterpower?
 6. Wild life?
 7. Rural home water supply (wells on farms etc.)?
- F. Do pupils reflect continuous interest in the efforts and findings of research as they appear?

VI. MATERIALS FOR REFERENCE PURPOSES

A. BOOKS

1. Boerker, R. H. D., *Behold Our Green Mansions*, University of North Carolina press, 1945.
2. Bruere, Mrs. M. S. B., *Your Forests*, Lippincott, 1945.
3. Gates, P. W., *The Wisconsin Pine Lands of Cornell University*, Cornell University press, 1943.
4. Guise, C. H., *The Management of Farm Woodlands*, McGraw, 1940.
5. Holbrook, S. H., *Burning An Empire*, Macmillan, 1943.
6. Hough, R. H., *Handbook of the Trees of the Northern States and Canada*, Macmillan, 1947.
7. Lillard, R. G., *The Great Forest*, Knopf, 1947.
8. Westuel, R. H., and Peck, R. H., *Forestry and Farm Management*, Wiley & Co., 1941.

B. PAMPHLETS

1. *Use Without Waste*, Hafstad, M. R. & G. E., Webster, 1944.
2. *Our American Forests; Yesterday, Today, Tomorrow*, Glover, Katherine, Row, 1941.
3. *Problems and Progress of Forestry in the U. S.*, Joint committee on forestry of the National Research Council and the Society of American Foresters, Society of American Forestry in Pennsylvania A.N.W., Washington, D. C., 1947.
4. *The Work of the U. S. Forest Service*, U. S. Dept. of Agriculture, Jan., 1945.

C. FILMS

Wisconsin Conservation Department

State Office Building

Madison, Wisconsin

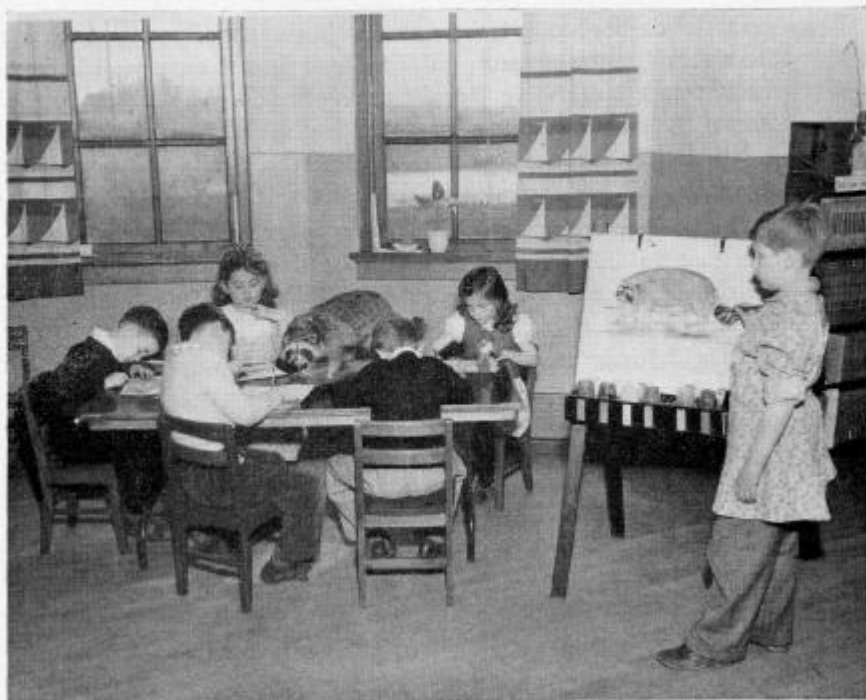
1. *Firemen of the Forests*, smoke, flames, and action.
2. *Future Forest*, methods employed by foresters in promoting the growth of forests.
3. *New Forests on Idle Acres*, new methods of nursery operations and field planting of trees.
4. *Siren*, a sound film, forest fires, their causes and destruction.
5. *Trees for Tomorrow*, a sound film, wise management which will insure forest reproduction and future timber crops.

U. S. Department of Agriculture Films Available Through:

U. S. Forest Service, Milwaukee 3, Wis.

Bureau of Visual Instruction, University of Wisconsin,
Madison, Wis.

6. *The Forest Ranger*, duties and activities of the forest ranger, U.S.D.A.
7. *Frying Pan and the Fire*, fire prevention and recreation, U.S.D.A.
8. *Stop Forest Fires*, forest fire problems, U.S.D.A.
9. *It Can Happen*, actual scenes from man fires of Oct., 1947, U.S.D.A.
10. *Scout in the Forest*, Boy Scouts—fire and planting—Boy Scouts of America.
11. *Trees to Tame the Wind*, shelterbelt planting, U.S.D.A.
12. *Strength of the Hills*, fire prevention and conservation, U.S.D.A.
13. *There's More Than Timber in Trees*, the effect of forest cutting practices on our economy.
14. *Forests Forever*, what can be done to stop destructive cutting, U.S.D.A.
15. *Green Frontiers* (Trees for Tomorrow, Inc.) B.V.I.



Art contributes to wild life appreciation

WILDLIFE CONSERVATION

I. SIGNIFICANCE OF THE TOPIC

A. WILDLIFE IS IMPORTANT IN WISCONSIN AND IN ITS HISTORY

One of the finest attractions of the state of Wisconsin is its wildlife resources. Few of our boys and girls fully realize the magnificent opportunities for recreation and study presented by the variety of wildlife of our state. Much of the enjoyment which people find in the out-of-doors is contributed by the boundless experiences with nature. Modern civilization is bringing about a greater appreciation of the esthetic values to be found in wildlife. The more worldly appeal of dollars and cents may be shown too in the value of the tourist trade brought to this state by the wildlife, as well as by the direct economic value of its wildlife products.

When Wisconsin was a wilderness its wildlife resources were the magnetic attraction which brought the white man to this area to conquer this wilderness. The wealth of furs brought about the establishment of the trading posts of our early history just as the

wealth of timber brought about the establishment of our towns along the rivers. To the pioneer, wildlife brought not only wealth from the fur trade but also food and clothing for himself and his family. One of the most intriguing parts of Wisconsin's history is the period in which the nations of Europe vied with each other for the supremacy of the fur trade of this territory.

The meager reports of the early trappers and missionaries indicate that wildlife did not always exist in the teeming abundance which we associate with pioneer days. The virgin forests with their deep shade and cover supported far less wildlife than the cut over areas with their more accessible and varied food and cover. And about 30 million acres of the 35 million acres of the state were originally covered by forest. Alternating with periods of plenty were times of starvation and want in the lives of the early settlers.

B. WISCONSIN HAS A VARIETY OF WILDLIFE

Originally, Wisconsin had some 350 species of birds, 90 species of mammals, and 174 species of fish—a total of over 600 kinds of wildlife as here defined. In addition, many thousands of other species of animals are to be found in this state.

Some of the kinds of wildlife formerly common in our state have become rare or extinct under the pressures of civilization. The buffalo, moose, caribou, elk, wild turkey, passenger pigeon, marten, fisher wolverine, Eskimo curlew are now totally lost to the state. Others as the wolf, spruce grouse, and upland plover persist in greatly reduced numbers. Some of the native species of more southerly states have been drifting northward to invade our area. The opossum, jack rabbit, cardinal and perhaps prairie chicken may be mentioned here. Many exotic species have been introduced into Wisconsin including pheasant, Hungarian partridge, starling and English sparrow.

C. THE BALANCE OF LIFE IS DELICATE AND MUCH DISTURBED BY MAN

Every form of life is a product of its environment. The adjustment of living organisms to their surroundings is a gradual process. Any sudden disturbance of the environment tends to upset this very delicate relationship of plants, animals, soils, water and climate; and before readjustment can be made, serious injury or even extermination of some of the species composing the balance may take place. Thus, for example, when man rapidly cuts off the timber of large forest areas, the deer rapidly increase with the increased amount of

low browse during the summer. The deer's winter yarding habit of staying in limited areas of cedar bogs soon crowded the increased number of deer into ranges too small to support their number. Abnormal concentrations made them easier prey to predators such as timber wolves which first thrived on easy hunting. In overcrowded ranges the deer also soon become victims of the limiting factors of disease and starvation and decrease in number.

The composition of the forest floor changes greatly with the disappearance of the forest. The smaller plants which form the undergrowth providing the habitat for innumerable forms of wildlife succumb to unfavorable chemical and physical changes. The breaking of the cover and the disappearance of humus starts erosion; thus destroying in a few decades the balance achieved by nature in many thousand years.

When man drains marshes to improve land he destroys the feeding and breeding grounds of waterfowl and other wildlife. Similarly, when man destroys hedgerow and fence line shelters, he destroys wildlife which tends to control insect enemies.

D. RESEARCH IS NECESSARY TO UNDERSTAND AND MANAGE WILDLIFE RESOURCES

Wherever civilization has made inroads on nature there has resulted a decreased total loss of wildlife resources valuable to society. Belated realization of that loss has resulted in a program of wildlife research to gain scientific knowledge in order to maintain as much of the original wildlife as managed land suited to the purpose will support. The economic aspect is evident. The food, cover, recreation, and beauty which provided the pioneer with the vital needs of life have great importance to millions today.

The very intricate interdependence of plant and animal communities must be understood if useful species are to be preserved under the artificial conditions of civilization. The study of these relationships is called ecology. The right control of the environment to favor wildlife populations is called game management. Game or wildlife research is the activity of discovering ecological truths. The application of this knowledge should help to maintain a satisfactory population of game and other useful wildlife.

E. A STUDY OF WILDLIFE SHOULD BEGIN WITH LOCAL RESOURCES

In heavily settled or intensively cultivated areas it is not possible to study firsthand the ecology of large game, fur or other animals, but common species like rabbits, mice, squirrels, foxes, muskrat,

and numerous species of birds may be studied in any part of the state. The direct approach to the study of wildlife ecology, which is the key to wildlife conservation, is by way of knowledge of the species present in the student's own locality and state. With such experience it is easier to extend the study to one of national scope including problems involving species peculiar to other states and regions.

F. EVERY CITIZEN CAN PLAY A PART IN INSURING THE PERPETUATION OF OUR WILDLIFE

Every boy or girl, every man and woman, has a definite responsibility in the perpetuation of Wisconsin's wildlife. This is one natural resource which belongs to all people no matter where it may be found. While governmental agencies are entrusted with the management of wildlife, the cooperation of every citizen is essential. One should study and know enough about our wildlife to have a sympathetic and discriminating attitude toward recommendations for its management. The duty of recommending and supporting sound conservation legislation is also the privilege of the citizen. The observance of good outdoors manner and of conservation regulations are other responsibilities of our citizens. By cooperating with private and community conservation projects and clubs, one can do much to perpetuate our rich and valuable wildlife heritage.

II. OUTLINE OF THE TOPIC

A. SIGNIFICANCE OF OUR WILDLIFE RESOURCES

1. Wildlife values—past and present

a. Economics

- (1) food
- (2) clothing
- (3) shelter
- (4) employment

b. Recreation

- (1) hunting
- (2) fishing

c. Esthetic

- (1) Birds and animals which provide enjoyment because of their beauty of form or color, pleasing song, interesting ways, etc.

B. SCOPE OF WISCONSIN'S WILDLIFE POPULATION

(Wisconsin's wildlife population includes all birds, animals, and fish not domesticated by man. The animal kingdom includes all living things that cannot be called plants.)

1. General classification of our wildlife species

a. Birds

- (1) Game birds, (quail, grouse, etc.)
- (2) Raptores (hawks, owls, etc.)
- (3) Song birds (robin, cardinal, etc.)
- (4) Upland and migratory game birds

b. Mammals

- (1) Upland game mammals (those which provide food and sport, i.e., rabbits, white tail deer, etc.)
- (2) Non-game mammals (those which are not hunted for food, sport, or fur, i.e., shrews, moles, bats, etc.)
- (3) Fur bearing mammals (those taken primarily for their fur, i.e. beaver, otter skunk, etc.)

c. Fish

- (1) Game fish (bass, pike, muskellunge, etc.)
- (2) Non-game species
 - (a) Rough fish (carp, buffalo, etc.)
 - (b) Commercial fish (herring, lake trout, etc.)
 - (c) Others (sunfish, minnows, sticleback, etc.)

d. Amphibia

- (1) Frogs and toads
- (2) Salamanders

e. Reptiles

- (1) Turtles (snapping turtle, painted turtle, etc.)
- (2) Snakes (poisonous and nonpoisonous species)
- (3) Lizards

f. Invertebrates

Examples: One celled animals (protozoa), sponges, worms, snails, clams, crayfish, spiders, and insects

C. FACTORS WHICH AFFECT NATURE'S BALANCE

1. Reduction and change of natural habitat of wildlife

Examples:

- a. Development of agricultural land for crop production
- b. Over grazing
- c. Removal of native vegetation
- d. Drainage of swamp and marsh areas
- e. Pollution of waters
- f. Development of urban areas
- g. Fires

2. Abuses of wildlife resources

a. Abusive commercialization

Examples:

Excessive hunting, trapping, and fishing for the market. (A traditional practice in early Wisconsin history to supply communities, lumber camps, etc. before wildlife regulations had been en-

acted. Still being practiced by commercial violators in defiance of the laws on the statute books at the present time.)

b. Abuses of existing wildlife regulations

Examples:

- (1) Hunting and fishing out of season
- (2) Taking more game and fish than bag and possession limit allows
- (3) Illegal practices—i.e.—dynamiting fish, headlighting deer, etc.

3. Need for better wildlife regulations and enforcement

a. Enactment of practical laws difficult because:

- (1) Lack of adequate knowledge and research about wildlife
- (2) Public demand by pressure groups conflict with sound wildlife regulations

b. Need for larger number of law enforcement personnel (conservation wardens)

D. SOUND GAME MANAGEMENT PRACTICES AFFECTING OUR FUTURE WILDLIFE POPULATION ARE THE RESPONSIBILITY OF:

1. Governmental Agencies

a. Wisconsin Conservation Commission (policy making)

b. Agencies cooperating with the State Conservation Department

- (1) U. S. Fish and Wildlife Service
- (2) U. S. Forest Service
- (3) U. S. Soil Service
- (4) University of Wisconsin
- (5) State Planning Board
- (6) State Board of Health
- (7) Others

2. The Public

a. Groups giving cooperative effort

- (1) Wisconsin Conservation Congress
- (2) Conservation Clubs
- (3) Service organizations
- (4) Schools
- (5) Others

3. Individual Cooperation

III. POSSIBLE OUTCOMES

A. KNOWLEDGE AND UNDERSTANDINGS

1. Knowledge of the kinds, characteristics, extent, and value of wildlife in the locality, state and nation.
2. An understanding of the numerous ways in which wildlife contributes to the life and living of man.

3. An understanding as to how wildlife welfare is dependent upon "balance in nature."
4. A knowledge of statewide wildlife conservation services, and how such services may be utilized in the development and successful operation of a wildlife program of protection and restoration.
5. A knowledge of how each student may contribute to wildlife conservation.

B. ATTITUDES AND APPRECIATIONS

1. An appreciation of man's custodial responsibilities in reference to wildlife.
2. An abiding interest in wildlife literature and the skills necessary to interpret, evaluate, and organize data concerning wildlife.
3. A recognition of the place of law in a wildlife conservation program, and a wholesome respect for such law.
4. The will to put forth continued effort in the direction of some phase of wildlife conservation effort.

IV. INVENTORY OF POSSIBLE ACTIVITIES

A. INITIATORY ACTIVITIES

1. Explore the community to determine the kinds and extent of wildlife found in the locality.
2. Interview an early settler of your community of the question, "How has the wildlife of our community changed during the last half century?"
3. Visit a taxidermist to view different species of wildlife preserved.
4. Build and operate a bird feeder to use in your study of bird life.
5. Talk to a local trapper to determine whether his trapping is for enjoyment or for economic purposes.
6. Visit the state game and fur farm or visit a local fur ranch, pheasant rearing pens, or fish hatchery.
7. Invite your local game warden to talk to your class about his work in the field.
8. Invite a Forest Ranger from your fire protection district to talk about his work.
9. Show animal films.
10. Collect and mount pictures of wildlife found in your community.
11. Cooperate with the class and the teacher in writing the Wisconsin Conservation Department and other agencies for available materials and literature. *Do not have more than one person send to the same agency for desired materials.*
12. Find materials in books and magazines which concern wildlife.
13. Learn to imitate the songs of several birds in your community.
14. Visit the home of the muskrat and the beaver, and observe the construction of a beaver dam.

15. Collect nests of birds and keep a record of where the nests were found.
16. Read a poem about birds and wildlife to your class.
17. Draw or sketch a bird or animal in its natural habitat.
18. Organize a nature or conservation club in your community or school, and outline a constructive program of activities related to wildlife for the year.

B. DEVELOPMENTAL ACTIVITIES AND DISCUSSION QUESTIONS

1. Developmental Activities

- a. Study and report to the class on the substance included in the chapter "Wildlife" found in the bulletin "A Picture of Wisconsin."
- b. Prepare a map of Wisconsin showing distribution of Wisconsin wildlife.
- c. How did wildlife in Wisconsin aid the early settler? After having studied wildlife conservation in detail, indicate how wildlife is of greater importance to man today.
- d. What major industries are dependent upon the wildlife harvest of Wisconsin and how can this importance be shown?
- e. Develop a bulletin board on which you show how wildlife contributes to the life and living of man and how man may contribute to the life and living of wildlife.
- f. Name ten common migratory birds, and chart their routes on a map of the Western Hemisphere.
- g. Make a survey in which you show:
 - (1) Kinds and numbers of wildlife animals, common to your locality
 - (2) Characteristics common to these animals
 - (3) Description of their habitat
 - (4) Kinds of common food which they consume
 - (5) Migratory habits if any
 - (6) Value
- h. Make plaster casts of tracks of birds and mammals, and identify each.
- i. Survey your community for the following:
 - (1) Kinds of lakes and streams
 - (2) Kinds of fish found in these lakes and streams
 - (3) Conservation practices carried on
 - (4) Improvement possibilities of the habitat of fish in these lakes and streams
- j. Make a survey of the reptiles and amphibians in your locality to determine the following:
 - (1) Habitat and habits
 - (2) Food
 - (3) Reproduction
 - (4) Ways in which they help or harm man

- k. What changes do we find in the wildlife now prevalent in our state as compared to that which was originally found here.
 - l. What affect did the commercial game hunter have upon Wisconsin wildlife.
 - m. What contribution has science made in the development of insecticides and how may the wrong use of these insecticides affect the balance of life in nature?
 - n. How has the bird population changed during the past fifty years? Account for this change.
 - o. How can the habitat for bird life in your community be preserved and improved?
 - p. Make a list of the common enemies of bird life.
 - q. Why is it advisable to study living things in their natural habitat and when they are brought into the classroom to retain them for a limited time only?
 - r. Design and construct bird houses, feeders, and shelters. Give reasons for characteristics of design and construction.
 - s. Make a chart of plants which supply food for birds.
 - t. What are the implications of the high and low prevalent cycles of wildlife observed in recent years?
 - u. What common enemies of wild animals do you have in your community?
 - v. How can the wildlife habitat in your community be preserved and improved?
 - w. Examine the contents of the stomach of freshly caught fish to determine the kinds of food they consume. List the different kinds of food and determine if you can where it comes from.
 - x. Survey some of the streams of your locality with particular attention to the temperature in relation to the kinds of fish caught. Report results to the class.
 - y. Obtain a copy of the Fish and Game Laws for your state. Study and discuss the reasons for the open and closed seasons, bag limits, and the reason why certain areas are closed or open to hunting and fishing.
 - z. Invite your local game warden to show the Wisconsin Conservation Department Fish Displays. Find out from him the reasons for fishing regulations.
 - a. Visit a local commercial fisherman. Find out about species of fish commonly caught, the making and keeping of nets, marketing of the fish, life of the fisherman, the difference in the fish catch now as compared to that of fifty years ago, also any other information related to wildlife.
2. Discussion Questions (These questions parallel foregoing experiences)
 - a. How does wildlife contribute to man's effort to obtain food, clothing, shelter and employment and recreation?
 - b. Give the major divisions of Wisconsin's wildlife population.

- c. What has the history of wildlife protection legislation been in this state? Why has legislation been necessary?
- d. Explain the characteristics of a true sportsman in reference to hunting, trapping and fishing.
- e. Discuss farmer-sportsman relationship and suggest how it can be improved.
- f. What international problems have arisen pertaining to migratory game birds?
- g. What is the purpose of bird banding and fish marketing?
- h. Discuss the harvesting of game species. Why is it necessary at times to protect them and at other times to remove the surplus?
- i. Discuss relation of the planting of fish to the control of environment.
- j. In what ways are the local, state and national governments contributing to the preservation of wildlife? Should the services of one or more of these agencies be modified or extended? Explain how.
- k. Assume that you are elected to the legislature. Propose a game management improvement program which would be helpful to your community.
- l. Assume that you are a delegate from your county to the State Game Congress. What proposals would you make at the Congress which would tend to improve wildlife conditions in your state and community?
- m. Assume that you are a warden charged with the responsibility of informing a group of hunters, trappers, fishermen, and tourists as to precautionary measures that are to be taken in reference to safety. What advice would you give them?
- n. In what ways is the local, state and national government contributing to the preservation of wildlife? Should the services of one or more of these agencies be modified or extended? If so, how?
- o. Find studies which indicate that owls and hawks are not as harmful as many people assumed and give reasons for this change in attitude.
- p. How does damage done by wildlife affect human welfare in your community? And how can this damage be reduced?
- q. Discuss the divisions of and the functions and responsibilities of the state conservation department. Compare the functions of our conservation department with those of other states.

C. CULMINATING ACTIVITIES

1. Have each member write a conservation code which he would be willing to use as a personal conservation conduct guide.
2. Write a set of safety rules for outdoor people (hunters, fishermen, trappers, vacationists).

3. Build a conservation trail in your community.
4. Explain the care and consideration a helpful and cooperative camper will give to his camp and campsite during his stay in the woods.
5. Map out a good conservation program for your conservation club.
6. Write and present a radio program to your school on one of the following topics:
 - a. The match is a dangerous instrument when carelessly used.
 - b. How our school helped in the state-wide conservation program.
 - c. Nature moves toward the development of essential balance.
 - d. Topics of your selection.
7. Write a newspaper article in which is publicized some noteworthy conservation effort.
8. Write an article for the newspaper in which recommendations are made for the need of conservation effort to improve a conservation problem in your community.
9. Hold a mock trial in which a person is tried for the violation of some of the rules of conservation.
10. Hold a panel discussion centered upon the topic, "What the conservation program of our community should include."

V. EVALUATION SUGGESTIONS

- A. Have pupils developed a fair understanding of the meaning and application of the various concepts included on wildlife?
- B. Does the pupil recognize the social implications of conservation?
 1. Does he cooperate with others in furthering practical wildlife conservation values?
 2. Does he show growth in tolerance of others who may differ in their thinking with him in their wildlife conservation thinking?
 3. Does he appreciate the contribution that wildlife conservation can make to life and living generally.
- C. Does the pupil show that he has improved certain individual skills through the effort in this area?
 1. Better ways of thinking, judging, and working
 2. Improved expression
 3. Can he organize and summarize the wildlife values in keeping with the scientific method?
- D. Does he approach and solve wildlife problems in keeping with the scientific method?

- E. Has the pupil developed an abiding interest in the contributions which science is making to the development of worthwhile wildlife values?

VI. LIST OF MATERIALS FOR REFERENCE PURPOSES

A. BOOKS

1. Beard, Daniel B. et al. *Fading Trails*, The Macmillan Co., New York, 1943.
2. Cahalane, Victor, *Meeting the Mammals*, The Macmillan Co., New York, 1943.
3. Ditmars, Raymond Lee, *Reptiles of the World*, The Macmillan Co., New York, 1935.
4. Gabrielson, Ira Noel, *Wildlife Conservation*, The Macmillan Co., New York, 1941. *Wildlife Refuges*, The Macmillan Co., New York, 1943.
5. Graham, Edward Harrison, *The Land and Wildlife*, Oxford University Press, New York, 1947.
6. Hawes, Harry Bartow, *Fish and Game, Now or Never*, D. Appleton-Century Co., New York, 1935.
7. Leopold, Aldo, *Game Management*, C. Scribner's Sons, New York, 1933.
8. Peterson, Roger Tory, *A Field Guide to the Eastern Birds*, Houghton Mifflin Co., Boston, 1947.
9. Pirnie, Miles D., *Michigan Waterfowl Management*, Michigan Department of Conservation, Lansing, Michigan, 1935.
10. Stevens, Ross O., *Talk About Wildlife*, R. O. Stevens, Box 5486, Raleigh, N. C., 1944.
11. Titus, Harold, *Timber and Game—Twin Crops*, American Forest Products Industries Inc., 1319 18th Street, N. W., Washington, D. C.

B. PAMPHLETS

1. *Wisconsin Birds*, Barger, N. R. et al., Wisconsin Conservation Department, Madison, Wisconsin, 1942.
2. *Wisconsin Wildlife—Birds*, Pub. 607 C-47, W. T. Calhoun, Wisconsin Conservation Department, Madison, Wisconsin, 1947.
3. *A History of Wisconsin Deer*, Pub. 323, Ernest Swift, Wisconsin Conservation Department, Madison, Wisconsin, 1946.
4. *Big Game Resources of the U. S.*, E. H. T. Jackson, Supt. of Doc., U. S. Department of Interior, Fish and Wildlife Service, 1944. (Research dept. 8)
5. *Feeding Wildlife in Winter*, W. G. Grang, Supt. of Doc., Fish and Wildlife Service, 1941. (Conservation Bul. 13)
6. *Local Bird Refuges*, W. L. McAtee, Supt. of Doc., Fish and Wildlife Service, 1942. (Conservation Bul. 17)

7. *Ponds for Wildlife*, P. F. Allan & C. N. Davis, Supt. of Doc., U. S. Department of Agriculture, 1941. (Farmers Bul. No. 1879)
8. *Organizations and Officials Concerned with Wildlife Protection*, Samuel Robinson, Comp. Supt. of Doc., U. S. Fish & Wildlife Service, 1945. (circ. 9)
The Status of Migratory Game Birds, U. S. Fish and Wildlife Service, 1941-42, Chicago 22, North Bank Drive, South. (Wildlife Leaflet 225)
Teaching Conservation of Wildlife Through 4-H Clubs, Ruth Lohman, U. S. Dept. of Agri. Misc. Pub. No. 291, Bureau of Biological Survey, Feb. 1938.
Wildlife Review, U. S. Fish and Wildlife Service, Chicago 54, 222 North Bank Drive. (No. 41)
12. *Wisconsin Game Fish*, Wisconsin Conservation Commission, Pub. 209, A-47.
13. *Wisconsin Wildlife*, Wisconsin Conservation Department No. 607, 1947.
14. *Balance in Nature*, Roe, Peterson Series.
15. *Plant and Animal Partnership*, Roe Peterson Series.

C. AUDIO AIDS

1. *Album of Bird Songs*. A. A. Allen and A. R. Brand, Recordings of Songs in the field of 72 native birds, Comstock Pub. Co., Ithaca, New York.

D. VISUAL AIDS

Conservation Department
 State Office Building
 Madison, Wisconsin

1. Animals

a. *Amik—The Beaver*—Silent

This picture illustrates the characteristics and habits of beavers, including detailed structure of their dams and houses. Shows conservation department employees removing the animals from localities where they are damaging property, and transporting them to another vicinity.

b. *Bear Facts*—Silent

A picture which is enjoyed equally by young people and adults. The reel consists of the playful antics of eight small bear cubs.

c. *Fur Babies*—Silent

A one-reel subject arranged for children, showing a mother and two children taking a trip through the State Experimental Farm to see all of the small animals. The titles are simple and understandable to youngsters.

d. *Fur Farm* (3 reels)—Silent

This film deals with the fur section of the State Experimental Game and Fur Farm at Poynette, Wisconsin. It shows the activities involved in propagating and experimenting with various types of game animals. A trip through the exhibition section shows many native varieties which may be viewed by the general public.

e. *Starvation Stalks the Deer* (colored)—Silent

A colored silent film of Wisconsin's deer problem. This picture was filmed in the winter and spring of 1942-43 and shows many dead and weakened deer resulting from lack of natural food in the winter deer yards. Projection time about 45 minutes, film contained on one large reel.

f. *Wisconsin's Whitetail Deer*—Silent

Wisconsin's deer in the wild. Over a year was required to complete this picture showing the habits and changes in the deer herd throughout the different seasons of the year.

2. Birds

a. *Game Birds of Many Nations* (colored)—Silent

Many varieties of native and exotic game birds photographed in natural color.

b. *Native Grouse* (colored)—Sound

Many colored pictures of Wisconsin's native grouse; the ruffed grouse, prairie chicken, sharptailed grouse and the now practically extinct spruce grouse. A very interesting film showing the ruffed grouse drumming and the prairie chicken and sharptailed grouse on their spring dancing grounds.

c. *Waterfowl* (colored)—Silent

Native and rare varieties of ducks, photographed in natural color.

d. *Wild Geese*—Silent

The flight of the Canada Goose is followed through Wisconsin in this picture, showing the fields and lakes where they stop to feed and rest, and their flight formations.

e. *Wisconsin's Game Birds*—Silent

One of the primary functions of the State Experimental Farm is the propagation of various types of native and exotic species of game birds for stocking purposes. The reel shows shipment of chicks and eggs; incubation, rearing and housing methods, as well as recommended winter feeding shelters. An excellent reel for people interested in game bird breeding.

f. *Wisconsin Song Birds* (colored)—Silent

A colored silent film of Song Birds native to Wisconsin. Most of the scenes were obtained during the nesting season and in many instances show the parent bird feeding their young. Excellent for nature groups and class room study. Note: This film is restricted to Wisconsin showings only.

3. Fish

a. *Collecting Lake Trout Spawn*—Silent

A trip on a Great Lakes fishing boat, showing setting and lifting of seines, spawning operations, and shipment of lake trout at the port.

b. *Detrimental Fish* (3 reels)—Silent

The activities of the conservation department in removing detrimental fish from infested lakes. The picture shows removal operations and the State Fish Cannery where carp are canned for fish and animal food.

c. *Muskies for the Future*—Silent or Sound

A one-reel subject illustrating the methods used in propagating muskellunge, from the time spawn is extracted from the fish, through the hatchery operations, and final planting in adaptable waters. This film is available either in sound or silent versions.

d. *Pike Propagation*—Silent

This film illustrates the methods used by the conservation department in obtaining pike spawn, and follows the propagation activities through the state fish hatcheries.

e. *Wisconsin Fish* (colored)—Sound

A one-reel colored film illustrating the many variations of game fish that are found in Wisconsin's lakes and streams.

4. Miscellaneous

a. *Realm of the Wild* (colored)—Sound

A 30 minute color film showing a very excellent survey of American game birds and big game. All photography taken in the National Forests. Portrays such birds and animals as: Canada goose, duck, owl, Canada jay, sage hen, squirrel, moose, deer, bison, elk, mountain goat and sheep, ptarmigan, etc. Excellent photography expressing the attempt to balance wild life in the remaining forage food.

b. *Spring Comes to Wisconsin* (colored)—Sound

A colored sound film on birds, flowers and animals as they make their appearance in Wisconsin in the spring of the year. Projection time about 23 minutes—one reel.

c. *The Wisconsin Musky*—Silent

An interesting and successful fishing trip on some of Wisconsin's lakes, with lots of big muskies in evidence.



RECREATIONAL, SCENIC AND HISTORIC VALUES

I. SIGNIFICANCE OF THE TOPIC

A. RECREATIONAL VALUES ARE INCREASINGLY IMPORTANT

The way of living and working in our present-day society is vastly different from that which existed in the society in which our forefathers lived and worked. The eight-hour week day has replaced the twelve or fourteen hour work day. Better means of transportation and communication have further increased the number of leisure hours people have to enjoy each day. Educators and parents have long recognized the importance of recreation in the total development of youth. Business corporations and other organizations are encouraging their employees to engage in healthful recreation. Child labor laws have also increased the need for additional recreational facilities.

Nature has provided Wisconsin and many other parts of our nation with an abundance of many kinds of natural resources which are lending themselves to the recreational interest and desires of millions of people each year. Billions of dollars are spent annually by people who are willing to pay for the privilege of enjoying these resources.

B. RECREATIONAL FACILITIES SHOULD BE MADE MORE GENERALLY AVAILABLE

Although exact figures cannot be given, it is generally accepted that present recreational facilities are inadequate, especially in the densely populated areas of our nation and state. Provisions for these facilities have not kept pace with the tremendous expansion of leisure and in the attitudes society has taken toward recreation. Many people who most need recreational facilities cannot afford those available or may lack access to those available because of distance or other factors.

C. CAREFUL PLANNING IS OF PRIME IMPORTANCE

Recreation has taken on a new meaning for all people. Millions today turn to nature for their recreation whether it is found in man-made parks within cities or in the great out-of-doors. The forests, parks, streams, lakes, mountains, seashores, and places of historic and scenic value, provide a means of recreation upon which many people

depend. Today, careful planning of the use and perpetuation of our natural recreational and scenic resources is of prime importance. A burned over mountainside or a polluted stream or lake has little to offer in the form of recreation which people might enjoy.

D. PUBLIC UNDERSTANDING THROUGH EFFECTIVE EDUCATION IS VITAL TO MOST EFFICIENT USE

The combination of values included in recreational, scenic, and historic sites are of everlasting use if they are properly treated. To maintain and preserve these in good condition is the responsibility of every citizen who uses them. The schools must meet the challenge of educating the youth to meet the problem of using these resources to their utmost and yet maintaining them unharmed.

II. OUTLINE OF CONTENT

A. SIGNIFICANCE OF RECREATIONAL, SCENIC, AND HISTORIC VALUES

B. TYPES AND AREAS OF RESOURCES

1. Recreational Values

- a. State parks
- b. State and federal forests
- c. Roadside parks
- d. County parks
- e. Municipal parks
- f. Public hunting grounds
- g. Game refuges
- h. Public bathing beaches

2. Scenic Values

- a. Topographic features—moraines, hills, waterfalls, dunes, escarpments, river valleys, mounds, caves, beaches, lakes, and streams.
- b. Forests and prairies

3. Historic Values

- a. Historic landmarks
- b. Historic buildings
- c. Indian mounds, villages, and reservations
- d. Monuments
- e. Battlefields and old forts
- f. Memorials
- g. Trails

C. NEEDS AND PROBLEMS OF RECREATIONAL, HISTORIC, AND SCENIC VALUES

1. To provide public facilities that will benefit and satisfy the people
2. To regulate commercial facilities in the light of community interest

3. Additional problems
 - a. The need for more recreational facilities
 - b. Location of recreational facilities in relation to density of population (e.g. development of Kettle Moraine area to serve the city population of southeastern Wisconsin)
 - c. Misuse and depletion of recreational resources which are now available
 - d. Private exploitation of these resources
 - e. Maintenance and control
 - f. Development of new facilities
 - g. Zoning and land use
 - h. Highway improvement and establishment of roadside parks
 - i. Stream and lake pollution

III. POSSIBLE OUTCOMES

A. KNOWLEDGE AND UNDERSTANDINGS

1. A knowledge of the location of local and wide area scenic, historic, and recreational resources, and the contribution which they make to human welfare.
2. Understanding that man's life can be greatly enriched through the intelligent use of scenic and historic resources.
3. Knowledge of how recreational, scenic and historic resources are damaged and destroyed and how they may be preserved for the present and for future use.
4. Understanding that our scenic, historic, and recreational values are dependent on the combination of any or all of our natural resources, and that only through such fortunate combination has the tourist truly become important in Wisconsin's economic life.

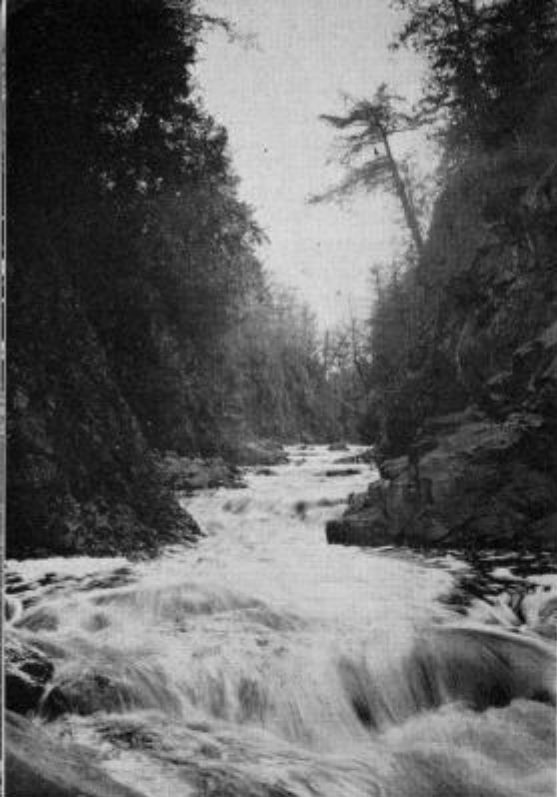
B. ATTITUDES AND APPRECIATIONS

1. A recognition and appreciation of Wisconsin's rich endowment of natural beauty, and the contribution which that beauty makes to human enjoyment.
2. An attitude of deep-seated responsibility toward our valuable resources coupled with a desire to utilize them constructively.
3. An appreciation that young people have a custodial responsibility which implies the conservation, development and further creation of scenic and historic values.
4. An attitude of consideration and courtesy toward public and private property.
5. An appreciation of reciprocity between Wisconsin and her neighbors toward sharing the natural wealth of beauty with which each state is endowed.

IV. INVENTORY OF POSSIBLE ACTIVITIES

A. INITIATORY ACTIVITIES

1. Take a field trip to some place of beauty in the neighborhood, while there, point out and try to describe the elements which are particularly appealing.



Gorge of Copper River

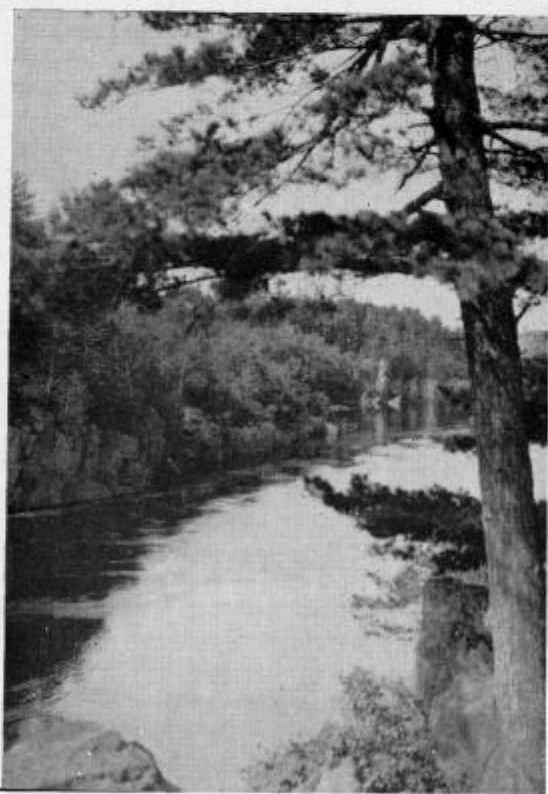
2. Develop further a collection of pamphlets, pictures and poems which include beauty values meriting use in your classroom.
3. Visit the state park or wild life reservation.
4. Interview some of the older settlers of the community to find out how community beauty has been helped and hindered over a period of years.
5. Visit a modern tourist camp and question the manager as to characteristics and services which are particularly appealing to visitors.
6. Start a booklet, "My Field Book" and in it keep an accurate account of field trips. Prepare interesting covers in the art class, and descriptive and illustrative sketches for the clarification of values observed
7. Write the Conservation Department, Madison, Wisconsin for folders on our state parks.
8. Have pupils make a survey of the locality for places under the following headings:
 - a. Scenic places of significance
 - b. Recreational places of significance
 - c. Historic places of significance
9. Invite in an official of the Isaac Walton League or some other recognized conservation organization, and have him talk on the following: "Conservation Purposes, Policies and Practices of Our Organization."

B. DEVELOPMENTAL ACTIVITIES AND DISCUSSION QUESTIONS

I. Developmental Activities

- a. On maps of the county, state, and nation, have student locate the twenty-five most significant places under each of the following:
 - (1) Scenic places
 - (2) Recreational places
 - (3) Historic places
- b. Arrange some discussion periods in which students justify the selections which they have made under the preceding project.
- c. Have each student choose a spot or area which is most repelling from the standpoint of appearance, and indicate how he would improve it were he in charge of a planning division of government.
- d. If possible, visit a museum. After a study of objects on display, choose five or six which you consider of most significance and justify such choice.
- e. On a map of Wisconsin, locate the national and state forest areas and parks.
 - (1) Justify national and state participation in forestry in parks.
- f. Many schools are now obtaining school forest areas, and some have excellent school forests in various stages of development.
 - (1) Justify such projects
 - (2) Indicate how such projects may be used to advantage for educational purposes.

The Dells of the St. Croix River



- g. Write a sportsman's creed, and compare it to the one developed by Zane Grey. (The creed may be found on page 409 Conservation of Natural Resources, Wales and Lothrop, Laurel Book Company).
 - h. Present the substance of the conservation program of each of the following:
 - (1) Isaac Walton League of America
 - (2) The American Legion
 - (3) National Wildlife Federation
 - (4) 4-H Clubs
 - (5) Boy Scouts, Girl Scouts, Campfire Girls
 - i. List the various divisions of the State Conservation Department, and explain the activities of each.
 - j. List the federal conservation agencies and explain the services of each.
2. Discussion Questions
- a. Locate and justify the establishment of state and national parks.
 - b. Explain how state and national parks serve for recreational purposes.
 - c. How may real estate dealers help to improve a community? How do they sometimes hinder wise development?
 - d. Explain how each of the following policies is out-of-keeping with wise use.
 - (1) Burning over grass land, woodland, roadsides, and idle land each spring
 - (2) Dumping trash on roadsides and in ditches
 - (3) Using creeks and rivers for sewage disposal
 - (4) Allowing builders to build homes upon lots very small in area
 - (5) Leaving litter on parks and camp grounds
 - (6) Allowing posters and bill boards to be placed along roadsides
 - (7) Allowing accessible stream sides and lake fronts to be purchased and exploited by private interests
 - (8) Allowing telephone and light companies to ruin roadside trees
 - e. Discuss purposes and policies of local, state, and regional planning
 - f. Design a civic center and a central park for your community, and discuss such plan and characteristics in class.
 - g. Discuss ten places of historic significance which are within reasonable distance of your home and community
 - h. Discuss the following topic—"Man creates an ugly civilization in many ways."
 - i. Discuss characteristics that should be considered in home grounds beautification.
 - j. Explain how the condition and care of your school grounds might be improved.

- k. What are the purposes and policies of the National Council of State Garden Clubs?
- l. Present a report on "wild flower preservation" (material may be had from the Wild Flower Preservation Society, Washington, D. C.)

C. CULMINATING ACTIVITIES

1. Assume your community or city has adopted the managerial form of government, and that you are about to employ a manager. Hold a hearing to interview candidates, and have three or four class members assume each is a candidate for the available office. Have each present his plan as to the beautification of the community, the provision of parks, and the provision of adequate recreation facilities.
2. Arrange a round table of three or six members, and discuss the topic "What We Can Do to Improve Our Community." Consider:
 - a. Historic interest places—kind of consideration they should be given and why.
 - b. Needed recreational facilities and why.
 - c. Needed scenic improvement and why—(Don't forget roadside signs and ugly appearing ravines.)
3. Assume that five or six of your class members are a committee to make recommendations for a memorial for veterans of World War I and World War II. Discuss how \$75,000.00 might best be spent for such purpose.
4. Assume that your class is a committee to put on a campaign for the improvement of your community. What might well be included in such campaign, and how might it be carried out.
5. Have floor talks.
 - a. One to be presented to the village, town or city board indicating the status of scenic and recreational facilities, and indicating how such facilities should be expanded and improved.
 - b. One to be presented to the conservation commission showing how state parks might be more adequately maintained.
 - c. One giving the history of the community, and pointing out the spots of especial significance that should be marked.
6. Hold a round table discussion, and point out the twenty places which you feel are of greatest historic significance in your area. Locate these on a map, and give reasons for your selection.
7. Hold a round table discussion on the tourist trade in Wisconsin. Bring out two especial phases:
 - (a) The value of such trade.
 - (b) What can be done to further stimulate it.
8. If members of the class have visited one or more of our national or state parks, have reports on such visits. Have members utilize pictures if possible for illustrative purposes.
9. Hold a discussion on, "The History of Our State Capitol" (Include in it, the history at Belmont, activity of the legislature in

obtaining its present location, and the history of it in its present location).

10. Present the history of your village or city—include your school, and also something as to prominent personalities and their contribution.
11. Plan a debate, "Resolved that Education is more effective than legislation as a means of promoting action and care in relation to recreation, historic, and scenic values."

V. EVALUATION SUGGESTIONS

Evaluation in reference to this and other divisions of conservation implies much more than mere testing at the conclusion of work on a unit. It includes an appraisal of both quantity and quality of pupil growth all along the way as the teaching and learning process proceeds. The following questions appear significant for evaluation:

- A. Do pupils realize that a well balanced life includes a fair proportion of time devoted to recreational activities, and that wholesome recreational pursuits contribute to character, personality and physical well-being?
- B. Do pupils recognize the significance of our historic places and persons. A recognition of person and place values comes through knowledge of the historical background of each?
- C. Are pupils developing ability to recognize beauty in its many manifestations, and are they acquiring a wholesome desire to improve and enhance it wherever possible?
- D. Are pupils coming to recognize the effectiveness of local, state, regional, and national planning as a major means through which to achieve conservation results?
- E. Are pupils terminating their school's program of conservation with a knowledge as to what they can do to preserve scenic values of their locality, and what they can do to enhance the beauty of their home and community?
- F. Is there evidence that pupils carry on voluntarily in the matter of home, school and community beautification?

VI. LIST OF MATERIALS FOR REFERENCE PURPOSES

A. HISTORIC VALUES

(Many of these materials are unavailable now but may be found in your school and public library)

1. *Badger History* magazine, State Historical Society, October 1947 to date. Every issue.

2. Centennial Committee on Wisconsin Women, *Wisconsin's Historic Sites*, Kohler, 1948.
3. Davis, S. B., *Old Forts and Real Folks*, Brown's Book Shop, Madison 6, 1939.
4. Fitzpatrick, John C. ed., *Some Historic Houses*, Macmillan, 1939.
5. Havighurst, Walter, *Upper Mississippi*, Farrar, 1937.
6. Henderson, Speersneider and Ferslev, *It Happened Here*, State Historical Society, 1949.
7. Holand, Hjalmar, *Old Peninsula Days*, Ephraim, Wisconsin Pioneer Publishing Company, 1943.
8. Holmes, Fred L., *Old World Wisconsin*, E. M. Hale, 1944. Centennial ed., 1948.
9. Kellogg, Louise P., *The British Regime in Wisconsin and the Northwest*, State Historical Society, 1935.
10. Kellogg, Louise P., *The French Regime in Wisconsin*, State Historical Society, 1925.
11. Schlinkert, LeRoy, comp., *Subject Bibliography of Wisconsin History*, State Historical Society, 1946.
12. Thwaites, Reuben Gold, *Down Historic Waterways*, A. C. McClurg, 1907.
13. Thwaites, Reuben Gold, *The Story of Wisconsin*, Lathrop, Lee, Shepard, 1899.
14. Wisconsin Legislative Reference Library, *Wisconsin Blue Book*, 1948. See List of Historic articles in all Blue Books, pp. 203-204.
15. *Wisconsin Magazine of History*, State Historical Society, Madison 6.
 Historic Spots, v. 4, 1920-21 pp. 55-8; 196-199; 281-6.
 Marking Wisconsin's Historic Spots, v. 24, 1945, p. 385.
 Social Value of Historical Memorials, v. 9, 1925-6, pp. 213-17.
 Historic Spots in Wisconsin, v. 2, 1918-19, pp. 428-33.
 Historic Sites as a Part of the State Parks of Wisconsin, 1948, pp. 271-5.
 Famous Octagon House at Watertown, v. 24, 1940-41, pp. 167-173.
 First Concrete Building in the U. S., v. 24, 1940-41, pp. 183-8.
 Historic Markers on Highways, v. 16, 1932-33, p. 477.
 Old Fort Howard, v. 18, 1934-5, p. 125.
16. *Wisconsin Then and Now*, State Historical Society, Madison 6, 1948.

B. RECREATION VALUES

1. State Department of Public Instruction, *Helps in Teaching Conservation in Wisconsin Schools*, 1938, pp. 22-24; *Helps in Planning Conservation Learning Experiences*, 1943, pp. 48-54; *Teaching Conservation in Wisconsin Schools*, 1937, pp. 37-41; *Our Wisconsin Heritage; the Development of a State*, 1947, p. 46, item 21.

2. State Department of Agriculture and Markets, *Wisconsin*, Bulletin 180, pp. 39-52.
3. State Planning Board, *A Picture of Wisconsin*, 1946, Bulletin No. 16, Chapter 7, Lands for State Parks, Bulletin 17, 1946.
4. Wisconsin Legislative Reference Library, comp. *Wisconsin Blue Book*, 1925, pp. 15-38. Description of surface features.
5. State Conservation Commission, *Wisconsin State Parks and Forests; Wisconsin Conservation Bulletin* (See index in December issue).
6. *Among the Wisconsin State Parks and Forests; Forests of Wisconsin*; folders on each state park, each roadside park.
7. WPA, American Guide Series, *Wisconsin: A Guide to the Badger State*, Duell, Sloan & Pearce, 1941, pp. 113-118.

C. SCENIC VALUES

1. Derleth, August, *The Wisconsin; The River of a Thousand Isles*, Farrar, 1942.
2. Holmes, Fred L., *Alluring Wisconsin*, E. M. Hale Company (out of print)
3. McClelland, Harold B., *Through the Windsfield in Southwest Wisconsin*, Wisconsin State Journal, 1948.
4. State Department of Conservation, *Hiking Trails in Wisconsin State Parks and Forests*. (Folder)
5. Wisconsin Conservation Bulletin, *Kettle Moraine Drive*, May 1947 issue, p. 5.
6. Wisconsin Legislative Reference Library, comp., *Wisconsin Blue Book*, 1927. "Wisconsin the Beautiful," pp. 55-67; Wisconsin Blue Book, 1940 "Relax in Wisconsin, Friendly Land of Beauty," pp. 171-6.
7. WPA, Wisconsin Recreation Series, *Wisconsin: Facts, Events, Places, Tours*. Madison and Wisconsin Foundation, 122 West Washington Avenue, Madison 1941.
8. National Parks Association, Publications on national parks and related topics. 1946, 7 p., 1212-16th Street Northwest, Washington 6, D. C. (Bibliography)
9. Wisconsin State Planning Board publications (out of print but many schools have copies)
 - a. *A Park, Parkway, and Recreational Area Plan* 1939.
 - b. *Horicon Marsh*—1939.
 - c. *Milwaukee River Basin*—1940.
 - d. *Local Government Study in Wisconsin*—1943.
 - e. *Airport System*.
 - f. *Picture of Wisconsin*—1945.
 - g. *Lands for State Parks*—1946.
10. United States, National Park Service, *The National Park System and Other Areas Administered by the National Park Service*, 1946, 52 p.

APPENDIX

A list of scenic, historical and recreational values in the state would appear to be needed by teachers. It is herein presented.

I. HISTORIC VALUES

A. *Landmarks*, such as,

1. Appleton—Site of Treaty of the Cedars, September 3, 1836, when Menomoni Indians ceded 4 million acres to the U. S.
2. Boscobel—Oak tree. Scion of the famous tree in England. This tree owns the land on which it stands.
3. DePere—One of the first Jesuit missions in Wisconsin (1671).
4. Ephraim—Totem pole—Potawatomi Indian Memorial.
5. Fort Atkinson—Site of old log fort.
6. Green Bay—State's oldest white community. Site of Fort Howard.
7. Ladoga—Seven miles north of Waupun on highway 26. One of Wisconsin's first commercial cheese factories (1867).
8. Leland—Natural bridge.
9. Lake Mills—Aztalan Mound park, remains of prehistoric Indian Village.
10. Portage—Site where Marquette and Joliet first saw Wisconsin River (June, 1673). Site of Fort Winnebago.
11. Prairie du Chien—Sites of French, British and American forts. State's second oldest white community.
12. Red Banks—North of Green Bay city along east shore of bay, on Nicolet road. Red banks may be site of landing of Jean Nicolet in 1634, first white man to set foot on Wisconsin land.
13. Rockbridge—Natural bridge.
14. Wyalusing—Nearest village to Wyalusing State Park, on the Mississippi south of Prairie du Chien and mouth of Wisconsin river. Famous spot where Marquette and Joliet first saw and discovered the Mississippi river.

B. *Buildings*, such as,

1. Antigo—Deleglise Log Cabin (1877), early settler's home on library grounds.
2. Baraboo—Al Ringling home, now Elks Club. Old circus winter barns. Al Ringling Theater.
3. Belmont—First territorial Capitol 1836. A state historical park.
4. Big Bend—Old Jesse Smith Cobblestone Inn.
5. Boscobel—Gideons Society founded here 1897 in old Central (now Boscobel Hotel).
6. Burlington—Immaculate Conception Church. Cross Evangelical Lutheran Church. Meinhardt Bank. At old Voree, 1 mile west

- on highway 11 near stone quarry on White River, is old Strang House. Strang contested Brigham Young's right to succeed Joseph Smith as Mormon leader. Voree was a Mormon Colony.
7. Cassville—Nelson Dewey Memorial State Park, old home of Dewey, first State governor.
 8. Cedarburg—Last covered bridge in state, about 4 miles north, on Cedar Creek.
 9. Dodgeville—Iowa County Court House, oldest in state. Early slag furnace in state restored.
 10. Durward's Glen—Sauk County. Only Saint Camillian Novitiate in U. S., chapel built in 1866; soil for Stations of the Cross brought from site of original Stations in Via Dolorosa, Jerusalem.
 11. East Troy—Buena Vista House, now the Cobblestone Hotel (1843).
 12. Elcho—Twenty-two miles north of Antigo on highway 45—47. Nuremburg style village.
 13. Elkhorn—Octagon House, South Lincoln Street. Old home of Joseph Webster, composer of "In the Sweet By and By", East Rockwell Street, 1 block west of Octagon House.
 14. Green Bay—Fort Howard Hospital, Kellogg and Chestnut Streets. Tank Cottage (1776), Fifth Street and Tenth Avenue, Cotton House (1841), Webster Avenue, about 2 miles south of city limits near State Reformatory, on west side of road. Martin House (1838), at 1008 South Monroe Avenue. Moravian Church, South boundary of Jackson Park (Moravian Street).
 15. Greenbush—Six miles west of Plymouth. Old Wade House, once an inn.
 16. Greendale—Nearby, old stone cottage, birthplace of Jeremiah Curtin, diplomat, during Lincoln administration and translator of "Quo Vadis."
 17. Hamilton—Six miles south of Fond du Lac. Concordia Mills.
 18. Hartford—About five miles south of town is Holy Hill, Carmelite Monastery, Church and Shrine.
 19. Honey Creek—About 4 miles west of Rochester. Old Frazier House.
 20. Janesville—Old home of Carrie Jacobs Bond, famous composer of songs. About 3 miles south of city, early home of Frances E. Willard.
 21. Kaukauna—Augustin Grignon House.
 22. Kirchhayn—Washington County. Old Christian Turck House.
 23. La Pointe—Old village on Madeline Island, Apostles group, in Lake Superior off Bayfield, Old Mission Church (1834).
 24. Little Chute—Nearby, old farm home of Eleazer Williams who claimed to be the "lost Dauphin" of France (Louis XVII).
 25. Mount Horeb—Little Norway, restoration of a pioneer Norwegian farm.
 26. Madison—State Capitol Building, University of Wisconsin.
 27. Merton—Old Baptist Church.

28. Milton—Old Milton House, former inn; reputed first concrete building in the U. S. Back of the inn, pioneer log cabin, once a station on the "Underground Railway."
29. Milwaukee—Benjamin Church House, Estabrook Park. St. John's Cathedral Jackson and Wells Streets. City Hall, North Water and Wells Streets. St. Josephat's Basilica (one of four in U. S.) South Sixth Street and West Lincoln Avenue.
30. Mineral Point—Old Cornish miners' homes, Pendarvis House, Polperro House, Cundry mansion, Harris Cottage, Odd Fellows Hall.
31. Neenah—James Doty Cabin (1820), city park.
32. New Diggings—Near Shullsburg. Old St. Augustine's church built before 1850.
33. New Glarus—Replica of first Swiss settler's cabin, city park.
34. Oconomowoc—Draper Hall, where Charles K. Harris composed "After the Ball."
35. Oconto—First edifice in the world for the Church of Christ Scientist. Old Governor Scofield mansion. Beyer homestead.
36. Okauchee—Old Okauchee House, former inn.
37. Palmyra—Enterprise News Building.
38. Perry—Dane County. Old Hauge Norwegian Lutheran Log Church (1852), may be oldest such church in U. S.
39. Platteville—Mitchell—Roundtree House, State School of Technology (Mines).
40. Portage—Indian Agency House, half mile east of town via East Cook Street. Old portage canal connecting Fox and Wisconsin rivers. Former home of the late Zona Gale, 506 Edgewater St.
41. Prairie du Chien—Villa Louis (1843), restored mansion of Wisconsin's first millionaire. Remains and partial restoration of Fort Crawford. Brisbois House (1815). American Fur Company warehouse. St. Gabriel's Church. Old fort hospital.
42. Racine—First Presbyterian Church, Pratt House, Old Hunt House.
43. Ripon—Birthplace of Republican Party, white schoolhouse on College Campus. Fourierites' Long House (1849).
44. Robinsonville—Kewaunee county near Dycksville. Sister Adele's Chapel, Former Belgian settlement known as "Oux Premier Belges".
45. Rochester—Henry Russell House.
46. Roxbury—Across the Wisconsin river from Sauk city. St. Peter's Church; altar painting attributed to Holbein.

47. Saint Nazianz—Manitowoc county. Salvatorian Seminary; old church (1854).
48. Shiocton—Old home of Eben Rexford, composer of "Silver Threads among the Gold."
49. Spring Green—Old Shot Tower in Tower Hill State Park.
50. Thiensville—Old William Bonniwell House, on east side of road.
51. Waterford—Old Norwegian Church, one of the oldest in U. S., in Colonel Heg Park.
52. Watertown—Octagon House, City was early home of Carl Schurz, famous educator. Mrs. Schurz opened first kindergarten in U. S. here in 1855.
53. Waukesha—Town Hall. Lain—Estberg home, 229 Wisconsin Avenue, Old Fountain Spring House, former hotel, 200 South Grand Avenue where Mrs. Lincoln, President Grant, and other notables stopped.

C. *Indian Mounds*, such as,

Wyalusing State Park; Lake View Bluff at Hudson; Man Mound Park at Baraboo; Beloit College campus; Riverside Park as Cassville; Delavan Lake Assembly grounds; around Lake Koshkonong; Fort Atkinson (Hoard's golf course has mounds for bunkers); Cutler Park at Waukesha; Aztalan Mound Park at Lake Mills; Bird mounds on University Hill; Panther mounds on shores of Lake Mendota; Ceremonial mounds on Lake Wingra; Wild Rose; Webster, Dewey mounds near Big Bend.

D. *Monuments and Markers*, such as

1. Waupun—famous sculptures by Lorado Taft and James Frasier in Forest Mound Cemetery and Rock River Park.
2. New Glarus—monument to pioneers.
3. Brule River—Tablet to Du Lhut.
4. Bascom Hill, University of Wisconsin—Abraham Lincoln on Lincoln Terrace.
5. Chequamegon Bay—marker on the spot where Radisson landed and built his habitation at the head of the bay.
6. Camp Douglas—marker in Mill Bluff Park, explains formation of mesas and buttes in the region.
7. Deerfield, Dane County—marker to Nels Gilderhus.
8. Lancaster—Statue of Nelson Dewey.
9. State Capitol—Colonel Hans Christian Heg, statue; Plaque at Maiden Rock.

E. *Battlefields and Old Forts*, such as

1. Battlefield of Wisconsin Heights at Mazomanie and Roxbury, townships.
2. Battlefield of Bad Axe near Victory in Vernon county.
3. Fort Howard at Green Bay.
4. Fort Crawford at Prairie du Chien.
5. Fort Winnebago at the Portage of the Fox-Wisconsin Rivers.
6. Fort Shelby; Fort McKay.

F. *Memorial Parks*

See names and locations in accompanying map.

G. *Trails and Roads*

1. The Military road from Green Bay to Prairie du Chien; old plank road from Beloit to Milwaukee
2. Black Hawk trail.

H. *Military Reservations*, such as

1. Camp Douglas
2. Camp McCoy
3. Camp Williams

I. *Indian Reservations*, such as

1. Keshena—Menomoni Indians in Shawano and Oconto counties
2. Lac du Flambeau—Chippewa Indians in Vilas and Iron counties
3. Odonah—Chippewa Indians in Ashland and Iron counties
4. Red Cliff—Chippewa Indians in Bayfield County
5. Lac Court Oreilles—Chippewa Indians in Sawyer County

J. *Trail Trees* (Crossing of Indian pathways), such as

1. Madison—Corner of Van Hise and Chestnut Streets
2. Lake Wingra—trees on the shores

II. RECREATIONAL VALUES

A. *State Parks*

See names in accompanying map.

B. *State Forests*

See names in accompanying map.

C. *National Forests*, such as

Chequamegon National Forest; Nicolet forest.

D. *Roadside parks*

See names in accompanying map.

- E. *County parks*, such as
Racine County; Ozaukee County; Door County
- F. *Municipal parks*, such as
Vilas park in Madison; Bethesda park in Waukesha; Washington park in Milwaukee.
- G. *Public Hunting grounds*, such as
In Wood county, Outagamie county, Burnett County (We had 63 in 1948)
- H. *County Forests*, such as
Clark county forest established in November, 1930; Forest county in April, 1929.

III. SCENIC VALUES

- A. *Moraines*, such as
Kettle Moraine; The nob in Green County; upper terminal moraine at Devil's Lake.
- B. *Caves*, such as
Blue Mounds; Cave of the Mounds at Muscoda; Eagle Cave at Shullsburg; Badger Park Lead Mine; Kickapoo Crystal Cavern near Wauzeka.
- C. *Dams*, such as
Bay City; Alma; Fountain City; Trempealeau; Onalaska; Genoa; Lynxville; Prairie du Sac; Petenwell.
- D. *Forests and Prairies*, such as
Hancock—Waushara county—first forest plantation in the state (1876), commemorates 100th anniversary of U. S. independence; Mount Vernon Forest of Fame; Coulee region.
- E. *Springs*, such as
Fontana—Seven Indian Spirit Springs at Big Foot Country Club; famous Blue Spring at Palmyra; springs and trout streams of Eagle Springs Golf Resort in Waukesha county; Rock Springs (used to be Ableman).
- F. *Dells and Dalles*, such as
French explorers in Wisconsin 300 years ago saw the deep-cut, sheer walled rocky gorges of Wisconsin's many rivers. They used their French word dalles meaning trough or gutter to describe them. Sometimes this word has been altered to "dells". Such as, Wisconsin Dells, St. Croix Falls, Wausau dells on the Eau Claire river; Keshena Falls on the Wolf river; Parfrey's Glen.
- G. *Quarries*, such as
Quartzite quarries at Ableman; granite at Amberg; granite at Montello; granite at Red Granite; extensive quarries at Wausau; black

granite at Mellen; lannon stone at Lannon; black gabbro near Mellen; silicon quartz at Rib Hill.

H. *River Valleys*, such as

Bad, Baraboo, Black, Blue, Brule, Chippewa, Crawfish, Crystal, Eagle River Chain; Flambeau, Fox, Kickapoo, Manitowish; Mississippi, Tomahawk, Tyler's Fork, Wisconsin, Wolf, Yahara, Saint Croix, Namekagon, Sioux, Milwaukee, Platte, Sugar, Pecatonica.

I. *Waterfalls*, such as

Copper Falls on the Bad River near Mellen; Tyler's Falls; Amnicon Falls in James Barden Park at Superior; Manitou Falls in Pattison Park at Solon Springs; Big Bull Falls of the Wisconsin; Glenn Grotto at Wyalusing; Pewits Nest Falls; Grandfather Falls near Miller; Osceola Falls.

J. *Islands*, such as

Crownhard; Governor; Washington; Beaver; Doty; Madeline.

K. *Watersheds*, such as

Superior

L. *Scenic Heights*, such as

Rib Hill at Wausau; Gibraltar Rock; Holy Hill; bluffs at La Crosse; Rock Bluff at Cassville; Mesa near Excelsior, Richland county; Platte Mound, Wyoming Valley Ridge; Owen parkway at Sunset Point in Madison; Blue Mound; Baraboo gap from the bluffs; Castle Rock in Grant County; Soldiers Grove Bluffs.

M. *Highlands*, such as

Lake Superior

N. *Monadnocks*, such as

Penokee range near Hurley; Mount McCalsin and Mount Thunder in Marinette county; Powers Bluff, Wood county; near Mauston; the region between the Dells and Wisconsin Rapids.

O. *Marshes*, such as

Horicon; Sheboygan



