Conservation Experiences for CHILDREN

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Contents

Foreword

CONSERVATION EXPERIENCES FOR CHILDREN is a source of good practices and information for elementary-school teachers and supervisors. The bulletin is a compilation of curriculum experiences which boys and girls have with natural resources, on which the Nation's economy and ways of living depend.

In preparing the publication, the authors kept in mind the needs of teachers. They emphasized those conservation experiences and learning activities that children develop outdoors with the cooperation of interested individuals and organizations in local communities. They included for ready reference a section of basic general information which schools are using.

To secure information, the authors visited schools suggested by elementary-education consultants of 28 State Departments of Education in each of the Nation's major geographic areas. They talked with children, teachers, superintendents, principals, and supervisors. They consulted interested lay citizens and local and Federal conservation officials. They talked with members of State Conservation Departments, staff members in teacher-preparing institutions, and members of parent-teacher groups and local, State, and Federal groups interested in conservation education. Members of State

Education and Conservation Departments assisted in obtaining information, made transportation available to the authors, and reviewed sections of the completed manuscript dealing with their States. Sincere thanks are extended to all these individuals.

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Landover Hills Elementary School in Prince Georges County, Maryland, contributed the picture on the front cover.

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1. Conservation Education Begins Early

THIS BULLETIN for teachers and supervisors tells how children of the United States are learning to conserve the Nation's reserves of soil, water, forests, fish, wildlife, minerals, and other natural resources. The purpose of the bulletin is to serve as a source of good practices — to be dipped into as needed for ideas, not necessarily to be read chapter by chapter.

Most of the information was collected through visits to schools in 28 States in the major conservation regions of the Nation. The information has been interpreted and supplemented by interviews with State department of education supervisors and conservation consultants. The bulletin presents realistically some of the problems related to conservation of various natural resources in such a way that, when comparable situations are found, a teacher may use the volume as a source for ideas to help her pupils understand their own conservation problems, decide what ought to be done about them, and make plans for action.

Children Learn by Experiences

In many parts of the country, children are having experiences which make conservation real for them. Meaningful activities are a "must." In some sections of the country a whole generation of

children are being educated so that they can make intelligent use of our natural resources.

In some elementary schools, conservation education is a part of the children's learning experiences in every grade. In others, the emphasis is given in one or more grades. Development of conservation concepts is not confined to a single unit, grade, or level of education. Such concepts often permeate the entire educational program.

There is a tendency toward providing children with many opportunities to learn about conservation and to practice it in many functional ways. The experiences may be planting trees, seeding grass, or providing homes for animals. Many children plant and care for school gardens, build nature trails, or help to plant burned-over areas. Reading and talking about conservation is not enough. There is no point in having a classroom poster contest about conservation, while ignoring the fact that the school ground is washing away.

When children *live* conservation, it becomes a way of life. They compare soils, experiment with grasses to see which hold the soil best, and plant trees, shrubs, and vines for wildlife cover, and windbreaks. They write for information and read many materials concerning conservation problems.

Learning Begins at Home

Schools tend to emphasize those aspects of conservation most vital to the region in which they are located. When conservation education is localized and personalized, the pupil gains a feeling of involvement and responsibility. One teacher says, "You learn to appreciate and love something before you have a wish to conserve it." In Colorado there is much interest in water, soil, grazing lands, wildlife, and minerals. In Georgia there is emphasis on soil and trees. The Northwestern States are concerned about forests and soil. California focuses attention on water and trees.

Some attempt was made in the bulletin to show specific regional or State resources and their interrelationships as a basis for the conservation enterprises and experiences described. This was not always possible. It is hoped that the reader will interpret the reports in terms of his own knowledge of regional characteristics and differences and select ideas that are related to the resources and natural habitats of the locality in which he is teaching.

Conservation teaching is frequently incidental, not facts formally presented or "pushed home." The children "absorb" the learning.

This change in method is from the "telling" technique to getting children ready or conditioned through learning from their outdoor environment. Changed practices may include field trips or having camp experiences. The children explore their natural environment and leave it better than they find it. Hence, putting the youngsters in an environment where they can learn is important.

It is noted that the emphases in conservation education change with conditions and with the times. It is not enough for a teacher to be concerned with some conservation outline or point of view developed even a few years ago. The increasing concern in many parts of the country and in several large cities about the water supply is an example of this. Water has always been a basic necessity. But some cities or regions which formerly had an adequate supply, now find themselves faced with a shortage.

New Horizons Appear

Conservation education these days has a "new look" in many schools. Children and teachers are frequently not as preoccupied with saving what we have as they are concerned with better uses of energy, new kinds of materials, new ways of using and controlling our water, better ways of managing our soil, ways of developing our watersheds, and habitat development for wildlife. Boys and girls are greatly interested in these new developments and in many instances have opportunity to observe, study, or participate in them.

Resources Affect Man

Throughout conservation education today there is increasing emphasis on the interrelationships of natural resources and man. Always man is in the picture. Seldom is the conservation of any natural resource taught in isolation from its relation to man or from other natural resources. Conservation of water is important in some areas, so that people may have it to drink, for irrigation, for power, and many other uses. Water is also related to the conservation of soil and forests on which man is dependent for food and shelter.

Usually schools find it important to study the interaction of all related elements in a situation, including man. This is carried out in the study of a region or in such an area of living as recreation.

How Children Learn About Conservation

Descriptions of how children and teachers learn about conservation are given in the following chapters, to be used in whatever order the reader wishes. The conservation experiences have been grouped in some chapters according to the resources involved, namely: Soil, water, forests, fish, wildlife, and minerals. Other chapters describe such activities as: Camps, clubs, nature trails, all-school enterprises, programs, and activities in which children review and evaluate in meaningful ways the experiences of their study. Final chapters report on what the schools are emphasizing and concerns of teachers with regard to conservation, and tell where to find information and other resources.

2. Working with Soil

CHILDREN GET EXPERIENCES with soil and minerals through improving their school grounds and through gardening, either on the school grounds or at home, or in both places. Community organizations and individuals are consulted. County agents, conservation technicians of local soil conservation districts, club leaders, ranchers and farmers, and others who have special knowledge, skill, or other contributions to make are invited to serve as consultants and to help in other ways.

Using Soil

Soil has been called the "most basic and indispensable resource" of the Nation. In the United States, as in other nations, soil erosion is serious today. Through planting seeds and setting out plants and observing them grow, children have opportunities to see the value of soil and some of the difficulties of holding it in place and of maintaining its fertility.

Learning about Soil

In Claiborne County, Tenn. children study soil and crops and on their school grounds put their ideas into practice. In Cumberland Gap School, a terrace in the background of the children's play area is being improved with vines and grass.

The activity has led some of the older pupils to study the soil of Claiborne County and the crops that grow there. They have learned that a certain proportion of the good soil of the county is planted in

tobacco. In order that the fertility may be maintained and the soil made to give its best, the tobacco crop is alternated with crops of grasses and clover and other sod-forming crops. *The children can understand the importance of maintaining the soil of the county in good condition because of their experiences with soil as they improved their school ground.*

The Bearden School near Knoxville in Knox County has a terrace at the back of the playground. Here the pupils have placed leaves and other organic matter on the soil. To prevent the mulch from being blown or washed away, the pupils put chicken wire over the mulch. In the more exposed places they have staked burlap over the leaves and grass. Planting different types of lespedeza helped to prevent erosion in this particular environment.

Saving Soil at Mill School

After some heavy rains, the grounds at Mill School, Whittier School District, Los Angeles County, Calif., showed evidence of soil erosion. The fifth-graders developed a rock garden to protect the soil. Everyone brought a rock for the garden and put in plants. A little drainage ditch runs through the center. The children made a bird bath of concrete and a bird feeding station for the garden.

The children also established a bird sanctuary in a corner of their school grounds. Children who were especially good in arithmetic made a survey of the corner. Based on this plans were made by the class.

Members of the class planted different grasses which are helpful to birds for shelter, seeds, or nest building. The local Audubon Society gave them buckwheat, barberry, and pentstemon seeds.

The children planted vines to climb on the fence. They planted wild flowers, sunflowers, and a native rose. Bird feeding stations were placed in convenient areas.

Shelterbelts in Kansas

In a one-teacher school in Kansas, the teacher combines conservation education with the children's interests and activities in Four-H Club work, which, in Kansas, is given a place in the school program. During the past year, teacher and children have been interested in including treebelts, or shelterbelts, as they are often called, in conservation study. These stretches of trees and shrubs were planted in earlier years,

and now are in their prime. Children can go into the fields and observe the extent to which the rows of trees check winds that blow across the level or nearly level land.

On the leeward side for a long way there is no drifting of loose soil. Rainfall is held and allowed to seep into the earth. Snow, which otherwise would be blown off some of the land in winter is collected and held by shelterbelts. On trips to the treebelt in the spring, children see the heaped-up snow melting where it fell.

In parts of Kansas, osage fences were once planted around farms, in squares as the farms were laid out. Today changing ways in farming have led some farmers to take out the osage and, where suitable, to plant fences of multiflora roses and other shrubs on the contour or across slopes in accordance with present land use practices. These will serve as cover for wildlife and tend to check wind erosion near at hand.[1]

School Gardens

At Central School, in Fulton County, Ga., the children are learning how to make the best use of the resources in their own environment. Many of the children come from homes of a below-average economic level. The school gardens provide one direct means of meeting the needs of children through effective use of the soil.

Third- and fourth-graders had a vegetable garden where they raised turnips, radishes, lettuce, tomatoes, peas, beans, cabbage, carrots, and corn. They used those things in salads for school lunches. They also raised watermelons.

To help them in gardening at school or home, the children made a chart about:

A Good Garden—

Should have loose soil.
Should have bits of decayed plants and animals.
Should be sunny.
Should have drainage.
Should be free of grass and weeds.
May need extra food.

[1] Practical problems in planning windbreaks and in studying and understanding their effect on wind erosion with diagrams are suggested in: Philips, Alfred W., *The Value of Soil Conservation; Problems of Conserving Soil, Water and Wildlife.* (Lincoln, The University Publishing Company, 1949.)

The seventh-grade boys were experimenting with potatoes to see which soil is best for them. Gourds were being grown for use in making bird homes for the next season. Some of the children made a flower garden. There are always arrangements of flowers or fruits in the school.

At Mill School, in Whittier, Los Angeles County, Calif., each classroom group had a garden. Some of the younger children made a potato patch. The second-graders raised things for their market unit. The third and fourth-graders laid out their own rows for planting vegetables.

Various experiments were tried by the fifth-grade children. They tried new seeds, such as white marigold. They divided their garden into three plots to test different types of fertilizers. These children tried growing various plants on a fence. They thought the latter was a very practical experiment, since many could continue with the discoveries at their homes.

These fifth-graders made models of both covered and bare land, making them look like the local terrain, with small school, church, houses, trees, and farms. When water was poured on the models, many of the things on the bare land toppled over and some were washed away. Conservation in this fifth grade, as in some of the other schools visited, is taught in relation to study of the westward movement.

The sixth-graders tried to see how plants raised in other places would grow in California. This was related to their work in social studies. They had a rice paddy, had planted tops of pineapples, and were experimenting with Canadian wheat.

Minneapolis Junior Garden Program

Large numbers of Minneapolis children participate in a program of home gardening in which flowers or vegetables are raised. This is a *cooperative three-way educational program for the summer in which the schools, the local Parent-Teacher Association, and the home of each child gardener are involved.* During the summer of 1956, there were 2,223 gardens in 52 elementary-school districts in the project.

The children learn effective ways to use the soil and how to beautify their homes and produce food. They plan their gardens, care for them regularly, and evaluate their successes and failures. At the close of the season, many of the schools hold garden fairs where the children can exhibit the produce of their gardens.

In the spring, a teacher is released from his regular teaching duties, to go to each elementary school and present the program to those

children who are interested in participating in the project. A gardener's handbook, which has been prepared in the Science Office of the schools, is given to each of the children who enroll. The gardens are visited during the summer by members of the Parent-Teacher Association.

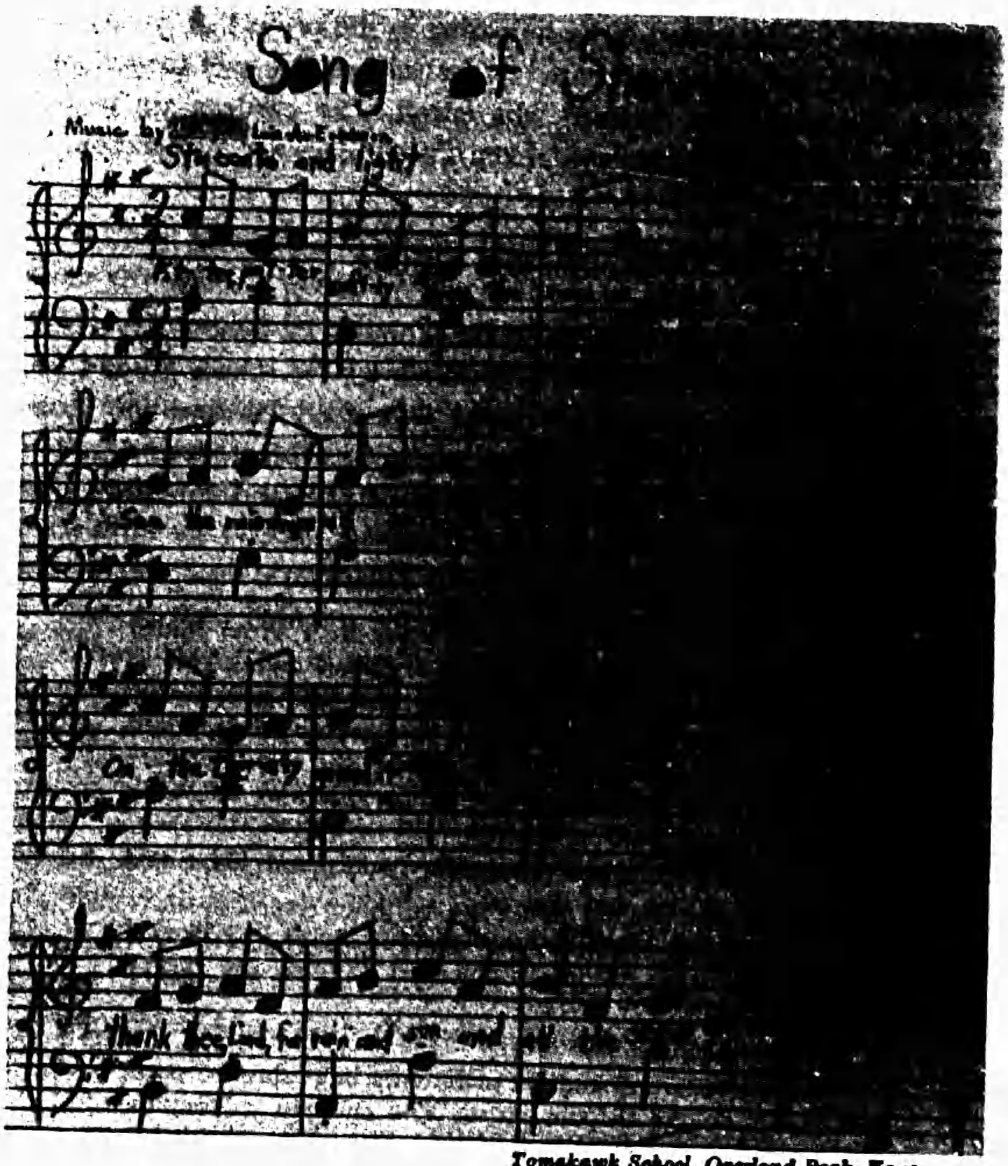
A Garden and a Song

A class of second-grade pupils in the Tomahawk School, Overland Park, Kans. chose the black soil in a corner of the school ground for their garden. They said the soil there was good because the grass nearby was thick and very green. They planted radish seeds and waited for them to grow. They wished for plenty of rain and sunshine. The teacher's account of what happened follows:

> The children were excited when the little green folded leaves pushed their way through the ground and began to spread out. When the earth became dry, the children anxiously waited for rain. When the rain fell they were so happy that I suggested that we all write a song about the rain. Here are some of the steps the children and I took in writing the words for the song:
>
> We tried to think of interesting words and ideas that were related to rain and showers.
>
> With my help, the children thought of words they liked. I composed a simple melody. (Sometimes children can suggest the music, too.)
>
> We made up the title last.
>
> I wrote the words and the music on a large sheet of paper and put it on the bulletin board. The children colored the notes, which I had left open. (We might have put illustrations around the music.)
>
> Later I mimeographed the song and each child colored a copy to take home. During an art period the children made freehand drawings entitled "Rain." In looking these over I chose parts of several drawings to copy on the stencil with the song as illustrations the children could color.

A Memorial Garden

The entire school population of Turnbull Elementary School in San Mateo, Calif., joined together to create a memorial garden in honor of a kindly man of their community, Mr. William Turnbull, who had done many fine things for the schools, the children, and all growing things of the city.



Tomahawk School, Overland Park, Kans.

Gardening inspires second-graders to write their own song.

The kindergarten children and their teacher planted and cared for a hedge of golden privet as a windbreak, and variegated ivy to cover the fence. The second-graders planted a pyracantha and the fourth-graders planted Scotch Broom. The sixth-graders provided two fir trees. Finally, the third-grade children outdid themselves with a gift of four spruce trees.

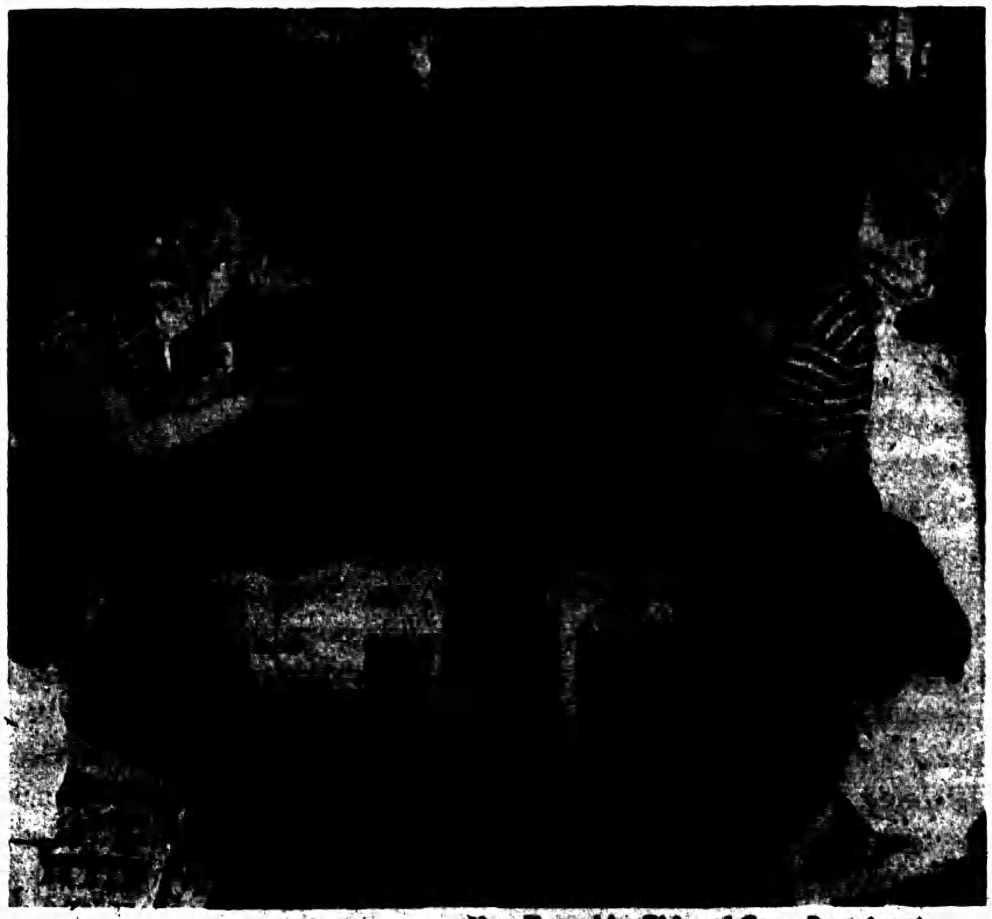
Two pines from her mountain home were given by the school secretary. Six young Japanese plum trees were brought by the principal from her garden. The nearby high school gave choice geranium slips. The gardener, a former Turnbull pupil, planted hydrangeas against the walls and took special pride in looking after the garden.

Most of the plants and trees were paid for by paper drives, candy sales, through foregoing some of the usual end-of-the year parties, and from a concerted effort on the part of all the children to save their pennies and contribute them to the plant fund. The garden was a beauty spot enjoyed by the entire community.

Practicing Conservation at Home

Sixth-graders of College Street School in Chester, S. C., studied erosion and its prevention in a conservation unit. They read widely and saw new films about conserving our natural resources. These pupils observed good farming and poor farming in the Chester area.

During the time they were studying the unit, most of the children carried out conservation activities at home. One boy built a check dam near his house and helped plant trees, shrubs, and other vegetation to stop a gully that was forming. Another, with his father, dug a diversion



New Hampshire Fish and Game Department

Testing the effect of cover on soil.

ditch to carry water away from and around their garage to keep the soil from eroding after heavy rains.

Bill told about planting flowers, shrubs, and grass on banks of a creek back of his home. Bobby planted some small cedar trees in his yard. One girl had a flower garden which began to wash, so she planted grass around it to hold the soil. Pat planted some flowers. Carol told about helping her father stop erosion on a vacant lot they owned. One boy built a small dam on a creek. Bill and his friends made some check dams when on a camping trip.

The children, firsthand, found out many things about planting cover crops, strip cropping, contour plowing, terracing, shelterbelts for preventing wind erosion, and other ways of using and conserving the soil. They made posters showing what they had learned in their study of conservation. They made plans for future use of the soil including flower gardens, vegetable gardens, and planting shrubbery to prevent erosion.

Johnny Grass Seed Projects

Like Johnny Appleseed, of pioneer days, who planted apple seeds wherever he went, many children of modern times plant grass seed wherever they go. The Johnny Grass Seed project began in Mesa County, Colo., in 1949, sponsored through the office of the county superintendent of schools. Through efforts of The Izaak Walton League of America it has spread to many parts of the United States.

The Johnny Grass Seed idea developed originally in Mesa County, Colo., as a means of reseeding overgrazed rangelands. While several organizations, including The Izaak Walton League, made the project possible, the schools played a central role. They helped children and adults to understand this conservation problem and the need for concerted action to improve the range country.

Through the Johnny Grass Seed movement, school children, Scouts, garden-club members, hunters, fishermen, picnickers, Future Farmers of America, and the public in general, planted certified seed approved by the Colorado Game and Fish Department, the United States Forest Service, and the United States Soil Conservation Service. The seed were packed by The Izaak Walton League and distributed through the cooperation of sporting goods stores. During this period, thousands of dollars were spent by stockmen for reseeding.

Teachers, pupils, and others learned where and how to plant seeds. Grazing lands and pastures, gullies, fence corners, road cuts, stream

banks, bare hillsides and other wastelands were some of the places seeded. Later summer and autumn were found to be the best time for planting in this region.

The Johnny Grass Seed project soon became a statewide activity in Colorado. The Governor proclaimed a Johnny Grass Seed Week and 250,000 packets were distributed in the State. Denver children were among those who helped to fill the seed packets.

Children of Aurora, Colo., carried out a Johnny Grass Seed project to improve the lawns and protect the soil of their community. In preparing for the action phase of this work, they made a list of problems to be working on.

We Need To Find Out —

Why should grasses be protected?
Why is water important in saving our soil?
What part does wildlife play in the problem?
What causes soil to blow or wash away?

Members of Johnny Grass Seed Projects in other States have carried out many of the same activities as those carried out in Colorado. They have developed Johnny Grass Seed demonstration plots, provided buyers of hunting and fishing licenses with seed packets, "adopted" a Johnny Grass Seed farm, and assisted a public or State agency with a planting project.

The projects are being expanded to include seeds of legumes and shrubs as well as grass. In addition to eroding or over-grazed pasture and range, burned-over range or forest lands and strip-mined lands are being reseeded. *Among results of the Johnny Grass Seed program are protective cover to prevent erosion and hold water, a lessening of flood damage, building up of the water table, and providing food and cover for wildlife where the project has been a success.*

Planting Seeds on Burned-over Areas

California children often plant seeds to hold the soil on burned-over areas. After a fire in the San Gabriel Mountains, the children of LaVerne Heights School made a study of conservation. Some of the children had been evacuated from the area at the time of the fire. To express their feelings about the experience, they created paintings which showed some of the devastation, the storm, erosion, people scattering mustard seed, planting seed by helicopter, and the appear-

ance of the slope after the rain. They also did much creative writing about their experiences.

As a means of protecting the soil of this burned-over area, the children secured flower seeds from an oil company and planted them where they would do the most good. Several other schools in the Foothill Boulevard area of Los Angeles County also participated in reseeding burned-over areas.

Summer Gardening Program

A pilot project in planning and maintaining summer gardens is provided in an Indianapolis suburban school where there is enough space and soil. Early in the spring a teacher and a committee of children and parents met three times a week for: (1) Preplanning; (2) getting a tractor to plow the garden; (3) arranging the garden in small plots so that each child could have one plot; and (4) planning a working program.

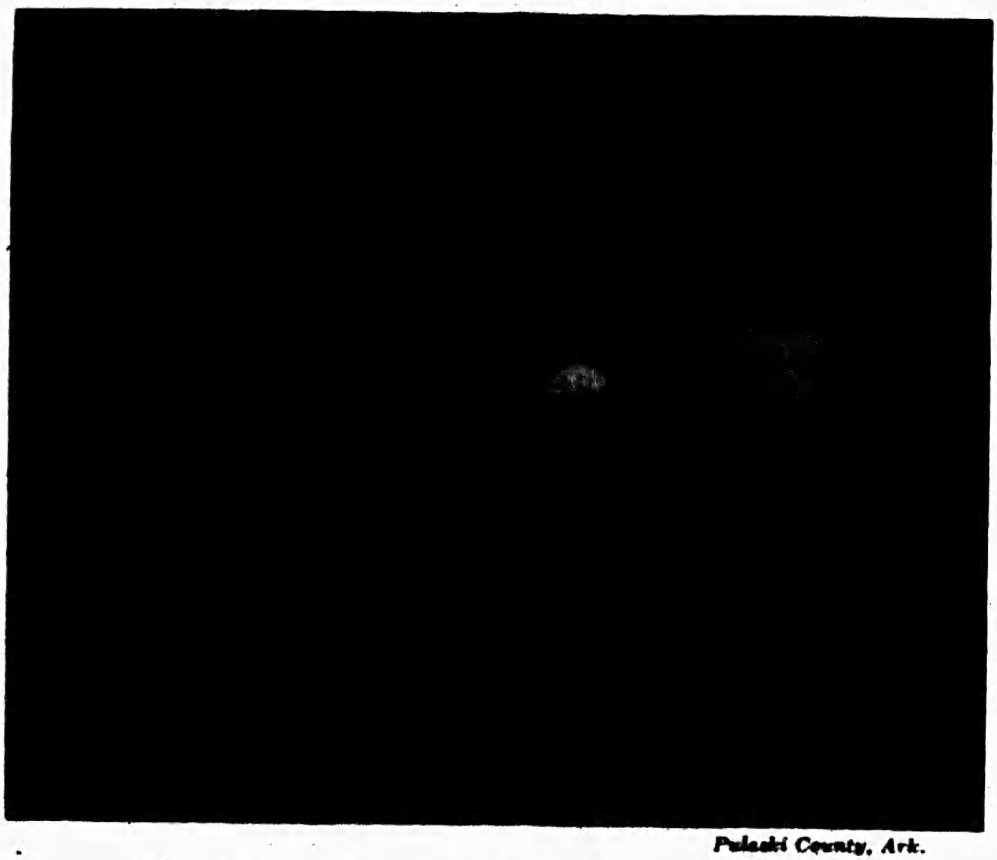
Many of the children of the school also belong to the Four-H Clubs, and school and club programs are carried on cooperatively. *The work program encourages experiences in conserving and protecting the soil, fertilizing according to needs shown by soil tests, and planting grass in gullies and on terraces.*

Garden Under the Fire Escape

A number of counties in Kansas have become conservation conscious about the soil. Schools, clubs, churches, and other groups are working to have people know the facts as well as practices of soil conservation. Many teachers in schools small and large try to have the children get firsthand experience in working with the soil. Pupils collect samples of different types of soil. They study the character of soil and find out ways of protecting it from erosion and of maintaining its fertility.

One example of a group of school children at work is a primary class at Dunlap, Kans. There the teacher teaches conservation in an incidental way. When opportunities arise in connection with other activities, she helps the boys and girls gain understanding of ways of using the soil with consideration for maintaining fertility erosion. A cultivated field adjoins the school ground. When winds blow the soil into the schoolyard, the children's attention is called to the farmer's loss.

More than this happened one year when the children discovered on the school ground some soil that was dark, rich, and easy to work. It was under the fire escape just outside the classroom. It had been blown there from the farmer's field. Now it belonged to the children to do with as they pleased. So they planted a garden of tomatoes,



Pulaski County, Ark.

Bill and Ann study conservation practices in a rural school.

radishes, and onions. They had a thriving crop. They could see that the schoolhouse and the fire escape protected the garden from the wind, and the black soil was not blown away from the garden as it had been from the open field. The fire escape was on the south side of the building, and the garden had plenty of sunshine.

The children's interest in the garden was an indication that in a community where soil is the source of income, *more land might provide woods or gardens for schools such as the one at Dunlap. There boys and girls could experiment with soil and its use and conservation in growing vegetables, flowers, and trees.* They could learn its values firsthand and be prepared to accept responsibility for its conservation as adults.

School Ground Improvement

The improvement of school grounds is a project which provides children of urban, rural, and suburban schools with opportunities to have experiences in soil conservation and in beautification of their surroundings. Such projects are developed by individual classes or as schoolwide projects.

Beautifying the Grounds at Parkside School

For over two decades, school beautification and the conservation of natural resources on its grounds have been a continuing interest and activity at the Parkside School, in Silver Spring, Montgomery County, Md. *The school grounds today provide evidence of the results of many years of conservation work on the part of children, teachers, principals, and parents who have participated in this enterprise.*

The pines which are standing now on the school's hill slope were planted by the pupils in 1937, when the present principal was in the third grade and helped plant the seedlings. Later check dams were constructed to slow up the runoff water and kudzu was planted to hold the bank at the primary building. In 1940, the pupils terraced some of the hillsides with logs and planted kudzu and barberry. These means of holding the soil have held successfully over the years.

Parkside School uses the outdoors as a laboratory for studying conservation and natural resources. Currently, each class in the school has a certain part of the school grounds to oversee. The children see that this area is kept tidy and neat, beautified, and its resources conserved.

One year practically all of the children, school personnel, and parents participated in a schoolwide project to conserve the soil and beautify the school grounds at the school. Each class selected one area of the grounds where it wished to work. As plans were made, each child drew a sketch map of them and indicated through a color key where he wished to work.

The kindergarten-primary children chose a newly graded slope over a new blacktop on their playground where the spring rains would have caused erosion. They decided to make a Memory Rock Garden of the bank. Each child brought one stone and one plant for the garden and put them in place to be a remembrance of him. A beautiful Memory Garden resulted from this project.

The third-graders felt a need for a quieter place to play. They wanted to visit or play quiet games, such as jacks, without large ball games or running games disturbing their fun. To meet this need they developed Secret Gardens. This was done largely through the planting of shrubs and grasses.

A lily pond was the special project of the fourth grade. They used an old bathtub for holding the water. A very decorative lily pond resulted—a small gem for the grounds of the school.

An outdoor theater was made by the fifth grade. The edge of a forest became the backdrop. Shrubs were planted to provide dressing rooms and screens at the sides of the stage. Grass was planted to provide a place for the audience to sit. This natural outdoor theater became the setting for many productions of creative drama given by the school's children.

The sixth-graders undertook the work of preventing erosion on banks along the highway by the school. They set out kudzu and other plants for holding the soil.

Parents decided that the children needed more play equipment at school. One parent took the lead in designing the play equipment. Most of it was constructed of cement. Fathers did most of the work. The finished project, called Parkside Playway, has slides, big pipes, swings, and many other objects with which the children can play.

Stopping Erosion at Holly Springs

Sixth-graders at Holly Springs School in North Carolina planted 500 pines and 100 cedars on a hill on their school grounds to keep the soil from washing. They got the cedars from the State Forestry Nursery. They dug up pines in the woods and secured others through the help of a service club.

Pine straw was used to prevent gullies on the hill where seedling trees were planted. Grass seed was planted in some places where needed on the slopes. Posts were put around the grounds to keep cars from driving in and spoiling the trees and grass.

The pupils learned a great deal about how to keep soil from washing. They put some of this knowledge to work on their own farms. They made conservation books for their parents.

A Land-Use Program for the School Ground

Children in the City Park School, McMinn County, Tenn., made a beauty spot inside the driveway with shrubs around it and planted

some 70 trees on the grounds. Plans are made to plant multiflora roses around the area outside the playground.

Specialists on land planning at the University of Tennessee worked with the teachers and children to develop a program of land use. When the plans had been determined, and each class had chosen what its part in the program would be, the children did the planting. When the road near the school was graded, the children secured permission to keep the sod and move it to the steep bank outside their classroom window. They smoothed it out and held it down with pegs until the roots of the grass could take hold in the new soil.

The school's land-use program extends over the years immediately ahead. The lawn is large and improvement will be slow. The children are making new sod out of bluegrass and clover. Tennis courts are laid out and the children and parents look forward to picnic grounds with tables and fireplaces. Plenty of space has been reserved for the playgrounds. These playgrounds are almost continuously in use. There are definite schedules for using the playgrounds, and teachers and children may use them at any time of the day if they are not already crowded.

Pupils Improve the School Ground and Save the Soil

An enthusiastic project in a one-room school near Ashland, Nebr., is "Operation School Beautification." The project began with a badly eroded school ground, the southwest corner of which was practically destroyed by a great ditch and rough eroding bank. When the teacher's and children's attention was called to the bank by the county agent who was working in the county, the group thought nothing could be done about the bank. It seemed to teacher and children as though the bank had always been there, a part of their school ground, and was something that had to be accepted. But as they kept looking at it, talking about it, and studying what parents were doing to prevent just such kinds of erosion, they began to think that there might be a way to improve the school ground.

The bank and gully were so large that the teacher and children soon realized that they would need tractors and other machinery and the help of adults on the project. Might the neighbors be willing to donate labor and machinery? The result was that neighbors came with tractors and completely filled the gully and extended the bank to its rightful edge of the school ground. When the men met with their tractors to work on the bank, the children's mothers came to school

with lunch and held a community picnic. Later, the story was reported in the county newspaper at Wahoo.

At this point, teacher and children took over. They planted grass on the bank and set out cedar trees at the edge. They also planted cedar trees along the north side of the school ground as a windbreak. On the east side of the school ground they planted shrubs and flowers. Now the trees are growing and the school ground looks lovely. The children have snapshots to show how the grounds looked before the work and 2 years later.

To raise money for some of their improvements, the children collected returnable bottles from the roadside and sold them. The children were not allowed to do this on busy highways. Most of the children lived on side roads. In business meetings in school the children assigned certain roads to different ones of the older group.

Experiences in which the children took part in developing the school-ground improvement project included:

Doing the light work needed in leveling the bank and putting soil in eroded places around the schoolhouse.

Looking into the future and thinking how the trees are going to look and talking and writing about their ideas.

Painting the merry-go-round, which for some time had needed attention.

Watching a neighbor pull down some old trees with a tractor.

These trees were dying; the children wanted them removed because there was little chance that their health would improve and they were in the way of new plantings.

The boys and girls had tried to cut them down with an ax but when a neighbor observed their difficulties, he said he would bring his tractor and do the rest of the work for them.

Trying to think of useful activities that would give all children an opportunity to share in the improvement project.

Getting seedlings of cedars, multiflora roses and honeysuckle for planting.

The children knew that some of these would have to be bought and they had spent all their money. They wondered what they could do to raise more money. First they figured the cost; then they asked the school board for advice and the school board decided to pay the bill.

Writing a report of an activity, "Today We Planted Trees."

Building bird feeders.

Finding out the right kinds of feeders to build and where to put them for the birds they hoped to attract to the school ground.

Starting a crimson rambler on a trellis and caring for it during the summer.

All the school subjects were used at different times in connection with the activities. Frequently it was necessary to write letters, and the children made use of their language books in writing these. They used arithmetic as they figured costs and learned to manage money. They read widely for information. Most important of all was the fact that the children had experience in planning and working with the soil and seeing it produce for them and make life more enjoyable.

Grass on the Playground

In Pond Gap School, near Knoxville, Tenn., the teacher is introducing conservation education into the curriculum. Since the school is new, children and teacher could really start at the beginning. Getting grass started on the school ground was the first problem. "What is the use of sowing grass seed? The children will walk on the young grass," said one boy. "That will cause it to die."

The group talked about walking on the grass and why children walked on the grass and did not follow the concrete walk. A committee was appointed to see if there were any paths where more people walked more often than in other places. Then the children made a plan for walks that would be laid out along the most prominent of these paths, which were taken in the ordinary life of the school. The school board offered to build walks where the children suggested.

What kind of grasses should we plant? To solve this problem the children studied different types of grass and their value in protection of soil. They discovered that Bermuda grass with its interlocking roots makes a thick sod, which withstands a great deal of walking and protects the soil beneath. From a dealer they learned how many pounds of seed would be needed.

The study was done informally and the children had opportunities to set up problems and, in solving them, to use information from their science and arithmetic studies. Different children made discoveries that aroused their curiosity. In the grass seed that one child was planting, for example, he found a bean and planted that. Plants

that children never intended to plant began to grow. It was interesting to see what they were and what they meant to the soil.

The children were pleased with the results of their activity, especially when the green shoots of grass began to appear over the yard. Underneath the front windows of the school was a vacant spot. During the winter, people had formed the habit of parking cars there when they came to meetings at the school. When the new grass appeared in the spring, the people began taking their cars to the parking lot. They wished to save the grass on which the children had worked so hard.

The school is now developing the project further as an all-school activity. Each classroom takes responsibility for a certain area of the grounds, developing plantings there and keeping these attractive.

The children and teachers in the Pond Gap School now are surveying the grounds to find the beginnings of gullies at certain drainage spots, as under unprotected eaves of buildings. They will stop these gullies as soon as they appear. They are making a study of the community to discover people who would like to help them with the school-improvement project. Among people mentioned as helpers so far are staff members from the University of Tennessee, members of the State Department of Conservation, State Game and Fish Commission, Extension Agent, and County Four-H Club leader, and practical farmers in the community who are familiar with the products that grow best and who are willing to share information and tools and sometimes machinery.

The children have discovered places on the grounds where check dams may be needed to help keep erosion under control. Sticks and logs, leaves and grass form the beginnings of such dams. Bermuda grass planted where its roots can get a start in the soil is good to cover the surface of the areas needing protective cover.

A major activity will be to secure seedlings and plant a background of pines for the school at one side of the playground. Some cedar trees will be planted. These will be sold for Christmas trees to provide a source of income. In their tree planting, the children and teachers plan to get native trees out of the forest rather than to buy from a nursery. They think these will make an interesting woods for the school. The curricular activities of the school are so planned that conservation has a natural place among the other projects of the program. Work begun by children who will graduate will be carried on from year to year by younger children who move along through the grades.

Pond Gap School will carry its work beyond the school. For example, *when the highways in the vicinity are widened as planned, the children will look forward to the development of roadside parks in the neighborhood.*

An All-School Activity in Improving Grounds

One of the most enthusiastic conservationists interviewed for this study said that for the children in his school in Pulaski County, Ark., the learning-by-doing ideas were especially applicable in conservation. Boys and girls seemed to remember and understand those experiences they lived better than the ideas they tried to get merely by reading, although when their projects were underway they looked for information in books and bulletins. Here is a report of the activities in which all grades of the school cooperated by forming committees for some tasks and assuming special assignment for others:

> The school terraced the athletic grounds and planted grass on soil on which grass had died from overuse.
>
> Members of committees terraced a bank along the side of the school yard and planted on it new grass, shrubs, and flowers.
>
> On each farm in the community that had conservation projects the pupils erected signs which they had made to explain their activities.
>
> The pupils worked "across grades" for some of their activities. The eighth grade, for example, helped the third grade develop a conservation display for a program at the end of the year. The fifth-and sixth-grade pupils worked together on a part of the planting for the terrace.
>
> The school discussed the meaning of "habitat" and worked to develop on the school campus and in surrounding areas a balanced environment for plant and animal life.
>
> They erected signs to identify interesting plants and trees.
>
> They made arrows that would help hikers follow trails where they might see ponds, wild flowers, plantings brought from other places, and newly planted trees and shrubs.

Wake Forest School Improves Its Grounds

Since Wake County, N. C., soil is easily eroded by the rains, the pupils of this 12-grade school undertook the conservation of the soil

on its grounds as a school-wide project. The younger children undertook many activities and the older pupils carried out the more difficult aspects.

First- and second-graders planted flower gardens. Shrubbery was planted by older elementary pupils. Seventh- and eighth-grade boys helped keep a small nursery for shrubs to be used in holding soil on the grounds. The front lawn was graded and planted by the boys. Seventh-graders planted jonquil bulbs in one area.

The Student Council planted one shrubbery area. A concrete trough was made to carry off water. Shrubbery was planted along the sides. On another area, they built a retaining wall and put in drainage. They used grasses to hold soil on graded slopes and built fences for honeysuckle. The Council made a shady side of the grounds into an outdoor sitting room with azalias and other flowers, seats, and tables. A drinking fountain was constructed on the athletic field by some of the boys.

Sixth-graders studied conservation as a unit in their classes. In other grades the children read about conservation, and all had opportunity to make practical applications on the school grounds.

Cane Run School Improves Its Grounds

Conservation activities have a different emphasis each year in Jefferson County, Ky. Natural resources in this county include soil, water, forests, and wildlife. Soil is the basic resource for most of the schools' conservation activities. This year the emphasis of study is on the balance of nature and the interdependence of natural resources. The resource person for the schools of the county is the county conservation adviser. He works with teachers and children when they request his help on curriculum projects. He has charge of junior conservation clubs in the county. Only boys at present belong to the junior conservation clubs.

The Cane Run School and community have an interesting school-community situation. The school people call it a "rurban" community, but say they are not sure what that word means. The school is located on the edge of Louisville in a manufacturing district with a few farmers in the outskirts. The homes are in the low land of the river valley which has enough water and good soil to produce healthy trees and shrubs. These can be used to add to the beauty of the community.

An example of conservation work in the Cane Run School illustrates some of the conservation work in Jefferson County. *One of the*

conservation goals of the school is to develop an interest in the surroundings and help children and parents learn how to make them more attractive. The sixth-grade teachers and pupils undertook a problem in soil conservation. Together they studied ways of stopping erosion and then set about putting into practice some of the things they thought would work on their school ground. They tried planting fescue to hold the soil in place. Parents were asked to help in this project, and a tractor, harrow, and roller were loaned to the school for improvement of the part of the ground most needing attention. The grounds have about 12 acres.

Another project of the school-community group was planting a game and bird refuge of multiflora roses and flowering plants and lespedeza. Plants were provided by the State Department of Fish and Wildlife Resources. Today a flowering bank extends across a corner of the school ground and with its beauty and protection welcomes bird visitors.

Still another conservation study and activity was the stocking of ponds in the community. Children learned that the best fish to use were the large-mouth bass and blue gill. There were provided by the State Department of Fish and Wildlife Resources to interested parents.

The school custodian was especially interested in the children's study of trees and helped them to plant a number of interesting trees including those used for the bird refuge. Among those were the black walnut, a flowering peach, holly, an oak, a spruce, and a dogwood.

Different classes for many years have given trees to the school. On a trip to the South, the custodian discovered the mimosa tree and brought two back to add to the children's collection on the school grounds. The principal thinks that *these activities are paying off in improvement of the homes in the neighborhood of the school. Neighbors are exchanging plants. Some parents and children are making landscape plans.*

The boys' conservation club in this school gives leadership to the school conservation activities. The local conservation officer serves as resource person when needed. Through him the boys have studied conservation laws. He brings out the fact that conservation laws are really just conservation rules—rules for living in our modern society. He thinks that the conservation club should admit girls, but at present the complications that would arise on the trips and in camps and workshops would cause more problems than he is able to solve without additional help.

In connection with their study of animals, a study with conservation emphasis, one of the teachers in the school makes arrangements for the children to take a trip to the zoo. Usually parents go along with the children. In one trip to a zoo and a museum, the children became especially interested in desert plants and studied the kind of balance of nature that provides their habitat.

A Year at Deer Park School

Deer Park School serves a small rural community in Garrett County, Md. Before the teacher and the children had thought about their responsibility for conserving natural resources right around them, the school ground had become a sorry-looking place. A large hollow tree, cut down for reasons of safety, left a stump and hard ground where grass did not grow. A short cut to the front door made a bare and sometimes muddy path through a weedy triangle in front of the building. The entire lawn had barren or weedy spots. Beginning gullies showed lack of thought and care. The grounds had some trees but few shrubs. The ball diamond for the most part was bare clay.

When the idea of conservation spread in the county, Deer Park started a program of school ground improvement that made a noticeable change within a year. On the principle that a walk ought to be placed along a route where people wish to go, bricks were laid down in the short-cut path to the front door. The poorly grassed triangle beside the short cut was reseeded. Other walks about the grounds were mended and outlined by short white-painted posts.

In the fall a compost pile of leaves was started. During the winter, organic matter from the compost pile was scattered over the ground where needed. A truckload of topsoil was spread on an area to be developed as a park.

In the spring more reseeding was done. Shrubs and trees were set where teachers and children thought they would look best. Flower beds were made and planted and fertilized from the compost pile.

Myrtle for School Grounds

Children of one school in Savannah, Ga. secured sweet myrtle plants in the woods and planted them on their school grounds to hold the soil. They also planted azaleas and some dogwood trees. They

planted native plums and cherries so that birds might feed on them. They prepared the soil in order to have a basin around the plants, so water could be absorbed by the roots. They were careful to keep the plants watered. On the slopes the children planted pine seedlings and carpet grass. This grass holds the topsoil and allows the water to soak in.

School Ground Planting at Woodstock

The children planted sprigs of Bermuda grass on their grounds to prevent erosion at Woodstock School, Cherokee County, Ga. The sprigs were given to them by the United States Soil Conservation Service technician assisting the local soil conservation district. The children also planted English ivy, honeysuckle and roses on the banks of the school grounds. They put in rocks to hold the soil. The larger boys planted kudzu and fescue on the steep back banks. They also made rock-lined spillways for heavy drainage.

Windbreaks for School Grounds

The San Mateo Knolls Elementary School, of San Mateo County, Calif., conducted a conservation project to protect the children from the prevailing winds and to beautify the school grounds. The pupils, school personnel, and parents cooperated in carrying out the project.

The 5-acre site was surveyed to determine the number of trees needed. It was decided that 300 trees would be needed. Two varieties of pine were purchased at a State Forestry nursery.

Since the school grounds were hewn out of a steep, rocky hillside, it was difficult to dig the holes for planting trees. Husbands and fathers in the Parent-Teacher Association came to the rescue. They volunteered their services and dug 150 holes for trees on the windward side of the school. The children took turns planting the trees. Their interest in the project was very high during this period of pupil participation.

For the next 2 years the pupils, with the help of the gardener employed by the school district, kept the young trees watered and cared for. During this time the pines grew from 6 inches to a height of 5 feet. The children are very proud of their work in saving the soil and making their school one of the beautiful places in the city of San Mateo.

A Laboratory and a Place To Play

In the foregoing accounts of school ground improvement, two ideas stand out. A school ground is thought of, first of all, as a place to play. School board, parents, teachers, and children who help to plan the laying out of a school ground take care that needed space for play is provided along with other forms of outdoor recreation. Secondly, *the school ground is the nearest real laboratory that children have for learning to conserve soil and water.* On the school grounds, boys and girls set out plants and start seeds, bulbs, and slips, keep the soil in good condition, observe the growing plants, and see that good soil produces useful and beautiful plants, grass, and trees.

3. Studying About Water and Minerals

CLOSELY RELATED to experiences in using and conserving the soil is the study of water and watersheds. While emphasis is placed on water resources in this section, the reader will understand that they are considered in close relation to soil.

The Water We Use

Children have dozens of experiences with water and are familiar with many of its uses. Personal and household uses of water are of first importance. Children drink water. They see it used for washing, for laundry, for cooking, for drinking. They see it used to control fires and to water lawns and gardens. Water makes possible the growth of plants, the existence of fish, and the production of other foods which the children eat. Water provides an important means of transportation. Cities have great water systems and towns have smaller ones.

We talk of "measuring" water, and of the "depth" of rainfall. We "soften" "hard" water and "purify" water that has been polluted. Water has "taste." Water is an important source of recreation, necessary to boating, canoeing, skating, swimming, skiing, fishing. *Such experiences and observations may arouse children's curiosity and lead to studies and work that result in the improvement of situations in the use of water.*

City Children Learn about Conserving Water

A number of cities have reported children's conservation experiences of value in relation to water. A school in Ohio developed a

conservation study in cooperation with the city fire department. In connection with a safety study, the children made clippings of newspaper items about fires that burned houses, did other damage to property, and destroyed life. Some of the children had seen a building being partly burned and observed the large amount of water used to put out the fire. They wondered how much water was used.

It was dfficult to find in books the facts desired, so the teacher suggested that they might ask the fire department to send an official to answer their questions. The fire department lieutenant who went to the school discussed the use of water and of chemicals in putting out fires and explained some of the apparatus. He gave figures from which the teacher and the children together compiled an estimate of the amount of water that might have been used in fighting the fires reported in this class.

Their study of water used in putting out fires led the children to study other uses of water in their city. They were puzzled to notice that the water they used seemed clear, although they had read stories about pollution in the river. They wondered how the water could seem clear and at the same time be polluted, and arranged a trip to the city's filtration plant. There they talked with managers and workmen about the way in which the city's water was purified. They gained facts to help them see that *it is important for each person to conserve water*, and began to report ways in which they were using water more carefully.

Safe Drinking Water

One of the most important resources in Mississippi, as in so many States, is a dependable and safe source of water for drinking. Some schools are helping children to learn the importance of safe water. Children learn not to waste water.

In one rural school visited for this study, for example, the water project takes on meaning for the entire community. The county office has a sanitation officer who tests drinking water for families who request it, and helps them arrange to purify their supply and to keep it safe to drink. Such service is usually important for families who live in the country and take their household water from wells or other local sources. Children on farms in this community study different ways of storing water and in other ways making convenient use of it for farm livestock.

Seaport on the Savannah

Through the leadership and interest of the president of a tugboat company the children of Savannah, Ga., participate in a Port Education Project. This man has served many years on the city's board of education and was formerly a Savannah River Pilot. The Captain's office and home are on the waterfront to which he has dedicated so much of his life. He first got the idea for the Port Education Project when in Portland, Oreg., where he found the children were studying the port.

Each year during April and May, more than 10,000 pupils, parents, and teachers participate in the Port Education Project when shipping, harbor facilities, and industrial plants are observed and studied from a passenger ship provided for this purpose. The Captain receives many letters and drawings of harbor activities from pupils and teachers, which lead him to believe that the project has considerable worth in helping children and adults understand the value and the problems of their harbor.

The Savannah River provides the city with a direct outlet to the sea for its products which include cotton, lumber, refined sugar, tobacco, boxes, crates, railroad ties, paper bags, and bricks. Imports are from the world's shipping points. They include live animals, tea, spices, and hides from India and Ceylon, leather goods from Australia, machinery from the United Kingdom and Germany, glass products from Belgium, France, and Italy, sugar and fruits from Hawaii, Cuba, Puerto Rico and the Philippines, and woodpulp, paper, and petroleum products from foreign and American ports.

Problems of maintaining the river as a harbor involve keeping the river at a relatively uniform depth, reducing the intrusion of salt, decreasing loss by floods, improving a year-around channel, decreasing sedimentation, and otherwise developing the harbor's navigation facilities. As present or future citizens, it is considered important for the teachers, parents, and pupils to understand the problems of maintaining and developing the harbor and its relation to their lives.

While the Port Education Project is now carried out mainly in grades 5, 8, and 11, the Captain foresees some study of the port in all grades eventually. A committee has been working on what pupils might do at any grade level.

The Port Education Committee meets two or three times a year to further the project. It is made up of teachers and lay resource people. It has sub-committees for such aspects of the project as visual aids,

history, science, industry, and occupation possibilities. Part of the work is carried out through harbor trips when the committee members have the opportunity to concentrate on what the problems and possibilities of this great harbor resource are.

Portland's Seaport on the River

Elementary school children of Portland make a comprehensive study of their seaport on the Willamette River at various grade levels. They learn about the many contributions of their river to the life of the city. They find out about the goods exported and how the ships reach Portland from the sea.

Harbor safety is studied as the children learn about the work of pilot boats, dredges, harbor patrols, fireboats, and Coast Guard boats. Insight is gained into such problems as water pollution, drifting logs, snags, fires on ships, the danger of rats coming ashore, and keeping the channel clear of ships.

Several unit texts about the port have been prepared and published by the school system for children of the various elementary grades. Field trips and speakers are other effective means used for gaining information and an understanding of the port.

Use and Study of Water in North Kansas City

North Kansas City is an industrial-rural center. One of the biggest conservation problems in the vicinity is the conservation of water. Unlike Kansas City, which processes the river water for general use, North Kansas City gets its water mostly from artesian wells.

Children in North Kansas City schools understand the importance of water to the life of the area because of the suburban character of North Kansas City. Practically all of the homes have gardens, which have to be watered. Many of the children themselves have gardens. In fact, the families moved into the region because they wanted more space to raise gardens and keep chickens in order to balance the high cost of living.

At home and in public places the children hear discussions of the inadequacy of the water. They hear remarks of people who are wondering if the water will last for the entire season. Sometimes those who have gardens are asked to conserve the water. They are permitted to water their gardens only at stated times and not allowed to water the lawns.

Some of the schools have plantings. One class, for example, gathered iris bulbs throughout the community and planted them on an eroded bank near the school. Experiences of this kind were helpful to the children in understanding the importance of water to plants they were trying to raise.

The eighth grade in one school complained about a dusty playground. The children invited the county agricultural agent to come to school, take a sample of the playground soil, analyze it, and tell them what they might do to improve the plot. The agent recommended that the children plant bluegrass and rye, with a few shrubs to help hold the soil.

The children studied the situation and discussed the cost with the agent. They decided that the agent's plan would cost too much for them to manage alone, and so they began trying to find help. They gathered the figures on the project and wrote a letter to the superintendent and the school board asking for financial help. They planned a conservation play and invited parents, teachers, and other citizens to see it. As a result, enough money was raised to buy bluegrass and rye seed and to purchase the shrubs which the agent had recommended and to pay for water when it could be spared.

Other groups in the school then became interested in conservation. *As a result, the entire school began a project in conserving water which continues from year to year.* The pupils kept the community informed and asked for help when needed. In an evening program children who had been working on the playground told what had been done around the school. A seventh-grade group showed a series of maps, explaining what they had learned about water conservation in the entire United States.

As a result of initial plans to make their playground look more attractive with shrubs and flowers, many of the pupils became interested in wild flowers. They realized that their school playground was not a place for most wild flowers. They planned excursions to parks and tried to find opportunities to study wild flowers in their natural habitat.

Conservation activities such as those described were incorporated in the regular social-studies plans for the schools of the area. Some of the themes or centers of interest in the social-studies program were: "Community Helpers" for Grade 1; "Clay County and Missouri," for Grade 4; "United States Through the Westward Explorers," for Grade 5; and "American Neighbors" for Grade 6. In all these areas were opportunities for study and location of the local community's natural

resources, and for learning about the problems of conservation related to them.

Growing Plants in Water

Pupils of one Portland elementary school gave a demonstration of hydroponics on TV. They showed how plants can be raised without soil in water with the help of chemicals. They explained how the method is useful in raising plants where they would not otherwise grow or how plants may be grown out-of-season. These pupils had secured resource materials for their demonstration through borrowing a hydroponics kit from the Instructional Materials Department of the Portland Public Schools.

Water Everywhere?

In the schools visited, children were beginning to realize that although water seems to be everywhere and although the supply is replaceable, people do need to do something about its distribution. Water shortage threatens many cities and even smaller cities and towns that are removed from a dependable source of supply. Children with gardens are sometimes limited in the amount of water they may spray on lawn or plants during a dry season. Pupils living in the country often mention experiences with farm ponds and irrigation. They are learning the importance of safe drinking water for home and school. *As a result of meaningful study and active experiences in more and more schools, it is hoped that the students will grow into adulthood able to participate effectively in the cooperative activity necessary to maintain the ways of living we all value.*

Watershed Development

The watershed, the land drained by a stream and its branches, is receiving increasing attention as a unit basis for conservation planning and development. Group action and teamwork, which call for a type of planning for solution of the complex problems of soil and water management that the individual owner can seldom accomplish alone, are important to secure the best use of land and water in a watershed area. Erosion, flood control, and silting are some of the problems encountered.

U. S. Soil Conservation Service

Fishing on a watershed tour.

Leonard Creek Community Watershed

Leonard Creek Watershed in Davidson County, N. C., is an experimental pilot watershed which is being developed as a guide for conservation planning on a watershed basis in other places. The seven square miles of the watershed are drained by Leonard Creek and its tributaries. There are about 176 farms in the watershed.

The principal problems of the watershed are water erosion, sedimentation in a reservoir downstream, unprotected roadbanks, and insufficient water supply on some of the farms. After an intensive survey of the area by the United States Soil Conservation Service and other technicians, recommendations in planning for improvement evolved, including: Land conversions, stabilization of gullies, improvement of pastures and woodlands, farm ponds, wildlife plantings, supplemental irrigation, and others. To facilitate the development of the watershed plan through a watershed association, it is necesasry to call upon such groups as farm organizations, garden clubs, churches, and public schools in the educational, operational, and evaluation phases of the plan.

The sixth-graders of Wallburg School, near the watershed, developed conservation units which were closely related to the study of the watershed. In addition to classroom study and work, they went on field trips to the watershed with their teacher and conservationists. They observed a forest, crop rotation, a fish pond, and a pasture. They saw multiflora roses planted to protect wildlife. Some children collected soil types which they put in jars and labeled for further study and experimentation. Then they all had a picnic and some went fishing.

Since most of these children lived on farms, many of them were able to put their conservation knowledge into practice. Many of them reported planting grasses on farms and other places. Most of the children work in their gardens. One pupil ordered 10 pounds of seeds from the Four-H Club which he planted for places where birds and other animals can hide and make homes. One secured small pine seedlings from the Four-H Club and planted them in a field which wouldn't be plowed. Several fed birds in cold weather, taking care to continue the feeding once the birds came to depend on it. All of the children had an interest and considerable understanding of the conservation problems or projects in the watershed near their school or where they lived.

The Watershed as a Unit of Study

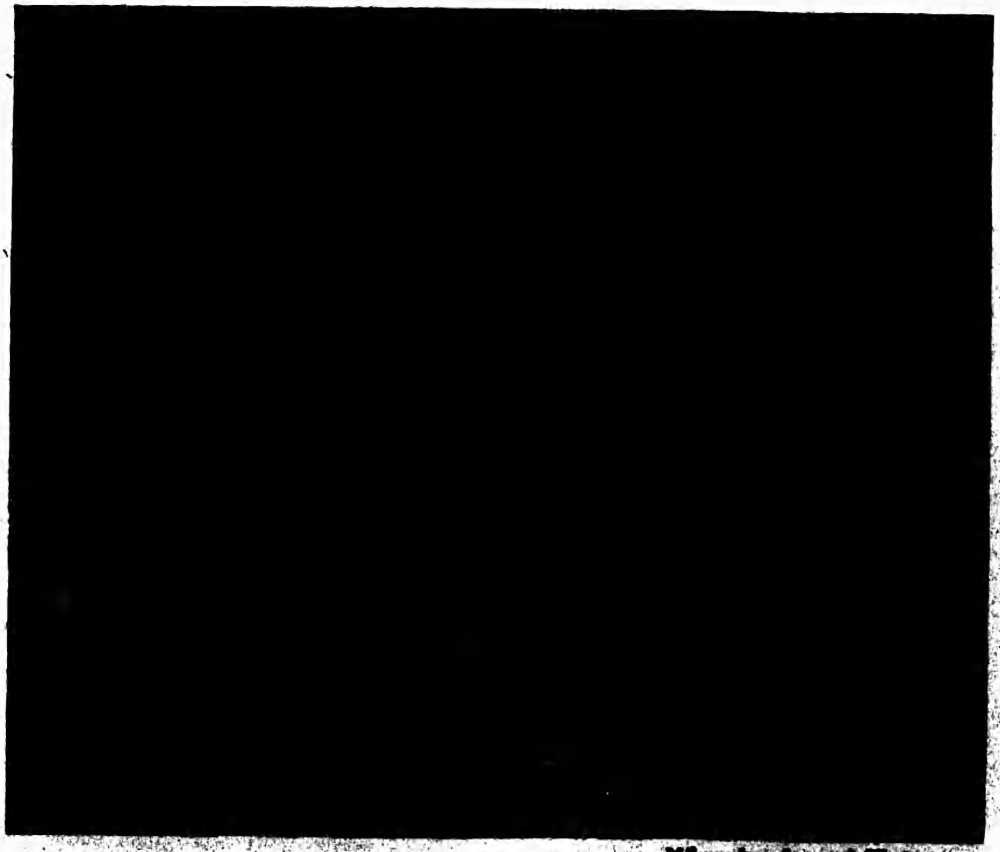
Several teachers in Traverse City, Mich., discussed ways of helping their pupils to see conservation as a need, not of one man's farm or of a single small stream or lake, but as a need of an entire watershed. Riding about in the vicinity of Traverse City, the teachers noticed a farming valley that was open to view from one of the hillsides sloping toward the stream. In the valley was a main stream with a dam that gathered the water from a space across two hills. Crops along the sides of the valley included clover, pastures, and hay. Only on the level ground near the top of the ridge was there open cultivated corn. The rest of the valley was protected by grass and pasture.

The teachers decided to bring their classes to the watershed and to invite agricultural resource persons in conservation and agriculture to join a panel discussion group at the valley where the river and fields would be used as a demonstration. The children rode from Traverse City in school buses to the highest hillside. There they stopped and stood in a large group where they had the best view of the valley.

Near them were the resource people from such agencies as the United States Soil Conservation Service, and the State Department of Conservation with its Divisions of Fish and Fisheries, Forestry, and Lands. These panel members and a few of the more vocal pupils discussed the erosion problems of the valley and pointed out patches of scanty crops that were evidences that soil had been washed from slopes. They noted the lay of the land, the curving corn rows that held the soil on certain hillsides, and the water that was caught by the dam and held back to prevent erosion in the lower river valley.

At the close of the meeting the entire group made observations, asked questions, and stated in tentative form some of the conservation problems to which the classes might wish to give further study in school library and classrooms.

Microphones were used and carried speakers' voices to the 250 children. All were interested in the lesson because it was novel, concrete, and objective. The teachers hoped that it would form the background for more intensive types of conservation study and experimentation throughout the school term.



Milwaukee Journal Photo

Charles gets a view of the watershed.

Teachers Have a Lesson From the Air

Conservationists consider it important in soil and water conservation to treat the watershed as a unit. In Nebraska conservationists serving as resource specialists are making the same approach. One of the State University professors uses the airplane in helping teachers get a background for teaching children about soil conservation.

In preparation for an airplane trip, teachers engage in a number of activities. They study pictures and slides of the watersheds to be seen. Soil conservation technicians point out the conservation measures that will be seen from the plane, including ponds, grassed cover for birds and wildlife, waterways, grass and pasture land on rolling terrain, and farm woodlands. They discuss the relations of children's participation in planning ponds, planting grass and shrubs as cover, and attracting wildlife in the valley as a whole, and observe how all are integrated.

If convenient, the teachers arrange for a bus trip to get a ground view of some of the conservation projects that will later be seen from the plane. Sometimes a technician is asked to speak to the group. He usually brings with him agricultural aerial photographs showing the terrain that will be seen from the plane and explains the value of the measures taken to conserve the soil.

Teachers who are prepared in this way through study of a real watershed can go to the boys and girls in their schools with more information and confidence. Some of these teachers are themselves doing pioneer work, taking conservation trips by plane with the sixth-graders, and reporting interesting responses from the children, and important activities that boys and girls have carried on, such as planting shrubs and seed-bearing plants in fence rows, helping their fathers with farm ponds, and sowing grass seed. Others who cannot arrange for trips by plane with their students, nevertheless, have an understanding of the importance of the watershed in conservation and can point out objectively the relation of the cover plants that children set out to the soil problems and the conservation progress of the valley. They can speak with confidence of the importance of plowing a hill on the contour instead of up and down.

A "lesson from the air" is one that integrates itself with major conservation problems of any State. Among the problems of Nebraska to be viewed thus are conservation of the soil, conservation of water, conservation of the Nebraska landscape, conservation of woodlands, and conservation of game, fish, and other wildlife.

A Valley's History of Conservation

Children's interest in conservation is an accepted part of the way of living in St. John's-Gildehouse Parish, Villa Ridge, Mo. The children's parents and other farm owners and operators in the valley are conservationists. It is natural to expect that some of the school work would be related to home activities of so great importance.

The development of the valley community into a conservation-conscious group has a history of more than 20 years. In the 1930's the parish priest helped the people set up a soil erosion control project in the county. With his guidance a county agent was invited to advise in the work. From then until now the farmers have been changing their emphasis in farming from the growing of wheat and corn to the building of pastures and the production of beef, pork, and milk. The new ways of farming are observed and talked about in school. *In school and at home children learn that the change from open cultivated crops, such as corn, to grass and pasture land has made the valley with its rolling hills one of the fine dairy areas in the State.*

In 1955, the priest in Villa Ridge at St. John's-Gildehouse celebrated his golden jubilee as a clergyman, receiving congratulations from all over the Nation and calls from hundreds of visitors. The beautiful valley was a testimonial to his leadership in bettering the physical as well as the spiritual ways of life in the community. Ways of living that are important to the young people of the valley today have come about because soil and water conservation have taken the place of old destructive ways of farming. It is hoped that *when the boys and girls have become adults, they will meet, as their fathers did, the conservation demands of the future, whatever they may be.*

In the seventh grade last spring the children's interest in conservation began with the farm practices of their parents. Because conservation is a community problem centering around a watershed project, and not necessarily an individual project of any separate family, the children learn to look at the effect of their own activities on the farms of their neighbors. The children in this group made a study of the location and development of ponds on their parents' farms. These ponds had been placed in such a way that the runoff of rainfall throughout the valley was held back and caused to go slowly down the channels of creeks and larger streams.

At a group meeting the children reported to a visitor the results of their work. They said proudly that there are no deep ditches in the low parts of the valley. Some of the children said that they had

helped to plant grass about the ponds and to set out shrubs in the lowest parts of the watershed. Several children said they have home gardens. Some work with their brothers and sisters in the family gardens. Others help their fathers stock their ponds with fish in accordance with accepted practice. Later they will have the fun of fishing and eating fresh fried fish for breakfast or dinner. The children have made studies of the value of pasture land and the alternation of pasture and crop land in farms that have rolling hills, such as those at Villa Ridge. In the parish school the Missouri Nature Knights Club has a large membership.

Trips to Farm Ponds

Children of Davidson County, N. C., go on 1-day field trips with their teachers and United States Soil Conservation Service technicians to see farm ponds and other aspects of conservation. Usually they have a picnic and go fishing at noon.

The United States Soil Conservation Service has been helping farmers in this county build about 60 ponds a year. These ponds keep the water from flooding areas below, supply water for irrigation during periods of drouth, provide a source of fish for recreation and food, and give opportunity for swimming. Where the pond is used for irrigation, the water is carried to the fields by aluminum pipes or transported in barrels. In case of fire, a pump can be dropped at the pond to secure water. This practice is used especially in those small or rural communities which are organizing fire departments.

Farm ponds constructed by the United States Soil Conservation Service in Davidson County are stocked with fish from either State or Federal hatcheries. An outstanding feature of the ponds is that they are mosquito free. They are constructed with edges at least 2 feet deep. This prevents the growth of weeds in the water and allows the fish to move around freely and eat any mosquito larvae that are present.

Children of Newberry County, S. C., have an opportunity to visit farm ponds. They learn how the ponds are constructed and used. They develop interesting ideas to discuss with their parents who may be building ponds. In this county, interest in farm ponds is high. When developing plans for a farm pond, the United States Soil Conservation Service technician uses aerial photographs, classifies the soil, studies the present land use including wildlife, and makes a conservation plan for the whole farm as well as the pond. Then the Soil

Conservation Service technician helps the farmer with the development of the plan. Children report in school as the work proceeds on their own or their neighbors' farms.

Opportunities in Many Places

Opportunities for children to relate their school projects to watersheds in their community exist in many localities. Country schools arrange for classes to take excursions to study watershed improvement. City schools are less likely to be able to arrange for such trips. Children in city schools become familiar with their watershed through study of maps. Through books and interviews with specialists and through excursions whenever practicable boys and girls are having opportunities to regard conservation of the watershed in which they live as a cooperative enterprise of the community as a whole.

Minerals

Intermediate grade children learn about the great mineral resources of their country, and in some schools, of the world. They learn that some minerals are renewable and some are lost to man after being used. They find out which minerals are used for fuel and for materials in industry.

Minerals We Use

Children observe the use of minerals in everyday living. For discussion in class, they make lists of equipment and utensils seen about the house and in the community. They observe the uses of minerals in transportation and in industries. They collect specimens of coal, iron ore, salt, and clay and identify and label them. They observe the use of oil and gas in cooking and in transportation. They observe the care that people take to preserve the iron used in machinery. They have a part in care of the articles they use themselves.

Boys Strike It Rich

Two boys who liked to study rocks and minerals actually *struck it rich* in California. Both boys were collectors of rocks and minerals. They had been on field trips with their teacher and classmates.

Yellow Springs, Ohio

Sixth-grade pupils and State Forester study minerals.

One day the boys went on a hike to look for minerals and rocks. West of Redwood City they found some ore that contained cinnabar, a red mineral which is the main source of mercury. The owners of the land where the boys discovered the cinnabar are giving the boys a percentage of money gained from mining the ore.

The two boys were interviewed on the San Mateo school science broadcasts. They told how they discovered the cinnabar ore. They described how the ore is sent about 150 miles to be processed. First the ore is crushed and then put into a furnace to be heated. The mercury comes to the top from the rock in the form of a vapor. Then it is condensed and is changed into liquid. In this fluid state it is called "quicksilver", which is often used in thermometers.

When the interviewer asked the boys what they would do with their money, one said that he would save most of it for a car and for going to college. The other said that he would save for college and a car, since he wants to be a geologist. Both boys plan to continue collecting rocks and minerals.

Getting Firsthand Information about Minerals

West Virginia is a State with many minerals. It has proved to be a resoureeful place for chemists to carry on experimentation. The State, for example, has salt mines. Many chemical companies have their headquarters in West Virginia. West Virginia has a great deal of natural gas and high grade petroleum.

West Virginia's oldest and best-known resource is coal. To some people, West Virginia's supply of coal and its chemical by-products seems almost unlimited. Production and use of coal has been mechanized so that labor costs are kept at a minimum. West Virginia lies in a strategic position with respect to markets, with large manufacturing cities on all sides. It is little wonder that when a discussion of natural resources arises in school, the children have questions to ask about West Virginia's coal.

In mining communities the parents of the children are miners, superintendents, foremen, and sometimes owners of the mines. There are opportunities for boys and girls to formulate problems and, by interviewing parents and neighbors who do different kinds of work in the mines, to gather firsthand information. The children report the results of their interviews to other members of the class. School newspapers usually carry items of interest about the mines. Resource people such as the employees just mentioned are invited to talk to the class. Some of them bring pictures to show the children.

One principal got permission to have a group of the boys of the class taken through the mines while they were in operation. On the children's return to school, the boys went from room to room reporting to the girls and others who did not go to the mines about some of the things that they had seen and learned. All pupils were interested. The activity increased the children's appreciation of mining as an industry. It led some of them to think of the work as a possible vocation for themselves. In helping the children summarize and review what they had learned, the teacher gave particular attention to the health, safety, and happiness of the people working in the mines and living in the mining communities. Emphasis was placed on the usefulness of coal to West Virginia's standard of living.

4. Trees, Forests, and Nature Areas

FORESTS CONTRIBUTE GREATLY to the comfort and progress of modern ways of living. They have helped to make possible the Nation's development since the early days of settlement.

Many schools are providing for students the experiences that enable them to understand the extent of our forests today in relation to the Nation's present and future needs. Teachers and children study first-hand problems that must be solved in making wise use of the Nation's forests, and try to see and accept responsibility for maintenance and future usefulness of our forests.

One of the most widespread conservation experiences leading to children's understanding and appreciation of our Nation's forests is planting and caring for trees. Children of both rural and urban schools are participating in projects to help keep our supply of trees and forests from diminishing. Tree planting becomes a part of school-forest experiences when schools have access to forest land or to cut-over land that can be planted to trees.

Tree Planting

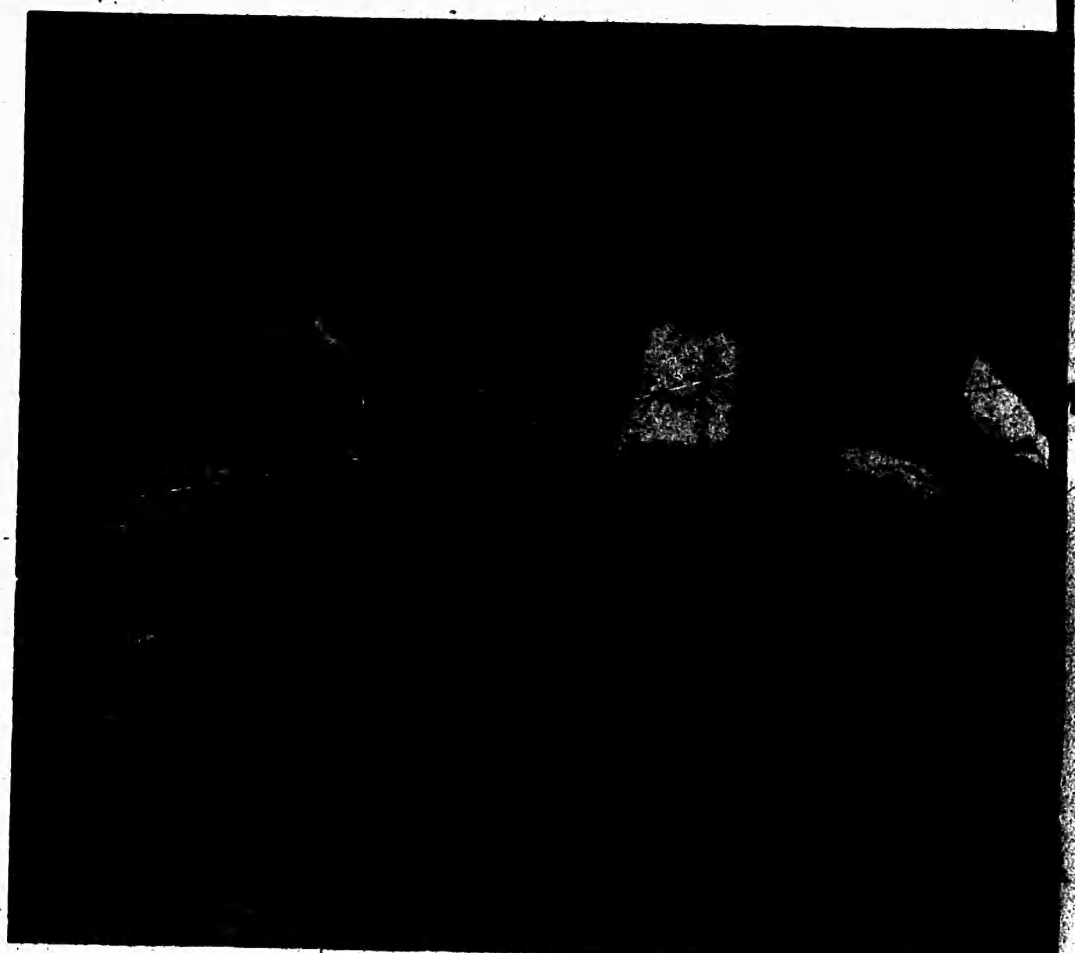
Children's experiences with trees include raising seedlings, planting trees, and keeping trees in healthy condition. Some schools are encouraging boys and girls to plant trees in their yards at home. Books, bulletins, and pictures on tree planting are provided to help them.

Planting Trees in the School Yard

A fourth grade in the Pearl Consolidated School, Rankin County, Miss., is planning to set out trees. The large grounds around the school building have much unused space. Teacher and children have been collecting interesting pamphlets and other material from the State Department of Forestry to help them learn which trees will grow best in their part of Mississippi and will be most practical for a school yard. When the children are ready to set out the trees, a State forester will be invited to talk to the children and help them.

Planting Shrubs on the School Terrace

The Powell Valley Elementary School in Claiborne County, Tenn., has the problem of growing trees and shrubs on the grounds around



Portland, Oreg.

Pupils replant forest areas at Tillamook Burn.

the new schoolhouse. A terrace forms part of the background of the play space. At present this freshly graded terrace has such a soft surface that rains wash soil across the playground. The teacher and pupils discussed the condition of the eroding bank and read bulletins on ways of checking erosion. In order to hold the soil in place until shrubs can be planted, the children have spread a layer of leaves over the surface and covered it with chicken wire.

Meanwhile, boys and girls are making a study of the environment about the school. The fourth-graders and their teacher are studying the effect of different kinds of soil and amounts of water on various plants just set out on the terrace. In one place on the terrace is a section of hedge with different types of smaller plants growing near the edge. Children are checking to see the amount of erosion in the hedge-covered spot and also to learn what kinds of birds, if any, may come to the hedge to nest.

Some of the other classes are discussing the idea of bringing native trees from a forest near the school rather than using the trees from a nursery. If the trees can be chosen according to types and quality of soil, they will make an interesting native woods for the school's nature laboratory. The children's present problem is to discover by experimenting what native trees will thrive on the school ground soil.

Collecting Tree Seeds for a State

On two occasions Minneapolis children have been active in collecting tree seeds for State conservation projects. The State Division of Forestry was planting tree seeds on burned-over areas in the State by airplane. Large quantities of tree seeds were needed. When pupils were informed of the time seeds are most available, large quantities were collected at leisure and brought to the schools where officials picked them up. This enterprise was preceded by class study of which seeds are most desirable for reforestation, the need for fertile seeds, and growing conditions needed by different species of trees. Hundreds of bushels of oak, elm, basswood, evergreen, and ash seeds were collected and turned over to the forestry department.

Tillamook Burn Replanting Project

Pupils of the Portland, Oreg., schools are making a significant contribution to the restoration of forest resources of their State. In 1933,

a tremendous forest fire blazed through Oregon forests, destroying about 240,000 acres of the State's finest timber, some of which was over four centuries old. Subsequent fires in 1939 and 1945 have brought the total acreage of this burned-over area, called Tillamook Burn, to about 355,000 acres.

The Tillamook Burn Replanting Project is carried out cooperatively by the State Department of Forestry, the local community, and the Portland Public Schools. It represents an excellent example of how children of a large city school system participate in a conservation project.

The State Department of Forestry owns the Tillamook Burn area, which is about 50 miles from Portland, and has assigned a 40-acre plot to each high school of the city. Pupils from the seventh grade through high school participate in the project.

When pupils go out to plant trees on one of the assigned tracts, the State Department of Forestry furnishes the trees, tools, and a trained forester to give supervision for each 80 students. Teachers always accompany their pupils. Transportation is provided by interested persons and organizations in the community.

High school pupils become expert in the work of planting. They are leaders and help elementary school children learn how to plant trees correctly. Elementary pupils — seventh- and eighth-graders — usually plant in the plots of the high schools which they will probably attend later on. High school pupils accompany them on the trips and show them how to do the planting. These experiences in planting are usually the culmination of a unit on conservation which involves much study and varied activities as well as the planting experiences.

By May 1956, there had been 183 trips to the project. Six thousand eight hundred seventy-seven students had participated and 364,254 trees had been planted. School people said the planting done by the children, with high-school pupil leadership, was as good as professional planting. They were looking forward to the day when each pupil would have planted some trees and when he would travel in rejuvenated forests and say, "I helped plant those trees and I'll see that they are used wisely."

Through this Tillamook Burn Replanting Project, the children of Portland are experiencing conservation in a way that is meaningful to them and of inestimable value to their State. They are learning the worth of trees and how to plant and care for them. They are learning about the hazards of carelessness and fire. They are gaining first-hand acquaintance with many other aspects of their natural environment.

They see elk and deer, salmon in the streams, springfed ponds, and sometimes a beaver dam.

Planting Christmas Trees

In the Northwest corner of the United States, in the Mount Baker School District of Washington, the children have unusual opportunities for conservation experiences. The Mount Baker District lies in the shadow of magnificent Mount Baker. The mountains, valleys, rivers, and streams adjoining this peak have many kinds of trees, wildlife, and fish.

The children of Harmony Elementary School in the Mount Baker District have their own Christmas tree plot. The plan for the project went into action beginning with the first day of school in the fall. The fifth- and sixth-grade boys, with the help of one Dad's spring plowing outfit, prepared the soil for planting. Post holes were dug and a fence put up to keep out stray cattle and wildlife which at the first snow would enjoy a meal of tender Douglas fir seedlings. During the fall, 250 seedlings were planted.

A tree was planted for each child in school with spares to replace trees which do not survive. Each individual tree is tagged with the name of the child who planted it. It will take 6 years to complete the first cycle of the project. The younger children hope to harvest their trees and give them to classrooms in States where Christmas trees are at a premium. Each class that graduates expects the next younger group to take up projects left unfinished and carry them on.

The children will gain a knowledge of the Christmas tree industry, lumber industry, conservation of trees, and some wildlife study, but *the educational value of this project is almost endless. It will provide a bond of interest for each pupil which can be integrated by the teacher into any phase of the curriculum.*

The Library Helps

At the public library in Athens, Ga., all of the children who came to the story hour were given something every week to take home to plant. They were given seeds, plants, and pine trees. Most of these things were furnished by the Garden Club.

The same summer, all of the summer reading clubs of Georgia were emphasizing the same idea. They utilized both the human and

material resources of the Forest Service, reading and discussing booklets and pamphlets and then taking them home to distribute in the community. *Under guidance of Forest Rangers and others from the Forest Service, the clubs visited reforestation areas and fire towers. They planted pine trees and enjoyed demonstrations of tree planting provided through the Forest Service.*

Planting Trees in National Forests

Children of Seattle schools go on field trips to privately owned forests and a National forest nearby where they can see one forest 500 years old, one 800 years old, and see logging practices needed in a Douglas fir area. Block cutting must be used (in which areas are selected for clear cutting) because Douglas fir will not grow in shade. On these trips each child plants a tree on one of the clear cut areas. Usually a forester from a timber company and an associate provide Douglas fir seedlings and planting equipment and give other assistance. *The children see how a balance of nature is attained, where natural deterioration and man tear down our resources on the one hand and nature and man restore them on the other.*

Seattle school people believe that children of urban areas need conservation education as much as those of rural areas. Children are growing up in cities with little contact with our natural resources or the industrial processes through which they are made into products. Since we are becoming a Nation of urban dwellers, this lack of contact with reality is a problem of national importance.

Campfire Safety

The third-grade children of the Tamworth Elementary School in New Hampshire studied causes and prevention of forest fires. They had a marshmallow roast during which they experimented with correct ways of building and putting out a campfire.

The children cleared an area of grass and leaves and laid a circle of rocks to prevent spreading of the fire. They were careful not to have the fire too large and to put it out properly. The children also made posters showing a campfire with youngsters around it and wrote paragraphs about building campfires to read to second-graders and to take home.

Protecting Trees from Disease

In the Cedar Hill Elementary School at Oak Ridge, Tenn., children are becoming alert to the first signs of disease in a tree. One of the maple trees in the schoolyard, for example, had a branch with dead leaves. The branch appeared to be dying. Along the branch and down the trunk the bark had cracked open. What should be done for this tree? Children and teachers looked at the tree and read their books and bulletins about trees, but could not decide. They asked a tree surgeon in the community. He came to the school, looked at the tree, and suggested a preparation to prevent the disease in the dead branch from spreading into the rest of the tree and possibly to other trees. One of the outcomes of *"learning conservation by doing" is that children become accustomed to calling upon a trained specialist for help with tasks they cannot do themselves.*

A Round-Table Report

Children who are interested in conservation like to know what their classmates are doing and thinking about the problem. In the Brandon School, Rankin County, Miss., the teacher, children, and a visitor had a round-table discussion about the things they did in tree planting last year and in conservation of other resources related to tree planting.

The children were interested in conserving the wildlife around them and in doing more about preservation and improvement of the soil. When the children had taken some trips with technicians from the United States Soil Conservation Service, they decided that their two projects were closely related. They examined the soil on the school ground and found several places which were bare of grass. The soil was being washed away. The problem seemed to be to get new grass seed started. They were concerned also about the lack of trees and shrubs on the school grounds.

Teachers and pupils held a planning meeting and decided that although the school ground is small, a few trees and shrubs could be planted to hold the soil and attract birds. They made sketches of the school ground and decided where to place the trees. About a fourth of the children also planned to plant trees at home.

The teacher mentioned the way in which she organizes her work on conservation. Instead of dividing the subject into separate studies about the different natural resources, she thinks it more practical *to*

help the children organize their activities around specific problems or activities which may involve several resources. As examples, she mentioned tree planting, and improving the soil on the school ground or in a garden at home.

In discussion the point was made that water, soil, forests, and wildlife are important natural resources in Mississippi. *In the activities undertaken, the school is doing its part towards conservation in the State.* The children placed special emphasis on what they had done in tree planting. They mentioned the forester's help. He had come to the school and planted a pine tree to demonstrate correct ways of tree planting. The demonstration made an impression on the children and they tried to follow the forester's advice in planting trees at home.

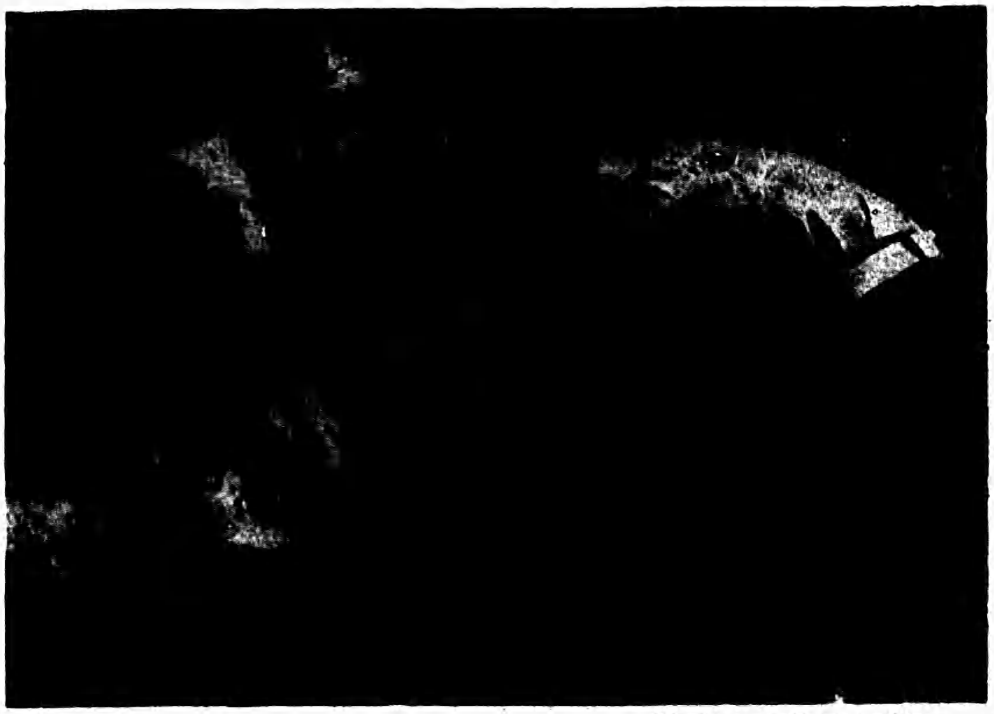
Teacher and children discussed the prospects of those who wished to plant trees at home and tried to help them decide what kind of trees would be best to plant in their particular yards. The teacher had a personal interest in tree planting to share with the children. She and her son had set out 750 small trees on an acreage of their own. When the children discussed the progress or problems in their own tree planting experience with their teacher, they felt that she too, was speaking from experience.

The Learning Values of Tree Planting

Tree planting is a practical curriculum experience. An individual can plant a tree, care for it, and see it grow. A group or a class can plant several trees or shrubs and study and discuss their characteristics, needs, and progress of growth. *Tree planting may spread from school experiences to home projects to community improvements,* such as parks and roadsides. That the values of tree planting as part of the curriculum are continuous and manifold has been illustrated by the reports on the foregoing pages of this bulletin.

School Forests

When a school is fortunate enough to have a forest, tree farm, or woodland, then children can gain on a large scale the experiences that help them to understand and appreciate the values of forests. Many schools in cities and in the open country have enough land to provide forests for recreation and study and in some cases to be a source of income.



Montgomery County, Ohio

Mad River pupils prepare the soil for tree planting.

Early Stages of School Woodland Development

Ohio is trying to get back some of the forests that have been destroyed in the State's development. In this way it will perhaps be able to supply several hundred industries with material from local forests and to develop new sources of lumber supply for building, mine props, barrels, hardwood floors, pulpwood, and industrial plywood. Woods for these purposes include: (1) Beech and elm, useful for timber in construction; (2) oak and maple, used for floors; (3) cherry, for furniture; (4) pine, for crating and boxes; and (5) locust, for mine props and fence posts.

Aware of the State's needs and also of the potential appeal that conservation activities have for school children, a curriculum coordinator of Montgomery County schools enlisted the cooperation of a retired forester in the community. Together they met with classes in several schools of the township. One was Brantwood School which was interested in conservation but had not begun a large enterprise.

The coordinator and forester helped the school form a conservation council, made up of teachers and two representatives from each class. It was organized on the order of an elementary-school student council. Its major purpose was to do something about conservation of trees and

soil in the school community. After a number of meetings, the council proposed a plan for beginning their project with tree planting on school grounds and outlined tasks for different groups.

When the time came for the tree planting, the children who had taken responsibility for jobs, with the forester's help measured off the ground and marked places for holes for the first trees. With older children taking most of the responsibility for the heavier work, holes were dug, trees planted, and dirt filled in around them.

Several hundred children had opportunity to take some part in planting or care of the trees. The result was the beginning of a tree plantation, on which trees are regarded as an important crop to be cared for and used as needed in ways that would not destroy future crops. The children expected to care for the young trees and keep them growing until they were the right size to be cut for commercial purposes. In this instance the pupils wished to grow and sell Christmas trees.

The Dixie School of Mad River Township in the Johnsville-New Lebanon District, Montgomery County, was also interested in a school forest enterprise. Grades 4, 5, and 6 were most nearly ready for the work. Since in this school as in the Brantwood School, the children wished to begin conservation experiences with tree planting, the council invited the forester to help them, but even with his help, beginning a tree-planting enterprise proved difficult for pupils of grades 4, 5, and 6. After a meeting of the council, the children voted to extend the tree-planting project upward through the senior high school and downward through grade three. There was appropriate work for every pupil according to his age, ability, and interest.

In the Highview School of Dayton, Ohio, a committee of teachers and pupils also invited the forester to help them. Being especially eager to get started, they met several times before he arrived. Through the school board they secured half an acre of space, marked it out for 500 trees, which the Department of Natural Resources supplied, and dug the holes. When the trees arrived, the forester was on hand to help the older boys with the planting.

In all three of the tree-planting enterprises just described, *each child had a share in bringing the forest back to Ohio.* Everyone had an opportunity to plant or to help to plant a tree, to see it grow, and to prune it, water it, or in other ways *add to the success of his school's contribution to conservation needs of the State.*

School Forest Farm and Camp

At Merrill, Wis., a school forest committee is responsible for the conservation program, much of which at present is centered around the development of a school forest. The committee consists of the superintendent, three teachers who are especially interested in conservation education, and four children from the junior high school and the sixth grade. When a school forest was discussed by the committee for the first time, two problems were all-important: (1) "Where can we get the land?" and (2) "How can we pay for it?"

Merrill, Wis.

Students built a school camp out of this old CCC shop.

Outside of the city a few miles was a tract of land that had once been forested and then cut away. Small trees, shrubs, grass, and weeds were growing up to take the place of the mature forest that had been cut. The charge for the land was $2,000. The committee believed that over a period of years the school could sell enough Christmas trees and lumber to raise the money. Their problem was to assure the owners of the land that the money would be paid. The superintendent gave his personal note for the purchase.

As soon as the school had possession of the land, groups of children asked permission to use it. The junior high school and the sixth grade, the originators of the project, had their plans for a school forest and a camp. The camp would require additional financing because, although there was a shell of a building on the land, it needed restoration, equipment, and materials would have to be purchased. In discussing the problems of the use and development of the land, the committee tried to take into consideration the needs of all the different school and community groups that might wish to use the forest now and in the immediate future.

A number of problems were set up by different school groups. Among them were these:

> How can we get information we need to help us carry out our plans?
>
> How can we arrange to use our social studies and science periods when these subjects are needed for our projects?
>
> How can we get seedlings to restore our forest?

Projects devloped swiftly, among them the following:

> One group of children found that the forest as it stands yields chiefly young pine and Norway spruce trees. It was suggested that the children ask their parents to help with their project. Plans were made for attractive landscaping to fit appropriately into the setting of the pines and spruces.
>
> The fourth-graders were particularly interested in wild animal life. They used the school forest for a laboratory. Several short trips to the forest gave them opportunity to discover that deer interfered with the production of a salable tree crop because they nibbled the lower branches of terminal buds of young trees. The fourth-graders talked with farmers and forest specialists and found that it would be a good plan to have an animal deer-hunting season whenever the animals threatened the tree crop.
>
> This group of children also went to the forest to study beaver dams and ways the beavers cut down trees and use them for their dams. They learned that beavers sometimes become too numerous and injure tree crops.

The older boys and girls developed their own problems and activities, as illustrated by the following:

> What can we do to make money for payment on the mortgage?

This was a problem that the older boys undertook to solve. They surveyed the lay of the land and the condition of woods and trees and the work that needed to be done. As a result, they decided that a tractor for some of the heavy work would pay for itself in a few years. They were able to borrow a tractor for the most difficult work. During the first two years of the project, they planted 100,000 young trees.

How can we study our forest and our problem of enabling everyone to make effective use of it?

This particular problem was undertaken by children of the upper grades and high school. In some of their class work, they made charts to show their plantings and the profits to be made by selling the products. A mathematics class learned how to survey land and locate it on a map by quarter sections. The pupils also took samples of the soil and sent them for analysis to the State testing laboratory in the State Department of Agriculture at the State capital to learn if something might be done to improve the soil for tree growth.

What can school children do at small cost to improve the camp's equipment?

A high school science class took the problem of building a house for the generator plant that produced electricity for the camp.

The School Forest Committee took the responsibility for arranging a plan to give each class an opportunity to use the forest. A flexible tentative program made it possible for each teacher and her pupils to have experience with each natural resource at the most interesting time. The conservation program gave the classes opportunities to make first-hand use of a number of the school subjects. Teachers and students gained much satisfaction from the fact that, only 2 years after starting the enterprise, they had paid off most of their initial expenses and felt themselves to be fully in control of the financial situation.

School Beautiful—A Forest Project

In Williamstown, Dauphin County, Pa., conservation education started with the help of a new principal who was challenged by the opportunities of the unusually spacious school yard. One of the first things he did was to call a meeting of the teachers to discuss the

general environment and ways of making the schoolhouse, classrooms, and grounds more attractive and useful and convenient for the work of the year.

No decisions were made at this first meeting, but teachers who were especially interested started cleanup campaigns with their own classes. Eager to help, the children put the classrooms in order and then they took a look at the grounds. There they saw brush and woods and a few struggling trees and wild shrubs, and felt that something should be done to make real use of the ground. Since the space belonged to the entire school, there would need to be all-school planning.

Another meeting was called at which principal and teachers concentrated on the school yard. One thing that could be done, it was suggested, would be to clear the entire plot, mark off the part the children used for play, and plant the rest in grass and trees. From the discussion, there emerged for the program a slogan, "School Beautiful."

Someone said there was so much space that profitable use ought to be made of part of it. A committee of teachers and children was appointed to discuss the matter and make recommendations. As a result, the following suggestions were reported to each of the classrooms:

> Keep some of the wild cover that is now there. Add to it appropriate trees and shrubs to provide food and cover for birds.
>
> Arrange for a tree-planting campaign with every child having an opportunity to plant a tree.
>
> As the trees grow, some can be cut and sold, and the money invested in school improvement.
>
> Plan a project for several years instead of months.
>
> Have the committee meet from time to time for further planning.
>
> Have a swiming pool, picnic grove, and refreshment stand.

Not all the work of developing the project was conservation. Other experiences contributed to the project and gave purpose to several school subjects. For example, there were a number of suggestions for raising money. Among the activities to make money were a series of motion picture shows sponsored by a high-school class, an operetta by children of the second, third, and fourth grades, and the sale of refreshments.

Children in the elementary grades had experiences in keeping accounts, paying bills, and in other ways making arithmetic have real meaning. The art teacher helped the boys and girls to plan posters

and other attractive ways of making new activities known to the community. Children wrote and mimeographed invitations to parties, particularly the kind designed to raise money for improving the space about the school. The children took these invitations home in order that in every family there might be at least one invitation to a school party.

High school pupils, for the most part, undertook the job of laying out plots for the plantings and planning for their care and maintenance. First considerations in their planning were study and care of the soil. The students consulted soil conservation specialists — local representatives of the United States Soil Conservation Service of the United States Department of Agriculture, and of the Pennsylvania State Department of Agriculture.

Committees on planning studied the grounds. They recommended that play areas be separated from plantings. Space for an outdoor theater was screened by hedge and shrubs from the area used for active games. The refreshment stand stood near the schoolhouse, yet was separated by appropriate plantings between it and the other areas.

The elementary school, high school, and individuals and groups from the community had a part in the activities. The Rotary Club, for example, furnished trucks and drivers to aid in planting trees. A contractor and a carpenter gave their services free in building stands and in helping classes lay out the plots of ground just mentioned.

When nurseries in the community learned that the school was planning to earn the money to buy young trees for the grounds, they cooperated by making reductions in price in order that the children might have the trees for planting at the lowest possible cost. As the work proceeded, the general supervision of activities was assigned to the Student Council, an organization that had been operating for several years.

Citizens of the community wanted to donate materials. Classroom groups discussed needs for materials that would be suited to the contributions the citizens wanted to make. They arranged for committees to interview those who were willing to make donations. In this way, citizens who wanted to give were guided toward the appropriate school committee of teachers and pupils. A local industry donated materials to build bleachers for games. A store gave the concrete for steps to the bleachers and the boys in the school made them.

Even with the generous donations, the committee discovered that they would need more money and materials to carry out their plans.

Accordingly, with the supervision and guidance of the teachers, they borrowed funds which they paid back bit by bit through the money-making activities that the school organized. Once they hired a man with a bulldozer to get rid of stumps and brush.

One of the most important outcomes of the project was the boys' and girls' growth in citizenship. Because this was their project, planned, organized, and administered by them through their school activities, they became responsible for its achievements. *The children's respect for property, their interest in beautifying their school and community, and their ability to cooperate in conserving trees also were results of the conservation phases of the project.*

Getting Land for Forests

Michigan began its school and community forest movement in 1931 with an act passed by the State Legislature providing for county, township, city, village, or school forests. This act has enabled school districts and communities to acquire over 65,000 acres of State land. Over 600 school forests have been established. Some of the forests are partly wooded. A number of schools have sold timber. But most of the school forest tracts are being developed slowly. In some, planning is done as teachers and children study the land or shrubs and small trees that happen to be there and begin to find uses for them. The Forestry Division of the State Department of Conservation provides a limited number of seedlings free of charge to schools and communities that wish to start forests.

The Traverse Heights Elementary School is an example. It has five acres of woods covered by small trees and wild shrubs and a few wild flowers. In this woods are meeting places for birds. Many classes are interested in birds and frequently take bird walks or go to the woods to study them. A fourth grade once studied ruffed grouse, a bird of the brushy woodlands, known locally as "partridge." They learned to identify the male and female. They studied habitats and collected and mounted characteristic leaves and seeds.

Other classes are looking forward to using the forest for different purposes. Some wish to study kinds of soil there and decide what trees and shrubs may need to be planted. Since much of the land is cut-over woods it should have some replanting in order to provide a cover for birds, small wild animal life, and plants and flowers.

Conservation of Woodlands in Raleigh County

Raleigh County, W. Va., has a variety of conservation activities. Those in which both children and adults are especially interested are developing woodlands, maintaining and increasing pastures and grass, conserving wildlife, and conserving soil and water.

Conservation of woodlands is a growing interest. In Beckley School the principal is encouraging development of a school forest. Teachers and pupils have planned their program in such a way that high school pupils are responsible for making a study of forest conservation and getting seedlings in the forest. Extra seedlings are available to high school and elementary pupils who wish to start trees in their own yards.

When the project was getting under way, about 200 parents and other citizens came to school to a forestry meeting. A number of people from the State Conservation Commission also came to the meeting and demonstrated ways of planting trees, including how deep and wide to dig the holes and how much water to use and how to place soil about the seedlings being set out. Planting was done by hand. The resource people worked on the theory that *people who are planting trees at home have to do the work by hand because tree-planting machinery is too expensive for home planting.*

A School Forest for Meditation

In Cedar Hill Elementary School, Oak Ridge, Tenn., a first-grade teacher is in the habit of taking her young pupils for a stroll and relaxation in the school woods. At the foot of the schoolyard slope is a tiny clump of natural woods covering about half an acre of ground. It is restful under the cool trees to look up into the green branches or out across the sodded slope. Teacher and children just sit there for a while and rest and meditate. The teacher thinks the practice of using short breaks in the school program for meditation has helped to develop in the children a fondness for the little woods. Now and then children are seen walking by themselves or by two's or three's under the trees and studying plants that arouse their curiosity or listening to birds in the branches above them.

Tree Plantations for Strip Mining Areas

The national organization of forest industries, called "American Forest Products Industries, Inc." has, in West Virginia, three major

operations. These are to continue the program called "Keep West Virginia Green," to encourage the development of tree farms, and to carry on the "Green Thumb Program." The organization works with young people's organizations outside of school, such as the Four-H Club, the Future Farmers of America, and the Boy Scouts, and indirectly with the schools, its members serving as resource people upon invitation from teachers and pupils.

Operation Green Thumb is active in planting trees to be used later for Christmas trees. The work is especially appropriate in "strip mining" areas where coal lies just under the surface soil and plants have been torn up by machinery in order that coal might be taken.

Areas that have been strip-mined are ugly and unproductive. Mineral and subsoil underlying the topsoil have been thrown to the surface. Little attractive plant life can exist. Heavy rains leave ugly gullies in the clay surface. Many years are required for nature to replace the shrubs, trees, fruit, and berries.

When the children and young people of the "Green Thumb" groups begin to help nature, the restoration of new life on the area is made more quickly. Certain newly growing trees are cut as needed to provide the best growth of the trees that remain. Children sell the trees that they cut. The money is used either for the expansion of the Green Thumb program or to extend camp opportunities to children in the vicinity.

Making School Forests Pay

The importance of using school forests to produce a small income for the children to spend on interests and activities not otherwise possible has been mentioned in several of the reports in this bulletin. Schools vary in their forest resources, however. Schools in some parts of Arkansas, for example, have from 30 to 40 acres of land, which if well cared for, produce timber that can be sold.

One school in Arkansas had no forest and wanted one. At Thanksgiving time the school arranged to raffle off some turkeys. The money was used to buy land on which to plant trees for market. In other instances, people have leased land to the schools to be planted in forests and *teachers and children are planning far ahead and dreaming of the day when there will be useful and profitable woodlands for other children to use and enjoy.* In Nevada County, Ark., every school has a school forest. In size, the forests vary from one-fourth or one-half an acre to 10 acres.

Arkansas soil and forest conservation agents are resource persons who can help teachers and children learn how to make forests produce, how to market the products, and how to use wisely the money they receive. In consolidated schools, where 4–H Club work is integrated with the school program, the club members cooperate with the Future Farmers of America to harvest and sell pulpwood. From some school forests Christmas trees are cut and sold.

What Forests Can Mean to Schools

A school forest gives pupils broader experiences with conservation than tree planting does. School forests provide variation in activities for children of many ages and abilities. School forests often serve the entire community because groups and individuals can use them evenings and holidays when school is not in session.

Children Conserve Wild Flowers

Once children become interested in wild flowers, they are particularly sensitive to the importance of keeping, not only those wild flowers that need protection because of their scarcity, but also those that reproduce themselves abundantly each year and need to be preserved in their habitats for the pleasure of as many people as possible. Among West Virginia's wild flowers that children are learning to protect, for example, are azaleas, violets, ladyslippers, mountain laurel, rhododendron, trailing arbutus, dogwood, and redbud.

Children who live in the suburbs or in the country study soil and flower habitats. Now and then they transplant wild flowers to gardens or school grounds, with particular attention to the kind of soil and surroundings to which the flowers are accustomed. They study wild flowers in meadow, fencerows, and woods and forest edges.

Another activity or service in which some of the children are engaged is making posters with items of interest about West Virginia wild flowers and putting these in places where many people will see them. The children seldom make posters without any particular purpose or use for them. They seldom use commercial posters because they get more pleasure through designing original posters. One year the schools held a countywide exhibit with posters which the pupils had made and used during the year.

A Program on Wild Flowers

In parts of Kansas relatively few wild flowers are left. Some should never be picked because there are too few to reproduce themselves continuously year after year. If picked, they soon will be gone forever. A very scarce flower in Kansas is the showy "ladyslipper." Ladyslippers reproduce themselves by seed. They should not be picked because flowers picked mean fewer seeds to grow into plants for another year. When children learn these things about the wild flowers, *they begin to ask questions, to admire the wild flowers they see, and to want to do something to save them.*

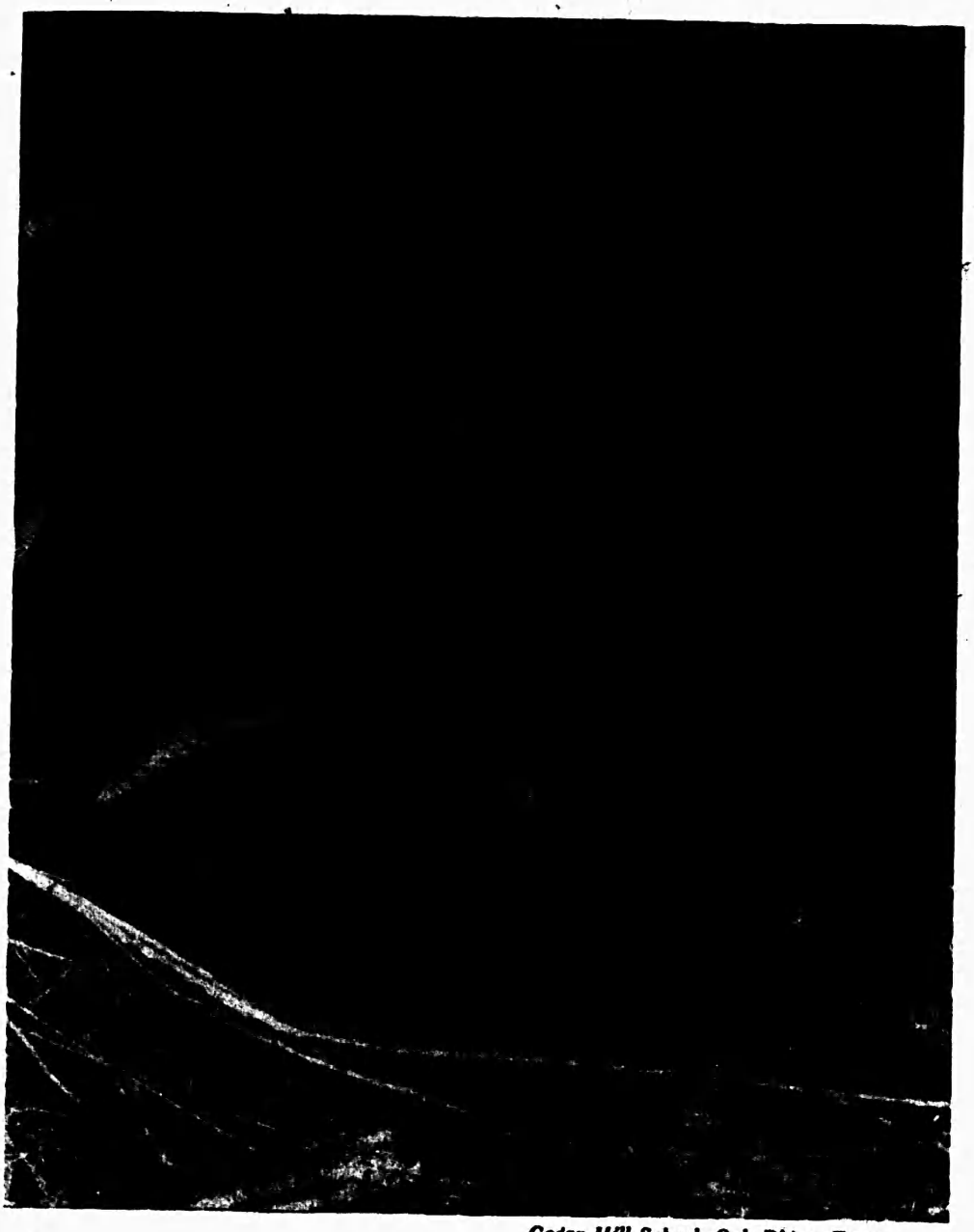
The children in a Topeka fourth grade learned that there are some flowers that can usually maintain themselves in the habitats where they live. Some of the children said that people might be allowed to pick these flowers if they wished. But other children explained that a patch of wild flowers is beautiful. Many people see them and enjoy them. If a few people pick the entire patch, then many people will lose the enjoyment of them for that season, even though in another year the flowers may bloom again. This was a thought that made an impression on the group.

New Hampshire Wild Flowers

Children of New Hampshire enjoy and learn to identify their wild flowers and to care for them so that they will continue to bloom from year to year. It is important for them to learn how to pick arbutus in such a way that the roots are not harmed. The children of Bristol Elementary School learn that ladyslippers and ground pines should not be picked and that many flowers, such as the closed gentian, must be left to go to seed. Children of Rumney School are careful to cut arbutus instead of pulling it up by the roots.

Conserving Wild Flowers in Colorado

A major concern of flower lovers in Colorado is to conserve the wealth of natural plant beauty, some of which is in danger of disappearing. The beautiful State flower, the columbine, is protected by law. School children learn about this lovely white and lavender flower at school. They identify it on mountain trips. They and their elders are urged to admire it and other rare flowers in their natural habitat, without picking them.



Cedar Hill School, Oak Ridge, Tenn.

Ted is going to transplant a fern.

Wild flowers differ according to altitude zones of the State. On the plains are yucca, cactus, sunflowers, milkweed, prickly poppy. On the foothills may be found numerous locos, beardtongues, Indian paintbrush, and gaillardias. Higher up, in the montane altitude from 8,000 to 10,000 feet elevation, are Mariposa lilies, little red elephants, fireweed, native orchids and tansy asters. Just below timberline are various gentians, marsh marigold, snowlilies, larkspurs, and monkshood, as well as such gorgeous flowers as Parry primrose, and dainty twinflowers.

And then above timberline, in Alpine meadows, are the "belly-flop" carpet plants, such as Alpine forget-me-not, fairy primrose, moss campion, and Alpine lilies.

Much needs to be done to conserve this unique treasure of wild flowers in Colorado. A definite feeling toward this need is being developed among children and adults.

Conservation Trails and Nature Areas

Teachers have asked, "What is a nature trail?" There is no one answer. The important idea about nature trails, conservation trails, and nature areas is their function, not the name attached. Areas with trees, woods, a stream or other outdoor objects frequently used by children have sometimes developed into "trails," probably because they are "followed" as trails. Some nature trails are planned from the beginning. *Nature trails and nature areas are used to help children develop curiosity and attitudes of study about nature and natural resources and to increase their understanding and appreciation of nature's balance and interrelationships.*

Sometimes boys and girls find a spot of special interest such as a stream or huge rock or old tree in their woodland. On their hikes to the favored spot, they observe along the way other trees, wildflowers, or boulders that have interest for them. If the teacher or one of the children makes the suggestion, the group may put up markers to guide others along the path. At this stage, teachers are apt to say they "have a nature trail." When the emphasis is on "conservation," "improvement," or "better use of," the teachers report the trail as a "conservation trail." A fence corner with wild shrubs with food and cover for birds and other small wildlife may serve as a nature area for a school that has no near woodland, park, or stream for a wooded trail.

Landover Hills Develops Wooded Nature Areas

Landover Hills School in Prince Georges County, Md., was built in a wooded area. Since the school has large grounds and teachers and patrons believe in practical conservation, there are excellent opportunities for developing outdoor projects. As the children's interest in the area grew, they named it Nature's Wonderland. Several school enterprises are now related to the care and use of the area. All children have a part in helping to plan for the development of the area and to

do some of the work. *Tasks are apportioned to groups and individuals in such a way that each child has an opportunity to work in the woods half an hour each week.*

Nature Trails. — First developments in the area included nature trails. They were laid out and extended as the children and teachers roamed the woods to see what types of improvements were needed. When school began in the new setting, the woods needed clearing. Dead trees, fallen branches, and undergrowth impeded the children's wanderings through the woods and interfered with their explorations. The first job was to cut out some of the underbrush, leaving enough to encourage birds and other wildlife. A State forester was willing to advise, help plan, and direct the task in places that could be cleared without destroying the natural balance of life in the area. He went through the woods with the children and helped them select and mark trees that should be cut.

Men from the neighborhood donated certain kinds of help. For example, they did the work that required the use of axes. For reasons of safety, the children were not allowed to use an ax. They piled up light brush, planted trees, and transplanted shrubs and flowers, but the parents did whatever chopping was needed.

Once the area was sufficiently cleared, the children began work on a short nature trail. They studied plants, soil, and land formations along a stream. They made labels for certain trees, plants, and rocks. They referred questions to which they could find no answers to the forest ranger, who soon became their admired friend. At a low point in the trail, he helped them build and wall a pond. The water collected, forming an attractive pool. In this the children started pond lilies. The trail leading in this direction was called Lily Pads.

As the seasons changed from fall to winter to spring, other nature trails were developed at points of special interest. The children named the trails in keeping with topography or resources. The main trail was called Winding Way. Other trails included Laurel Ridge, Turtle Run, Fern Hollow, Singing Waters, and Echo Drip.

The number of pupils increased, making necessary the addition of a new wing to the schoolhouse. For the new wing, workmen cut away part of the wooded hillside, leaving barren ground exposed to wind and rain. Erosion set in, forming ugly gullies and banks of clay. The school again called on their forest ranger for advice and help.

The Diversion Ditch. — To stop the erosion, a diversion ditch seemed necessary to divert runoff water from the problem area. This

was too big a job for children of elementary school age. Adults were asked for advice and help. The county agent offered his services. The county board of education set aside money to hire certain types of work done. The State Department of Forests and Parks gave the school 600 seedlings.

The children planted the trees. The Department of Forests and Parks gave extra seedlings in case some might die. These plants were heeled in, and the children spoke of them as their nursery. They would be used later, one at a time, to plant in place of trees that died. The children planted lespedeza for cover for the seedlings. To hold the soil while the lespedeza was taking root, the Bowie Race Track donated to the school some straw, which the children scattered on the bank, then held in place like thatch with sisal twine tied to removable stakes.

Landscaping the Lawn. — The children worked with advice and help from their community committee and consultants to landscape the grounds. The board of education gave topsoil for the lawn, gardens, and plantings out in front of the building. A committee from each grade helped with the work. For a winter garden, they bought plants that start blooming in March, such as oxalis, crocus, winter roses, and grape hyacinths. For a spring garden, they planted iris and tulips. For summer they had roses, cannas, gladioli, and zinnias; and for fall, chrysanthemums and asters. Third-graders use the gardens to help keep the cafeteria tables decorated. For winter they make terrariums in low jars for tables and windows.

The children's work was not always successful. As a rule, if one of their ideas would not work, they tried a substitute. For example, some of the children had longed for dogwood, and finally obtained some small dogwood trees and set them out. They died. But trees were still needed where the dogwood died, so they got six small mimosa trees. Two men from the neighborhood helped with the planting. These trees are growing.

Developing the Glen. — The school needed a place for children to play. For this it was decided to use a glen back of the schoolhouse. The school board hired men to prepare the soil. Then the children sowed grass seed and covered it with straw as had been done on the terrace by the diversion ditch. Finally, the glen developed a grass cover.

The board then bought and installed playground equipment, some of which pupils had helped to design. The equipment included a fireman's pole to slide down, a boat, and a tunnel. The glen with its playground equipment lies next to an area that the people hope will

become a picnic area for the community, with fireplaces and tables where families and small groups can bring picnic lunches and use the playground equipment.

Not far from the glen is a shady place for two outdoor classrooms, for study of plants, soil, birds, and insects. The idea of an outdoor classroom was tried when the first nature trail was made. Logs about four feet long are used for seats. The children sit on these while they talk or hold committee meetings.

Nature Areas in New Hampshire

An outdoor laboratory for conservation and nature study has been developed by the pupils and teachers on a wooded plot next to the North Woodstock School, which includes grades 1 to 8. Here birds, fish, insects, forestry, and soil conservation may be studied. Some recreation facilities have also been provided in this beautiful spot in the foothills of the White Mountains. They include fireplaces, tables, and benches.

Four years ago, permission was secured from the owners to use the tract for the project. Since then a continuous conservation program has been going on. Part of the swampy area has been filled. The crowded trees have been thinned out and unwanted brush cut. During the thinning process, care was taken that some trees of each type that grew in the area were left. In some areas the brush was not cleared, so that good cover was left for birds and small game. Also, a few seedlings were planted from varieties of trees found in the locality, but which did not grow on this particular piece of land.

At the upper end of the area, good use was made of a spring and its stream. Three small fish pools were constructed by making dams of "feldstone" and cement across the stream, in such a way that the fish may still move up and down the stream. Here the pupils may observe trout develop through their various stages.

On one side of the area there was an example of the erosion caused by flood waters of the West Branch of the Pemigewassett River. By hand — dozens of pupils at a time — rocks were lifted from the flood bed and piled against the bank. The work is slow and will take more time, but during the last fall and spring, very little soil has been lost, and the pumps in the school boiler room have had little work to do.

The pupils go to a swamp area, where they camouflage themselves with green vines and watch and listen to the numerous songbirds which

abound there. Occasionally they take some very good photographs. It is reported that some of the pupils learned quite a bit about the value of patience through this experience.

Pupils of this school are encouraged to make many woodland trips. Their reports of such trips are valued as much as book reports. In addition to encouraging alert observation and creative writing, these trips provide excellent exercise and the opportunity for such hobbies as photography, mushroom study, birch bark drawing, and fungus etching. In winter the pupils continue the hikes on skiis and snowshoes.

The Slim Baker Area, at Bristol, is a community project which has been developed in honor of a former conservation officer in the area. It has 125 acres of wooded land about five minutes from town. Practically everyone in Bristol contributed to make possible the area's lodge.

The area may be used by anyone in the community. In cooperation with the schools, the director of recreation, in Bristol, takes children and teachers on field and camping trips to become acquainted with trees and with problems of erosion. Good forestry practices have been started. Elementary school children have helped to clean out the picnic area, to cut the trails (learning to follow the contours of the land), and to build the fireplaces. Family camping is encouraged.

In using this area, children and adults are often advised to follow Slim Baker's belief that persons should go alone or in small groups into the woods, depending on their age, and be absolutely quiet for a few minutes so the natural wildlife can be seen and heard. The natural movement of the wildlife comes more or less to a standstill if people move around a great deal in a wooded area.

Nature Areas in the West

In several of the States, schools have developed nature areas, usually in canyons or gullies near their school grounds. They are used for studying conservation and the natural environment, and for opportunities to carry on conservation projects of various kinds.

The Hacienda School at La Habra, Calif., has a wilderness area in a canyon next to the school grounds. It is called the Nature Area. It includes a stream, a gully, Los Coyotes Creek, and avocado and eucalyptus trees.

The first step in developing the Nature Area was to find out from the children what they saw there and what they would like to see there. The Student Council members were taken to it first. They were told

they could take other children. Then they all drew pictures of what they would like to see there, including bridges, fireplace, pool, bird houses, flowers, benches, weeds removed.. These plans were discussed with a steering committee which included teachers. The committee made recommendations. These were shared with the school's landscape architect. In developing the area, the "Dads" helped a great deal with the heavier work. The children carried out such projects as putting up signs where they wished to point out a particular nest or plant to other children.

The children and others, who have had a part in the Nature Area, consider it a place to enjoy and be quiet in. It is not a noisy place. "When we go down to this spot, we feel different," they say. They like to hear, see, smell, and touch the various ingredients of this wonderland out-of-doors retreat.

Behind Elizabeth Hayhurst School in Portland, Oreg., is an old railroad right-of-way. It is in a gully, about 1,000 feet long, where the children can find many kinds of trees, birds, and plants native to the area. Muskrats, raccoons, mice, and many kinds of insects may be found in this natural environment.

Some years ago someone built a duckpond in the gully. It has since fallen into disuse. Now it is grown over with water lilies, bulrushes, and other kinds of marsh life. Since the water is somewhat stagnant, a film of green slime teeming with life has formed on the top of the water. The pond contains eggs of frogs and salamanders and other forms of water life. The children are interested to examine the slime and water under the microscope.

A nature trail has developed naturally in the gully, through use by the children. Every class at some time during the school year finds it interesting and enlightening to take several trips to the gully. The teachers believe that a more perfect place to see trees, shrubs, ants, raccoons, insects, and water life in a natural surrounding could not be found.

Committee work is used a great deal by some of the classes in the school for their study of conservation and natural resources. The nature area provides an excellent resource for their explorations and experiments. They learn that everything from the smallest living thing to the largest living thing in a natural area is of importance in the study of nature and conservation, in that all life is interdependent.

In this area, the children can watch the birds building their nests and raising their young, they can observe the habits of snakes, and

they can watch the development of the frog and salamander from the laying of eggs to the maturing of the adult.

During each season, the area presents a completely different but interesting phase of life for study and experimentation. In fall, for instance, the children may observe the changing color of the foliage, the falling leaves; they may note the disappearance of many flying insects, the snakes going into hibernation for the winter, the departure of many summer birds, the beginning of the winter rains.

The Highline School District, in Washington, is attempting to retain on each new elementary site a wooded area for conservation education as it is developed. Thus in addition to the weeklong, outdoor classroom experience at a campsite in the mountains, youngsters may participate in preliminary activities right on the school site.

One 10-acre tract consisting of rugged wooded terrain is being developed by the schools in conjunction with a local service club for a variety of outdoor activities including conservation. Thus, continuing experiences in a natural environment closely related to classroom activities are possible.

On the Franklin McNutt Nature Trail

All fourth-graders in Greensboro, N. C., have worked on the Franklin McNutt Nature Trail. The land for the trail was given by a dean of a local college. An audio-visual aids director started the trail. The nature trail work done by the fourth-graders is part of a 6-year program of conservation education carried out in some of the elementary schools of Greensboro.

Illustrative of trail work is a trip taken on a trail by one class of fourth-graders. They were accompanied by the audio-visual director, who conducted the trip, a college professor, their teacher, some parents, and some visitors.

The trip began at the first-aid station near the beginning of the trail. First the audio-visual director talked to the children. As they walked along, he showed them poison ivy and warned them about it. They saw a phoebe's nest and heard a quail. The children sat on logs and looked back up the hill at an example of erosion on a slope. Then they counted the rings in the ends of the logs to find out the age of trees.

As the group walked down another slope, the director pointed out examples of erosion. In a field they saw red clover which adds nitrogen

to the soil. The children went to see a sky pond, which is fed from the rain only, no springs or streams. They saw bugs, frogs, and frog eggs. They walked along fields where they saw contour plowing, strip farming, terracing, and a grassed waterway. Then they walked by an oxbow lake and along Buffalo Creek.

When they returned to the first-aid station, everyone was ready for the picnic lunch. Some of the mothers had it ready for them when they returned from the hike. The Director gave them a flannel-board talk about conservation. This was followed by a demonstration of water erosion of soil with two tables of soil — one with grass on the soil; one without. The various aspects of conservation and study of the natural environment experiences on the nature trail were followed up by continuing study and experience at school and other places in the area.

Nature Trails as Conservation Trails in Wisconsin

Many of the nature trails which teachers and children in Wisconsin develop in the edges of forests and farm woodlands are planned as laboratories for the study of conservation. Activities in developing the trails are carried on with a view to what the children can learn about conservation through them.

Where fallen leaves and forest litter on a trail are thick and vine-covered, children sometimes number the spot, and in a guidebook, which they made for using the trail, they write a statement directing the user to notice how the soil is protected from erosion. A beaver dam is numbered and in the handbook the corresponding statement directs users to observe the size and kind of trees that beavers have cut down for their dams and to see that the dam prevents the stream from flowing swiftly and eroding its channel. The conservationist must decide whether the trees or the dam are more valuable in that particular spot. A number on a stick erected beside a ladyslipper may, in the guidebook, be followed by a statement to the effect that this flower is rare and should not be picked.

Central School Builds a Nature Trail

A school in Fulton County, Ga., developed a nature trail through woods near the school building. This trail was constructed by children and teachers. They marked each kind of tree with its name, using

small pieces of wood on which they burned the letters. They checked the names for accuracy with the Georgia Forestry Commission and the county agent.

The children transplanted ferns and native blooming plants, such as violets, trillium, and honeysuckle, to the area. Down in the woods a circular place was cleared. The fathers built benches for it. The pupils went there for story hour, devotions, or bird watching.

Conservation Trails as Laboratories

Many schools use conservation trails as laboratories for study. Plants, streams, soils, rocks, and other objects on the trail are selected for the purpose of helping the children get a broader concept of the interdependence of natural resources and of the interrelationship of all life in a given area. Objects that do not contribute to a particular purpose are at the time ignored. Objects are identified and studied if the children have questions about them or think them sufficiently interesting or beautiful to call to the attention of the people who use the trail.

5. Protecting Wildlife

A NATION making rapid changes from an agricultural to an industrial economy as the United States has done, inevitably sacrifices some of its birds, fish, mammals, and other wildlife, as well as part of its other valuable natural resources. Wildlife resources began to disappear in the United States in early days as a result of man's exploitation, largely for food and fur.

Conservation organizations became aware of the loss and began to work for the preservation of the birds, fish, mammals, and other wildlife that remain. No group has been more enthusiastically dedicated to this task than the children in some of the Nation's schools. Teachers in many schools are helping the children plan and do practical projects to improve their community's use and appreciation of the wildlife. Small areas of the woodlot, shelterbelts of trees, and sections of native grassland are practical places to demonstrate land-management practices for the benefit of wildlife.

Learning About Birds

Nearly every school with a conservation program plans some activity concerned with birds. In large cities, studies of birds are limited mostly to parks, books, pictures, and museums. Children of the suburbs usually have good opportunities to become acquainted with a few birds, such as the cardinal, red-winged blackbird, robin, bluejay, wren, and flicker. Boys and girls in the country have opportunities to grow trees, shrubs, and food plants to provide food and cover. In many places the protection of harmless weed patches will give songbirds their required food and cover. Only drinking water might need to be added to develop a real haven.

Attracting Birds

Children almost everywhere can build birdhouses and birdbaths to attract birds in the spring and summer, and feeders for the wintering birds. The United States Fish and Wildlife Service (page 186) publishes pamphlets on attracting birds which give specifications for birdhouses and tell about the kinds of places to expect to see certain birds. Almost every State Fish and Game Department also issues attractive booklets about songbirds.

Members of bird clubs and other children who like to study birds find their activities made easier and more interesting by providing food, because the birds come where the food is and thus can be more readily observed.

Boys and girls also plant many cultivated flowers, such as marigolds, cosmos, sunflowers, and poppies, because their seeds are food for birds. Other cultivated plants that provide good food and cover for birds might include native trees and shrubs, such as fire-thorn, or wild apple.

Bird Clubs and Walks

In schools and in small neighborhood groups, children often organize bird clubs, such as Audubon Junior Clubs, or they form bird study groups through their Four-H Clubs, and Boy Scouts and Girl Scouts. If there happen to be persons in the home neighborhood who know a great deal about birds, they are asked to go with these bird club groups on early morning walks to identify and observe the birds.[1]

Children in the various grades of the Glenwood School, W. Va., select different wildlife projects. They work them out according to their particular interests and the resources they are able to locate.

The lower grades study wildlife in the separate seasons of the year. In the third grade the children are making a special study of birds and wildlife and have made a frieze on wild animals and a collection of wildlife stamps. A zoo is located near Charleston, and parents sometimes help the teachers take children of the lower grades to it. The trips to the zoo extend the boys' and girls' observation. Among the birds that the children have opportunities to observe, either at home or at school, are cardinals, robins, and sparrows.

[1] Teachers and club leaders can secure forms and folders of information for registering groups of children in the Audubon Junior Clubs by writing the National Audubon Society, 1130 Fifth Avenue, New York 28, N. Y.

Bird Study at Klamath County

At Klamath County, Oreg., deep in the heart of the Cascades, many migratory birds can be observed during the spring and fall. Here the school children have a wonderful opportunity to meet personally a great variety of songbirds and waterfowl.

The children take many field trips to observe the birds. A popular trip is to Tule Lake, National Wildlife Refuge, where more wildlife gathers than at any spot in the area. Three parts of the Pacific flyway converge there: the Pacific Coast, Willamette, and West Rockies.[2]

Conservation is studied in the schools in 5-year cycles, so that every five years the children have experiences in a given area of conservation. The program extends from grades 1 through 12. The areas studied during the first seven years of the program are:

1st year — Birds
2nd year — Wildlife (Mammals)
3rd year — Soil
4th year — Water
5th year — Forests
6th year — Irreplaceable Resources
7th year — Wildlife (Birds and Fish)

The children have carried out a number of projects to help the birds that live in Klamath County or that stop there on their migrations. Pupils of various grades have made bird feeding stations. These have been placed on the window ledges and other places on the school grounds at the time of the first snowfall. Not only do these feeding stations help the birds when food and water are scarce, but they offer the children excellent oportunities to observe many kinds of birds. Some of the children have made bird feeding stations for their own homes. One class of seventh graders made a bird bath for a park. Children who put out feed for birds are cautioned to keep up the practice as long as there is no feed that the birds can find themselves.

The conservation work in the classrooms is not centered in any one subject field, but cuts across fields. At one school the three first grades invited the second-graders to meet with them to hear about their study of birds and wildlife. The children read their chart stories about meadowlarks, ducks, geese, and pelicans. They sang some bird songs with rhythms. They did choral speaking about birds. They dis-

[2] See also: Lincoln, Robert C., *Migration of Birds.* Washington, United States Government Printing Office, 1950. (United States Department of the Interior, Fish and Wildlife Service: Circular 16.)

played a diorama they had made of a lake with ducks, geese, and cattails. One first grade showed a branch of a dead tree on which they hung paper birds and bird houses.

A second grade made collections of bird pictures, feathers, and clippings about:

Birds of the Marshes
Birds of the Forests
Birds of the Fence Rows

Another second grade made flying ducks for a model of a lake region.

Third-graders made a Bird and Wildlife bulletin board. They were especially interested in the western meadowlark, Oregon's State bird. The children studied flyways and wrote bird poems.

A fifth grade wrote stories and drew pictures of mallard ducks. Another fifth grade made maps of the migratory bird flyways. And yet another fifth grade made posters on preserving birds, especially swans, snow geese, and quail. One fifth grade made a wide frieze across the end of its room, with real leaves, cattails, and rushes, with drawings of birds, ducks, geese, and swans. It was titled "Birdlife Paradise."

The conservation program has interested clubs and other organizations in Klamath County in participating with and carrying out its various projects. The local papers and magazines use the children's writing about conservation. It may be truly said that the program of conservation has improved public relations for the schools of the county.

Student Plans for Teaching about Quail

In Kansas State Teachers College at Emporia, professors of education and conservation help their students prepare to teach conservation. A student in one class was interested in the quail, or "bobwhite," as he is often called. Even the bobwhite's uncanny ability to survive has nearly come to an end in the vast wheatland of western Kansas.

The student wished to prepare himself for helping the pupils in the school where he would teach. He decided to make a study of the bobwhite, to learn how the bird can be protected when necessary and preserved as a source of outdoor pleasure and recreation, and to

become familiar with kinds of cover that children can provide on farms where clean cultivation methods are making life more and more difficult for wild animals.[3]

The objectives that children in the school where this student expected to teach might be likely to have were: (1) To recognize quail by sight and sound; and (2) to learn how to conserve quail in the vicinity of the school and on the home farms. The student learned all that he could about quail firsthand by wandering along the field borders and along the byroads near the school. He learned to wait and listen when he heard the call "Bob White!" near at hand. A fainter "Bob White!" would soon be heard from a distance. Sometimes he was fortunate in seeing a mother quail move silently along a roadside, followed single file by a brood of quail chicks. Just observing the quail was satisfying at first, but when he made teaching plans he needed information from books and bulletins and from people such as the county agent, farmers, and conservationists.

The information gathered by talking to people and by reading led the student to make the following list of activities that seemed possible for the children and teacher to plan and carry on together.

Look for quail's nests in the vicinity of the school in the late spring.

Find out through observation or by consulting a county agent or other resource person whether quail are scarce in the community.

Plan field trips to study the habits of quail in the local community.

On Saturday or Sunday, plan to visit children in neighboring communities and learn what they are doing to conserve quail.

Find out if they are carrying on successful activities and if possible, get ideas that might be started in the home community.

Make inquiries to learn if there are resource persons in or near the community that could be called in to help the class.

Perhaps conservation agencies have technicians near the school. Invite these people to school, or appoint interviewers from the class to talk with them.

If there is insufficient habitat for quail in the community, secure the cooperation of a farmer near the school to provide

[3] See also: Aldrich, John W., and Duvall, Allen J., *Distribution of American Gallinaceous Game Birds*. Washington, United States Government Printing Office, 1955. (United States Department of the Interior, Fish and Wildlife Service: Circular 34.)

a small amount of land for the children to plant with food and cover for quail.

Plan ways of getting the community interested in the conservation of quail. Make posters and charts and secure permission to display these in store windows. Make a large bulletin board and cover it with glass in such a way that posters can be displayed without being destroyed by rain or wind. Get permission to place this bulletin board in a public place in town.

Build feeders or plan other ways of feeding quail during storms or extremely cold weather. Arrange to have a supply of grain on hand to feed the birds in storms or other emergencies that prevent them from getting food from the usual natural sources.

Keep a list of the coveys of quail that have been seen in the community during the winter. Record where they go for food and what there is for them to eat.

Find what enemies are dangerous to the quail in the community and, if possible, protect the quail against these enemies. Read interesting bulletins and pamphlets about quail.[4]

Providing cover is often a problem. Cover crops can be planted in fence rows. Some schools get farmers to fence a small area to keep out livestock and let the natural cover and food develop. With a little extra work, such a patch can be seeded with plants that the quail like to eat, such as lespedeza. Good cover crops also include sumac, wild grapes, wild plums, mulberries, elderberries, wild roses, and wild blackberries. It generally takes about 2 to 3 years to grow good cover. For this reason a quail project that is carried on by several grades in the school is most useful because the children can check on progress from year to year.

In Kansas the water supply for quail needs attention. In an average year the quail may get most of the water they need from dew, juicy fruits, and insects. Ponds are helpful if there is a dry season. Artificial containers 2 to 3 inches deep may be provided and kept filled with water. Once the task of providing water is begun, it should be continued for the season.

Food and cover will only support a given number of birds and the annual hatch will usually exceed this limit. This surplus should be used for controlled recreational hunting, but coveys should not be reduced to fewer than ten birds.

[4] See *Making Land Produce Useful Wildlife*. Washington, United States Government Printing Office, 1951. (United States Department of Agriculture, Soil Conservation Service, Farmers' Bulletin, No. 2035), and Eschmeyer, R. W., *Bob White*. (Oxford, Ohio: Fisherman Press, Inc., 1952.)

Feeding Stations, Refuges and Sanctuaries

In Mississippi a number of State agencies and independent organizations are interested in preserving the fine wildlife that exists there. Children's clubs, such as Four-H Clubs, Boy and Girl Scouts, Audubon Junior Clubs, and Junior Garden Clubs are particularly active. Some are working to establish and maintain local refuges for wild birds and animals in the neighborhoods around small towns. Among the wildlife that depends on habitat in Mississippi are turkeys, rabbits, squirrels, deer, quail, and song birds of many kinds.

In school the children make studies of the habits of animals that live in the vicinity. Then they develop posters with brief statements that they think might interest other people in wildlife conservation. Sometimes the children ask businessmen for permission to place the posters in windows. They also get permission to place the posters in offices and other public buildings.

In Manchester, Iowa, a Lincoln School teacher helps her kindergarten children build and maintain a feeding station for the birds on the school ground. One year the teachers' group in the town sent her as a school representative to Spring Brook Conservation Camp for the summer. There she got many new ideas for conservation activities. *Teachers from other schools in the town drop in occasionally to see evidences of new conservation activities and talk with her about them.*

Feeding Stations for South Carolina Birds

Because of the many beautiful songbirds in South Carolina, the schools give considerable attention to their appreciation and protection. Bird study is accompanied by activities to help the birds in many parts of the State.

In Columbia, elementary grade children study ways to take good care of the birds. They call this, "Conservation." Birdhouses were built for school grounds and homes. Bird feeding stations were put up on the school grounds to attract birds for study. Many children joined the Audubon Junior Club. One teacher said, "The more children appreciate the birds and their songs, the more they are likely to take care of them."

A first grade showed its movie on "Birds of the Farm." This was on a scroll, moved on rollers, and contained pictures and two stories they had written. The stories told about helping the birds by building birdhouses, providing water and food, planting trees for them; and

about how birds help us through eating insects. They created a song, "Little Birds," which they sang for visitors.

They learned ways first graders can help birds at home and at school. They learned how to provide feed and water for birds, and how to make the right kinds of birdhouses and feeding stations.

These children went on several bird walks with their teacher. Every morning they had stories to tell about the birds they had seen.

Boys and girls of Chester, S. C., planned and built bird-feeding stations for school and homes. They studied international bird laws and how birds are banded to trace migrations.

Protecting Birds with Living Fences

Living fences are being used extensively in North Carolina to protect birds and other wildlife. When school children of Davidson County go on field trips to study conservation of natural resources, they see how multiflora roses have been planted to provide many kinds of protection.

The dense thorny growth of the roses makes it impossible for cattle, dogs, or men to go through the fences. This makes it possible for small animals and birds, such as quail, to escape through the fence or to find shelter in it. The fence provides a protected highway along which small birds or animals may travel with considerable safety.

The fences also hold the soil with their roots and help in preventing erosion. They keep cattle and other animals from getting into fields where they might destroy crops. They bring beauty to the countryside with their white blossoms in summer and red berries in winter.

In Florida, the boys and girls of Junior Conservationist Clubs plant multiflora roses for protection of wildlife. They also do food planting in a management area, especially for turkey or quail.

Fishing as Recreation

Fishing is becoming increasingly popular as a sport. Fresh water lakes, ponds, and streams provide most of the recreational fishing in the United States. Farm ponds are popular sources of fresh water fishing and are good sources of food as well. More people, young and old, are recognizing the value of fishing as recreation.

Children Learn To Fish

The Pennsylvania Fish Commission, a self-sustaining conservation agency of the Commonwealth, has a program designed to serve more than a million fishermen in the State. This program reaches children and young people in the schools as well as adults desiring wholesome recreation. The sole source of the Commission's income is the sale of some 700,000 fishing licenses each year. Around 400,000,000 fish are stocked regularly each year into the more than 4,000 miles of trout streams open to public fishing. In addition, the State has thousands upon thousands of acres of lakes and ponds and thousands of miles of large rivers that are also open to public fishing and regularly stocked with warm water game and food fish. Through this rich recreational resource, Pennsylvania provides public fishing free of license charges to boys and girls of the State under 16 years of age.

To carry out its objective in helping Pennsylvania boys and girls grow into good sportsmen with a high regard and respect for the law, the Pennsylvania Fish Commission has people making studies of the State's fishing resources. On invitation they also talk with teachers and children and help them become interested in fishing as an important outdoor recreation. These Fish Commission employees also help teachers arrange school visits to fish hatcheries where the children learn about this important work. Through the Commission, a collection of films, some in color, will soon be available to the schools in Pennsylvania. Reports of the Commission's activities are published in its periodical, *The Angler,* to which schools, community groups, and individuals may subscribe.

Huck Finn Day

In Otero County, Colo., children, from 5 to 15 years, had a Huck Finn Day to emphasize the need for obeying the State laws on fishing and to learn correct ways of fishing. First they had a Huck Finn and Tom Sawyer parade, and then gathered at various ponds and fished. They learned what size fish must be returned to the pond and what size might be kept. They also learned how many fish they might catch.

Adults from the various towns in the county assist the Game and Fish Department personnel to aid and supervise the youngsters at the ponds. In this way, much knowledge about good ways of fishing is gained by all who participate.

A Fishing Derby in Tamworth

During May, a Fishing Derby, sponsored by the Tamworth Outing Club, is held for children up to 16 years of age. The local conservation officer comes to the schools and talks to the pupils about the laws, limits, seasons, and why we have the various regulations.

During the Derby, the children may fish in any of the town's lakes and streams. At the end of the Derby, a man from the New Hampshire Fish and Game Department takes them on a tour of the Powdermill Fish Hatchery. Prizes are awarded children who catch the fish weighing the most and also the longest fish.

Mammals and Other Wildlife

Small wild animals are familiar to children in most communities except in the largest cities. Many children who have access at least now and then to a field or meadow know and love the cottontail rabbit, the ground squirrel, and the woodchuck. Other equally interesting wild animals are common to certain localities, but not to all. Among those are the beaver, deer, fox, skunk, and raccoon. Schools are making it possible for children to get the kinds of experiences that help them understand and appreciate the desirability of having wild animals to make our outdoor life more interesting and pleasant.

Conservation of Deer and Other Wildlife

West Virginia is rich in wild animal life. Citizens and organizations that are interested in conserving wild animals are agreed to work together in developing a balance among wild animals and wild plants that includes using these resources for sports and other recreation. Hunting seasons are the results of surplus game that the range will not support. Hunting seasons are controlled so that recreation can be enjoyed from year to year. They are a means of keeping animal populations in balance with their available food supply.

Deer, beavers, raccoons, and many other small animals are included in the conservation programs of the State. Young children in the schools are particularly interested in wildlife. One of the problems of teachers in these grades is to help the children understand the reasons for having seasons in which people are allowed to hunt and trap game animals. The children's sympathy for the animals is so

easily aroused that they are apt to be emotionally disturbed when they know that some animals are used for sport and food.

Teachers try to *help children understand the significance of the balance of nature*. They help them study the figures on the numbers of wild animals that die because the supply sometimes becomes so great that there is not enough food for the animals. When food is scarce, animals such as deer and beavers sometimes begin eating types of food which they ordinarily do not prefer. That means that trees often those that people set out for ornamental purposes, are destroyed or disfigured by the animals.

A State Commission in Touch with Local Groups

The Mississippi Game and Fish Commission and the State Board of Park Supervisors cooperate in providing land for study and experimentation in the State. More than 4,000 acres are owned by the State. Other land is leased from private owners such as paper companies.

In accomplishing educational objectives, the Game and Fish Commission sometimes gets the help of schoolboys. For example, schoolboys may count deer before the hunting season. In a particular refuge the deer are driven across a fire lane, and the boys count them. When one area has more deer than the particular habitat can support, the surplus deer are trapped and released in other sections of the State.

Whenever there is no section in need of deer, then certain counties that have unusually large numbers of deer are opened for the hunting season. In this activity the boys learn one of the things that is particularly difficult for children taking part in the conservation of wildlife; that is when numbers of deer or other wild animals are beyond the carrying capacity in habitat, some will die from natural causes during winter. A hunting season makes use of the surplus for recreation.

Among local resource people with whom the Game and Fish Commission cooperates are county agents and agricultural extension workers. These local workers are generally available to go with teachers and children on tours to see the wildlife refuge. For tours, the Game and Fish Commission arranges for transportation and supervision. Sometimes parents lend cars to take the children; but if private cars are not available, the State offices supply transportation.

The State Department of Education makes it possible for college students who are learning about forestry and wildlife to help elementary

and high school young people with tours. These college students are selected from classes in forestry and wildlife because they have an interest in making wildlife conservation their life's work. The Game and Fish Commission, on request, sends consultants to work at the county level with Four-H Club boys and girls. In some schools, Four-H Club programs are a part of the regular activities.

Among activities suitable for older pupils in elementary schools and for high school young people are:

> Furnishing nesting places for wood ducks. In many forests the beautiful wood duck is one of the birds that is being rapidly denied a place to nest. Hollow trees are taken down and nesting places must be provided by man. Nesting boxes are made proof against predators and placed where the ducks will use them.
>
> Cooperating with the United States Fish and Wildlife Service in dove-banding. Children can help someone who holds a banding permit to find birds to band. This is an activity that increases the children's interest in conservation and at the same time enables them to give valuable service to the Government in protecting this migratory game bird.
>
> Developing wildlife refuges for conservation study. Wildlife refuges are areas closed to hunting in order that their surplus game may supply surrounding areas with game for hunting. Some refuges are planned and highly developed by State and Federal agencies. Others are small areas of plants and shrubs growing in private fencerows or in the corners of fields. In them may be found oats, lespedeza, millet, or upland rice. In early days, of course, many such places existed naturally and in those days the supply of wildlife was large. Among the wild birds and animals that depend on refuges are turkeys, songbirds, deer, quail, squirrels, rabbits, and hawks.

Wildlife Conservation in Consolidated Schools

A sixth grade in the Brandon Consolidated School, Rankin County, Miss., got help from State conservation personnel. They invited Four-H Club leaders and the county game warden to come to school and help them begin their activities. Among their questions were:

> What are the most important native plants and wild animals for our State to conserve?
>
> Do these plants and animals have a proper balance of food and water and soil in the places where they live in our county?
>
> What can school children do to protect our wildlife?

The children asked the resource people to help them with their collection of local wild plants. These were mounted in a book and properly labeled. The children used the book as a key to identifying other specimens brought to school for conservation study. Several of the children reported that they were trying to avoid picking wild flowers or useful plants except as they needed them for study.

Among the children in the lower grades in this school there was particular emphasis on birds. The fourth-graders made an interesting map showing migratory routes of birds in the United States and sketched places that were known as bird sanctuaries in Mississippi. Their emphasis on the map was on birds of Mississippi.

In the Pearl Consolidated School of Rankin County, Miss., the sixth-grade teacher is planning to help the children *begin their study of wildlife through a pet show in which they will learn first to understand the needs and natures of their own animal pets.* She expects the children to follow the pet show with a study of wildlife and of its value to the community, and of the importance of conserving it. From learning about pets and wildlife in the community, the teacher expects the children to make a trip to the zoo, where they will have an opportunity to compare local wildlife with animals in the zoo that have been brought from other places.

Kindergarten Children and Their Muskrat Center

Along the river near the Lincoln School of Manchester, Iowa, a number of muskrats have made burrows. The kindergarten children are especially interested in these little animals. Last year the boys and girls made several trips in the school bus to observe the muskrats and the places where they had made their burrows. When the children came back to the school their teacher gave them opportunities to talk about the muskrats and to use their experience in the play activities of the classroom.

A School Plans for Wildlife Conservation

In the Watts School of Charleston, W. Va., the children learned that the wildlife around them did little harm, yet was being destroyed. They tried to think of ways in which the school could help protect it. The teacher suggested that they study the conservation needs of wild-

life in the community in order to discover for themselves the kinds of things they might do.

By asking questions of parents, conservation officers, and other adults, the children learned that brush fires in the area are among the worst destroyers of wild-animal life. They learned that brush fires around Charleston get started through carelessness, many as a result of careless smoking. The city Fire Department has the job of putting out these fires at great expense to the city and often without saving the small animal life and wild flowers in which the children were so greatly interested. The boys and girls soon decided that they could save wildlife by learning more about fire prevention and sharing their knowledge with others.

The children organized the information that they had gathered through their interviews and by reading, and then planned ways of sharing this information and their ideas with the adults of the community. They distributed posters which they planned and made themselves. They wrote items and articles for school newspapers.

Wildlife Program on Radio

Doing something to conserve wildlife in Kansas became a major goal of a fourth grade in Lawrence. The children studied about different kinds of wild animals that live in Kansas. They learned that the State today has wild ducks, skunks, hawks, beavers, snakes, turtles, frogs, and chipmunks. Most of these wild animals are helpful rather than harmful. Now and then a hawk may take a chicken but the mice that the hawk eats could be so destructive in houses that they would more than balance the value of a few chickens.

Two of the children had a turtle that lived on insects in their garden. Boys and girls said they often saw frogs catching mosquitoes and insects in gardens. The children supplemented their observations with reading and came to the conclusion that many small animals do much more good than harm and that they are a pleasure to have about us and should be conserved.

The children read about the great herds of buffalo that were sometimes seen on Kansas prairies in pioneer days. Buffalo are practically extinct today except in parks and National wildlife refuges. The pupils learned that the reason for the disappearance of the American buffalo is that people thought there would always be buffaloes, not realizing that the magnificent animals were gradually being destroyed. The

boys and girls said that they might do something to keep people informed about the value of other wild animals and about the importance of protecting them before it is too late.

The children discussed the practice of hunting wild ducks. They admired the wild ducks in the sky and on ponds. They learned that in some years more ducks are hatched than nature can feed over the winter. In this case a short duck hunting season provides people with an outdoor sport. Boys and girls in Kansas gradually understand why it is no more cruel for the ducks to be hunted than for them to have to starve for lack of food.

The boys and girls learned that conservation of beavers in Kansas is an important activity. Sometimes a number of beavers build dams in the Kansas River. To get the wood for their dams they move into new timber and cut down trees that are needed to hold back the water that flows from the hillsides of watersheds. Beavers can, in this way, become quite destructive. When the conservation officers see that the beavers are doing harm to a river and a valley, they either give the farmers permission to kill them or make arrangements to transplant the beavers to some other river where there is timber for them to cut without interfering with the runoff of the water.

In connection with the study of beavers, the children learned that there are animals, such as coyotes and weasels, that are enemies of the beavers. Sometimes these animals kill so many beavers — that those that remain alive are too scarce to do great harm. In other words, the beavers and their predators are kept in balance. This is part of the idea of balance in nature which exists in different places among the wildlife resources of the State.

As the children talked about the interesting books they had read and the new ideas they learned, they decided to make a radio program of their study. "Then other people will know what we have learned and they will wish to conserve the wildlife in Kansas," they said. The class gave a "live program" from a local station. Different boys and girls spoke on wild animals in which they were especially interested. One of the pupils announced the speakers over the air.

Woods Safety in Maine

Because there is so much hunting in the State of Maine and *because the greatest causes of accidents during the hunting season are carelessness and mistaken identity, there is considerable attention to*

woods safety in the schools. Emphasis is given to proper clothing, use of firearms, hunting regulations, and basic preparedness.

Map and compass reading are important in Maine. Last year there were 250 people lost in the State. A flying warden service has proved necessary and helpful in meeting this problem. The schools are emphasizing getting out of the woods safely.

Sixth-graders at the N. H. Fay School in Dexter, Maine, learn about guns at home and see their fathers and neighbors prepare for the hunting season. They study about the use of firearms and woods safety at school. They learn of the importance of checking guns, to see if they are loaded. When picking up a gun, they learn to point it in a safe direction. Safety devices on guns are observed.

The teacher-principal has demonstrated firearms use and safety with real guns. He hunts himself. He has sent parents a pamphlet, "What Every Parent Should Know When His Boy Wants a Gun."

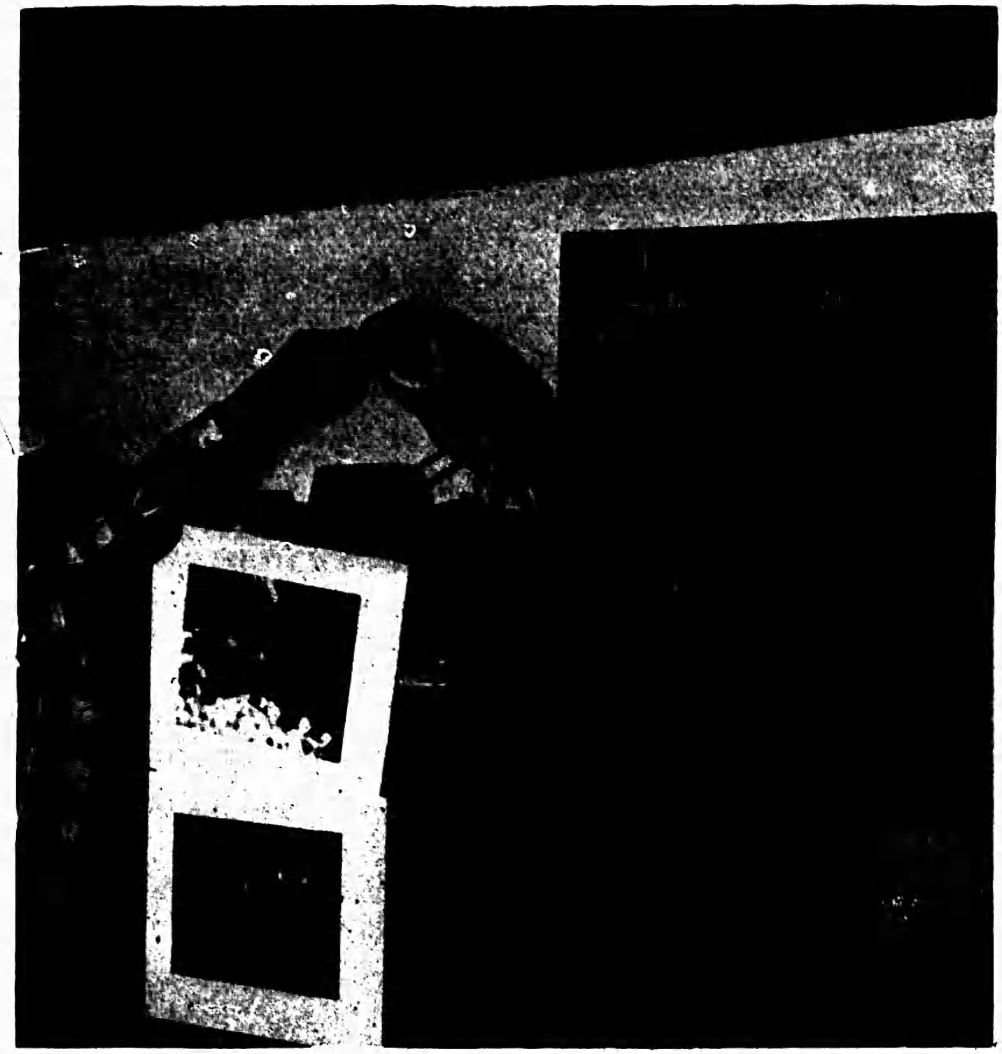
One boy has demonstrated the way to put a rifle in the back seat of a car, first, unloading it and then putting it into the car muzzle first; then removing it from the car stock first.

In their studies these children learn that: Red is the preferred color of clothing for hunters and wherever possible fluorescent red clothes should be worn; white clothing or objects such as handkerchiefs should not be used, for these may be mistaken for some part of an animal by a hunter in the woods; a hunter, when eating lunch, should sit out in the open, not in the brush; it's a good idea if seated in the woods to sit with one's back to a tree or wall; a hunter should not go threshing around in the brush; at home, guns should be stored separately from the ammunition and both should be kept under lock and key. *The children were working with the use of compass and maps to learn how to find their way.* They planned to go soon to the woods to practice finding their way out with their teacher.

Museums and Zoos

Museums and zoos are contributing to the conservation education program, especially with regard to animals and other wildlife. They are helpful whether or not children have access to the outdoors for study and recreation. Mounted specimens of wild animals, replicas of wild-animal and bird groups and wild animals on loan are among the specimens for study. Museum staff members are sometimes available

to go with children on trips. In some States, trucks and trailers transport museum exhibits from school to school.



Junior Museum, San José-Santa Clara County, Calif.

Visiting the live animal library.

Junior Museums in the West

At a number of points in the West, junior museums have been established to help children become better acquainted with wild animals and to learn about their care. Ten or 11 of these museums are in California.

One junior museum, serving San José and Santa Clara County, is located in Alum Rock Park near San José. The museum receives support from its city and county governments, the schools, and service organizations. It contains habitat groupings representative of various

areas of the Santa Clara Valley. These show adaptations of wildlife to various types of environment.

Most intriguing is the Live Animal Library. Here children, teachers, or others may check out live animals and birds for one week or longer. There are rabbits, squirrels, snakes (in glass boxes), owls, hawks, white rats, guinea pigs, marmots, pack rats, hamsters, tarantulas, skunks, lizards, and turtles. Children are given opportunity to become acquainted with the animal and receive instruction about its care before taking it home or to school. Cages and feeding instructions are provided with the animals. Museum people report that the animals have received very good care in most instances.

The animals have been used in classrooms in many and varied ways. Nutrition, pets, birth process, growth rate, responsibility, group cooperation, and motivation for reading and writing are some of the uses to which the animals have been put in the past.

Schools may arrange field trips to the museums so that various aspects of natural science may be studied. Classroom activities are correlated with those of the field trip. During a recent year, 10,000 school children visited the museum. Field trips to the park areas and other areas away from the museum may be arranged for studying geology, wildflowers, birds, sea life, and pond life, with the help of museum personnel.

On Saturday mornings, the museum people take the children on trips in Alum Rock Park and other places near the museum. The trips are arranged to suit the needs of any group and may include collecting for study, insects, plants, minerals, reptiles, or amphibians.

The museum has summer programs, especially for children interested in science. These programs include field trips, talks, and such activities as attracting birds, and making collections of plants, insects, and rocks. Subject areas covered are insects, flowers, trees, shrubs, birds, reptiles, minerals, and rocks. The sessions are scheduled twice a week and the program is free.

Purpose of the summer program is to increase the children's understanding of the world they live in. Conservation and the interdependence of all living things are stressed. Activities are planned so that the children may continue with them at home.

Children of San Mateo Schools have access to the San Mateo Junior Museum. This is a museum of natural science located at Coyote Point on San Francisco Bay. In addition to dioramas and other exhibit materials, the museum houses many live specimens. Here children study various habitat groups and learn much about the care and conser-

vation of wildlife. When the children are able to prove that they know how to protect and care for animals, they are permitted to check out for a week a woodchuck, hamster, parakeet, or some other live animal which is available. These animals may be checked out to be used in their classrooms or to be taken to their homes, just as would be a library book on a short-time loan basis.

The Junior Museum at Portland, Ore., lends live animals and birds to schools and groups and, sometimes, to individuals to take home. Among its loan collection are monkeys, guinea pigs, kids, hamsters, flying squirrels, parrots, rabbits, white rats, mice, parakeets, canaries, owls, and chipmunks. Many animals are kept at the museum for the children to see and pet. They may handle rabbits, beaver, ground hogs or skunks, if they are gentle, or they may pet alligators, turtles, hamsters, or guinea pigs.

Use of Wildlife Museum in Conservation Education

Schools near Jackson, Miss., make use of the resources of the Natural Museum of the Game and Fish Commission of the State Department of Conservation. In the museum are preserved specimens of birds, fish, wild animals, amphibia, snakes, and reptiles. The director of the museum and her assistant, who are both skilled in working with children, sometimes go with teachers and children on field trips.

With the expert guidance of these two resource people from the museum, the children learn ways of identifying birds and of recognizing their calls and songs. They may observe other small animals such as rabbits, raccoons, or squirrels. Then they may go as a group to the State museum where they study the mounted specimens and replicas of habitats of the animals they have observed, and learn more from the director in charge. In the museum is a collection of bulletins, pictures, and other materials from which the children may select those that look useful in answering questions arising from a particular trip or study.

Museum Materials Used by Conservation Officers

In West Virginia the conservation officer is a resource person who helps groups of boys and girls who are conserving wildlife. In addition to helping teachers take children on trips or serving as a resource

person when they want extra information or facts to improve their activities, the conservation officer keeps a collection of stuffed wild animals. He uses these to help the children answer some of their questions about wild animals and to arouse interest in preserving animals that do more good than harm. Part of his work is done in conservation clubs. Children above second grade may join the clubs. Bulletins, stuffed animals, and other museum materials are in frequent use in schools.

Use of Museum and Zoo

In Jefferson County, Ky., Cane Run School has an environment that is conducive to study of wildlife. The children's homes are located in valley land which has enough water and good soil to produce healthy trees and shrubs. These not only add to the beauty of the community but serve as cover for birds and other small wildlife. Through short trips to observe the wildlife around the school, children develop interests in rabbits, squirrels, and other small animals but, as a rule, they get no more than a glimpse of some of the animals because they are startled away from cover by the children.

Teachers in the school have learned to supplement the children's outdoor observation and study with the specimens in the local museum. The stuffed animals do not run away. Boys and girls can stand and observe them to their hearts' content and some of them are mounted with appropriate brush and shrubs around them so that there is opportunity to study part of the habitat as well as the animal. Not far away from the school is a zoo which is also a valuable means of supplementing children's reading and observation, and trips to the zoo are carefully planned with a background of information gained through reading and observation.

The Zoo as a Conservation Resource

The French Creek Game Farm in West Virginia is a zoo used by schools and families and other groups of girls and boys who are interested in birds and wild animals. Through the zoo the children have opportunities to see many native birds and animals, including some which have become extinct in the State outside of the zoo. In addition to the cardinals, robins, and sparrows which are near the homes of most of the children, the boys and girls may see hawks, owls, quail, partridges, buffalo, elk, and wildcats at the zoo.

Children's Museum Plans Conservation Excursions

The Children's Museum of Nashville, Tenn., conducts a nature field trip every month. Field trips are scheduled on Saturday mornings so as to be available to children when they are not in school. Each field trip site is of general outdoor educational interest, but may have a more specific objective such as studying minerals, fossils, water life, wild flowers, trees, and other local resources. Activities in which the children engage follow sound conservation practices.

In order to provide better leadership for nature field trips, the Museum also conducts trips to train the leaders of children's groups, such as teachers, camp leaders, and Scouts. For such groups the field trips are organized on the basis of subject matter and the resource people are selected also on the basis of their special subjects, such as natural history or science. The Director explained that the resource person for different subject groups is changed frequently so that even though topics such as insects or plants are repeated, something new is brought to each group with each new leader.

Another service of the Museum is to cooperate with school classes. The Museum has wildlife exhibits, some of which show mounted animals, birds and plants in natural habitats, as well as live animals. It has a collection of minerals, especially of those found in Tennessee, and many exhibits dealing with natural history. The Museum reports service to about 400 school groups from outside the immediate vicinity of Nashville during each school year. As a rule, about 30 children form a group. More than 12,000 school children have used the resources of the Museum annually, in addition to about 15,000 from the local vicinity, and 35,000 adults and others.

The Museum is cooperating with numerous classes, including those that wish to study the natural resources of Tennessee. One program, for example, included a study of clay as one of Tennessee's resources. The children's attention is called to the use of clay for tile, insulation, and decorative pottery.

Traveling Truck Exhibits in Los Angeles

The Los Angeles City School Districts have two demonstration trucks which are scheduled for visits to elementary schools. Traveling teachers, who accompany the exhibit trucks, present to the elementary children demonstrations on California wildlife and agriculture conservation with the help of dioramas, exhibits, and pictures. The regular

elementary teachers use instructional material, sent in advance of the visits, to prepare the children for the special lesson.

One truck carries exhibits depicting most of the possible habitats associated with wildlife in California — seashore, marshland, inland valley, foothill, mountain, desert, and city. The following themes are demonstrated by the traveling teacher through dioramas of wildlife in natural settings: environment as it affects habits of wildlife, environments suited primarily to one type of wildlife, special adaptations to environment, wildlife existing in cities in spite of environmental difficulties, birds and animals living in mountain areas, man and his relationship to wildlife, and maintenance of balance of nature.

The other truck carries exhibits illustrating agriculture conservation. These exhibits show contour plowing, gully control, windbreaks, controlled grazing, irrigated pastures, crop rotation, mulching, soil, water, weather, forests, and fire prevention.

Conservation Trailer

A conservation trailer goes from school to school in Ohio. It is owned and operated by the Ohio Department of Natural Resources.

Ohio Department of Natural Resources

This trailer exhibit is moved from school to school.

In the trailer are samples of Ohio soil. Some show soil that is well drained. Others are samples of soil poorly drained. In the trailer is a collection of agricultural seeds under glass. These, along with pictures of the plants, enable the children to identify the seeds of barley, clover, and other "grass" crops that help keep soil in place. The trailer contains mounted specimens and carved models of bass, white and black crappies, and other kinds of Ohio fish.

Collections of pictures help children learn about industries that use or process natural resources, such as coal mining, stone quarries, other mineral industries, and lumbering. Charts accompany the pictures to show the results of increased efforts to conserve resources used in the industries. Attractive pictures show native trees of Ohio, some of them as they grow near one another in forests and others as they stand alone as shade trees in town or by the highways. Some of the photographs are in color, with lighting back of the pictures so that they stand out clearly and realistically.

It costs several thousand dollars to build a trailer of this kind. *The present trailer is being used as a pilot project.* The State Department of Natural Resources has suggested to the schools that they make a study of results gained with children who use the trailer compared with those who do not use it. *The initial reaction of the children to the trailer has been satisfactory. Children return to see the exhibits again and again.* The trailer is usually kept open during a full school day so that pupils may enter it at any time with the teachers, as well as by themselves, to study the meaning of the displays.

6. Conservation in Camps and Clubs

SCHOOLS in many of the States visited are using camps and clubs to give children firsthand experiences with nature's resources. This experience includes using natural resources to improve ways of living. It also includes learning to preserve the supply of natural resources, especially of those that are not renewable. *Camp life and club life give the children conservation opportunities that they could not have in the classroom and through study of books alone.*

Experiences in Camps

Camping is an enterprise through which boys and girls with appropriate guidance usually learn to plan with other children, take responsibility for some of the chores of group living, have the experience of being away from home, and enjoy hikes through woods and fields. In the camp program many schools are also including opportunities for children to develop understanding and skill in conservation of natural resources.

School Camps Emphasize Conservation

School camps in Indiana help make conservation meaningful. *Opportunities are provided for conservation experiences and information in the children's planning for camp, in the camping program, in their attempts to summarize their learning at the close of the week's experience, and in activities growing out of the camp experience.* Usually

the latter were carried on after the pupils returned to school where they could use the resources of their school library.

Schools sometimes use the 4-H Club camp, which is a part of the Versailles State Park. The camp has a hall, a kitchen, an office, and 12 cabins. One year, 478 pupils came to camp. They represented 15 elementary schools and for the most part were sixth-graders. Thirty-three elementary teachers were with them.

Children had different camp experiences. Usually a program was planned by the teacher and pupils before starting for camp. One group, for example, made hikes to a shale bank to look for fossils, an excursion to a clay bank to select clay for ceramics, a journey to a cave, and a trip to a fire tower where an observer was constantly on the alert for forest fires. Some of the children went on fishing trips, and a few visited a saw mill. Sixteen teacher counselors were available. Eight parents helped out, and three representatives of Indiana garden clubs served as resource persons and sometimes conducted nature hikes.

Camping in a State Park

Three classes of fifth-graders of a Greensboro school went camping at Camp Crabtree Creek Park, N. C., for a week in April. A man from the North Carolina Wildlife Resources Commission, a mother, the principal, and the teachers and student teachers from Women's College went with the children. Before going to camp, a planning session was held with the parents. Teachers told about equipment, schedule, and finances. Because they had had nature-trail work in the fourth grade, the children were well prepared for their new conservation experiences at camp.

The children had two field trips a day to study wildlife, balance of nature, forestry, and other aspects of conservation. They hunted along the ponds and streams to see what they could find in the water. They visited two farms—one which used modern techniques of soil and water conservation and one that used poor methods. At the camp they built check dams to hold the soil where it was likely to wash. They visited a rock quarry, and collected rocks, clays, and minerals.

Men from the United States Forest Service came to the camp to help the children. They took the children to visit a fire lookout tower. They showed how to conserve forests.

Near the end of their stay, the children had a "share and tell" program. Each showed and told about the most interesting thing he had found during the week at camp.

On their return to school, the children painted pictures of what they had seen and done at camp. These were displayed with photographs of camp activities, including one of the boys constructing a check dam and some of the children studying pond life. They planned to build some check dams on their school grounds.

For about a month, much of the pupils' work centered on the trip. They made several booklets containing their written accounts of what they had seen and learned. The booklets bore such titles as: "Nature Trail," "Water Biology," "Insects," "Building Check Dams," "Soil Conservation," "Rocks and Minerals," "Wildlife," "Forestry," and "Fire Fighting." Finally they saw a movie, taken at camp, which gave them the opportunity to enjoy again some of the experiences at camp.

Conservation Activities at Mill Lake Camp

At Dearborn Outdoor School at Mill Lake Camp, near Chelsea, Mich., a director and staff are taking a critical look at the children's program. Mill Lake Camp has a central location with respect to the 32 schools that send children there. The director for this year of special study has had successful experience at other camps and is interested in conservation as a phase of the camping program. She has the assistance of students of the Eastern Michigan College at Ypsilanti, and from Antioch College, Ohio, who wish to get experience in directing camp activities. She helps each student meet his individual needs as well as those of the children with whom he works. Along with the usual outdoor activities of the camp during the past year the director and her student assistants have worked with each group of children to help them learn to set up goals and make plans for conservation projects.

The camp curriculum consists of activities that can be secured best in camping situations yet at the same time are related to the regular school learning. The pupils develop the habit of covering picnic fires with gravel or sand. They learn to observe the condition of the soil, particularly with respect to erosion. They develop appreciation of flowers and the desire to see and care for them. *Finally they begin to appreciate the value of land for crops, woods, recreation, and homesteads.*

A Week at Camp Waskowitz

Every sixth-grader of Highline, Washington schools spends a week high in the Cascades at Camp Waskowitz. Here they study conservation and natural science in a setting that is magnificent in scope and rich in opportunities for living conservation.

Early in the school year teachers, parents, and principals meet at the camp to study possibilities, learn about the site, and make plans. Before a sixth grade goes, the parents are invited to ask questions and hear explanations of the total program. A large steering committee works on this program.

Preceding the work at the campsite the children do extensive research and planning in preparation for the trip. A real effort is made to introduce all the correlating activities possible into the curriculum to make the camp experience as meaningful as possible.

At camp the pupils build nature trails and put tags or labels on trees and shrubs. Every child plants a tree and is given one to take home. The children conduct a fish experiment to study eggs, fingerlings, and larger fish. They plant fish in nearby streams. They stop and visit at a large fish hatchery on the way up to the mountains. They set up a museum at the campsite, bringing in and tagging specimens. They observe demonstrations of use of firefighting equipment and the pruning and thinning of trees.

Each year live animals are kept at the camp so the children can become acquainted with them. One year two fawns were brought in. The children cared for them, feeding them by bottle. One year they adopted two 6-weeks-old bears. Another year they had game birds, such as pheasants and sage hens. The State Department of Game sends the camp a collection of Washington animal pelts for identification.

The children organized a nature hunt, when they went out in groups to see which could bring in and identify the most specimens. They also formed groups for their "cook-outs."

Books, films, filmstrips, records, exhibits, kits of materials, and other resources are available at the camp. *The children are gradually weaned away from too much dependence on resource persons.*

Conservation at Camp Colby

A great deal of attention is given to conservation in the camping program of Bellflower Unified School District Calif., which uses Camp

Camp Colby, Calif.

Protecting the soil through wattling.

Colby for its children. The campsite and the surrounding mountains provide an excellent place for studying the natural environment and the conservation of resources. Emphasis is given to the conservation of soil, water, plants, and animals.

At camp, sixth-grade children learn to work together democratically on conservation and other study of the environment. They study projects on which they want to work at their school in the mountains. They work on wattling projects, for which they put down stakes and weave grass and twigs to hold the soil. Some of them build dams and others work on reforestation.

Still other children clean and trim along the stream near camp, work on the rock wall, and clear away tall grass (a fire hazard) in some areas. They find or see many interesting things, as the head of an old prospector's pick, a rattlesnake, the camp turtle, a baby Red-tailed Hawk, and a riot of colorful wildflowers.

The children produce class newspapers about their work at camp after their return. The camp staff, too, provides a monthly publication which is distributed to all who attend camp. In it the lessons of conservation are reemphasized.

Bellflower children continued work in forest conservation on their return from camp. One class brought small cedars back to school and planted them on Arbor Day. Another class built a check dam on the school grounds. In these followup activities the conservation experiences of camp continued on into meaningful school activities.

Improving the Area Near Camp Cuyamaca

When the children of San Diego County, Calif., go to Camp Cuyamaca, they explore the area and try to leave it better than they found it. They hunt for harmful beetles, which are then destroyed by spraying. Every week, children transplant pine seedlings from adjoining property to a burned-over area near Camp Cuyamaca.

Many of the children help build check dams to prevent erosion of the soil. They observe and assist in the importation of beaver clans to the streams of the area, because the beaver dams retard runoff of precious (and scarce) rain and melted snow. The children take an active part in removing obstructing logs and other debris that were causing flooding and erosion of stream banks. They remove fire hazards in picnic areas.

Lindley School, Greensboro, N. C.

Practicing safety with campfires.

One class went to the camp the third week of school so they had the opportunity of opening it for the season. They found the camp experiences were an excellent beginning for a study of conservation which they continued on their return to school. The most crucial local conservation problems were forest fires and the water shortage.

At camp, the children collected water from different sources (ditch, bay, stream, bottled, drinking fountain). They brought the samples back to school and studied them under the microscope and made slides. This came about as a result of studying safe sources of drinking water at camp. The children also learned the steps required in felling a tree, including the safety factors. They made observations at the camp's weather station. Finally they collected many specimens of the area and brought them back for further study of conservation at school and in their own community.

Conservation Camps for Children in Tennessee

In Tennessee, conservation has been accepted as a valuable area of work in school camps. In Claiborne County, Tenn., one observes especially the smoothness of the organization enabling teachers and children to develop conservation projects together.

Here, on one occasion, teachers were divided into 5 groups with 4 teachers in each group. Consultants and specialists first worked with the teachers to help them understand the conservation projects in which the children would be working and to learn important working techniques.

The children were divided into groups of seven, with a teacher for each group. The teachers then took charge of the pupils who were interested in the respective projects. Teachers who were not working with pupils joined groups as observers. ***Projects and concepts on which the various groups worked included erosion control, the balance of nature as shown in the camp environment, tree diseases and treatment, making rock terraces, and setting out plants.***

The following statements from pupils show some of the knowledge gained and sincere interest:

> I learned about forests and erosion and a lot of other things.
>
> I think camp is wonderful . . . .
>
> Camp was a lot of fun. I liked the field trips, especially the one where we worked on a bank that had eroded . . . .
>
> I liked best of all when I planted five little trees where the erosion had been on the bank . . . .

Our consultants showed us a lot of things up the Silent Trail.

Our group saw some jack-in-the-pulpits, bloodroots, maidens-hair-fern, and a lot of things I have never seen around the woods in back of my house . . . .

Lindley School, Greensboro, N. C.

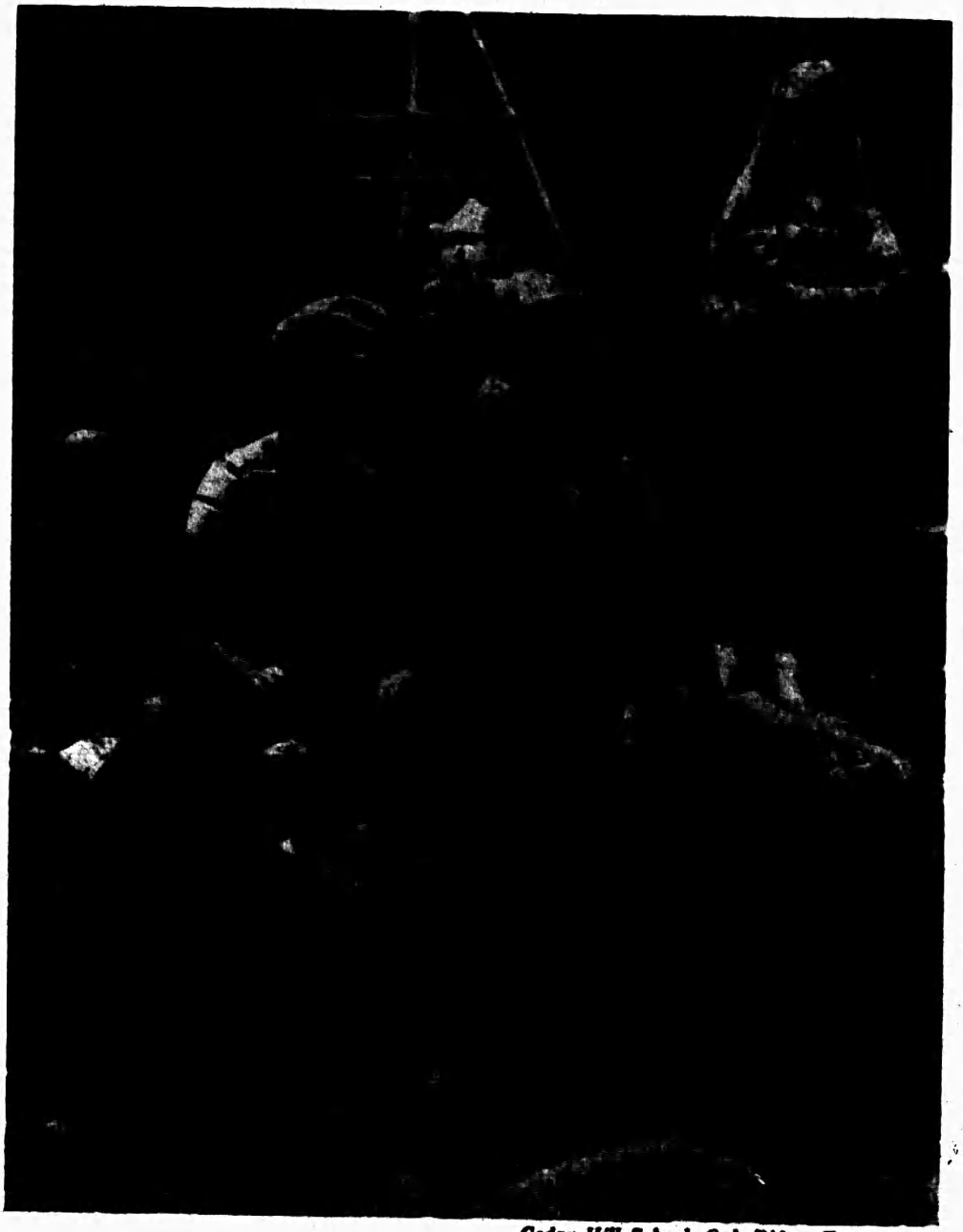
Reducing erosion through check dams.

Community Cooperation Provides Conservation Camps

In one Ohio county a pilot project in school camping is conducted with a major emphasis on conservation education. In certain schools it is the plan for each child to have experience in camp before he finishes the sixth grade, and preferably during his sixth school year. The curriculum coordinator for the Mad River Township schools is in charge of the project.

The consultant's work at the camp and in preparing the children for camp is a part of her regular work in coordinating the school's curriculum program. She has the services of a retired forester in the vicinity as a resource person. He donates his time to take the children on trips and helps them actually plant trees on the camp grounds. A study of trees and how to plant and care for them is an important part of the conservation program.

Another resource person in the project is a State wildlife specialist who comes to camp and takes the children on trips as a part of his public relations work with the schools. A technician from the United States Soil Conservation Service advises with the coordinator and the other camp staff members. Among helpful local resource persons in the camp project are members of the Audubon Society. Garden Club women, Izaak Walton League members, and staff members from the Dayton Museum of Natural History.



Cedar Hill School, Oak Ridge, Tenn.

Learning correct practices at camp.

Students from Antioch College with interest both in camping and in conservation serve as camp counselors. For this experience the college gives them credit in teaching. The coordinator plans with these counselors and guides them in their work with the children. Together she and the counselors plan ways of helping the children decide on camp and conservation goals, such as:

> Gaining experience in living out-of-doors.
>
> Developing interest in wild plants and how they grow, how they depend on soil, and how they restore the soil.
>
> Learning what flowers should not be picked because they do not readily reseed or reproduce themselves.
>
> Learning how to plant trees.
>
> Getting firsthand experience with small animals, such as snails, frogs, harmless snakes, rabbits, and others.
>
> Getting some idea of the balance of nature in a particular habitat.
>
> > An example is the children's experience in observing an anthill and seeing the black ants carrying termites. That was the consultant's opportunity to explain to the children that black ants are beneficial to man because they kill the termites that do damage to the wood in houses. Black ants should not be destroyed.
>
> Getting new experiences in living with playmates, counselors, and resource people.
>
> Learning how to use free and unplanned time profitably.
>
> > Some of the children used this time for painting, inspired by the new experiences they were having in outdoor living. Some wandered about the lake, woods, and fields. Others sat in small groups and chatted.

When the time came for tree planting near the camp, the children who had taken responsibility for certain tasks helped to measure off the ground and mark places for the holes. (See also chapter 2, p. 21). The children then planted the trees by hand and filled the dirt in around them. The consultant gave advice and answered questions or made suggestions as necessary while the work was being done.

As a result of the children's interest, "a tree plantation" was started at the camp. This meant that the children of different school or club groups would take care of the trees and keep them growing until they were the right size to be cut for some purpose. It was expected that after the trees got a start in the plantation, there would be some that could be cut and sold for Christmas trees. The money would be used for school and camp activities.

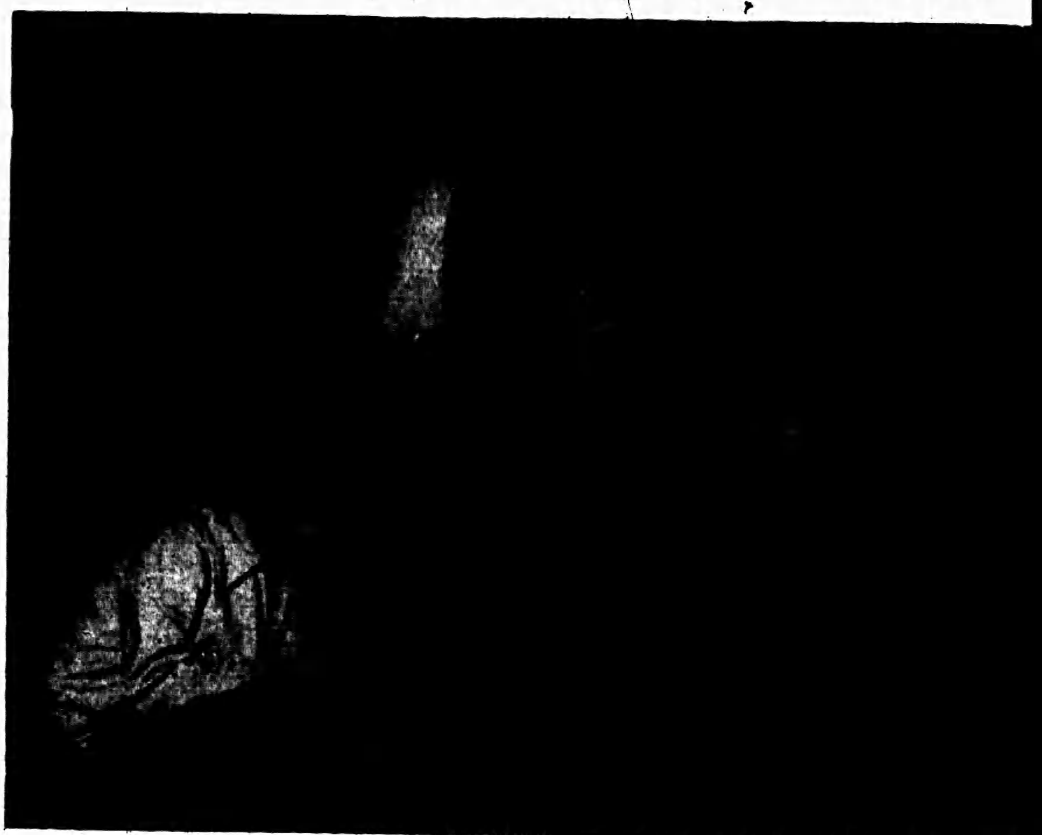
"Little Acorns," a 16-mm. kodachrome film with narration and optic sound track, shows the activities of a sixth-grade from a school in Mad River Township, Montgomery County, Ohio, on a 3-day camping trip. (Inquiries should be addressed to C. H. Buck, Dayton Chapter, The Izaak Walton League of America, 2000 Far Hills Ave., Dayton 9, Ohio).

Law-Enforcement Officers Teach Conservation

In a recent evaluation conference of school and conservation specialists, two young law-enforcement officers took an outstanding part. They were members of the county conservation staff, Raleigh County, W. Va. They discussed their work and the principles that guide them in the development of their programs.

"We are appointed technically to enforce conservation laws," one of them explained. "If we find a man fishing or shooting deer out of season, we arrest him. He has to pay a fine."

"But there is more in our work than law enforcement," the other said. "We like to think of our most important job as the education



Antioch College Outdoor Education Center

Antioch student counselors and sixth-grade pupils study conservation.

of the young. As a result, when these children grow up they will have a tendency to act as they have been taught, and few laws will be broken. That is the reason we work with children."

The conservation officers visit schools when invited by teachers and pupils. They talk to the children, answer their questions, and try to stimulate them to develop activities in the conservation of resources that are outstanding in the local community. There is quite a difference between the old-type conservation officer who believes in penalties, fines, and enforcement of regulations, and the new type who believes in education, especially of the younger generation.

The law-enforcement officers have most time to help the schools during the months that are slack for law enforcement; that is, when there are no open hunting seasons on wildlife. Then the officers visit schools and arrange for summer camps for the children.

In Raleigh County, W. Va., the camping project is experimental. Not all the schools can have a part. Last summer, four schools took part; next summer, it is planned for 10 schools to be invited to send children to camp. The camps have a strong conservation program.

The superintendent of the school and the conservation officers work together. Camping, on the experimental basis, is only one of the activities and does not yet reach all of the children. The following list includes a few of the activities in which many of the children engage, according to their interests or the use they have for a particular experience:

Testing soil.
Making collections of leaves, bark, and pieces of wood.
Identifying fish.
Restocking streams and Beaver Lake with fish.
Planting windbreaks, shade trees, and nut trees.
Planting and caring for gardens at home.
Learning how to take a fishhook from another person's hand.
Learning how to handle guns.
Learning what to do in case of snakebites.
Conserving wild flowers.

Among the flowers that children in the vicinity can identify are daisies, dandelions, violets, ladyslippers, goldenrod, rhododendron, trailing arbutus, dogwood, and redbud. Children learn that they should not pick wild flowers near the road because this would deprive people who use the roads of their beauty. Elsewhere certain flowers can be

picked without any risk of extinction and certain others should not be picked at all because they are rare.

A member of the Conservation Commission works especially to develop cooperation among foresters, technicians, and other conservation officers in the State. As a resource person he has helped to organize real conservation activities in a dozen or so elementary schools where the teachers and the children are interested in doing something about conservation. In helping the children in their study of wild animals, he uses films and stuffed animals. Sometimes he takes a wild animal with him to a school where he is to work. He helps teachers and children organize conservation clubs. In any elementary school, children above second grade may join a conservation club.

The Spirit of a Conservation Camp

The camping program of the Parker School, New Castle, Ind., started with the sixth grade. The program "was inaugurated to give the children the chance to learn more about the out-of-doors and to practice living and working together." Experiences in conservation were emphasized. Every sixth-grade child had an opportunity to attend the camp, which is at the Versailles State Park, about 68 miles from Newcastle. The following excerpts from a radio script summarizing a week's activities will give a bit of the spirit of the school-camp program:

RADIO SCRIPT

JACKIE JO — Good evening, ladies and gentlemen. YOUR SCHOOL wants to give you a program by Grade Six, Parker School, entitled "CAMP CONVINCERS." This group spent 4 days in September at New Castle School Camp in the State Park at Versailles, Indiana . . . .

JOHN — Would you like to know what we did in camp? For one thing, we had fun working with clay! We really did work! We think it improved the camp. Some of the stone steps leading to the cabins were loose so we fixed them. We mixed sand and cement to make road markers at the entrance to camp.

EDNA — We heard you built log dams. Tell us about them.

TOMMY — At the entrance to the camp was a big eroded gully. In time, a whole bank could have been ruined. We sawed logs the right length for the gully. These logs we fitted together between upright poles. We built three dams at different levels to prevent water from washing away the soil. It was work, but I can *proudly* point to one place in the State park and say I helped to make it better.

CAROLYN — We can't say our camp improvements were so valuable or so permanent but *we did think of the campers who were to follow us. We left some wood at the cook-out spot and in our cabin to give the next group a bit of a start.* We built up low tables of stone slabs at a cook-out spot. They were a help to use in preparing our meal and cleaning up. We hoped the next group could use them.

Parents, Teachers and Children Evaluate Camping

In Manitowoc, Wis., three days in camp are part of each sixth-grade pupil's school experience. In addition to emphasis on conservation in the program for children, the Manitowoc plan includes a 3-day camping experience for the children's teachers, preceding the session for children, also with emphasis on conservation.

To help evaluate the work, parents were asked to come to school at the close of the period to meet with an evaluating committee of teachers, supervisors, and representatives from the children. *The group discussed and analyzed some of the children's camp experiences and decided how the camp experiences could be made more valuable, and how more children in the school could have opportunity to participate.*

One of the teachers said that the experience in camp is really an inspiration for her boys and girls for the entire year's program at school. Especially was this true of conservation activities. The week in camp provided opportunities for these city children to see woods and streams, forest litter, wild flowers, wildlife, birds, varieties of rocks, insects, and soil of different kinds.

Groups of children had experience in different conservation activities. One group, for example, planted some trees, another cleaned the debris out of a spring, one class made further study of a conservation trail that had been started by a preceding group of children, and helped to develop a guidebook for the trail. They discovered new

trees and added these to the guide-book. They found and identified some bird nests that had not been there the year before.

Back in the classroom, the children often referred to these activities. Some of the pupils started rock collections growing out of their interest in rocks discovered in the woods at camp. Some made murals and posters to show to the fifth grade, who were looking forward to their turn at camping in the year ahead.

One teacher explained that she depended on the children's reports of the camp experience for clues as to what might be interesting to another group of children. She said that the boys and girls held several meetings just to talk about the experiences of the camp and to point out the ones which had meant the most to them.

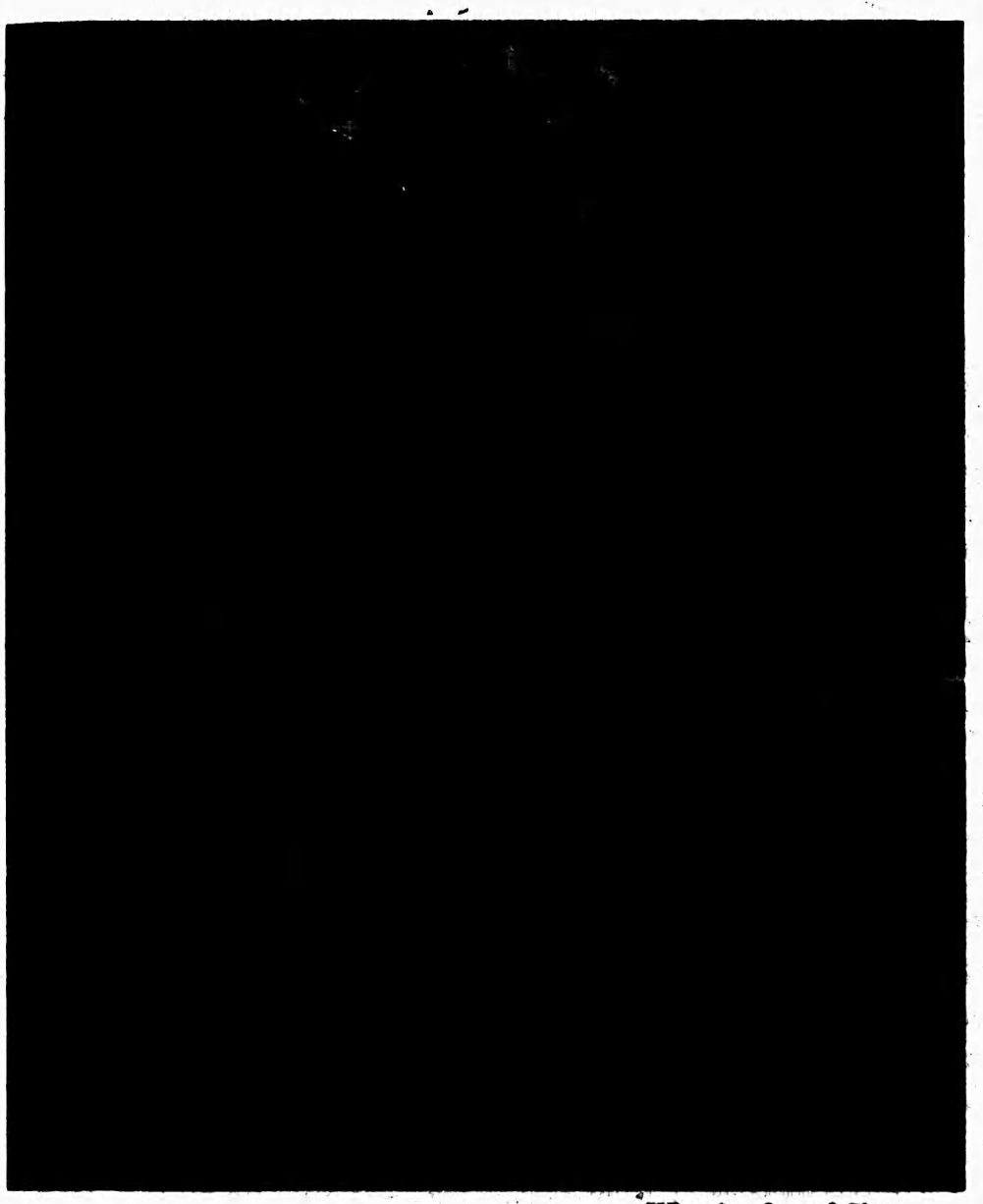
Camping Opportunities for Older Children

The Arkansas Game and Fish Commission has for some years cooperated with the State Resources and Development Commission to make summer camping possible for school children and to emphasize in the camps an appreciation of wildlife in Arkansas. Some center of interest is chosen for each camp, such as the conservation of fish and ways of fishing and methods of stocking ponds with fish. Generally speaking, one child out of ten has an opportunity to be in one of these camps. The goal, of course, is for much higher percentage of children to have camping experiences.

Student Interns as Assistants in Tennessee School Camps

City Park School at Athens, in McMinn County, Tenn., provides conservation education in school camping. A member of the laboratory-school staff from East Tennessee Teachers College teaches an eighth grade in City Park School. Planning for the conservation work in this class is extensive. In the beginning of the year, the teacher and children plan broadly, leaving out all but essential details. As the days go by and the need is shown for more activities, these are added.

Challenging to the creativeness of the children is the idea of keeping facilities and equipment at camp very simple, with as few commercial facilities as are needed for health and cleanliness. Several cookouts are planned. A camp cookstove is made of a No. 10 vegetable can with a square cut in the edge. The can is turned upside down and tinder is lighted and pushed under it through the square hole



Milwaukee Journal Photo

Playing it safe in case of fire at a forest camp.

that has been cut out. The fire will heat a can of soup. Camping is part of the year's program. During the past two years, the camping experiences have been limited to a 4-day week; in the future a 6-day week is planned.

Several grades are planning a week in camp for the current year. The fifth grade will go to camp first. Six of the eighth-graders will accompany them to serve as helpers to teachers and children. Forest specialists will serve as resource people and consultants. Normally 10 adults accompany a class of children and the 6 upper-grade classmates.

Outdoor Learning in Snohomish County

In 1948, a site was selected in the Mt. Baker National Forest area in Washington for a camp program for Snohomish County Public Schools. All school districts of the county have used the Silver-Waldheim Camp and additional camps are being considered.

At camp the children live as a community under rather primitive conditions. It is planned to keep the conditions primitive so that new groups of children may have the experience in living and learning in this type of environment.

Civil Defense values enter the picture as the children gain confidence in their ability to get along without modern conveniences and to organize quickly a safe and sanitary living routine even in the wilderness. The children also learn considerable pioneer history at camp since the area is extremely rich in history of this period. Through experiences in primitive ways of living the children gain an appreciation of the trials and accomplishments of their pioneer ancestors.

The children carried out numerous projects to protect the soil, water and forests and to develop the camp as a place where children can learn and can enjoy themselves. One outstanding achievement has been the building of nature trails.

The fourth-, fifth-, and sixth-graders constructed a Teepee Trail. They leveled places for walking, made steps, built check dams. They labeled various specimen trees and plants along the trail. In clearing the trail, they didn't cut a single evergreen tree. At the end of the trail, they set up a Teepee Camp. Here the children go for story hours, cook-outs, and campfire discussions.

Several logged-off areas have been replanted by the children. Now they have Douglas fir trees over 9 feet tall. On one area they have planted many types of trees.

Many trips are taken from the camp which is located in a magnificent watershed area which contains virgin timber. A 1-mile climb takes the children to a mountain lookout. The children can usually see a logging operation going on. They see the slashed areas and the clear-cut logging. Each group of children makes a tour of the Rangers' Station, where they see fire packs, tools, forest service trucks, and learn about what the ranger does. They learn, too, what they themselves can do in the prevention of fire.

The children visited a fish ladder at Granite Falls. The longest fish ladder of its type, it opens up 35 miles of up-river spawning

grounds. Rainbow trout are being planted. The children were allowed to catch one fish each from the lakes.

Across from the camp is a beaver area where the children can see the beavers, their houses, and their dams. The children help tear down the dams when the beaver have to be moved into the wilderness areas.

The children learn about renewable and nonrenewable resources through visiting Silverton, a ghost mining town. They pan for gold and look for other minerals and stones.

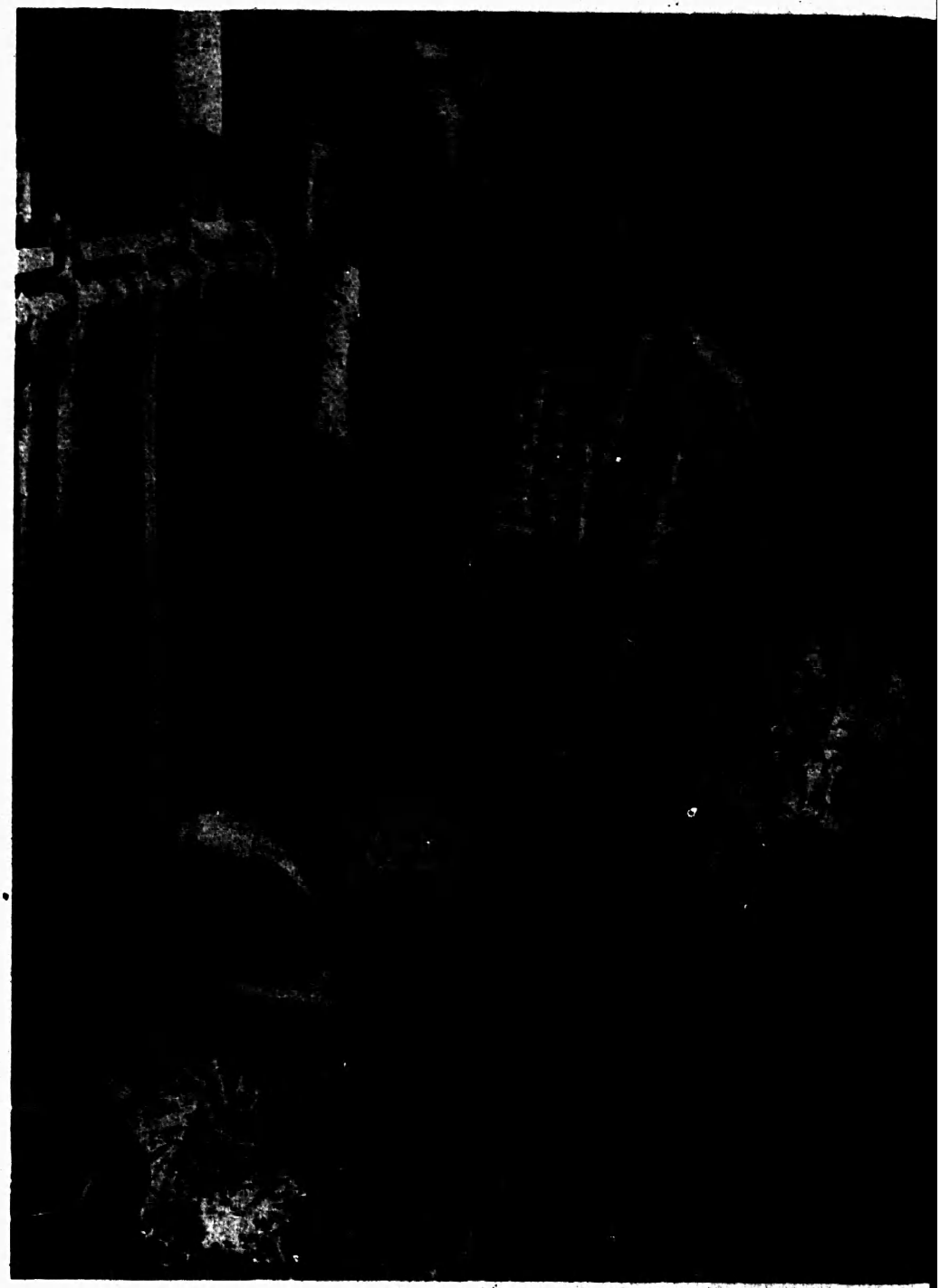
Truly this camp and its surrounding area provide an environment where the children can "absorb" learning through guided experiences in outdoor living in our great Northwest.

Rural-Urban Exchange of Pupils

To find out about school and farm life in the country, as reported in the Milwaukee Journal, sixth-graders in the schools of Manitowoc, Wis., live and attend school with the same number of country pupils for a week. The project is sponsored by the Manitowoc County Farm Bureau. Later the situation is reversed. The children from the country are guests of the children in the city. The object of the exchange is to help children from the farm and those from the city to understand and appreciate each others' differences and problems.

Children who were pioneers in the exchange program were helped to prepare themselves for the new experiences in the country and to get as much as possible out of all phases of farm life, including conservation of the natural resources. Pertinent to the study of conservation activities were the suggestions that helped the children from the city understand the conservation problems of the farm and the ideas which children from the country gained from their visit to the city. When the children left Manitowoc for their week on the farm, duplicated lists of questions were given to them, including such problems as:

> How and why does the farmer rotate his crops?
>
> If the farmer plows his fields on the contour, ask him to tell you about it.
>
> Discover what you can about windbreaks and cover-crops.
>
> Ask the farmer to tell you about the kind of soil he has on his farm and about the kinds of crops that are adapted to the soil he has.
>
> How many acres are in the farm?
>
> What part is under cultivation?



Milwaukee Journal Photo

Boy from a city visits his friend on a farm.

Conservation Adds Meaning to Camping

"We left some wood at the cook-out spot to help the next group," expressed the atmosphere of helpfulness in one of the conservation

camps. Without exception 3 days or a week in camp seems to add meaning to conservation in the regular program for weeks to follow. Parents wish more such experience for their children and are willing to help the school to provide it.

Conservation In Club Programs

A number of well-known clubs and other organizations for children and young people cooperate in the conservation program of local schools. A few have conservation for their major objective. In most of these groups, boys and girls with sponsorship of adult leaders accept responsibility for planning and carrying on activities and developing programs.

Junior Conservation Clubs

The Department of Fish and Wildlife Resources, Frankfort, Ky., in a Junior Conservation Reference Booklet, explains the State's conservation resources and problems. Kentucky has rich resources that are products of the land—of soil. Among these are crops and forests, wildlife, and wild flowers. Kentucky also has water—streams and ponds—and minerals. Yet Kentucky, along with other parts of the Nation, has lost many of its former stores of these fine resources through thoughtlessness and waste.

To offset the harm now done to natural resources in Kentucky, and to prevent further harm, the children in schools and clubs, along with adult groups, participate in conservation activities. One of the boosts given to conservation education by the Department of Fish and Wildlife Resources is a Conservation Adviser for each congressional district. This adviser is a resource person available to the schools on request in the district. He helps teachers get the technical information they need for the children's activities, and is chief organizer for junior conservation clubs. He works with sportsmen's clubs and other community groups.

In Lancaster School, Garrard County, is an example of a boy's junior conservation club whose present activity is bird study. The superintendent of the school is the sponsor of the bird club. The conservation adviser is a resource person who provides special information at the request of the club or its sponsor. *The resource person sometimes provides materials for the club to study or to use in identifying and enjoying birds and learning about their habits in learning more about their place in the local habitat, and in interesting others in them.*

Once each month during the school year, the adviser or resource person talks to the club members. At one club meeting, for example, he talked to the boys about the value of birds, placing some emphasis on the importance of hawks among other birds that are of value in Kentucky. The children appeared to have held the erroneous idea that all hawks are harmful and especially that they all take chickens. The resource person explained that in Kentucky the two hawks that may do harm are the sharpshin hawk and Cooper's hawk. These occasionally take chickens, but only if other food is not available. Other hawks are helpful rather than harmful because they eat mice, rats, and many insects.

Kentucky has nine congressional districts, each of which has a conservation adviser. In each district the sportsmen's clubs get together and form a sportsmen's commission that aims to influence votes for sports. The commissioners work without pay. The object of the sportsmen's clubs is to carry out projects in schools and communities that the commission decides are important or necessary, such as:

Conservation projects, such as ponds, bird study, and fishing.

Youth projects.

The sportsmen's clubs work with the junior conservation clubs and other groups of young people who are interested in hunting and fishing.

Setting out white and yellow pines.

A girls' club in Hazard, Ky., put out 50,000 trees. A lumber company helped sponsor the project and paid the girls a penny for each tree planted. The money was used for various club activities.

Conservation excursions.

As resource person, the conservation adviser helps the teachers with excursions. Some of these trips are for bird study; others are soil conservation excursions. In one school, the junior conservation club is in touch with a wild goose farm not far from the school. Part of the project is a group of ponds maintained with food and cover so that wild geese nest there and return from year to year. Schools take trips to the farm to observe the geese and to study the sources of food and cover.

Four-H Clubs Active in Conservation

Children who belong to Four-H Clubs are active in conservation work. At the elementary school level, these children are from grades five and up. The children gain information about conservation and

resource use through their club activities and put it into practice on their farms. Some illustrations of the widespread activities of Four-H Clubs in the United States follow.

At Granite Falls, Washington, the elementary pupils have a Four-H Club. One of its conservation projects was to open up streams for spawning salmon. They opened the channels so silt would wash out, leaving gravel for the fish to spawn on. The boys have been especially interested in opening streams above the fish ladders. In the spring of 1956, the boys found that, for the first time, salmon had used these creeks as spawning beds.

In Otero County, Colo., the Four-H Clubs received considerable help in the summer from a man from the Colorado Fish and Game Department who took the children on hikes and otherwise assisted with their program. He taught them the proper methods of working on the land to save it from erosion. They learned how to stop erosion on stream banks. The children constructed shelters for birds. School people feel that the children have profited from these experiences and that they use the knowledge and skills they have gained in a practical way. Four-H Clubs contribute to the conservation work of elementary schools in many of the States. Other States where they were found to be active include Florida, Georgia, Missouri, Kentucky, Arkansas, and Tennessee.

Future Farmers, Boy Scouts, and Junior Conservationists

Eighth-graders in many places, especially in rural areas, have Future Farmers of America Clubs. Future Farmers are active in Florida, where they receive assistance from the Florida Forest Service, the United States Soil Conservation Service, and other organizations.

In 1954, conservation was the major theme for study and activities of the Boy Scouts of America. An invitation to do some conservation work was extended to them by President Eisenhower. An example of their work was found in Carroll County, Ga., where the Boy Scouts were active in setting out pine trees, controlling erosion in gullies and on road banks, protecting wildlife, reworking a farm pond, and thinning and trimming a small forest acre. The United States Soil Conservation Service technicians of the area helped in an advisory capacity. Boy Scouts in Portland, Oreg., collect cones for seed. These are used in reforestation projects.

There are 48 Junior Conservation Clubs in Florida, with 50 more in process of organization. The age of members ranges from 8 to 18.

During the summer vacation, the Junior Conservationists may go to a camp where they have a special program including life saving, boat handling, hunting safety, fishing, and habitat development. In a management area for turkey or quail, club members plant food and cover for birds and wildlife.

State Department of Public Instruction, Mich.

He who cuts his own wood warms himself twice.

Junior Foresters in Nebraska

The first Junior Forester Club in the United States was organized in 1941 in the Miller Park School, Omaha, Neb. Since then Omaha children interested in tree planting have carried their inspiration into their homes and neighborhoods through school programs, exhibits, guided practice in tree planting, and planting trees in their parents' yards and gardens. Radio programs, picture shows, discussions, and demonstrations also have been used by the Junior Foresters to get people interested in trees.

A combination of guided practice and demonstration is abridged from an explanation by the originator of the Junior Forester idea, as follows:

> After needs and ways of pruning are discussed, the pupils do most of the pruning . . . Both boys and girls take turns in cutting off a branch — usually at least six of them at a time. Then others do the wound painting. When not taking part, children observe those who are working . . . When an inexperienced pupil — especially a girl — has difficulty in sawing off a larger branch but finally completes the task, a cheer goes up that would make any performer swell with pride. Some immediately want to test their pruning skill on their own trees at home.

In 1956, the Junior Forestry program had spread to schools throughout the State, to those in other States, and those in every continent, with the possible exception of Africa. Hundreds of thousands of trees had been planted in Nebraska. The Lincoln Junior Chamber of Commerce gave a spruce and a pine to every fifth-grader in the city to plant in his home yard. The State Department of Education extended its plans for a Keep Nebraska Beautiful campaign, which was started the year before, and made available to all Nebraska schools a booklet on the planting and care of trees, entitled "Trees," published by the Omaha-World Herald.

The club members always like to consider themselves Junior Foresters. One girl said, "The most wonderful thing about it is that I will be able to use this knowledge the rest of my life."

Junior Garden Clubs

The Orlando Junior Garden Club is made up of adult members who carry on a conservation program for children. During a recent year, the Club paid the expenses for one teacher of each school to visit Belleair School, in Clearwater, Fla., to observe the conservation work on their Annual Conservation Day.

Each class throughout Orlando, Fla., has a sponsor from the Junior Garden Club. They have a meeting once a month with pupils, teachers, and sponsors. They keep printed programs and notebooks growing out of these meetings. For the most part, they have their meetings at school, and gardens at both home and school.

At their meetings, the children discuss such topics as conservation, wildlife, and forestry. A recent theme for the year was "Partners in Conservation," as related to trees, soil, water, birds, and insects.

The Green Guard

The Green Guard is a youth activity of the Keep Washington Green movement in the State of Washington. It is also active in 35 or

more additional States. Any child may become a member of the Green Guard of his State without payment of dues.

In each State, the Keep Green organization has a special name and slogan, such as "Keep Oregon Green," "Keep Washington Green," "Keep California Green," or Idaho's "Don't be a Guberif" (firebug spelled backwards).

Keep Washington Green carries on an interesting program for children, youth, and adults. It conducts poster contests on fire prevention for school students each year and provides foresters to help in teacher workshops where teachers learn about the conservation of our forests. It is reported by a member of the State Department of Public Instruction that this program of education and information has contributed to a considerable decrease in losses from forest fires in the State. The average loss in Washington prior to 1940 was almost 200,000 acres of forest each year. In the last 5 years the average loss has been reduced to 25,000 acres.

The Orgeon Green Guard has been organized by the Keep Oregon Green Association for the purpose of eliminating man-caused forest fires and otherwise protecting and conserving Oregon's natural resources. Members are boys and girls from 8 to 16 years of age who wish to participate in the work of the organization. Some of the youngsters work as individuals and some in small groups.

The Green Guard program is expanding rapidly throughout Oregon. Seventy-seven thousand Green Guards have enrolled since the organization started in 1942; with 11,757 enrolled in 1955.

During the fire season, the Green Guards do everything possible to remind people of the necessity of preventing farm and forest fires. They check their patrol areas and report any smoke to the nearest fire patrol station. The Guards check on fire hazards and keep fire-fighting equipment in their homes and grounds.

These children learn and practice a great many things considered "Good Manners in the Forest." They learn to select good campsites, how to build and put out a campfire properly, how to protect trees and shrubs, never to cause litter, and what to do about big-game animals. They learn good camping practices and how to keep from getting lost in the forests.

Conservation Demonstrations at Garden Club

Third-graders of the Tamworth Elementary School in New Hampshire presented conservation demonstrations at the annual flower show

of the Tamworth Garden Club. The youngsters used a corner representing a roadside picnic area, which was put up by the club, as background for their demonstrations.

Several children took turns telling the visitors how much it cost the town the previous year to clean up its roads of seasonal materials and of litter. They demonstrated the use of trash cans and of litter bags for cars. They had an exhibit of posters on the Litterbug Campaign.

Some of the children told what it cost Tamworth to fight fires the previous year. They showed fire-fighting tools that should be in every home — an Indian pump, a shovel, and an old broom. The children explained that some of the chief causes of fires occur in the spring when people clean up their homes and yards and burn trash in the open. They recommended having fire-fighting equipment ready before building the fires. In Tamworth one must have a permit before he may burn trash out-of-doors. The children explained how to call the fire warden, and pointed out that a permit would not be granted if it is too dry or too windy.

One group of children demonstrated how to build a campfire within a circle of rocks, though they didn't actually set it ablaze. Then they showed how to put it out, by beating the logs with a stick to knock the coals off, pouring water on them to soak them, and turning them over in the process.

Another group of children showed how to plant a seedling tree. They gave the price for which seedlings can be purchased from the State Forester. They told how long it would take for different kinds of trees to grow to maturity.

Finally, some children displayed a small tree and demonstrated how to prune it. They had samples of clear and knotty lumber and gave prices. The clear lumber brought about four times as much as the knotty. They concluded that it pays to prune trees early since this practice eliminates the knots.

Junior Humane Society

Children of the Deming Elementary School in the Mount Baker School District of Washington State have a Junior Humane Society. The slogan of the club is Humaneness, Conservation, Citizenship. Some of their work is done in cooperation with the Watchum County Humane Society.

As one project the children made *conservation booklets to send to a school in Japan*. These booklets were made on onionskin paper to reduce bulk in mailing. They contained original drawings and paintings of our native wildlife with captions and slogans about conservation of forests, soil, and animal life as well as humane treatment of our dumb friends. The children tried to emphasize the fact that as citizens all should accept responsibility for conservation and humaneness. This project will be repeated and is an exchange affair with Japanese school children.

The children carried out an enjoyable and educational letter-writing project. They secured names and addresses of schoolchildren in several foreign countries through their County Humane Society and the American Junior Red Cross. The letters contained exchange information about plant and animal life, conservation, and care of animals. Pressed flowers, clippings, souvenirs, and drawings were included. The idea of lasting friendship with the children of other countries was stressed through common interests such as pets, school life, and hobbies. *This project is a continuing activity.*

The middle-grade children, all of whom belong to the Junior Humane Society, gave a series of panel discussions on such subjects as Prevention of Forest Fires, Cutting of Christmas Trees, Care of Pets, Citizenship in School and Out of School. These discussions were held at regular meetings of the club with parents and other interested people present.

The children maintain a traveling chest containing conservation exhibit materials for use of clubs, schools, and other organizations. It is used in the county and also in Canada (British Columbia). Each year the children give a radio program for the County Humane Society. The teachers report that the children are enthusiastic and the subject matter is closely related with various school subjects and results are most gratifying.

Junior Forest Fire Fighting Wardens

Fifth-graders of the Villa Rica School of Carroll County, Ga., became Junior Forest Fire Fighting Wardens. They received badges from the Fire Fighting Warden of Mobile, Ala., whose project is sponsored by a paper-pulpwood company. On two or three occasions, some of the boys had a chance to help put out fires.

Fourth, fifth, and sixth-grade pupils of Aurora Schools, Colo., work toward being Junior Wardens. They receive Junior Warden

cards of rank upon completion of suggested projects. These children observed Arbor Day with a program on the history of tree planting. They planted a tree on the school grounds.

Woodcraft Club

An organization called the "Boys of Woodcraft Sportsmen's Club" has special interest for people of the Johnston Consolidated School and community at Johnston Station, Iowa, because there is a branch of the club in the school. The national headquarters of the group is at the Woodmen of the World office at Omaha, Neb. The current interest of the boys of Johnston School is conservation of the natural resources with an emphasis on soil.

It is fitting that the children of this community be interested in soil conservation because it is located near the farms where a nationally known seed-corn company is carrying on experiments with new types of corn and chickens. During the current year the boys were interested in soil building and prevention of erosion. They enlisted cooperation of their fathers in conservation activities undertaken by the club.

The members of the club were concerned about erosion in a creek near the school. The work required to check the erosion would have been too much for the children to do by hand. They discussed the problem at home with the result that fathers of club members brought tractors and other machinery and did a large part of the heavy work for the boys, who were then able to level off rough places, sow grass, and plant shrubs to control erosion.

A visitor asked the boys to tell what they had been doing to conserve the natural resources. One of the boys served as chairman while individuals reported their activities. A boy reported on conservation in a pasture near the school. Big holes had been washed in the pasture. The boys hoped to get permission to build the pasture up so that there would be grass on it and the holes would be filled up and grassed over.

Another boy stated that his father works at the seed-corn farm and when he comes home at night he tells the family what is done to conserve and improve the soil of the farm. At this point still another boy reported that he and several other club members went to camp at Spirit Lake and while there studied about the importance of preserving good topsoil in its original condition, and of keeping it from washing away with plenty of grass, especially on hillsides and where gullies threaten to start.

Anti-Litterbug Projects

The Anti-Litterbug Project had some of its early beginnings in Portland, Ore. It was organized nationally through The Izaak Walton League of America. *The project is built around the cultural beauty and resources of the region, with special attention to parks, coasts, and highways.* A poster contest was used at first to develop interest. Litter cans and wayside areas are provided along the State highways. The filling stations give out litter bags for cars.

At the Glen Haven School the children made "Anti-Litter Bug" posters for the halls and the school cafeteria to remind the children to avoid litter and to keep the places where they go neat and clean.

Children of the third grade at Mills School, Whittier, Calif., made a study of the parks in their area. Special attention was given to the preservation of their beauty and usefulness. Contrasting murals were painted showing advantages of the "well-cared-for look" over the "littered and destroyed by careless people look."

As a culmination of the study the children made litter bags for family cars. The pupils strengthened their bags by taping them around the top. Sometimes the bags were decorated to make them more attractive for use in the cars.

Nature Knights Emphasize Conservation

An active group of children and young people in Missouri are the Nature Knights. The group is sponsored by the Missouri State Commission. The Knights include pupils in the elementary schools and in a few high schools. Their activities are carried on as a part of the program of daily instruction in the school or as a club program. When the pupils are organized as a club, regular periods are set aside for meetings.

In the club work conservation leaders are trying to *avoid undue emphasis on the club idea and to stress conservation study and activity.* The variety of club activities is wide enough for every child to receive any of the awards suggested for completed activities. Thus harmful effects that might result from stress on awards and competition may be avoided.

The work includes both self-improvement and conservation activities. Among the suggested conservation activities are: Identification of wild animals; learning about their habitats; doing something to

conserve them through protection of habitat or planting cover; developing wildlife areas; identifying and studying trees, plants, birds, weeds, fishes, mammals; and learning about laws and regulations concerned with their conservation. A few children work with their parents in planning and securing services to establish farm ponds. Some groups are building boxes for bluebirds and putting them along highways and other places where birds are likely to nest.

Among Missouri's conservation problems are reforestation and forest maintenance, soil and water conservation, wildlife conservation, and conservation of minerals. Schools are emphasizing the conservation of wildlife. *Natural resources in a particular situation, however, are interdependent, and although the activities reported are concerned with wildlife, problems of forests, soil, water, and minerals are studied.*

In Jasper County, Mo., Nature Knights, Future Farmers of America, Four-H Clubs, Boy and Girl Scouts, and elementary- and secondary-school groups work in cooperation with the Sportsmen's League. The Missouri State Conservation Commission's educational adviser and other personnel in the area help supervise the program.

The object of the Nature Knights in Jasper County is to study needs of wildlife and other resources in the county and to develop an appropriate program of conservation. Among the wildlife in the area are birds, foxes, deer, squirrels, and other animals. Children engage in such activities as planting trees, multiflora roses, and food and cover patches. They help to develop farm ponds.

Children and their teachers need assistance with conservation activities. Their county agricultural agent receives orders for trees, wildlife bundles, and other plantings during the year. The wildlife conservation agent, educational adviser, and others, help to plant trees and multiflora roses. They help the children and parents to stock their ponds and pastures. They feel that to have a part in these constructive activities to preserve and at the same time develop for recreation and pleasure the community's wildlife and other resources causes people to be conservation conscious and reduces the need for rules and restrictions.

The county superintendent of schools finds that children in grades 5 through 8 are the ones most interested in conservation. In cooperating with the schools, the Carthage Sportsmen's League has charge of a festival in Carthage in which the entire community, old and young, take part. From 2,000 to 3,000 children take part in the conservation program which is a part of the festival.

Usually the schools' part in a festival consists of skits and exhibits presented by groups of children. One school gave a conservation play that the children had written cooperatively during the year. Posters made by the children of different schools are displayed in public places.

Part of the impetus for the interest in conservation throughout the county first came about through the inspiration and enthusiasm of one of the business men of Carthage, the operator of a drygoods store.

Children's Clubs at Work

At the ages of 10 to 14, children begin to enjoy working in organized groups. Representatives of fourteen or more clubs that include conservation in their programs were observed in their work or consulted about it. All expressed satisfaction at being able to work together in undertakings that promise to maintain or develop the resources on which depend the ways of living that we value and wish to pass on to future generations.

7. Getting a View of All Our Resources

PUPILS AND TEACHER usually need to get an overall view of their conservation activities in order to understand that natural resources are all interrelated. Such reviews are thought to be most effective when they come about in the logical development of a project. For example, children sometimes make an initial survey of local situations when they plan their program, and use a summarizing or review activity near the close of the project or the end of the year, or prepare programs for school and community.

Getting Initial Information

An initial survey may be made for the purpose of deciding what to undertake first. Children take trips to learn about problems. They interview officials, farmers, foresters, and others who are in a position to know particular facts. They make collections of pictures, bulletins, and other materials that might help them. The accounts that follow are illustrative.

Statewide View of Activities

Schools vary in the number of real conservation activities and experiences the children can have. The problems studied are usually those that have their roots in the condition or use of resources in the home community.

Arkansas has good topsoil, forests, fish, birds, game, wild flowers, and minerals. One of the State's needs is to control the effects of soil erosion through planting more grass, trees, and cover crops to hold the water in the soil. In one area of the State a pilot project experiment demonstrates how to control runoff and erosion on different watersheds in such a way as to keep the water on the soil and prevent floods in the lower river valleys. Aerial maps in some localities are available from the United States State Soil Conservation Service. These maps are helpful to schoolchildren, especially in the upper grades, who are studying the control of runoff on watersheds.

Other successful ways of controlling erosion are in progress. New grass, young trees, and pastures are often seen now in places that were once barren soil. Many gardens are fertilized and erosion eliminated. In some communities irrigation brings water when the rains do not come.

Next to control of soil erosion in Arkansas comes the conservation of forest areas. As a rule, children do not have firsthand experience with forest problems. Yet they can observe forest industries in many places. Children can see men cutting trees, handling timber, and processing the wood. Forest industries are the largest employers of labor in Arkansas.

The Arkansas Game and Fish Commission is responsible for establishing game and fish reserves.[1] Since these are so closely related to the conditions of the forests, the Arkansas Game and Fish Commission and the Arkansas Forestry Commission cooperate closely. Both commissions send resource people to work with school and community groups on request. They also provide informational materials free of charge.

Arkansas also produces bauxite. The State has rich bauxite mines and factories provide informational materials and resource people to aid schools in developing studies.

One of the ways in which some Arkansas schools are helping boys and girls to get a view of the State's many resources and their interrelationships is to cooperate with children's, young people's and parents' groups that are interested in conservation of all the State's resources. From the headquarters of these organizations, teachers and others may secure materials. Resource people go to schools on request, exhibit materials, talk with classes that are working on projects and help teachers and pupils organize excursions to one or several resources.

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[1] See also: *A Survey of Arkansas Game* (Little Rock, Arkansas Game and Fish Commission, 1951), p. 155.

One of the youth groups that works most closely with schools is the Four-H Club. The associate county agent of Pulaski County gives much of his time to the promotion of Four-H Club work, which in Arkansas is integrated with the school program and often deals with phases of conservation. A recent statement reports for one year 27 Four-H Clubs with 2,500 boys and girls of Pulaski County enrolled in the work. The county Club work receives good cooperation from school principals and the county superintendent. Schools that cooperate with the Four-H Club have one 45-minute club meeting during school hours each month.

In Pulaski County, a demonstration is usually a part of the Four-H Club program in conservation. Several tree-planting projects have been carried on in recent club programs. The club members get their seedlings from nearby forest industries. In this county during the year mentioned, from 16,000 to 20,000 seedlings were planted by individual club members.

When the Four-H Clubs began their work on tree planting, interest was stimulated through exhibition of posters, samples of trees and plants used to protect the soil, display of books, children's scrapbooks, and reports. These exhibits were made by the club members. Recognition and prizes in money were given for outstanding or original or especially practical exhibits. The money was used by the winning schools to buy new plants and shrubs. In these beginning stages of the project, the exhibits were moved to the county office in town.

As the children's activities changed from book-and-paper work to real and practical activities, such as planting forests and shrubs and hedges in fencerows, it became increasingly difficult to transport all exhibits to town. As a result, *the children displayed the exhibits in their own schools, and the county officials, judges, and visitors were transported from school to school and from house to house, where children had projects at home.*

In Arkansas, the Keep Arkansas Green Society provides materials and resource people to aid schools in getting broad views of conservation needs and progress. This Society is a branch of the national group working on the Keep America Beautiful program. One of the important goals of the group at present is to aid in enforcing State laws to prevent forest fires.

Different counties in Arkansas, as well as in other States find different ways of getting overall views of their resources. Not all review activities occur at the close of the school year, but involve instead, many resources in day-to-day experiences.

Community Activities

A group of fourth-, fifth-, and sixth-grade pupils in Sand Spring School near Manchester, Iowa decided to make a study of the natural resources in their community. Instead of making a formal study of a particular resource, such as soil, the teacher suggested to the pupils that each one might like to study the outdoors for a while and report his observations and experiences to the class.

In summarizing their preliminary observations, the children reported that they had first tried to learn as much as they could about the squirrels, birds, beavers, and other wild animals that live around Manchester. The children said there were squirrels' nests in the trees around their schoolhouse. There is a hunting season on squirrels and other game. Some of the children think they would like to have all game preserved. A few are beginning to observe, as children of other schools have done (page 159), that saving more of one kind of game such as deer in a certain environment may lead to the destruction of desirable plants or other kinds of wildlife.

The children took a school trip to a game reservation. Before the trip, they discussed what they might expect to see. They got together the books that might give them facts. After their trip they planned to make a report and formed committees to work on different parts of their report.

A number of the children had conservation experiences at home. One boy was driving with his family when he saw 10 young pheasants. When he reported the incident, a committee volunteered to make a study of pheasants and learn what laws had been maintained for protection of pheasants and other wildlife. They mentioned the protective coloring of pheasants which leads to the natural preservation of the bird, especially in regions where cover has been left in fence corners and woodlots.

The children asked their fathers about practices in conserving soil. One boy said that his father changed the crops from year to year in order to keep the soil in good condition. He said that corn is hard on the soil and that his father produced only one crop of corn every 3 years. In one of the other 2 years, clover and oats are sown, and the third year, hay is harvested.

Another boy reported that on the hillsides near his home, his father had planted trees where they would help hold the soil. Between the trees, grass had been sown and was used for grazing cattle. This farmer also had a woodlot in one corner of the farm. The trees and

shrubs in this woodlot kept the soil from being washed down the hillside. In this locality, woodlots provide cover for wildlife and trees that can be cut for posts now and then.

"Later," said the teacher, "we will organize our experiences into a unit, but just now we are trying to learn more about wildlife, soils, or other resources or maybe just get the answers to our questions about outdoors."

School and Home Cooperation

Communitywide activities that bring pupils and parents together on conservation tasks provide opportunities to look over major problems and entire areas of experiences. Examples follow.

Pupils, Parents, and Teacher Together

In a 1-room school near Garland, Nebr., a program developed by the teacher, children, and community embraces several phases of soil conservation. In this school, the curriculum includes improvement of the environment — the school, roads and parks, organizations in the community, and the learning activities of children at home. For example:

> One year when the children and their teacher together looked over their school grounds to see how they could make them more attractive, they decided to plant iris around the flagpole. And when the children discussed where more trees should be planted on the school grounds, one of the older girls explained that she had planted the cedar trees then growing there about 6 years before, when the seedlings were about 5 inches tall. This last incident served to demonstrate to the others the continuing benefits to be derived through conservation activities extending over a period of years.
>
> Children in this school maintain a roadside cleanup project as such a continuing activity. Groups of children regularly pick up paper and trash that is scattered by the byroads near their homes.

Care of property is one of the areas of conservation emphasized by the teacher through this school program. Children and teacher help select supplies and equipment. Not long ago, the group went to the equipment store in Lincoln, Nebr., to pick out desks which cost $30

each. They developed this errand into an excellent learning activity for the pupils. The children in this school know exactly what each piece of equipment in their school costs. Such knowledge helps develop their interest in care of property.

To recent visitors, these children remarked, "That globe (one to be lowered from the ceiling when desired) cost us $150. We try to take good care of it, especially since we know that it cost so much."

When something is broken in this school, pupils immediately repair it, alone if they can, and with the teachers' help when jobs are too difficult. In one classroom, for instance, when chairs came unglued, teacher and pupils together mended them.

Parents of this community help take care of the school yard. For example, they mow the yard several times during the summer to preserve the attractiveness of the landscape and to prevent growth of weeds which might injure the children's feet when school begins. Last spring the children themselves raked up the leaves and dead branches accumulated on the lawn. This cleanup activity made it easier for the parents to keep the lawn mowed.

Home Experiences in Soil Erosion

A fifth-grade class and their teacher in the Badgett School, Route 2, Little Rock, Ark., presented a review of their past year's home experiences in soil conservation in a special program set up at their school. They invited members of other classes in the school to contribute reports of their conservation experiences, too. Following are incidents reported in this program which give a general idea of the types of home experiences that contribute to the study of soil conservation in this school.

> Dick, who is 10 years old, lives on a farm of about 750 acres. Four families live on the farm and help with the work which means that 19 people live on the place where Dick lives. There are three tractors and some horses to be used in the work. Among the crops raised on this farm are grass to check erosion, and soybeans, used as feed for hogs and to help put soil in good condition. Dick, of course, helps with this work as much as a boy of 10 can.
>
> Jack Brown is a farm boy who attends one of the lower grades. His farm is planted in 123 acres of cotton. His family maintains a 1-acre garden where they raise corn, tomatoes, beans, turnips. Nitrate of soda is used as fertilizer. On this

farm patches of alfalfa and Sudan grass help keep the soil in good condition. Jack's favorite crop is cotton.

Children in one of the classrooms in this school are especially interested in birds. While engaged in a unit on birds they observed a bird family building its nest, laying eggs and hatching young birds.

Howard's interest is in gardens. His father raises cucumbers and various garden greens, as turnip greens, spinach, and mustard greens. He finds that the market for spinach is best during the winter, that people like turnip greens in almost any season, and that mustard greens sell at any time during the growing season.

All of the children enjoy studying conservation. Practices they observe at home frequently stimulate ideas on conservation which are explored further in the schoolroom. Children observe that better farming means better living; that contour plowing checks erosion; that a wildlife season, providing hunting as a recreation, may be desirable in an area with a surplus of animals too great to maintain life; and that certain crops, as hay, soybeans, and sweet potatoes, take a long time to grow and harvest.

The school is on the edge of the pecan region. Some of the farms raise pecan trees and use pecans as a supplementary crop. School activities in which the pupils engage include:

Painting a mural to show how conservation is tied into many of the community activities.

Plotting the children's home farms and showing where conservation practices exist.

Carrying on conservation practices during the summer.

Taking field trips to study conservation activities.

Putting flowering crab apple trees on opposite sides of the school grounds.

Planting a mimosa in honor of a boy from the school who was killed in the service.

Conservation Days and Observances

As a means of reviewing and pulling together and focusing a spotlight on the outcomes of conservation study, schools use a variety of observances. They may have a conservation day or week. They may give a radio program. Whatever means is used, information about conservation of natural resources is presented to people who have responsibility for helping to conserve them.

At Belleair School, Clearwater, Fla.

Pupils and teachers, parents and conservationists, and others in the community look forward to Conservation Day at Belleair School all year long. Visitors from other school systems and from colleges and other organizations interested in conservation, even foreign visitors journey to Clearwater for this annual program on conservation.

Conservation Day at Belleair School is the outgrowth of a year's study and experiences in conservation on the part of Belleair pupils, staff, parents, and others in the community. Beginning in early March, the children begin six weeks of intensive study of conservation during which they go on field trips, see movies, listen to invited speakers, make maps, booklets and pictures, and write reports of their work in organized form. Some of the reports and exhibit materials are used in the Conservation Day program.

The study of conservation at Belleair School is developed according to a 6-year plan, which is designed to give every child from the first through the sixth grade the opportunity to study a different phase of the conservation program. The faculty of the school is primarily concerned with the problem of balanced use of natural resources.

On field trips, the children may see the results of poor resource-use practices in abandoned farms, burned-over woodlands, eroded lands, polluted streams, and diminished water supply. They may discover good practices in neighboring gardens, groves, forests, and greenhouses. The school maintains a school garden where all the children have a chance to participate in gardening activities. In this school the children also learn to make use of many common things nature has placed about them which are often wasted or destroyed, such as pine needles, cones, seeds, Spanish moss, palmetto fronds, scrap wood, old newspapers, shells, clay, stones, old inner tubes, bottles, jars, cans, and the like.

The conservation units developed by grades at Belleair School in 1956, included: Animal life (1),[2] community helpers (1), farm life (1), birds (1), human resources (2), dairying (2), community resources (2), insects (3), birds and animals (3), soil and water conservation (4) sea life (4) Florida resources (4), fish (5), forest products (5), plant life (6), government (6), and industries of Pinellas County (6).

[2] Numbers indicate school grades.

The children carry on varied activities related to their unit on which they work intensively for about 6 weeks, with some activities such as gardening continuing through the year. Such subjects as reading, arithmetic, spelling, language, and art are integrated whenever appropriate to the conservation study. The children collect clippings and pictures concerning their unit topics. They frequently make booklets. They have planted the grass, flowers, shrubs, and trees on the school grounds.

One day each year all the children of the school give a conservation program. This is the occasion when visitors from various parts of the State as well as local people come to see the program and may ask questions of the children. These people are supervisors, teachers, members of the State Department of Education, foreign visitors, and others.

The program takes different forms each year. At a recent presentation, a big conservation frieze was related to current events. The children explained the frieze dramatically.

At Minneapolis, Minn.

Children of Minneapolis Public Schools celebrate Conservation Week and Arbor Day with many appropriate activities. For 6 years elementary schoolchildren have planted tree seedlings in cooperation with The Izaak Walton League. During Conservation Week in 1956, sixth-graders from six elementary schools planted approximately 5,000 conifer seedlings on some public grounds near Medicine Lake. The League women supervised the planting and furnished the buses for reaching the planting area. The tree planting activities in Minneapolis are an outcome of a unit on trees and conservation which the children study at their schools.

Arbor Day

Arbor Day is often the occasion for a whole-school or school-community program. Following is the children's account of a program and planting for Arbor Day, 1955, in a Nebraska county:

> We held our Arbor Day program on Monday. Our apple tree arrived and we did not want to delay planting. We held an outdoor program of poems, songs, the history of Arbor Day,

and reports on Arbor Lodge State Park, and the life of J. Sterling Morton (an early Nebraska statesman who built the lodge and landscaped the grounds as a home). Then the boys dug the hole and planted a Jonathan apple tree. Everyone took part in filling in around the tree. The seventh grade arranged the program. *Three families volunteered to water the tree during the summer. We are all hoping to return some day and have an apple from this tree.*

In South Carolina

Each year the first Friday in December is set aside in South Carolina to be observed as Arbor Day. The week which includes Arbor Day is designated as Conservation Week.

Many Arbor Day and Conservation Week programs include a tree planting ceremony on the school grounds or in some other place. Emphasis is given to the importance of lending a hand to the little

Blacksburg School, Chester, S. C.

Broadcasting about conservation of natural resources.

trees planted by nature as well as to those planted by man. Other programs focus attention on the conservation and wise use of forests, soil, water, scenic and wildlife resources. In 1954, 709 Conservation Week and Arbor Day programs were reported by teachers, with 80,663 persons attending. There were undoubtedly many other programs that were not reported.

During this Conservation Week, there is considerable cooperation on the part of the State Commission of Forestry, clubs, the United States Soil Conservation Service, the State Department of Education, newspapers, radio and television stations, and the schools to present the challenge of conservation to the people of South Carolina.

At Newberry, S. C., the radio broadcasts a daily program on conservation during the week. On "Youth Night," representatives from each youth group in the community in the county were on the program. There were Scouts, Four-H Club members, and others.

Tree Appreciation Day in Georgia

In Georgia in 1953, an annual observance of Tree Appreciation Day was begun on a selected date during early December. The program is sponsored by the Four-H Club members who try to give one tree to each boy and girl of school age in the State.

In some instances the trees are furnished by the Four-H Club members, and in others by banks, Farm Bureau Chapters, or local forest industries.

In 1953, successful Tree Appreciation Day programs were conducted in 128 counties, with 1,646 persons participating. On this day, 547,682 boys and girls each received a tree to plant. The Tree Appreciation programs were designed to encourage boys and girls to participate and were used to demonstrate how to set out a seedling properly. Most of the trees were pines, but a few maple, dogwood, and flowering peach were included. The programs created a great deal of interest in tree planting, as well as in general forest conservation.

At Lake Como School, Orlando, Fla.

A Conservation Week culminates the year's studies and activities in conservation at Lake Como School. Pupils, parents, and the public are invited on this occasion. Conservation specialists from local, State, and National levels have a part in this program.

The conservation work is carried out in each grade in the same general way as at Belleair School. (See page 134.) During the preplanning period in August, two United States Soil Conservation Service technicians take the teachers and a few parents of Lake Como School on field trips to study types of soil, pasture lands with improved grasses, types of irrigation, a nursery, a stocked fishpond where they fished, the mucklands, a dairy, and a dam.

In each class, the pupils choose conservation subjects for their study during the year. Topics chosen by grades for a recent year included: Animals (1),[3] water birds (1), flowering plants (1), gardens (1), birds (1), insects (2), ornamentals (2), community helpers (2), garden plants (2), citrus (3), fish (3), trees (3), transportation (3), useful insects (4), wildflowers (4), harmful insects (4), wildlife (4), forestry (5), government (5), human resources (6), truck farming and related industries (6), and cattle (6).

The children took as many field trips as possible. Walks around the school grounds were found effective for studying trees, cases of erosion, and effects of insects, traffic, and wind erosion on grass. Each class had a garden outside its windows for vegetables and for flowers.

One year the children set out 50 pine seedlings on Arbor Day. The trees were furnished by the State Forestry Service. The United States Soil Conservation Service also helped the school by making materials available and by helping to take the children on field trips.

Throughout the conservation work at Lake Como School the approach is not just to save but to use and manage resources wisely for the greatest number of people. The school tries to integrate this study of conservation with the other work of the school and to make it a regular part of its daily living. Conservation of such things as paper and pencils, books, the school building, and human lives, is a part of the children's daily conservation experiences.

The parents have assisted in the conservation work of the school by furnishing transportation for field trips. Also, several parents have served as resource people for various aspects of conservation.

Graduation Programs in New Hampshire

Several schools in New Hampshire make conservation the theme of their graduation programs. These programs grow out of the conservation work carried on by the school throughout the year.

[3] Numbers indicate school grades.

Last year, Union School presented such a conservation pageant for its graduation program. Union is a 2-room rural school, where teachers and pupils have many conservation experiences and give much time to study of conservation. Grades 5 to 8 are in one room. They study two conservation units as a group each year. One year the units are about soil and water. In alternate years they are about wildlife and forestry.

To assure continuity in the conservation pageant last year, the graduating class used a narrator. Some children told about such resources as soil, water, animal life, and forests. Other children told about the conservation work of several National and State agencies. At various points in the pageant a few children portrayed the parts played in the conservation of our natural resources by some of our great Americans.

North Woodstock and Rumney Schools have had graduation programs with conservation and natural resources as a theme. The student-speakers on the North Woodstock program dealt mainly with scientific aspects of conservation. These schools find the graduation programs an excellent opportunity to bring conservation information and interest to the people of their localities.

Conservation on Radio and Television

Summarizing and review activities may consist of programs that the children develop and produce for radio and television. *Such programs give the children opportunities to look at and evaluate the results of some of the experiences they have had in order that they may present good productions.* In places where conservation is given considerable emphasis in the schools and community, radio and television programs have been produced as an outcome of work and as a means of informing and interesting the public in conservation.

San Mateo Broadcasts Conservation

The San Mateo City Schools of California have a 15-minute weekly Science Program on radio for the children and teachers. One hundred fifteen school districts outside of San Mateo also use the program. Children in grades 2 through 8 listen to the program regularly. Kindergarten and first-grade children listen to those programs that are suitable for them. Teacher guidesheets and pupil worksheets are supplied to all the schools using the programs. The guides include background

materials, related vocabulary study, and suggestions for discussion, excursions, and experiments to be held before and after each broadcast. The worksheets, which provide illustrations of the topic discussed on each broadcast, are used by the pupils during and after the broadcasts.

The broadcasts are prepared by a steering committee composed of the superintendent, science consultant, curriculum director, and a teacher committee. Each member has specific responsibilities for the project as well as to work with the group as a whole.

Resource units have been prepared for several of the topics included in the broadcasts, such as animal communities, garden insects, seashore life, rocks, minerals, weather, stars, weeds, and winter birds. These units have been developed by committees in the various schools. The units and the broadcasts are developed from children's questions. Conservation receives a continuing emphasis in the entire series of programs. The main purposes of the programs are to supplement science instruction in the classrooms, to enrich the science experiences of children, and to make the child more aware of his San Mateo environment.

Conservation on Television in Seattle

Seattle, Wash. schools teach conservation and other subjects directly by television. During 1955, three programs were on non-renewable resources, such as rocks and minerals. One was on all the ways men use these resources. The pupils used magnets in their homes to locate some of these items. Another program was on a most important resource — soil. All the erosive factors were shown and what man can do about it. The question was discussed: "What is our responsibility?"

During the autumn and winter of 1956, a series of 12 conservation programs, entitled "Resources for Harvest" was given on Monday afternoons for fifth- and sixth-grade pupils. These programs were presented to help teachers and pupils understand their citizenship responsibilities with regard to our five basic natural resources in particular. The first four programs emphasized the relationships of the various resources and the fact that they cannot be separated from each other. The last eight programs dealt with the work of the State Department of Game. They pointed out that the management, production, and harvest of our wildlife is necessary in order to keep the balance between the wildlife population and its habitat.

A representative of the State Department of Game was host for each telecast at his conservation camp at the foot of Mount Rainier.

He introduced each program, showed animals and birds to the viewers, and presented guests who discussed various aspects of conservation and gave demonstrations. The programs were about:

Relationship of Our Natural Resources
Salt Water Fisheries
Minerals and Their Meaning
Forest Products and Wildlife
Know Your Game Department
Hunting Safety
Small Game Animals
Big Game Animals
Migratory Waterfowl
Upland Game Birds
Archery
Fur-Bearing Animals

Conservation on the Air

For more than 20 years, the Wisconsin-School-of-the-Air program, featuring Ranger Mac and his eye-and-ear-opening talks to children, was popular in Wisconsin and well-known and liked in other States. In that time, more than 700,000 boys and girls and adults listened to Ranger Mac's:

Hello, Girls and Boys:
This is your day—
So, Up and Away!

and then were carried to the woods and meadows by a fascinating tale of ten billion small feathered migrants sweeping through the air each spring and fall. Or, perhaps, the story would be about that "little bomb in feathers," the ruby-throated hummingbird, able to move its tiny propellers at the rate of 60 beats a second, yet weighing less than a penny. Or over the air might come some timely fact about the pine-tree seedlings grown from tiny seeds in the pine cones which boys and girls and often families collect from newly felled trees or from the caches the squirrels gathered for the winter and then forgot. The following paragraph is an excerpt from a talk by Ranger Mac shortly before his retirement in 1954:

> Ten billion birds are now flying across the face of North America on their way from their northern breeding places to their winter haunts, the barn swallows to Brazil and Argentina, the bobolink to the pampas of Brazil, the warblers that are now passing through from the forests of the North on their way to Central America. The flight is now on from the tiny hummingbird to the large eagle. South in the fall, back in the spring—ten billion birds sweep across the face of North America each year like a great feathery pendulum.

U. S. Soil Conservation Service

Radio skit. Sound of falling rain made by shaking salt on cellophane.

Recently the Wisconsin School of the Air has presented the "Wonderful World of Nature," a series of talks including Wisconsin's Forests, Wisconsin's Forest Industries, The Whistle of Wings, and Booming on the Prairies. The belief is expressed that "*when we can observe children who involuntarily stop their play to wonder at the lazy circling of a hawk or pause to admire a beautiful wildflower, we shall be well on our way to accomplishing the goals of the broadcasts.*"[4] Wisconsin School of the Air is also developing television programs that will include conservation education.

Televising Conservation in Portland

Supervisors of Portland, Oreg., schools produced a series of telecasts, called the Supervisors' Series. Each supervisor presented five

[4] Robert S. Ellarson, Department of Forestry and Wildlife Management, University of Wisconsin.

programs to get across to the public what the schools were doing in his field.

Several of the programs were related to conservation. On one program, an eighth grade gave a demonstration of paper making. The pupils used a papermaking kit furnished through the Curriculum Department. They said: "Conservation is not hoarding. It is the wise use of our resources." Someone from the mills had come to help the class before the telecast. After the program, the pupils planned to visit a paper mill. On another program, sixth and seventh grade pupils demonstrated hydroponics.

8. What Schools Are Emphasizing

THE ACCOUNTS OF CHILDREN at work in the foregoing chapter show that boys and girls are interested in the Nation's natural resources. They are eager to learn to use resources wisely to improve life for themselves. They can understand that it is important for them to leave a heritage of natural resources for Americans of the future. When asked to help in school-and-community conservation projects, they respond and get satisfaction in what they accomplish.

What are the points of emphasis in school conservation programs? First, it is essential for every generation to use the resources available with thought of maintaining the supply that will be required by future generations. Secondly, problems of supply need to be identified and defined in order that resources be used wisely. Thirdly, understanding that all resources are interrelated and interdependent is the key to good conservation practices. In the development of each of these major ideas, every child needs a great deal of basic information as well as firsthand experience. Information and experience belong together as the children learn to use the resources around them, identify and define the problems of supply, and understand and improve their practices.

Using Resources Around Us

What do teachers and children see as they look over their local situations together? Soil is one example. Children who live on farms

or in suburbs find soil conservation experiences in gardens, woods, or parks. They set out trees. They help to plant or weed or harvest lettuce, radishes, tomatoes, and other food products. They observe the rate and amount of growth in different kinds of soil. They see rich topsoil displaced through erosion by wind or water. They build piles of leaves and other vegetation to produce compost, which they will use to replace fertility losses in the soil. They lay mulch of straw or plant grass to stop erosion, noting that the cause or source of an erosion problem in a particular area may not be in the immediate vicinity of the ditch or gully that mars a lawn or field. They acquire a background of experience on which to build in learning about the importance of caring for soil and protecting it from misuse.

When the children live in cities, opportunities for them to experiment with soil must be sought or made. Some schools in cities have enough soil for small gardens and for trees and shrubs. From the suburbs or nurseries, varieties of soil are brought into the classroom. The children keep and care for growing plants. They plant seeds, slips, or bulbs in different types of soil and observe differences in growth. They develop water runoff experiments to demonstrate the erosive effect of running water on soil.

In all the States visited, children are learning by some firsthand experience that scientific research has resulted in improvement of impoverished soil, erosion control, and effective cropping methods. They also observe that still greater improvement is needed and they become eager to have a part in bringing about a change.

In similar ways children learn about other natural resources. Our minerals are being used in the improvement of living for more and more people. Yet the coal, oil, and gas we use up cannot be replaced. Metals, such as iron, are also limited, although they have the advantage of being made reusable again and again. Atomic energy promises to be a remarkable and continuous source of heat and energy. While scientists are preparing society for its wide use, efforts are meanwhile made to conserve our sources of energy from our natural resources.

Water is seldom entirely consumed. The amount remains approximately the same although it moves from place to place. But the lavish supply we utilize in living in most States or cities may not always be widely available for such free or inexpensive use as we now make of it. Or the quality of water may be changed so that it becomes unfit for man to use.

All resources are woven together in a web of interrelationships and balance among soil, water, plants, and animals. Man has an important

part to play in the maintenance of a balance between plants and animals. His use of animals as food and recreation helps to keep animal populations in balance with the plant life produced by the soil and water. We have all seen the farmer sell for meat the surplus cows his pasture and feed cannot care for. By this means his pastures will not be destroyed. Similarly, the hunter harvests the surplus deer to protect the forest cover.

Children and teachers are asking about the future that the Nation faces with respect to resources today. Will increasing demand for resources to improve the quality of the Nation's modern living so exhaust our supply that the standards we hope to maintain will be irreparably lowered for future generations? Or will science come forth rapidly enough with new discoveries to maintain and improve the quality of living?

Students of scientific progress tell us that within the last decade science has revealed uses of resources to maintain and improve living that once were beyond the imagination of any but our greatest geniuses. Nuclear and solar energy may soon be substituted for commonly used fuels as sources of heat and light. Hybrid plants and animals already are greatly increasing our food supply. The chemical synthesis of chlorophyl may some day result in the manufacture of foods which are now produced by green plants. Mineral salts, magnesium, and metallic elements necessary to good living are reclaimed from sea water. Plastics, which are chemical productions, taking the place of iron, steel, and wood, make a great impact on our lives. In the building industries, plastics substitute for wood or steel in shelving, window blinds, and tiles for floors and walls. In airplanes are shelves, fixtures, upholstery, and dishes made of plastics. Plastic drapery and upholstery make more comfortable and attractive our homes, hotels, and travel conveniences.

Identifying Problems of Supply

Ways of modern living use up resources and bring new problems. In the States that could be visited for this report, industrial developments of both State and National significance are studied, especially those that have occurred within the last 20 years. Children are being made aware of these through firsthand experiences and by discussions with resource persons.

New developments result in increased agricultural and industrial production and bring about inventions that make still heavier demands upon our present resources. War and threats of war and increasing population demand more production. Problems of supply are pointed out by people who are helping to plan conservation education. Often referred to are such facts as those reported by Wilfred Owen of The Brookings Institution concerning our use of resources between 1900 and 1950:

> . . . The amount of copper, lead, zinc, and oil taken from the ground during the past 50 years is considerably greater than present known reserves. Since 1900 our total consumption of agricultural products increased 2¼ times, and our consumption of minerals, including fuels, 6 times 1900 totals. By 1950, as compared with 1900, we were taking from the earth 2½ times more bituminous coal, 3 to 4 times more copper, iron ore, and zinc, 26 times more natural gas, and 30 times more crude oil.[1]

Mr. Owen goes on to say that millions of acres of forests have been cut without enough attention to reforestation. Farmers have impoverished their lands and mined them of fertility in their efforts to produce cash crops or to meet the requirements for products during the war and immediately thereafter. In many parts of the country, industry, irrigation, and city living have increased their demands on our supply of fresh water. Teachers and other educational leaders in the States visited are helping children and young people understand the problems that are within their experience and observation.

Our dependence on other countries for nickel, cobalt, tungsten, chromite, and columbite is emphasized in Mr. Owen's report. Molybdenum, he says, is the only one of the ferro-alloys that we have domestically in abundant quantities. Quoting again, Mr. Owen says:

> . . . The United States has practically no domestic tin, natural rubber, cordage fibers, or chromite of certain grades, and practically no nickel or cobalt. Other minerals found at home but in insufficient amount at economic costs include copper, lead, and zinc. Sixty percent of bauxite supplies come from abroad, and of the 13 pounds of manganese required per ton of steel, the United States produces half a pound.[2]

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[1] *The Nation Looks at Its Resources,* Report of the Mid-Century Conference on Resources for the Future. (Washington, D. C., Resources for the Future, Inc., 1954), p. 15.

[2] Ibid, p. 16.

Our list of imported vegetable and animal products in short supply, Mr. Owen says, currently comprises 75 items. Our main sources of supply for certain imports include: Coconut oil from Indonesia for lubricants and incendiaries; palm oil from the Belgian Congo for the manufacture of tin plate and cold-rolled steel; silk from Japan and Iran for powder bags for large guns; special cotton from Sudan and Persia for airplane fabric; and castor oil from Brazil for brake fluids and nylon. Mr. Owen states that:

> . . . The United States is the world's largest importer of timber products. Many items that we produce at home, which showed a substantial surplus of production over consumption as recently as 1939, now indicate a deficit that has to be made up through imports from other nations.[3]

Understanding the Relationship of Resources

For the most part, children are working on problems related to resources right around them — problems that they can do something about. In many States, the most important conservation task is to control soil erosion at its source and maintain soil fertility. In other States, the conservation job is to manage forest lands for sustained production of timber products, watershed protection, and erosion control, and to keep rivers free of pollution.

Often children become interested in a problem of soil erosion that at first seems to be limited to the home community. The spread and uneven distribution of natural resources, however, can make conservation a State, regional, and national problem as well as a problem of a single community. The State that suffers from floods in lower river valleys may not be responsible for the cause of the floods in the upper reaches of the valley. The forest cut in one State may cause the flood in another State.

Generally speaking, six groups of natural resources and problems connected with them receive attention. Some of these resources are renewable or replaceable and others are irreplaceable. All are interrelated.

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[3] Ibid. p. 16. See also; Owen, Wilfred, *A Mid-Century Look at Resources.* (Washington, D. C., The Brookings Institution, 1954), 20 p.

Water for Modern Living

Since people are rapidly increasing their use of water, children naturally have observed what is done and are prepared to understand the problems to be solved. Population is soaring. New questions continuously arise. Will the duration of our civilization be measured, as are some civilizations of old, in terms of what they do about water?[4]

How much water is there, for example? It has been estimated that 70 percent of precipitation — 21.5 inches annually — is evaporated or absorbed by plants of no value to man. To understand the meaning of the statement, the children in a city school, in a region where a great deal of corn is grown, made guesses about how much water a corn plant would use. They planted corn and measured the amount of water they had to give it. A technician from the United States Soil Conservation Service visiting a class explained that it takes about 50 gallons of water to produce one ear of corn. He used charts to help the children realize the large amount of water that is needed for different crops in that region.

After evaporation and absorption, 30 percent, or 8.5 inches, of our supply of water is left for man to use. He takes it from streams and wells. Theoretically this is usable water. How is it used? One way is through industries, which are multiplying faster than ever. Industries consume, it is said, around 40 percent of all usable water in the country.[5]

Electrification in rural communities bring household and recreational improvements that require an ever-increasing amount of water. Water helps provide electricity to run mills and factories. Air conditioning is expected to cause heavy drains on our water supply — heavier perhaps in the future than now.[6] Irrigation consumes great quantities of water — more than half, it is said, of all usable water of the Nation.[7] Water is required for growth of forests for building our homes. It is in turn preserved by the trees and made available for other uses in the same region.

Part of the Nation's shortage of usable water is the fault of people

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[4] See also: United States Department of Agriculture, *Water*, The Yearbook of Agriculture. (Washington, United States Government Printing Office, 1955), p. 1-8, 681-684, 126-135, and other sections as questions arise.

[5] *Water, Water Everywhere*, The Sunday Star. (Washington, D. C. January 12, 1955), p. 1 and 4.

[6] *The Nation Looks at Its Resources, op. cit.*, p. 128.

[7] The Sunday Star, *op. cit.*, p. 1, 4, and 7.

who use it wastefully. Water is often polluted or made unusable or unavailable by destruction of resources related to it to such an extent that cities and States are in danger of having modern homes, lawns, gardens, street washing, and other ways of living hampered or curtailed, and even drinking water made costly. Sewerage plants and industrial plants have been allowed to discharge their wastes into rivers, destroying fish and polluting the supply of water. It is said that only about two-thirds of the Nation's sewage and industrial waste receive treatment. A city might make an ordinance prohibiting pollution within its jurisdiction, but the next city up the river may have different laws or no laws at all. Hence, the river continues to be polluted by the waste that is thrown into it. Since most rivers cross State lines, no one State can end stream pollution. All States and the Federal Government must cooperate in preventing the tragedy.[8]

Since water is a renewable resource, the supply never gives out. Rapid runoff from denuded grass and forest lands results in lowering of the underground water table. Ways of distributing water to all the people who need it are sought. To offset the uneven distribution of the Nation's supply, for example, certain industries that require a great deal of water are often built where the water is, instead of near the supply of materials as one might expect them to be.

Scientific projects, with huge dams and their hydroelectric energy, have been established in many States, providing water for industrial power and irrigation. More water can be made available when certain problems and difficulties are overcome. Much water that is now wasted could be reclaimed, but sewerage treatment and other types of reclamation are often inadequate.[9]

Power projects to enhance utilization of water in the West destroy fish, especially salmon. The salmon are affected most tragically by the power projects because the adult salmon migrate from the sea to spawning beds in the headwaters of rivers high in the faraway mountain ranges. They find their way through creeks and by waterfalls to the place where they were born and there they spawn a new generation and then die. When the young fish are old enough they work their way back to the sea.

Many attempts have been made to help the fish fight their way

[8] *Water Pollution in the United States*, Washington, U. S. Government Printing Office, 1951. (U. S. Public Health Service, Pub. No. 64, p. 9.)

[9] *Water Pollution in the United States, op.cit.*, p. 44, and *Protecting Our Living Waters*, (Washington, The National Wildlife Federation, 1956.)

around the dams. Some of the dams, such as Grand Coulee, are so high that man has not been able to pass the fish around them. At other relatively low dams fish have been successfully passing the structure on fish ladders. The concrete baffles of the fish ladder form a series of small pools separated by 3-foot waterfalls that salmon can jump. Most salmon swim through an underwater opening in each of the baffles. This saves the much-needed energy of the salmon for the long swim to the spawning grounds.

Children learn that supplies of fresh water can be extended. Among means suggested are:

> Making new laws to reduce misuse and waste.
>
> Planning new developments on a watershed or river-basin scale.
>
> Restoration and reuse of waste and industrial waters.
>
> Establishment of conservation measures that conserve runoff water.
>
> Improvement of methods in using irrigation water.
>
> Reduction of surface evaporation from lakes, reservoirs, and other water surfaces.
>
> New ways of increasing our supply include:
>
> Replacing nonbeneficial plants with useful plants.
>
> Reduction of cost of converting sea water to fresh water.
>
> Control and distribution of precipitation by such devices as "cloud seeding."
>
> Additional development of underground and surface water.[10]

Through study, observation, and use of water for personal, family, and school needs, children gain understanding of the problems mentioned. They begin to appreciate the importance of the problems that will be theirs when they grow up.

Topsoil as a Basic Resource

Most schools are helping children learn that topsoil is the Nation's basic resource. We rely on soil for food, clothing, shelter, and the raw materials from which we manufacture goods we need. Without soil most of our other resources would be nonexistent or useless.

[10] See also: Kohler, Karl O, in *Water*, The Yearbook of Agriculture, 1955. *op.cit.*, p. 40 and Fleming, Roscoe, in *The Problem of Water*, Britannica Book of the Year. (Chicago: Encyclopaedia Britannica, Inc., 1957), p. 1-32.

Importance of Topsoil. — Good topsoil is the surface layer of soil that has in it all the elements that produce healthy plants abundantly. For this reason farmers should preserve the topsoil.

Soil is usually considered a renewable resource because it can be maintained or improved by good farming methods and the use of lime and fertilizers. Yet it has been said that the rate of soil building geologically runs from 1/600 of an inch to one foot in 10,000 years.[11] Children learn that there are two major tasks in the conservation of soil. One is to keep soil from being blown or washed away. The other is to keep nutrient materials in the soil.

Soil in Its Place. — Soil gets moved from where it is needed and where people can use it, to some other place where it may do harm. Excess rainfall and runoff water wears and washes the soil away from hillsides into valleys and river bottoms. Wind may blow soil for miles in dark yellow clouds. Children are taught to observe these problems, to learn how they are being solved, and to participate in solving them whenever the opportunity arises.

Knowing that the quality and yield of their crops depend upon the depth and condition of the topsoil in which their seeds are planted, farmers try to control erosion. They plow around hills on the contour instead of up and down. They plant grasses, kudzu, and other legumes. Orchards are also planted on the contour. All of these means are used to protect soil and keep it from being blown or washed away.

Farmers also alternate soil-building crops such as clover, alfalfa, and other legumes with soil-depleting row crops from one year to the next. Trees or grasses are planted on land too steep for cultivation. On certain fields, farmers plant alternate strips of land in clover, grass, and corn. Soil that may be washed from the strip of cultivated corn is caught by the strip of close-growing clover or grass. On steep sloping land, slight banks or terraces are made on the contour to slow up runoff water and to keep soil in place. Natural waterways in cultivated fields are planted to grass in order that runoff water may be carried off without gullying. Through observation, outdoor projects, and study, such knowledge is made part of the children's experience.

Food for Plants. — Rotating crops also helps to keep nutrients in the soil. A rotation plan may provide for a crop such as corn or cotton which depletes soil nitrogen, to be followed by a crop or two of legumes

[11] Allen, Shirley W. *Conserving Natural Resources.* (New York: McGraw-Hill Book Company, Inc., 1955), p. 25.

such as clover, alfalfa, beans, or cowpeas which put nitrogen back into the soil. Turning under sods and green manure crops is an effective way of getting organic matter into the soil. Another way to improve soil is to apply lime when needed, and phosphate or other fertilizer.

To encourage a use of soil that maintains its basic material and its nutrients, students, teachers, and soil technicians work together to learn the facts themselves. Sometimes they make information available to the people who are responsible for caring for the soil, as when schools that maintain school newspapers help keep their communities informed about the studies and experiments of the children and young people.

Care of Soil on Rangelands and in Forests. — Conservation of soil on land that belongs to State and Federal Governments is tied in with the use of grazing or rangeland in the open edges and valleys of the

U. S. Soil Conservation Service

Comparing runoff from terracing, stubble mulch, and bare ground.

forests. Rangeland usually consists of native grasses, legumes, and other plants. A single piece of rangeland sometimes provides grazing for the livestock of several owners. The kind of livestock selected to graze rangeland is usually determined by the forage and browse available. An important problem with grazing land is prevention of overgrazing, especially in dry weather.[12]

Grassland resources need wise and careful use just as forest resources do. Among the agencies that manage federally-owned rangelands are the Forest Service of the United States Department of Agriculture, which administers grazing in the National forests, and Bureau of Land Management of the United States. Department of the Interior, which has similar responsibility on the public domain. The Agricultural Research Service and other agencies conduct research that will result in better management practices of grassland resources.

Trees and Forests

Children are helped in various ways to gain important understanding about the value of the Nation's forests. They usually begin their study or activities with local problems. For example, if there are woods near at hand they take short trips to study the trees in connection with an enterprise, such as improving a child's or teacher's lawn or setting out trees as a windbreak for a playground. They observe the value of the woods as a windbreak. They note how the roots and floor of forest litter slow up runoff from rains. They note the coolness within the forest. They look and listen for wild birds and for signs of wild animals. They observe the appearance and values of different kinds of trees.

Have We Enough Forests? — Children learn that forest land in the United States has been reduced from about 822,000,000 acres originally to fewer than 649,000,000 acres. About 484,000,000 acres are of commercial importance.

There are reasons for the decline. Early settlers needed space for crops. They needed space for roads and factories and the forests were in the way. There was not manpower enough to clear the forest quickly. Many acres were deliberately burned. Once started, many fires could

[12] See also: United States Department of Agriculture, *Grass*. The Yearbook of Agriculture, (Washington, United States Government Printing Office, 1948), p. 203-205 and Foster, Albert B, and Adrian C. Fox, *Teaching Soil and Water Conservation; A Classroom and Field Guide*. (Washington, United States Department of Agriculture, Soil Conservation Service, PA 341, free.)

not be easily controlled, even had the settlers considered it important to control them.

Early settlers needed lumber for houses, transportation, factories, furniture, and aids to improved living at a time when other materials were not known or not available. They cut the forests for many purposes. They were not sensitive to scientific methods of cutting or to needs for maintaining young trees because they thought the forests would always be with them.

Early settlers had to learn by experience the importance of keeping forests productive. Since they had few accurate maps of the country to show the extent of the forests and little knowledge of the time and efforts required to replace trees, the forests could well have seemed limitless and overpowering. No wonder our ancestors are now accused of failure to appreciate the forests and of wanting to get rid of them. Yet would their accusers have had any greater foresight?

The important fact before us today is that foresters believe that our remaining forests, if properly managed, can be made to provide the wood required to maintain good and even improved ways of living. This goal can be met only by solving the problems that tend to destroy our present forests and their productivity. Schools are asking resource people to help children to understand some of the problems.

How Should Our Forests Be Used? — Forests have many uses. Usually the chief emphases are on the use of wood in the manufacture of products to improve ways of living and on the importance of the trees in the conservation of water and the protection of soil. But there are other uses. Children are interested in conserving forests to provide a habitat for wild animal life, such as birds, deer, and squirrels, and beaver and other fur bearers.

Sometimes these animals conflict with the growth of the young trees and are disastrous to the trees. When there is an over-population of deer, for example, and too little food for them, especially during a hard winter, the deer are apt to eat the young tree growth and damage the forest itself. The solution is to manage the wildlife and the forest so that food supply and number of animals are in balance.

A serious conservation problem is preventing and controlling causes of forest fires. Causes of forest fires in 1955, in order, were: Incendiaries, trash burning, smoking, miscellaneous causes, lightning, fires set by campers, fires set by railroad trains, and lumbering.

In some schools near forest areas, children make posters and write articles and announcements about recent facts in forest conservation

for their school newspapers, which are distributed to parents and community groups. Children are taught how to use safety measures around campfires. They learn how to extinguish campfires. People who wish to burn trash, especially during periods of little rain, are taught the measures of safety to use. In some States, permits are required for burning trash, and railroads must use safety devices on locomotives that travel through forested areas.

Children learn that besides such precautions by individuals and groups who use the forests or travel through them, there are Government agencies to protect the forests. Forest rangers and observers keep on the alert to discover forest fires as soon as they start. These men are stationed in forest lookout towers, in airplanes, in homes, resorts, mines, and logging camps. They serve on large cattle ranches. They are equipped with telephone and radio in order that they may receive messages or call for help. Fire fighters have tools and automotive equipment. They have planes, helicopters, trucks, and saddle and pack animals to help them get to fires quickly.

Insects and diseases kill more trees yearly than does fire. They must be continually fought. From local forest rangers and conservation specialists and through some of their own activities, school children are learning about the ways in which epidemics of forest insects are prevented through careful harvesting methods, the use of chemicals, and quarantines against insects that might be brought into the vicinity by plants in cars.

Employment of specially prepared scientists and employees is a help. Sometimes these specialists search for plants that carry, or are "hosts," for insects in different stages. Children are of assistance in reporting such plants to proper authorities.

Boys and girls are taught to be observant of the damage to trees, woods, and forests by storms, frost, and drought. When children observe the damage done to shade trees by storms and lightning, they can understand how great the damage might be to forests. Proper and selective cutting of mature trees is one way of lessening damage caused to forests by winds. Early cleanup and use of fallen timber is another. Some scientists are experimenting with reproduction of varieties of trees in order to develop some that can withstand windstorms better than present varieties.

Most (75 percent) of the Nation's forest land at present is in private forests. The Federal Government, through the Forest Service in the United States Department of Agriculture, has responsibility for the management of the National forests which contain 181 million

acres of land. The National, State, and other public forests maintain 25 percent of the commercial forest land.

National forest watersheds are scientifically cared for in order to provide continuous water supplies, conserve soil, and help prevent floods. Cattle, under permit, are allowed to graze on grasslands in the National forests under rules that prevent overgrazing. The harvest of mature trees under good cutting practices produces a substantial income for the Government. Fishing and hunting are permitted in the National forests under State game laws.

A number of State agencies and organizations cooperate with the Forest Service. Their common goal is to develop further a sound program of conservation of the Nation's forests, both public and private.

A part of a forest program is research in the use of forest products. The use of wood waste, such as sawdust, bark, and branches to produce by-products, is a conservation measure. Substitutes for cork are sometimes made from cellulose, rubber, and other synthetic materials. They are useful in manufacturing linoleum. Yeast has been made from wood sugar and shows promise of being used for human or animal food. Turpentine is extracted from some woods by steam.

Emphasis in forest conservation for the future is on wise and careful management of the forests we have. The money that will be required for such conservation should be considered not cost but investment in greater production from a resource that is indispensable not only for itself and the ways of living affected directly, but also because of its relation to other resources, such as the conservation of soil and water.

Along with improved production and management in the conservation of forests of the future is reforestation. Many millions of acres of barren or poorly stocked land, once in forests, can be brought into production again through tree planting. At present, State nurseries and conservation districts supply young trees for farm holdings. Many industrial owners of commercial concerns are increasing their efforts at reforestation and continuous production of wood products from their lands.

Reports on the value of trees as observed in the town or city are important. Children notice the beauty of the trees. They identify them and choose favorites. In parks they enjoy the coolness of the trees and shrubs and look and listen for birds. Boys and girls who live in the country have opportunity to visit woodlots and see what great value even small stands of trees are in holding the soil on a slope where rains and wind are likely to cause erosion.

The establishment of school forests as described in this bulletin has given hundreds of schoolchildren opportunities to understand firsthand the value of forests. School camping, also described in preceding pages, provides an opportunity for many boys and girls to enjoy experiences that lead to understanding the values of forests.

Wildlife Resources and Man's Use of Surplus

Wildlife usually means animals with backbones, and includes birds, mammals, fish, reptiles, and amphibians. Conservationists in areas visited regard wildlife as subordinate to the welfare of human life in any particular habitat. Wildlife does improve human ways of living. Some animals are used for food. Furs of certain animals are still highly regarded in commerce. Hunters, trappers, and fishers often depend upon wildlife as a source of income. Many people also hunt or fish for the recreation, change, and outdoor living that the activities afford.

Considerations in children's conservation of wildlife include children's love for wild animals, the understanding that children get through activities and experiences related to wildlife, what boys and girls can learn about such problems as surpluses and scarcities, relation of wildlife resources to environment, and restoration of wildlife.

Children Appreciate Wildlife. — To children in the schools visited, wild animals and birds have strong appeal. Conversations about the first robin seen in spring or what the cardinals are saying when they whistle or call, and whether the beavers will have to be moved from their home in a local natural park are subjects of great interest. They seem to recur in some schools almost every year, usually providing fresh interest and opportunities for wider experiences.

We find schools engaging in activities to conserve or adjust wildlife resources, both for their own sake and in connection with activities related to other resources, such as those of school forests, conservation trails, in museum activities and student clubs.

Children are concerned when they read about the loss of the passenger pigeon, which is now extinct. In parks and zoos the children look at experimental groups of American bison. They read regretfully of the incidents where bison were driven over cliffs by early settlers and shot and killed without reason from the windows of the first trains that passed through the prairie and plains States, and they are perhaps, inclined to censure unduly our ancestors for their extravagance.

Young people are being helped to understand the need for adjustment of wildlife with ways of living, past and present. Modern cities, farms, and towns obviously could not have the security they do if hundreds of thousands of buffaloes roamed the plains as in the past. It has been said that if passenger pigeons existed now as they did in the days when only the Indians lived here, they might be as troublesome in many areas as the starlings are today.

A consideration in the conservation of wildlife is the main crop or type of land management that is dominant in a particular area. Cultivated crops and truck gardens require or encourage such complete use of the land that game and fur bearing animals frequently do not thrive in these areas. However, on larger farms and ranches which are not used so intensely, wildlife, such as some of the fur bearers and game animals, live in harmony with man's use of the land.

Through Action, Children Get Understanding. — It is the practice in schools that are using real conservation activities to select for action some form of wildlife that could well be preserved without interfering with man's ways of living. In many schools, for example, quail and pheasants are an interesting source of conservation activities. Before the deer season opens in Michigan, children in schools are as interested in reporting the deer they have seen and where deer may be seen as they are in recording the robins that appear in early spring.

What about the Surplus? — One of the problems in teaching conservation of wildlife is helping children to take an objective view of the desirability of a hunting season. What to do about deer is an example.

The children first observe deer's habits. Spring, summer, and fall, deer move about and eat first the foods that they like best. They browse on shrubby plants or twigs of trees but rarely show preference for grass. In the winter if the key plants are in short supply other shrubs and grasslike plants may be eaten. A few of the cone-bearing trees have leaves that deer will eat, but hardwoods and brush are preferred.

Where snow is deep the deer are limited in the size of living space. The result is that concentrated deer herds often destroy all the available food supply in a rather small area and, because of the deep snow, do not move to other available feeding areas. The trees appear sheared of young leaves and twigs as high as the deer can reach. As a result of the limited amount of natural food for the deer, many of the animals die. Nature thus takes care of overproduction.

People who are interested in outdoor recreation and hunting explain overproduction as the reason why a season for hunting and thereby reducing the number of deer is desirable. Since there is not enough food for all the deer the entire winter, these people say, there may well be a hunting season to provide recreation and a bit of outdoor sport that otherwise cannot be available. This is true in the State of Michigan. Other States where deer abound also are finding it desirable to provide a hunting season in order to adjust the supply of animals to the amount of feed available. The same is true for all other wildlife, even though they may be migratory.

Why We Have Scarcities. — The greatest single factor affecting depletion of wildlife resources is the destruction of required habitat. Some species today are so restricted that special National refuges have been established to provide living space for the remaining numbers of such animals, as the whooping crane, American bison and bighorn sheep.

Other causes of depletion of wildlife resources are: Water pollution which destroys fish and other aquatic life; over-hunting and over-trapping; ill-considered use of insecticides and herbicides; forest and grass fires caused by carelessness.

Some of the undesirable practices will probably be remedied when we have discovered effective ways to achieve the quality of living we desire without injuring other ways of living. The use of rivers and other waterways for factory waste is an example. Until recently the practice was an acceptable one. Factory owners saw no other way of disposing of industrial waste and sewage. Fish, as a result, were destroyed. So also were furbearing animals and waterfowl in marshy areas along streams. Science and industry together, however, are now engaged in research to discover practices to offset the pollution of streams that results from waste and sewage and makes biological deserts of our waters.

Adjusting Wildlife Resources to Environment. — Wild animals today need help in maintaining their relationship to the habitat in which they live. In early days the law of survival controlled supply. Today surplus wildlife is a matter of relationship to a settled country. It is also a problem of management.

In most schools children learn that among the needs of wild animals are those for food, water, shelter, living space, protection of habitats that provide these things. Wildlife-population studies are carried on by State and National agencies in order that regulated harvest may be possible, which will in turn reduce unnecessary damage

by wildlife. People who are closely affected by wildlife in their environments, such as farmers, ranchers, gardeners, and trappers, need up-to-date information and knowledge about the supply of different species of wildlife.

Certain animals, such as raccoons and hawks, are sometimes misunderstood. Because one species of hawk may now and then take a chicken, some farmers believe that all hawks are chicken killers. Because once in a while a raccoon takes a chicken, he too is considered a predator. No one takes into account the fact that he may kill rats and other animals that do more harm in the environment and are more at variance with the people's ways of living than the raccoon.

An important factor used in today's wildlife management involves the development of regulations for the harvest of species during a hunting season. Some States limit the number of quail, pheasants, and turkeys that may be taken per day or season. Management practices of this kind are planned in such ways that from year to year there will be a supply of each species for recreation, food, fur, or for whatever other purpose they may serve man.

Children in the schools visited are helping to improve cover for wild animals and birds in their vicinities. Wildlife landscaping is practised in town and country. In early days of machine farming and use of all possible soil for crops, farmers in most States ceased to leave shrubs and weeds and bushes in fencerows. But now, here and there, farmers are leaving patches of soybeans, other grain crops, and berry bushes for winter feed for wild animals. To some people these clumps of cover for birds and animals look unsightly. When they are left, however, animals are protected by them. In some schools, boys and girls are making posters for shop windows in towns and churches to call attention to needs of wild birds and animals of the community for shelter.

In some places children are planting the kinds of shrubs, trees, and vines that will provide shade and shelter as well as food. The question of food for wild animals is of vital interest to many people, including children. The sufferings of animals such as deer and elk in recent winters of heavy snowfall in the northwest and Rocky Mountain States have brought this need of food to people's attention.

Game birds and animals in arid regions need protected supplies of water. Government agencies have built thousands of small ponds and basins in arid regions to catch and hold water for wildlife. Some ranchers locate their watering facilities for stock in places that can also serve wildlife.

Migratory birds and other animals need places where they can stop and rest during their travels. These managed areas or refuges are provided by Federal and State governments and in some cases by private landowners.

Always questions arise as to how much surplus population of a game species will be available for hunting. State agencies and conservation organizations are engaged in taking game censuses. This helps them to know how many animals the hunter with a license can be allowed to kill in a day.

Among Federal Government agencies that assist State agencies in preservation of desirable wildlife are the Fish and Wildlife Service, the National Park Service, and the Bureau of Land Management in the United States Department of the Interior, and the Forest Service and the Soil Conservation Service, and the Bureau of Animal Industry in the United States Department of Agriculture. These agencies make studies about wild animal life in the Nation. They serve farmers by helping them use appropriately the wild animals in their environment.

Restoring Wildlife. — Experiments are being carried on in artificial restocking. In some States children are raising quail and releasing them. Efforts have been made to raise and release prairie chickens and wild turkeys. Children of the Middle West are familiar with the imported multi-colored male pheasant with the red and green collar. Are these efforts to restock species of wildlife desirable? No one knows at present. Certainly the cost of restocking is high. Federal laws regulate the introduction of species and studies are being carried on about the desirability of the activity. In general if good habitat is available a transplant might prove successful.

In Pennsylvania efforts have been made to move unwanted beaver from one location or dam to a place in the same stream or a similar stream where the flow of water needs to be slowed down. Children are always interested in following the success of an experiment of this kind. National Parks and Forests are trying similar experiments.

Mineral Resources

Mineral resources are grouped as metals and nonmetals. There is not much that children can do in actual use and conservation of these metals, but even the small amount of pupil participation which exists in some schools pays off in attitudes of awareness and appreciation.[18]

[13] References used for the section include: *The Nation Looks at its Resources, op. cit.* Allen, *op. cit.* Dicken, *op. cit.*

Conserving Iron. — One of the metals with which children have some contacts is iron. Children who live in cities have experiences using household tools, equipment, and utensils made of iron. Furniture, made wholly or partly from iron, can be observed in stores and homes. Children going home from school see iron used by builders. They notice steel beams for floors; they see that iron is sometimes placed in concrete to reinforce the cement block or beam. Does such use appear to be a waste of iron? Actually what the children see is iron put to use to make the finished products last longer. In this way several resources, as well as iron, may be more wisely used. Iron is sometimes combined with plastics to produce tools and utensils that the children use.

Children who live on farms have the experiences previously mentioned. In addition, they are familiar with the iron used in making much of the machinery and tools used on the farms. Boys and girls observe their father's work with plows, harrows, and tractors, and observe him adjust, oil, and repair them. They see him use implements and tools such as hammers, spades, screwdrivers, wood planes, and knives. Often in school shops and in farm and home shops children themselves have opportunities to use tools that are made of iron. Through use and observation they learn how valuable iron is to modern ways of living and that it is not replaceable. Such concrete experiences carry them into somewhat limited studies of the methods which society uses in conserving the Nation's iron resources.

Collection and Sale of Scrap Iron. — Dealers in small towns and in city neighborhoods buy household scrap, which consists of broken tools, castoff or outmoded implements, and wornout machinery. The iron in these discarded pieces of equipment can be broken up, melted, and made into new articles. Sometimes the children act as "agents" by collecting household scrap and taking it to the dealers who pay them for it. The collection of scrap is a familiar wartime and defense activity that has carried over into everyday living. Collecting it means that some children have a bit more pocket money and some homes and farms are neater and more attractive than if the scrap were not collected. Conservation activities for some children include planned cleanup campaigns in schools and school neighborhoods.

Taking Care of Articles Made of Iron. — Children and adults who have become conservation-wise are pleased when they keep tools and utensils in good condition and learn to get more use from them. It is not always an advantage, so some people believe, to discard the old article for something new and different, so long as the old one serves

the purpose just as well and often has a better style than the new one. Other people believe that "turning in" the old "improves business." In either case, when an article of iron is finally scrapped, the scrap is prepared for further use and not wasted.

Children take pride in learning how to sharpen kitchen knives, planes, chisels, and saws. They learn that paint is a good conditioner for some articles made of iron as well as those of wood. They help their fathers put tools and equipment away to preserve them from rust. They observe their mothers put oil in the proper place in household machinery when it squeaks, and they help their fathers find the holes for oil in the lawn mower. Reports of such activities are good starters for studies in school that help children learn basic truths underlying the science of conservation.

Our Supply of Iron Ore. — Iron is one of the earth's most abundant metals. Although iron is not renewable, the fact that it can be reprocessed and used again and again increases its usefulness. It has been estimated that in the United States more than 1,200 pounds of iron are consumed per capita per year.[14].

Production of iron varies from year to year. During wars, production of iron expands. Iron ore is found in every continent and in almost every country. The deposits vary in quality.[15].

Conserving Copper. — Copper is a metal with which children are familiar because they use it or see it used for cooking utensils. They observe it used for objects of art, such as trays and vases, and for jewelry. These are not the most important uses of copper. They are ordinary uses.

Copper is an old metal. It was used by some of the earliest men of history. Copper became especially valuable to men when they discovered the value of copper wire in conducting electricity.

Copper is important to our Nation because it is used in electric wiring, in painting, for equipment, for diesel engines, and for shell cases in time of war. The United States has copper mines in Arizona, Utah, Montana, New Mexico, Nevada, Michigan, and a number of other States and in Alaska. Despite its abundance of copper resources the United States does not have all the copper it needs. A large amount of copper is imported. Among the countries from which we get copper are Canada, Cuba, Chile, Cyprus, and some of the countries of Africa.

Copper is not renewable. Ways of conserving copper are limited.

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[14] Dicken, *op. cit.*

[15] For figures, see Dicken, *op cit.* p. 381-382, and Allen, *op. cit.* p. 297-299.

Some copper is recovered in the form of scrap from articles that have been made from copper, used, and discarded. In mining copper, workers sometimes leave copper-bearing waste when the copper is crushed for reuse. Recovery and refinement of this waste affords a source of copper for certain uses. It is important that the Nation have more copper and more sources of copper. To this end American industrialists have helped foreign countries discover resources of copper and have helped to refine it.

Conserving Aluminum Resources. — Aluminum is one of the resources which are increasing in importance in American ways of living. Children have opportunities to use and observe things made of aluminum. The airplane industry frequently comes first in children's minds. Aluminum is used for certain airplane parts because it is strong but light in weight. Aluminum is also used for making parts of trucks, automobiles, and railroad cars.

In their kitchens, children see their mothers using aluminum foil in cooking. Aluminum pans and skillets take the place of some of the old iron and tin and granite cooking utensils. Aluminum is used for objects of art with which children are familiar, such as trays, vases, and pitchers. Bauxite, the ore from which aluminum is made, is mined in Arkansas, Georgia, Virginia, Alabama, and other States. Near the United States are deposits of bauxite in Haiti and Jamaica. World sources are Hungary, British Guiana, and the Gold Coast. One conservation device in the management of aluminum is the recovery of scrap aluminum. That means in families that are conservation conscious, children can and often do collect wornout articles of aluminum and sell them.

Other Metallic Minerals. — Among more recently known minerals of value in the United States is molybdenum. It occurs usually with other metals, among which might be copper, gold, silver, or tungsten ore. It is generally used with other materials, as is the case of iron, making them more useful and durable.

Another of the more recently discovered metals is tungsten. It is known for its use in electric lamp and radio tube filaments and for cutting tools. Tungsten salts are used in tanning leather. The United States does not produce all the tungsten the Nation needs and must import a large amount.

Aside from its valuable uses in medicine, uranium is important for its military uses. A publicized use of uranium is the manufacture of atomic bombs. Production of uranium is in control of the Government. Children read their school newspapers and become familiar with the

importance of the Atomic Energy Commission and are interested when they know that this body controls the production and sale of uranium.

Conservation of Nonmetallic Minerals. — Of the mineral fuels, petroleum and natural gas are well known to children. Their activity is mostly confined to observing its use in cars and for heating. Older children, with supervision of their mothers, sometimes use gas in cooking.

Petroleum is especially important to modern transportation and heating. For a number of years new supplies of petroleum and natural gas have been discovered intermittently on the continent. Probably not all of the usable petroleum and natural gas has yet been discovered. Both petroleum and natural gas are irreplaceable. Both are more expensive than coal. But because they are so much easier to use, both petroleum and natural gas are popular fuels for heating houses. The responsibility of the individual citizen with regard to both minerals is to avoid waste in using them and to keep informed.

In years past the most popular mineral for fuel was coal. Most children are familiar with coal. In some children's homes coal is still used for kitchen cooking. Coal is exhibited with other minerals in museums. Coal is used to generate electric power in many parts of the United States.

The following facts are among those that children study:

A number of by-products come from coal, including plastics, nylons, fertilizers, and insecticides. Although irreplaceable, coal is distributed widely in the United States.

Most coal is mined by sinking shafts to deposits deep underground. Some coal, however, lies very near the surface. This is mined by stripping off soil and exposing coal, which is loaded on trucks and taken to producing centers.

Strip mining has become a conservation problem because in the past strip miners made little effort to restore land from which coal was mined. Acres and acres of hillsides and often level ground that could be productive have been stripped of plant growth, with their topsoil turned under so that new growth of the kind that originally lived there is impossible.

The ugliness of strip mining is the subject of much discussion in coal mining towns. To some people strip mining means a way of making a living. After mines have been exploited, however, people who work there have to move on or find other work. Many who do remain for other work are distressed by the ragged appearance of the turned-over earth at the mines.

Maintaining Our Supply of Minerals. — Prevention of waste in the processing and use of minerals is important because minerals are nonrenewable resources. Consumers should eliminate waste in the use of mineral products. Industries should eliminate waste in processing.

Industries are making progress in the elimination of waste. Some industries maintain research departments in which teams of scientists devote their time to the discovery of ways to eliminate waste, such as new methods of processing which extract more of the pure mineral from the ore and permit a larger amount to be used in production. Large amounts of money are spent in the work. Some industries are using the services of the Federal Government to prevent waste in processing and in mining. The Government agencies that give such services include the Bureau of Land Management, Geological Survey, and the Bureau of Mines of the United States Department of the Interior.

Another way to conserve minerals is through use of more plentiful substitutes. Plastics, for example, are substituted in the manufacture of articles made out of steel or copper. More research needs to be done in this field. The danger in the use of substitutes is that the substitutes themselves may be in short supply, so that sometimes little is gained by using a substitute instead of the original mineral.

A problem in the use of substitutes is to convince people that substitutes can serve as well as the original mineral. Hydroelectric power is sometimes a substitute for coal in the production of power. This use of electricity is limited to the regions that have abundant water supply.

Children who have helped to collect scrap iron appear to develop a respect for reclaimed material. Metals are seldom completely discarded; they can be processed and used again and again for different articles. Often in the past our greatest efforts in the use of scrap metals have been confined to war and defense. Since metals are not destroyed when scrapped, however, people are becoming more sensitive to the value of scrap in times of peace as well as in war.

National Parks as Original Resource Habitats

In studying the balance of nature among the various natural resources, conservationists are aware of the fact that man changes a particular habitat in ways that make it vary greatly from the original condition. In the interests of science the world needs places where original habitats are maintained. National Park specialists have a part

in the care and management of wildlife habitats. Naturalists and other scientists who visit the parks can study the kind of life that is preserved by different forms of plant and animal life and different amounts and qualities of soil, water, and minerals.

How National Parks Serve the Nation. — The National Park Service of the United States Department of the Interior is provided to maintain and administer the National Park System, which consists of the various Parks. Efforts of the National Park Service are directed especially toward preserving examples of the original interdependence of all natural resources.

The National Park System, of which the National Park Service is the administering agency, was founded in 1872, with the establishment of Yellowstone National Park. It now contains some 176 areas scattered throughout the continental United States, Alaska, Hawaii, and the Virgin Islands. Nearly 22,500,000 acres of land and water, about as much land as there is in the State of Indiana, are included. Within the various areas are said to be: (1) Most of the superlative examples of our country's natural scenery; and (2) those sites which are most significant in our history. Over the years new parks have been established and others abolished.

In 1916, forty-four years after the National Park System was founded, the National Park Service was established by Congress as a Bureau of the United States Department of the Interior. The purposes of the new agency in administering the National Park System were to "conserve the scenery, the natural and historic objects, and the wildlife" of the areas entrusted to it under the National Park System and to "provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

The national parks are of value for scientific study, watershed protection, and wildlife sanctuaries. Their primary reason for existence, however, is the provision of recreation in its broadest and most fundamental sense.

Cooperation among Agencies. — If recreational requirements sof the parks are to be met fully, the directors have said, other levels of Government also have important parts to play in accomplishing the task which is so vital to the welfare of 170 million Americans. When invited to do so, the National Park Service cooperates in planning park and recreation areas for the States and their subdivisions.

The National Park Service provides consultant service to other Federal agencies. The administrative authority of the service is for the

most part limited to its management of the Federal properties which comprise the National Park System.

The objectives of the service are accomplished in different ways. One is through the park museum. This basically is an attempt to give the visitor some idea of the character of the area. In this way he is prepared to use the park intelligently. The real measure of the park museum's success is the extent to which it stimulates visitors to go afield and discover things for themselves. Another activity of the service is the caravan or walk under the guidance of a naturalist, historian, or archaeologist, depending upon the character of the area. Another is the self-guided drive or walk, by a series of signs along a road or trail, or to locations where natural or historic features are explained through especially prepared publications. Finally, evening campfire programs, lectures, roadside and trailside exhibits, recordings, and interpretative literature are used by the service to prepare guests for their use of the park.

Outdoor Fun and Education. — If a National park is within or near the home State, parents of children in school are usually willing to cooperate in helping their children visit the park. Sometimes visits are taken on Saturday with the family. At other times schools plan excursions for separate groups of pupils. In school children prepare themselves for understanding what they will see. They may appoint a class representative to write to a particular park office for materials to read or examine in getting ready for a weekend trip with the family or for a school excursion. Sometimes they look at films.

When boys and girls return from a weekend trip to a park they report their experiences to their classmates. When a teacher and the pupils return from a school excursion, they summarize their ideas and bring together printed materials, which they have collected or purchased in the parks, and classify them for future reference and study.

9. Concerns of Teachers

IN THE STATES visited, children, teachers, parents, conservationists, and other citizens are working cooperatively to improve their use of resources around them. The immediate aims of all are to carry on tasks or solve problems that seem urgent at a particular moment.

Objectives of Conservation Education

Teachers also have special concerns and objectives in relation to conservation as a part of the school program. Some objectives are reported by teachers interviewed for this study. Others are implicit in the descriptions of activities and experiences in foregoing chapters. Many others are listed in bulletins from departments of education in States visited.

The following are general aims that incorporate most of the specific objectives mentioned:

- To help children increase their appreciation of the value of natural resources in preserving and improving ways of living.
- To help each child grow in ability to accept responsibility for doing all he can to maintain or make wise use of resources in his environment in order that people now and in the future may receive maximum benefit from these resources.
- To provide opportunities for pupils to develop and improve their skills and techniques in using natural resources.

- To guide children in developing understanding of the fact that, in improvement of present and future living, there is no substitute in science and technology for wise use and care of the earth's present resources.
- To enable pupils to develop respect for all resources, regardless of ownership, public or private.
- To increase pupils' appreciation and understanding of the interdependence and interrelationship of the earth's natural resources.

The Place of Conservation in the School Program

Conservation education is almost always included in elementary school programs. This is due primarily to the persistent nature of conservation and resource use problems.

Curriculum Integration

No one widely used pattern of conservation education is found in the curriculums of the many elementary schools visited in the 28 States. Rather, conservation appears as a dynamic element in various school subjects and in numerous other parts of the curriculum, such as schoolwide projects and club and camping activities.

Conservation education lends itself to a local and regional approach. Schools tend to emphasize their immediate conservation problems and when desirable move to conservation problems elsewhere. As an example, each State with extensive forests has its own problems, some of which extend into nearby States. California schools are concerned with problems of water supply and forest fires. In the Northwestern States, the danger of forest fires and the replanting of burned-over areas are important. In the Southeastern States there is great concern for preventing erosion and replenishing the forests. East Central States place emphasis on conservation and wisest possible use of soil and water and on these in relation to forests. *Since problems of conservation as well as basic conservation information are usually emphasized at local and State levels, considerable variation is found as to where such study and activities occur in the curriculum.*

A number of States and local school systems consider conservation, or resource-use education, an integral part of the State's total elementary school curriculum. Activities, understandings, and concepts

are developed without concern for subject matter lines. Studies are sometimes carried out through integrated experience-type units, which cut across subject fields. They may be carried out as large school or class enterprises. These involve children of many ages and grades.

New Hampshire, California, Maryland, and Florida are examples of States where conservation education permeates the entire curriculum, rather than being assigned to a certain subject area.

Schools in some States center the conservation and resource-use studies in either the social studies or the science programs, with some attention to conservation in both fields. An example is South Carolina where conservation is usually placed in the social studies program with inclusion in other fields when the need is felt.

While many States which emphasize conservation in social studies do so in integrated or unified courses, some present history and geography as separate fields. In either case, much conservation is taught with the geographic work, in connection with the regions of the Nation and the world, or in connection with such broad areas of living as transportation, housing, farming, or lumbering. In history courses or the historic aspects of social studies courses, conservation is frequently taught in connection with the westward movement.

In some States, such as Colorado, North Carolina, Georgia, Oregon, and Maine conservation education is sometimes centered in the social studies programs and sometimes in the science programs, depending on curriculum planning at the local level.

Grade Placement

Most schools visited include experiences in conservation education at all grade levels. In some places conservation education is achieved through participation of children in a conservation project or projects on a schoolwide basis with children of different ages participating according to ability or interests. Again it is accomplished by providing experiences in different areas of conservation at each grade level, with definite planning for the development of habits, skills, and understandings at the children's maturity levels.

In still other schools, the children have incidental conservation experiences throughout the grades, but make an intensive study in a given grade or grades, usually in one of the grades from sixth to ninth. This intensive study is frequently the rounding-up stage. The pupils carry out a unit on conservation growing out of their previous incidental

experiences. This involves gathering information from books, pamphlets, films, field trips, and resource people. Outdoor experiences in conserving such resources as soil, trees, or wildlife are carried out. The pupils record, report, share, and evaluate outcomes. They are encouraged to put their knowledge into practice in their environment and in their daily living.

How Teachers Prepare Themselves

Conservation education is discussed in curricular materials for teachers. Most social studies and science textbooks deal with the earth's resources. Children get inspiration from carrying on even the simplest conservation activities, such as planting trees, protecting or attracting wildlife, or stopping a gully. Once a teacher finds herself in the midst of even a small conservation activity with the children, the way is open to go ahead. Many teachers become so interested that they reach out for more and more ideas and are eager to prepare themselves better. Following are examples of the opportunities that are theirs.

Preparing in College

College courses and other experiences for students, teachers to be, and graduate students provide preparation for participating in conservation education when they teach. The following are examples:

In the Kansas State Teachers College at Emporia, for example, students have opportunity to make plans for conservation activities that will be appropriate for their own schools. In one case, a student knew that conservation of quail would be both a problem and an opportunity for him in the school in which he expected to teach. In the class on conservation education of which he was a member, he made a study of the bobwhite, the species of quail which is common in most of Kansas. He also studied the environment of his school to learn what activities it might be possible for children to carry on, including possible stocking of quail in the neghborhood. When he went to his school in September, he was prepared to help children take hold of the problem of conserving quail and get a great deal of good from it. The report on page 76 shows the results of his preparation.

In this conservation class, a student preparing to teach first grade pupils studied ways of making conservation meaningful to very young

children. A song that teacher and children developed appears on page 10.

In the School of Education, University of Nebraska, student-teachers prepare through a science course to teach conservation of natural resources. The basis for curriculum units in this course is the watershed as a whole. Students take airplane tours for the purpose. On such a tour soil erosion and land problems are studied, and their solutions, brought about through wise use of soil and water resources on a farm-by-farm basis, are seen in relation to one another. As a result students become accustomed to thinking of the interdependence and interrelation of resources in given areas. An airplane tour may be supplemented by pictures and maps. The picture below shows a group of students ready for such a tour.

In the same institution, students have conservation opportunities in laboratory school. There, teachers and teachers-to-be, with guidance and counsel from experts, work with children who are learning skills and practices of conservation at the same time that they develop appreciation and understanding of natural resources. Pupils may garden,

Lincoln Journal, Lincoln, Nebr.

Science students take air tour to study soil conservation practices.

plant trees and shrubs, and study the wildlife of the habitat. By way of comparison, students and pupils sometimes develop miniature wildlife or plant habitats from regions far away from the home setting.

Other opportunities for teachers are provided in many institutions during the summer. These include summer schools which schedule credit courses or experiences in conservation education, summer camps for teachers and students who are preparing to be teachers, and regular summer sessions in which conservation education is integrated into science and social studies or geography and history courses.

Conservation in camping is helpful for young people who expect to teach. In Wisconsin, students from high schools and colleges have opportunity to spend several days at camp studying the surrounding forests, visiting power dams along a nearby river, and observing work in fish hatcheries here and there. Resource persons, such as representatives of State and Federal conservation agencies lead groups on excursions and explain what is going on. They point out fundamental principles in growing trees and caring for local forests.

One of the camping programs for these groups of teachers-to-be is at Trees for Tomorrow Camp, Eagle River, Wis. Conservation of natural resources is the center of activities. Teacher-preparing institutions send to camp classes and groups of students who expect to teach in elementary schools or in high schools. These students use the demonstration forest of the camp to help them understand the State's need to maintain its forests and to develop appreciation of forests as a background for their own teaching.

Among highlights of the camp program are excursions into the forest. Young people on these excursions perform some of the conservation activities that are regularly applied in forests over the State on a much larger scale. For example, they learn to mark off an acre of land just as local farmers with farm forests mark off their land. With a compass in his hand, each student learns to follow accurately a given direction in the forest.

Students compare the way trees grow in the forest with the way they grow standing alone. They learn how trees can be taken care of in order that the forest may be preserved and made to produce more trees for useful purposes continuously from one generation to another. These experiences and the information gained are helpful background later for students who go into teaching.

At Plymouth Teachers College, Plymouth, N. H., a 25-acre plot — Langdon Park — belonging to the college, is used as a laboratory for nature and conservation study. Special attention is given to

the study of ecological relationships. Ponds in the area are filled with plant and animal life. In the fall, the students bring in specimens to study in the college laboratory.

Tazewell, Tenn.

Comparing notes at an outdoor workshop.

During winter months the students study conservation, building up to spring activities in working with resources. When they study problems of power, water pollution, and recreation, they take up forestry and go on a watershed trip. On an agricultural trip they visit several types of farms. On a geological trip they see different types of erosion. Then they take a "cellar hole trip" visiting places where formerly there were farmhouses, and try to learn what has happened to them.

The main purpose of this work is to develop awareness and understanding of New Hampshire resources and how they can be best used and protected. The college hopes that students, who will soon be

teachers, can and will work for similar results with their own pupils in ways suited to their age and ability.

San Jose State College, San Jose, Calif., provides a major in conservation education. A degree is now awarded in wildlife conservation.

For a number of years, there has been a strong emphasis on conservation in natural and physical science courses at this college. Conservation is taught in geography courses which emphasize resource distribution and use. One science course for elementary teachers takes up such areas as the seashore and the Valley's streams, so that the students can study relationships, uses, and balance of nature. Occasionally courses are given in soil, water, or forest conservation. Two courses which include conservation are provided to camp counselors.

The college provides leadership in conservation education to the area it serves in California and other places. Though this is accomplished in many ways and through cooperation with many organizations and individuals, much of the basic contribution is in providing conservation information and training to prospective teachers and camp counselors.

At San Diego State Teachers College in California, preparation for teaching conservation is provided in courses in elementary science and in elementary social studies. Many student teachers go to Camp Cuyamaca with the fourth-, fifth-, and sixth-grade children and their regular elementary teachers. Members of the college faculty believe that it is important for teachers to know about the subject matter of conservation.

Preparing While Teaching

Everyone can take part in conserving resources. However, there are conservation problems that require cooperation on a community-wide basis. A flood problem, for example, is a community problem and cannot be solved by independent individual action. It requires cooperation of landowners, industrial managers, and merchants.

A school trying to encourage the practice of planting multiflora rose fences in the farms of the community might make little progress without the cooperation and assistance of local conservation leaders and organizations. As they plan their work, teachers who view conservation as a job for the community as a whole enlist the help of local, State, and Federal conservation agencies and farm organizations.

To prepare themselves to work understandingly with their pupils, teachers become acquainted with conservation interests and activities of families of the community. They consult the local library and other libraries that serve the school community. They cultivate the acquaintance of the families of businessmen, bankers, clergy, and others who have communitywide interests and acquaintanceships. Some teachers make lists of cooperating conservation societies and organizations accessible to the pupils as well as to themselves, including the National Audubon Society, Keep America Green, National Park Service Museums, Boy and Girl Scouts, Future Farmers of America, Four-H Clubs and other groups, including those on pages 185-186. Throughout the descriptions of activities in chapters 2-7 are examples of community groups, agencies, and individuals, that are sources on which teachers can draw to prepare themselves for their part in conservation education.

During the summer come special opportunities for in-service teachers to prepare themselves professionally for better conservation education in the coming school year. Teacher-preparing institutions, State departments of education, school staffs, professional organizations, and conservation organizations, for example, are eager to experience with others the pleasure of learning to do better a task that is so much worth doing. The following passages illustrate the activities of such groups.

The Illinois State Department of Conservation is making a natural park in the State fair grounds. There teachers, who during the summer months are preparing themselves for conservation education when school begins, will have opportunity to observe grass in gullies, see native animals, and birds, study flowers, shrubs, and soils, note the relationship between the environment as a whole and various resources found there, and gain ideas for helping their pupils take part in real conservation activities.

In certain counties in Illinois, farm conservation advisers assist colleges that give extension courses in conservation and serve as resource people for groups of teachers. These conservation advisers also accompany teachers and children on field trips and help them locate for school excursions the farms and woods where conservation practices are good.

In Iowa, teachers have an opportunity to get new ideas for conservation education through Springbrook Camp near Guthrie Center. The camp is conducted cooperatively by the State Department of Public Instruction, the Iowa State Teachers College, and the Iowa State Con-

servation Commission. College credit and scholarships are offered to encourage teachers to attend.

In Florida, each elementary teacher must have some college or university work in conservation before he is certified by the State Department of Education. Practically every teacher education institution in Florida now offers at least one course in resource use education.

Like most Southern programs of this kind, the resource use program in Florida received its original impetus from the first Gatlinburg Conference on Resource Use Education in 1943. At this conference educators, State planners, resource agency personnel, and others reached the conclusion that resource-use education could contribute greatly to the development of attitudes, understandings, and skills needed to solve some of the persistent problems of the South.

With the aid of a General Education Board grant, Florida set up a resource use education project with a director and an advisory committee composed of representatives from the State Department of Education, various other State and Federal agencies, and most of the teacher education institutions which was encouraged and vigorously promoted. In conferences for college instructors, ideas were exchanged and improved courses for prospective teachers were planned. Pilot resource use studies were made in extension courses in several counties.

By 1946 representatives of agencies and institutions operating in the advisory committee of the project were so fully convinced of the value of the work that they agreed to serve as members of a permanent Florida Resource Use Education Committee appointed by the Governor. This committee continues to sponsor resource use education in every way possible. The meetings are held each year, usually at college or public school centers.

In the past 4 years, two Governor's conservation conferences, planned by the committee, have been held in Tallahassee, one for lay citizens and one for presidents and deans of colleges and universities.

The colleges and universities of Florida play an important role in helping teachers prepare themselves to teach resource use and conservation. The three State universities conduct extension courses in use of community resources. Florida State University, in Tallahassee, has given such work in 14 counties. In each case, the county or community has served as a laboratory for direct dynamic action. Thus, in addition to stimulating resource use education, active programs with far-reaching effects in community improvement have been initiated.

Summer conservation workshops are being conducted in the three State universities. In 1956, the Florida Federation of Garden Clubs

sponsored such a workshop at Florida State University with a scholarship for each participant. This was repeated in 1957.

At present, the State Department of Education not only requires college work in conservation for certification of all elementary teachers but for secondary teachers of science and social science as well. The honest fulfillment of this requirement, and the cooperative efforts of agencies and institutions involved, are gradually making Floridians conscious of the importance of resources and their wise use for benefit of the people.

West Georgia College, at Carrollton, Ga., carries on a program of community education which emphasizes conservation education through "College in the Country", a program of education for adults, and teacher education for elementary schools. Among campus courses which stress conservation are courses in Geography, Conservation of Natural Resources, Health Education, Georgia Problems, and the Community.

"College in the Country" serves adults both on campus and in their respective communities. Noncredit studies, chosen by the group, are as varied as Health, Psychology, Geology, Astronomy, International Relations, Community Self-studies, and "Studycades," i.e., study tours. As the program of resource use and improvement of living is developed, coordination of community personnel and agencies is encouraged as a way of working and attaining of goals.

Sand Hill Elementary School, laboratory of West Georgia College for in-service education of teachers, is dedicated to the needs of its students and of the community. Here teachers, pupils, student teachers, and parents learn to use their resources more effectively.

A workshop in Teaching of Conservation has been held summers at Western Maryland College in Westminster. Both elementary and secondary teachers participate. Consultants and field trips are available for observation and study in forestry, forest resources and management, water, soil culture, inland water, marine resources and research, wildlife, ground water, and minerals.

Western Maryland College seeks to enlist the cooperation of such associations as National Wildlife Federation, federated garden clubs, service clubs, and soil conservation districts in developing the workshops. Students who attend the workshop course not only develop plans for resource use education in their schools, but also spread interest in conservation by returning to the various sponsoring groups to report the kinds of experiences they have had. In addition, they make their services available to other interested groups.

Among the numerous field trips workshops have sponsored are trips to schools which have developed conservation education programs. Careful planning is required in arranging for the viewing of numerous points of interest, seeing and studying in the field the resources in three major areas of the State. The final weeks of the workshops are devoted to applying the information and understandings gained in a school situation and the preparation of a plan of action by each individual which he can put in operation in his own school and community.

The college believes that as an outcome of the workshops: (1) Class members have a broader view and concept of conservation; (2) there is a realization that all people need to be concerned with wise resource use; (3) there is realization of the interdependence existing among natural and human resources.

In the State of Washington, a conservation education workshop for teachers was organized on an experimental basis in a camp area in 1953. In this there was cosponsorship between the State Department of Education and colleges, forest industries, natural resource agencies, and conservation organizations.

People from the colleges were brought together to evaluate this workshop project and to see what could be done in the future. Four of the colleges followed with similar workshops and have been conducting them ever since. Generous scholarship help was provided by forest industries, garden clubs, sportsmen's clubs, parent-teacher associations, and some school boards.

By the fall of 1956, about 600 teachers had participated in this program. Now there is a core of teachers in Washington who are informed and enthusiastic about conservation education.

Moving Ahead

The look ahead is realistic. At the beginning of the new school year, there's something lost in learning if children do not wander over the nature areas or conservation plantings with comments and questions, as "See how our trees have grown!" "Do our shrubs need pruning or weeding or watering?" "What's the next thing to be done?" These observations by the children are the first steps on the road ahead.

Teachers and consultants in the schools visited had their look into the future of conservation education, too. Their comments appeared

to lie in fields of what to teach, how to teach it, and cooperation with others.

What To Teach

Many teachers and consultants believe it is important to help the children learn more about the conservation of natural resources right around them. The emphasis is on the home community, at least as a beginning, as is shown by the experiences described in the foregoing chapters. The importance of learning to work with soil and water, seeing plants grow, and making the outdoors around us an attractive place is stressed.

Many teachers wish for more acreage where children might learn to plant trees and forests for beauty and for profit and where they might observe or help to attract rabbits, squirrels, birds, and other wild animals. Many wish for opportunities to teach the children how to make the most of camping, how to swim, and how to fish and to enjoy fishing. Some point out the importance of helping children learn how to use the outdoors with safety for themselves and others. Others say their pupils need to be taught how to enjoy being outdoors and to use it for study, meditation, and experimentation.

How To Teach Conservation

Teachers who have included conservation in their curriculum for some time believe that the subject should be made more real and meaningful. The problems children recognize and define themselves with the teacher's guidance probably lead to more effective learning than those the teacher plans.

It is a mistake to limit conservation to reading books, making charts, and looking at pictures or movies. Conservation is something one *does*. It requires skills and techniques. Books can help, but they cannot do the entire job. Demonstrations, if performed as a rule by the children rather than the teacher, can be helpful; but it is a pity to limit instruction to demonstrations. Conservation can only become real through actual experiences. Projects should not be prolonged beyond the children's interest and ability. A teacher explained that making a wall for a terrace was a tedious project although the children wanted one. She suggested that the rocks could be moved a few at a time whenever the children needed fresh air and a "stretch" outdoors.

Other teachers have pointed out the importance of not allowing children to do more labor than is good for them or to spend in conservation the time that is needed for other learning. In experiences requiring handwork and repeated performance, such as working soil, weeding gardens, laying walks, or setting out trees and shrubs, children participate only to the extent that the activity can be useful to them educatively or physically.

Emphasis in conservation teaching for the future appears to lie in continuing to make conservation more real and meaningful than is often done today. In Parkside School, Prince Georges County, Md., where teachers have a "forward look," they considered it more exciting and educational for the pupils to plant tulip bulbs than only to read about them. Each child brought a tulip bulb to school. The teacher found a place to keep them. When the right time arrived, teacher and children planned together and made preparations for the planting.

The class had a flowerbed all its own. They discussed the effects of layout, type of soil, fertilizer, and water. They dug the holes, measured their depth, planted the bulbs, and put soil around them with their hands. They talked about how to keep their soil from being washed away, how to make it grow better flowers, and what would happen if people walked on the soil where the bulbs were planted. Teachers, consultants, and resource people are agreed that more such real and functional teaching is needed, especially for conservation education.

Cooperation with Others

School people who have a background of several years of conservation teaching believe that conservation is a cooperative undertaking, even in its very beginning, and think other community organizations should cooperate with the school. Without cooperation, what children can do alone is sometimes undone by the lack of interest or information on the part of other groups.

More and more cooperation of individuals, organizations, committees, official agencies, and other community groups would seem to be needed to make conservation a way of life for all of us.

10. Sources of Information

FOR THE PUPILS and teachers who need information about the various aspects of conservation of natural resources there is a tremendous amount of material. Some is free, some inexpensive, and some available at regular prices. Especially useful and completely free are many natural resources themselves.

The teacher's task and opportunity is to know the nature of these materials and where and how to obtain them. Pupils play an important role in writing for and collecting materials. Teachers give guidance to pupils in selecting and obtaining materials best suited to their maturity levels and the conservation areas being studied or developed.

An excellent collection of conservation books and other published materials observed during the visits to the States was found in a two-room rural school. The teachers and pupils had obtained quantities of free and inexpensive materials which they had organized and filed for use in studying the conservation problems in their own environment.

One of the teachers had been an active participant in a summer conservation workshop where she had learned about many sources of conservation materials and services available to schools. She had also served on a committee which wrote the State's bulletin on conservation for elementary schools.

The conservation materials available for elementary teachers and pupils vary extensively as to format as well as content. There are pamphlets of information, bibliographies of source materials for pupils and teachers, kits, books, films, filmstrips, recordings, models, posters, pictures, blotters, bookmarks, stamps, comic books, and many other materials of interest to children. For teachers there are guides, units,

and publications containing background reference material and useful pictures and maps.

As for the natural resources themselves, they are all around us in the great outdoors. The variety and type depend upon the environment or region. They might be trees, soil, a small gully on the school grounds that needs a check dam, a wooded area, a stream and the hillsides it drains, a nearby park, or wildlife.

Resource people are contributing a great deal to conservation education in elementary schools in many parts of the country. Soil conservationists, State foresters, State fish and wildlife personnel, college and university professors, and members of garden clubs, Audubon groups, and other organizations, are examples of resource people who assist elementary schools in their conservation activities.

Organizations and Agencies

The following list gives the names and addresses of some of the Government agencies and other organizations from which schools obtain such materials as those mentioned above and other assistance for conservation education. Teachers can secure lists and descriptions of materials and services available by writing to the sources listed.

American Forest Products Industries, Inc., 1816 N St., NW., Washington 6, D. C.

American Forestry Association, 919 - 17th St., NW., Washington 6, D. C.

American Nature Association, 1214 - 16th St., NW., Washington 6, D. C.

Bituminous Coal Institute, 1425 H St., NW., Washington 6, D. C.

Boy Scouts of America, National Council, New Brunswick, N. J.

Camp Fire Girls, Inc., 16 East 48th St., New York 17, N. Y.

The Conservation Education Association, Eastern Montana College of Education, Billings, Mont.

The Conservation Foundation, 30 East 40th St., New York 16, N. Y.

The Garden Club of America, Conservation and Roadside Committee, 15 East 58th St., New York 22, N. Y.

Girl Scouts of the United States of America, 155 East 44th St., New York 17, N. Y.

The Izaak Walton League of America, 31 North State St., Chicago 2, Ill.

Keep America Beautiful, Inc., 99 Park Ave., New York 16, N. Y.

National Audubon Society, 1130 Fifth Ave., New York 28, N. Y.

National Coal Association, Southern Building, 15th and H St., NW., Washington 6, D. C.

National Education Association, 1201 - 16th St., NW., Washington 6, D. C.

National Geographic Society, 16th and M Sts., NW., Washington 6, D. C.

National Wildlife Federation, 232 Carroll St., NW., Washington 12, D. C.

Sport Fishing Institute, 413 Bond Building, Washington 5, D. C.

State Conservation Departments, (In most State capitals).

State Departments of Education, (In each State capital).

U. S. Department of Agriculture, Federal Extension Service, Washington 25, D. C

U. S. Department of Agriculture, Forest Service, Washington 25, D. C.

U. S. Department of Agriculture, Soil Conservation Service, Washington 25, D. C.

U. S. Department of Health, Education, and Welfare, Office of Education, Washington 25, D. C.

U. S. Department of Health, Education, and Welfare, Public Health Service, Washington 25, D. C.

U. S. Department of the Interior, Fish and Wildlife Service, Washington 25, D. C.

U. S. Department of the Interior, National Park Service, Washington 25, D. C.

U. S. Government Printing Office, Superintendent of Documents, Washington 25, D. C.

Wild Flower Preservation Society, Inc., 3740 Oliver St., NW., Washington 15, D. C.

Publications Available

So many stimulating books and bulletins for teachers and pupils are available today that it is impossible to include all, even of the most recent. Items in the list below are recent examples of conservation publications with national distribution that teachers and children have found useful in classrooms, homes, or libraries. For the convenience of purchasers, the current price of each publication is given. *Prices are subject to change.*

Many excellent and attractive conservation materials are published by State agencies and organizations such as State departments and commissions of education and conservation and local organizations that deal with utilization of the natural resources. General distribution of these materials is usually limited to the States where published. They are, therefore, not included in this bibliography, which serves all States.

For Class Use

Allen, Durward L. Wildlife Management. New Brunswick, N. J., Boy Scouts of America, National Council, 1952. 95 p. $0.25

Discusses values of wildlife, the relation of plants to animal life, and the urgent need of fire safety. Tells how to provide cover for wild animals and fish. Grades 5 to 12.

Blough, Glenn O. Lookout for the Forest: A Conservation Story. New York, Whittlesey House, McGraw-Hill Book Co., Inc., 1955. 48 p. $2.25

How "forest farmers" help keep forests healthy and productive. Through eyes of forest rangers in lookout towers, the book helps readers see how forests are protected against fire and how fires are fought. Grades 3 to 8.

Blough, Glenn O. Not Only for Ducks: The Story of Rain. New York, Whittlesey House, McGraw-Hill Book Co., Inc., 1954. 46 p. $2.25

A little boy learns that rain is important. It cleans sidewalks and fills wells and reservoirs. It refreshes and helps to feed roots of flowers, vegetables, and trees. Rain is necessary to all living things. Grades 2 to 4.

Butcher, Devereux. Exploring Our National Parks and Monuments. Boston, Houghton Mifflin Co., 1954. 288 p. $2.50

Scenery of National Parks, with emphasis on special characteristics. Beautifully illustrated. Useful in helping children prepare for vacation trips they will take with their parents. Grades 6 to 12 and adults.

Colby, C. B. Park Ranger and other books about people of the great outdoors. New York, Coward-McCann, Inc., 1955. 48 p. $1.00

Forest rangers lead a dangerous, exciting, but extremely useful life. This book tells how they dress, where they live, and what they do to protect the Nation's forests, and to help the people who use the forests. Attractive pictures, interesting reading.

Other Colby books include books about fish and wildlife, police, submarines, tall timber, and F. B. I. Grades 6 to 12.

Conservation Education Association. Selected References on Conservation Education for Teachers and Pupils. Billings, Mont. The Association, 1955. 18 p. $0.15 per copy, reduction on 25 or more copies.

Helpful books, bulletins, and other materials, grouped by grade levels and subject. Lists of teaching aids.

Cooper, Chalmer L., and others. Geology. New Brunswick, N. J., Boy Scouts of America, National Council. 1952. 83 p. $0.25

Tells how the earth was formed, explains the movements of water, and has information about rocks, minerals and ores. Grades 5 to 12.

Elliott, Charles N. Conservation of American Resources. Atlanta, Ga., Turner E. Smith and Co., 1951. 430 p. $3.28

Discussion of America's natural resources and how her people are trying to learn to use them wisely for the good of present and future generations. Grades 6 to 12, and adults.

Eschmeyer, R. W. Bob White, Mac Mallard, and other little wildlife books for children. Oxford, Ohio, Fisherman Press, 1951-53. 48 p. $0.50

Stories about common wild animals and their interrelations with the environment and with one another. For readers of all ages. Books in series include:

Bob White	Charley Cottontail	Al Alligator
Bobby Bluegill	Tommy Trout	Woody Woodcock
Willie Whitetail	Fox Squirrel	Billy Bass
Mac Mallard		

Eschmeyer, R. W. Land, Water and Fishing. Washington 5, D. C., Sport Fishing Institute, 1955. 15 p. $0.15 per copy, reductions on 100 or more copies.

Interrelationships among resources — forestry, fishing, grass, drinking water. Cartoon illustrations. Grades 5 to 12. Other materials available. Write for price list.

Gee, C. W. The Soil That Went to Town. Washington 25, D. C., U.S. Department of Agriculture Information Bulletin 95, 1952. 20 p. $0.15

Limited amount of text. Pictures of two farms. On one, conservation measures were practiced. On the other, soil was allowed to be washed away by heavy rains. Children of all ages and adults.

Goetz, Delia. Deserts. New York, William Morrow and Co., 1956. 64 p. $2.50

How plants and animals adapt themselves to the environments of desert lands. Descriptions and pictures. Grades 4 to 6.

Goetz, Delia. Tropical Rain Forests. New York, William Morrow and Company 1957, 64 p. $2.50

Tropical Forests extend over wide belts in South America and Africa, and in "narrower stretches in India, Burma, and the West Indies." Tells how plants and animals are adapted to the rain forest environment. Grades 4 to 6

Graham, Edward H. and Van Dersal, William R. Water for America. The Story of Water Conservation. New York, Oxford University Press, 1956. 111 p. $3.50

Pictures and text on uses of water. Other books in the series include The Land Renewed and Wildlife for America. Grade 6 and adults.

Green, Ivah. Partners with Nature. Scranton, Pa., International Textbook Co., 1950. 112 p. $2.00

Tells about small animals around us. All depend on the earth for life. Helps children see relationships in nature. Another book by the same author and publisher is Animals Under Your Feet. Grades 4-6.

Howell, Henrie Andrews. Muddy Water. 100 Garfield Ave., New London, Conn., Arthur C. Croft Publications 1949. 94 p. $0.75 per copy, with teacher's guide

A city boy and his family rebuild a rundown farm. Methods of conserving and making the most of soil, water, forest, and wildlife. Grades 4 to 8.

National Audubon Society. Audubon Nature Bulletins. 1130 Fifth Ave., New York 28, N. Y. The Society. $0.15 each. Any 5 or more, $0.10 each.

Helpful leaflets with pictures, some in color, to help children become acquainted with birds. Audubon Junior Club Kit, Chart, Folders.

National Wildlife Federation, Inc. My Land and Your Land Series. Washington, D. C., National Wildlife Federation, Inc., 1953.

Would You Like To Have Lived When—? (Grades 3, 4, 5), 32 p. $0.25
Raindrops and Muddy Rivers (4, 5, 6), 32 p. $0.25
Plants and Animals Live Together (5, 6, 7), 48 p. $0.25
Nature's Bank—The Soil (6, 7, 8), 48 p. $0.25
Written from a background of children's interests.

Outline for Teaching Conservation in Elementary Schools. Washington 25, D. C., U. S. Department of Agriculture, Soil Conservation Service, 1955. 14 p. Free.

Ideas for teachers and pupils as they plan together curriculum experiences in conserving the natural resources. Lists of visual aids and references.

Palmer, E. Laurence. Fieldbook of Natural History. New York, McGraw-Hill Book Company, Inc., 1949. 664 p. Textbook edition, $6.00

A natural history guidebook, including the universe itself, our solar system, the earth, and the rocks, minerals, plants, and animals represented in practically any normal environment in which man lives. Identification is determined by pictures. Species and family are described below the pictures. Grades 6 to 12, and teachers.

Peterson, Roger Tory. Wildlife in Color. Boston, Houghton Mifflin Co., 1951. 191 p. $3.75.

One of a series of field guides. Presents in color the flowers and animals that embrace the wildlife community and shows how they live in harmony with one another and the environment. All grades and adults.

Ress, Etta Schneider (in cooperation with the National Audubon Society). Field and Meadow (The Community of Living Things, Vol. One), Mankato, Minn., Creative Educational Society, Inc., 1956. $6.95

Illustrations and simple text dealing with wild plants and animals of field and meadow. Relation of living things to environment. Large pictures selected for interest to children. All grades and adults.

Riedman, Sarah R. Grass, Our Greatest Crop. New York, Thomas Nelson and Sons, 1952. 128 p. $3.00

Values of grass as food for animals that give us meat, as a soil holder, as a soil builder. Enemies of grass, the beauty of grass. Conservation. Grades 6 to 12, and adults.

Smokey the Bear. New York, 261 Fifth Ave., Dell Publishing Co., Inc., 1956. Comic Books No. 653 and No. 708. $0.10

Colored pictures and dialogue telling how Smokey and his forest companions, young Smokey, Specs, the raccoon, the beavers, the salmon, the bighorns and others work together to solve problems of forest environments.

Other Smokey-Bear materials include Smokey Bear's Story of the Forest, an illustrated workbook, Conservation Pledge, song, "Smokey, the Bear," Smokey-Bear seals, and Smokey-Bear stamps.

Sport Fishing Institute. Conservation Chart and Text. Washington 5, D. C., 1955 15 p. Chart 3½ feet by 2¼ feet. $0.60

Story of two valleys. In one, the people used good conservation practices. Fish, trees, grass, and plants flourished. In the other, the people did not practice conservation. Heavy rains caused soil erosion and plants and animals and people died. Grades 3 to 5.

Tilden, Freeman. The National Parks—What They Mean to You and Me. New York, Alfred A. Knopf, 1954. 324 p. $1.00

National Parks as areas where land and its creatures can be preserved in natural state, with a balance of nature that adjusts itself naturally to changing conditions, and where "survivors survive without man's interference." Role of parks in maintaining natural areas for recreation. Background for grades 6 to 8 and adults, especially when children and parents are planning trips to parks.

U. S. Department of Agriculture, Forest Service, Washington, D. C. Single copies of publications listed below are free. Requests for these should be directed to the regional forester in whose region your State is located, or to the United States Department of Agriculture, Washington 25, D. C. When additional copies are desired, they may be purchased from the United States Government Printing Office, Washington, D. C.

In Your Service: The Work of Uncle Sam's Forest Rangers. United States Department of Agriculture, (Forest Service Bulletin, AIB 136), $.20. Pictorial bulletin showing how forest rangers provide for maximum protection and utilization of the National forest. Grades 4 and above.

Highlights in the History of Forest Conservation. United States Department of Agriculture. (Forest Service Bulletin, AIB. 83.), $.15. Events that mark progress in the forest conservation movement in the United States. Grades 6 and above.

National-Forest Vacations. United States Department of Agriculture, (Forest Service Bulletin (AIB 55.) 54 p. $.30. Where to go and what to see for recreation in the national forests. Names, headquarters, special features, outdoor sports, and accommodations of the National forests in the various States. Grades 6 and above.

United States Department of Agriculture, Soil Conservation Service, Washington 25, D. C. Single copies of publications listed below are available free. Requests for these should be directed to local field offices of the Soil Conservation Service or to the Soil Conservation Service, United States Department of Agriculture, Washington 25, D. C. When additional copies are desired, they should be purchased from the United States Government Printing Office, Washington 25, D. C. at the prices indicated below.

Conquest of the Land through Seven Thousand Years, by W. C. Lowdermilk. (Agriculture Information Bulletin No. 99, 1953.) 30 p. $0.15. An account of cities of the past that are said to have gone out of existence through

destruction of soil and loss of other important resources. Teacher and grades 6 to 12.

Grass, the Rancher's Crop, by J. S. McCorkle. 8 p. (Leaflet No. 346, 1954.) $0.10. Tells why grass is important. Grades 6 to 12 and teacher.

From the Dust of the Earth, by William H. Lathrop. 16 p. (Information Bulletin No. 78, 1952.) $0.15. Explains the importance of a soil and water conservation program in a way that children who have few contacts with farming can understand. Shows that everyone can contribute something toward the success of the program. Grades 6 to 12.

Making Land Produce Useful Wildlife, by Wallace L. Anderson, 24 p. (Farmers' Bulletin No. 2035, 1955.) $0.15. Useful information for school children who are helping to develop wildlife areas, ponds, and windbreaks. Ways of managing land to meet wildlife requirements. Grades 6 to 12.

Managing Farm Fishponds for Bass and Bluegills, by Verne E. Davison. 18 p. (Farmers' Bulletin No. 2094, 1955.) $0.15. Tells ways of building, managing, and improving farm ponds. Discusses control of fish, tells when to fish and how much to fish. Useful for children and adults who live on farms that have ponds. Grades 6 to 12 and adults.

Youth Can Help Conserve These Resources. 24 p. (Agriculture Information Bulletin No. 52, 1957, rev.) $0.15. Pictorial book including pictures of sheet erosion, crop rotation, strip cropping, water ways, flood control, shelter belts, and farm ponds. Grades 5 and above.

U. S. Department of the Interior, Bureau of Mines. Washington 25, D. C.

Facts about Coal, by Allan Sherman and Allen B. MacMurphy. 1955. 26 p. $0.25. How coal is formed, where found, how mined. Ways of conserving by greater use of low-grade coal and by improved industrial equipment. Grades 5 and above.

United States Department of the Interior, Fish and Wildlife Service, Washington 25, D. C. Single copies of publications listed below are free. Requests for these should be directed to the Fish and Wildlife Service, Washington 25, D. C. When additional copies are desired, they should be purchased from the United States Government Printing Office at the prices indicated.

Visiting National Wildlife Refuges. (Refuge Leaflet 1, 1953) $0.10.
Tells how some of the Nation's wildlife refuges are preserved and contains attractive photographs describing scenes from them.

A Visit to a Federal Fish Hatchery. 8 p. (Circular 28, 1954) $0.10
Tells how a fish hatchery is managed. For grades 6 and above and for teachers. Write to Fish and Wildlife Service for price list of other useful bulletins on the Nation's fish and wildlife resources.

Following publications should be purchased directly from the United States Government Printing Office, Washington, D. C.:

Alaska's Fish and Wildlife, by Clarence J. Rhode and Will Barker. 60 p. (Circular 17, 1953.) $0.25. Interesting and helpful bulletin on some of the Nation's most prized resources. Grades 6 and above.

Migration of Birds, by Frederick C. Lincoln. (Circular 16, 1950.) $0.30. Helpful in answering questions on the movement of groups of birds, studies of flyways, and bird banding. Contains maps and sketches of birds. Grades 6 and above.

Some Common Birds Useful to the Farmer, by F. E. L. Beal. (Conservation Bulletin 18, 1948.) $0.15. Useful bulletin for grades 6 and above.

Walker, Ernest D. and Foster, Albert B. This Is Our Soil. Danville, Ill., The Interstate Printers and Publishers, 1951. 56 p. $0.50 for single copies, discounts on quantities.

How soil is formed, how it can be damaged, how much good topsoil means to us, and why we need to protect our topsoil for ourselves and for the people who live after us. Pictures that even primary pupils can understand, and text usable through the eighth or ninth grade.

Walsh, Mary Regina. Water, Water Everywhere. New York, Abingdon-Cokesbury Press, 1953. 48 p. $2.00

Beautifully illustrated. Much information. Grades 5 and 6.

Werner, Jane. Smokey the Bear. New York, Simon and Schuster, 1955. (Little Golden Book Series) $0.35

True story of Smokey the Bear, the symbol of fire prevention in the Nation's forests. Grades 1 to 5.

A longer story in a larger book for somewhat higher grade level is available from Simon and Schuster for $1.00.

Zim, Herbert S. and Hoffmeister, Donald F. Mammals. New York, Simon and Schuster, 1955. 160 p. (A Golden Nature Guide, Series) $1.00

Descriptions of individual and family groups of mammals with family trees including illustrations. Suggestions for studying mammals, photographing them, collecting tracks, and preparing skins. Grades 4 to 8.

For Teachers

Allen, Shirley W. Conserving Natural Resources. New York, McGraw-Hill Book Co., Inc., 1955. 347 p. $5.50

Practical and nontechnical treatment of the conservation of natural resources, with reading lists. A source of information for the teacher to answer questions that children may raise or to help with projects that they undertake.

American Association of School Administrators. Conservation Education in American Schools. 1201 16th St., NW., Washington, D. C., The Association, 1951. 527 p. (Twenty-Ninth Yearbook) $4.00

Describes State, regional, and local programs for conservation and reports practices in rural and city schools. Gives sources of materials and bibliographies for teachers and children.

Carhart, Arthur H. Water—or Your Life. Philadelphia, J. B. Lippincott Co., 1951. 312 p. $4.00

What to do and what to avoid in maintaining appropriate distribution of water.

Dicken, Samuel Newton. Economic Geography. Boston, D. C. Heath and Co., 1955. 569 p. $6.50

New edition of a regional economic geography. Main emphasis is on production. Chapters on minerals should be especially helpful as source information.

Handbook for Teaching of Conservation and Resource Use. Richard L. Weaver, Project Leader. Danville, Ill. The Interstate Printers and Publishers, Inc., 1955. 499 p.

A sourcebook of projects and activities by highschool students. Detailed bibliographies and lists of materials and organizations by many States and organizations. Many of the suggestions lend themselves to adaptation in the elementary school program.

South Carolina, State Department of Education. Our Land Is Our Life. By J. M. Eleazer (Ed.). Columbia, The Department, 1955. 134 p.

Example of helpful resource books for teachers published by State Education Departments. Contains much background information. Readers' attention is drawn particularly to section 6, "Our Minerals," on which little is published elsewhere for school use.

United States Department of Agriculture, Soil Conservation Service, Washington 25, D. C. Books, Booklets, Bulletins, on Soil and Water. Washington, United States Government Printing Office, 1953. 30 p. $0.15

Lists publications for teachers and other adults and for children in the upper and the lower elementary grades.

Forest Service, Washington 25. People and Timber, Washington, United States Government Printing Office, 1956. 16 p. (Misc. Publication No. 721). $0.20

Answers questions about our timber situation — how much timber we have, where it is, who owns it, how we use it, and what can we expect for the future.

Vogt, William. Road to Survival. New York, William Sloane Associates, 1948. 335 p. $4.00

Narrates the story of man's abuse of natural resources in different countries. Useful in relating conservation to history and geography.

Acknowledgments

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Arkansas	Indiana	Minnesota	Oregon
California	Iowa	Mississippi	Pennsylvania
Colorado	Kansas	Missouri	South Carolina
Delaware	Kentucky	Nebraska	Tennessee
Florida	Maine	New Hampshire	Washington
Georgia	Maryland	North Carolina	West Virginia
Illinois	Michigan	Ohio	Wisconsin

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Conservation Pledge

I GIVE MY
PLEDGE AS AN AMERICAN
TO SAVE AND FAITHFULLY TO
DEFEND FROM WASTE THE
NATURAL RESOURCES OF
MY COUNTRY — ITS SOIL
AND MINERALS, ITS
FORESTS, WATERS,
AND WILDLIFE