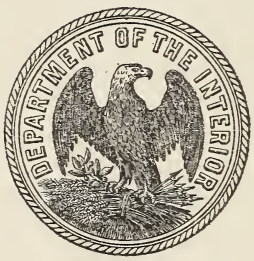
ELEMENTARY SCIENCE BY GRADES

Book Two



ELEMENTARY SCIENCE BY GRADES

EDITED BY

FRANK W. BALLOU, PH.D.

SUPERINTENDENT OF SCHOOLS, WASHINGTON, D. C.

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BOOK TWO

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SUPERINTENDENT OF SCHOOLS,
WASHINGTON, D. C.

BOOK I. *By* ELLIS C. PERSING *and* ELIZABETH K. PEEPLES. *In preparation.*

BOOK II. *By* ELLIS C. PERSING *and* ELIZABETH K. PEEPLES.

BOOK III. *By* ELLIS C. PERSING *and* ELIZABETH K. PEEPLES.

BOOK IV. *By* ELLIS C. PERSING *and* EDWARD E. WILDMAN. *In preparation.*

BOOK V. *By* ELLIS C. PERSING *and* C. LOUIS THIELE. *In preparation.*

BOOK VI. *By* ELLIS C. PERSING *and* JOHN A. HOLLINGER. *In preparation.*

THE WOOLLY BEAR CATERPILLAR, THE WOOLLY BEAR COCOON, AND THE ISABELLA TIGER-MOTH.

ELEMENTARY SCIENCE BY GRADES

Book Two

A NATURE STUDY AND SCIENCE READER

BY

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NEW YORK
D. APPLETON AND COMPANY

PRINTED IN THE UNITED STATES OF AMERICA

EDITOR'S INTRODUCTION

The Elementary Science Series has been prepared because of the very earnest belief of the authors in the importance of the subject matter to be covered, in the interests of children in nature about them, and in their ability to profit by a study of it.

Throughout the series the authors have kept in mind the psychology of the child rather than the orderly scientific arrangement of the subject matter. The vocabulary of each book has been most carefully selected from and checked against accredited lists of words of highest frequency in the spoken vocabulary of young children. Moreover, the point of view of the authors is that of explaining to children the everyday world about them and making it an object of interest and profit to them.

Simplicity has been one aim in the preparation of the readers in order that the joy of the subject and the attitudes, habits, and ideals taught by them may not be lost in a maze of mechanical difficulties.

The general aims and objectives throughout the series are those set forth in the *Fourth Yearbook* of the Department of Superintendence.[1] The subject matter of the lessons has been selected with a view of making it possible for teachers to realize those aims and objectives.

The organization of the subject matter of the series agrees in the main with that of the *Fourth Yearbook* course and with other leading courses of study of the

[1] *Fourth Yearbook,* Department of Superintendence, Ch. IV, "Elementary Science and Nature Study" (Washington, National Education Association, 1926) pp. 59-112.

country. The course can be articulated with the more formal science course in junior-high-school grades.

The national policy of conservation of our natural resources is recognized and encouraged among pupils throughout the series. The protection of trees, wild flowers, and birds is specifically taught.

Each volume of the series is organized on the basis of seasons. For example, the study of flowers is increased in the fall and spring months, and minimized in the winter season. The physical sciences are largely taught during the winter months.

Each volume contains the material for a year of instruction. Each volume also carries suggestions to teachers on how to handle the activities; how to obtain materials; plans for field trips; preparation of school gardens, and other aspects of the lessons. Although each volume is a unit in itself, the series represents a unified program of instruction in elementary science and nature study. The series is built on the spiral plan and is progressive in content and style.

At the close of each chapter various suggestions and questions are offered under the heading "Things to Think About." These questions and suggestions are for the purpose of stimulating thought among the children either before or after reading the lesson.

The books are primarily designed as readers with science content for the school systems that have yet made no provision in the curriculum for instruction in elementary science and nature study. New-type tests have been included for the purpose of determining comprehension of the reading assignment.

For the schools that provide for science instruction as such even more important than the comprehension material are the suggestions contained under the title "Things To Do." Since much of the instruction cov-

ered in this series of books can be given objectively through the direct contact of children with the objects themselves, the authors of this series have indicated what may be properly done by teachers and pupils in making a study of elementary science more than a book subject. Suggestions of trips to the zoo, excursions to the country, trips to parks and woods, and observations of those activities within the home that are based on scientific principles taught in the books are the various ways suggested of making the instruction covered in this series of books more real and more vital than such instruction acquired exclusively from books.

The material in these books has been successfully tested out before publication under actual classroom conditions both in schools that used the material primarily as readers and in schools that have permanent provision for instruction in elementary science.

Frank W. Ballou

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PREFACE

Elementary Science is the natural means through which a child becomes acquainted with the world about him. Without suggestion or direction some children acquire considerable knowledge of their environment; but more remain pathetically and dangerously blind and deaf to it. For the child's physical, intellectual, and spiritual good the educator should see that he is made aware of the phenomena within his observational scope, and his relations to them.

Elementary science, more than any other subject, supplies actual experience with concrete things. It is, therefore, an ideal study in elementary schools, and may be used as a basis of approach to practically every other subject. Present practice in the teaching of elementary science and nature study in the first six years has indicated the need for a graded series of readers having a science content that will conform generally in subject matter and organization to accepted requirements. It was in the hope of supplying such a need that this series, *Elementary Science by Grades,* has been prepared.

This volume of the series, *Book Two,* has been designed for use in the second grade. In content, it meets the generally accepted subject matter requirements for that grade except for some minor modifications that were made as the result of testing the material in the classroom.

The vocabulary has been based upon the first and second groups of Gates, "A Reading Vocabulary for the

Primary Grades'' and upon Thorndike's ''The Teacher's Word Book.'' Words that fall outside of the list of words of highest frequency for the grade have been placed in a list in the back of the book. Many teachers will want to use this list as a source of words for drill before the assignment of the lesson.

Like other books in the series, this volume has been organized on a seasonal basis. Subject matter has been arranged throughout so it will be suitable for the season of the year in which it normally will be studied. In this book, for example, the grasshopper, the spider, the caterpillar, and certain flowers are studied in the fall. The chapters dealing with astronomy and the physical sciences come during the winter months. The latter part of the book, which ordinarily will be studied in the spring, includes chapters on birds, gardening, trees, and flowers.

To test reading ability, different forms of new-type tests have been included at the end of every chapter under the heading, ''Some Things to Think About.'' Some teachers, of course, may desire to substitute other forms or to supplement those that have been prepared. Suggested forms for activities are given under the heading ''Some Things to Do.'' Specific suggestions to the teacher on the teaching of each chapter are placed at the back of the book.

Acknowledgment is gratefully made to Miss Rose Lees Hardy, Assistant Superintendent of Schools, Washington, D. C. and Dr. Paul Bartsch of the Smithsonian Institution, for their advice and comment; to Miss Helen K. Brett, Principal of Alabama School, Cleveland, Ohio, for reading most of the manuscript and for helpful criticisms and suggestions; to Miss Laura Zirbes, specialist in reading, Teachers College, Columbia University, and Dr. Hanor A. Webb of George Peabody College

for Teachers, Nashville, Tennessee, for reading the manuscript and for helpful suggestions and criticisms; and to Dr. Edward E. Wildman, Director, Division of Science, Philadelphia, C. L. Thiele, Assistant Director of Exact Sciences, Detroit, and Dr. John A. Hollinger, Director of Nature Study, Pittsburgh, for their helpful advice on the outline, their reading of the complete manuscript, for testing chapters of the manuscript, and for reading the proof.

Mention must also be made of the Washington teachers who tried out the material in their classrooms. These are the Misses D. M. Beller and L. M. Coates of the Petworth School, E. D. Gilbert, H. S. Casey, S. T. Schwartz, and M. E. Millner of the Hayes School, C. M. Stinzing and A. V. Keliher of the Thompson School, M. L. Brinkley, Raymond School, R. E. Barnes, Peabody-Hilton School, M. G. Hesse, Hilton School, and G. McLaurine and Mrs. Louise Hughes of the Force School.

The thanks of the authors are also due the various organizations that aided in the gathering of illustrations for the book, especially the American Nature Association, publishers of *Nature Magazine*, the Division of Educational Extension of the Department of Agriculture, and the American Museum of Natural History.

E. C. P.
E. K. P.

ELEMENTARY SCIENCE BY GRADES

Book Two

INTRODUCTION

SHARP EYES

Billy is a little boy. He is old enough to go to school. Billy likes his school. He is in the second grade. All the children in Billy's class have a lot of fun. Their teacher has fun, too.

Billy likes to go to the toy store with his mother. The toy store is beautiful. Its walls are blue.

All over the store there are toys. There is a big Teddy bear. There is a rocking horse. There is a doll in a green dress. There is a train. There are big red balls, too.

Billy likes to look at the toys. He has sharp eyes. He sees every one of the toys.

One day there was a new toy in the store.

BILLY LIKES TO GO TO THE TOY STORE.

Billy said, "Oh, there is a new train!"

His mother said, "You have sharp eyes, Billy."

One day Billy and his mother took a walk. Billy did not want to go for a walk. He wanted to go to the toy store.

It was a beautiful day. The sky was blue. There was a red bird in a tree. The leaves of the tree were green.

His mother said, "What a beautiful day!"

"I do not see anything beautiful," said Billy.

Next day his mother took Billy to the toy store. She put her hands over his eyes.

"Why do you do that?" asked Billy.

"You are in the toy store," said his mother.

"Do you see the beautiful toys?"

"No, I do not see anything beautiful," said Billy.

"But the beautiful toys are here," said his mother.

"How can I see the toys? Your hands are over my eyes," said Billy. His mother took her hands off.

"Now I see the toys! I have sharp eyes again," said Billy.

BILLY SAW A BIRD IN A TREE.

On the way home Billy asked, "Why did you put your hands over my eyes?"

His mother said, "To help you have sharp eyes out of doors. When you are out of doors, you do not see beautiful things. You have something over your eyes."

"No, mother," said Billy, "there is nothing over my eyes."

"Then use your eyes to see the beautiful things out of doors," said his mother.

Billy looked all around. He saw the blue sky. He saw a bird in a tree. He saw the green leaves on the trees.

"What a beautiful day," said Billy.

"Now you have sharp eyes, Billy," said his mother.

A GAME TO PLAY

This is a game called "Why."

Find the right answers to these questions.

1. Why did Billy like to go to the toy store?
2. Why did Billy not want to go for a walk?
3. Why did Billy's mother put her hands over his eyes?
4. Why did Billy say, "What a beautiful day"?
5. Why did Billy's mother say that he had sharp eyes?

CHAPTER 1

HOPPITY HOP

Can you hop? Can you jump?
Think of some things you know that
can hop and jump.

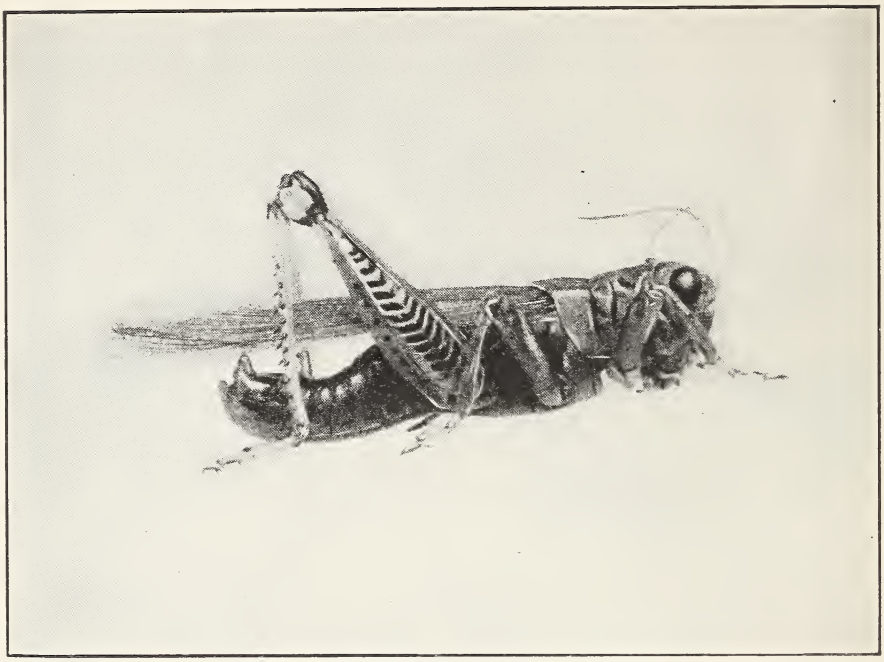
Hoppity Hop lives in the grass. He can hop and jump. He has long, strong hind legs. His strong hind legs help him jump. Hoppity Hop is a grasshopper.

Birds like to eat grasshoppers. They look for grasshoppers with their sharp eyes.

Grasshoppers are hard to see in the grass. Some of them are green like the grass. Some are brown like the ground. That is why it is hard for the birds to see them. When a bird comes near, Hoppity Hop hops away.

Courtesy of U. S. Bureau of Entomology.

THESE YOUNG GRASSHOPPERS ARE GREEN LIKE THE GRASS.



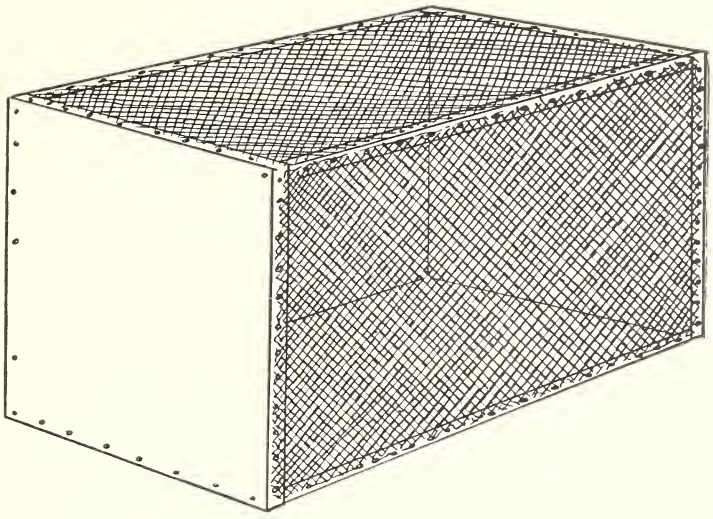
Courtesy of U. S. Bureau of Entomology.

GRASSHOPPERS HAVE STRONG LEGS AND WINGS.

Have you sharp eyes? Can you see grasshoppers in the grass? Can you catch one?

Grasshoppers can fly, too. They have strong wings. With their strong wings they fly fast. They do not fly so far as birds do.

Grasshoppers fly to new places to find food. They like to eat green grass and leaves. Have you ever seen a grasshopper eat? Hoppity Hop has a



YOU CAN MAKE A PLACE FOR GRASSHOPPERS TO STAY.

funny face. It is fun to see him eat green grass and leaves.

Hoppity Hop can sing a song. He does not sing with his mouth as you do. He sings with his legs! What a funny way to sing! He rubs his hind legs against his wings when he sings. Do you know Hoppity Hop's song? Can you sing it?

Some children like to have Hoppity Hop come to school. They like to watch grasshoppers hop and jump. They like to hear them sing.

The teachers help the children make a place for grasshoppers to stay. They get a big box. They put some earth in the box. Then they put some netting over the box for a top.

The children look for grasshoppers out of doors. Sometimes they find many grasshoppers. They put the grasshoppers in little boxes. Then they take them to school and put them in the big box.

Every day the children put fresh green leaves and grass in the big box. The grasshoppers eat the fresh leaves and grass. The children like to watch them eat.

After the children have watched the grasshoppers a few days, they let them go.

SOME THINGS TO THINK ABOUT

1. Find all the sentences about Hoppity Hop that tell about the first picture.

2. Find all the sentences about Hoppity Hop that tell about the next picture.

3. Find all the sentences that tell about the last picture.

SOME THINGS TO DO

Play you are a grasshopper. Hop and jump and sing like a grasshopper.

Make a place for grasshoppers to stay. Bring some grasshoppers to school and watch them.

CHAPTER 2

WEBS OF SILK

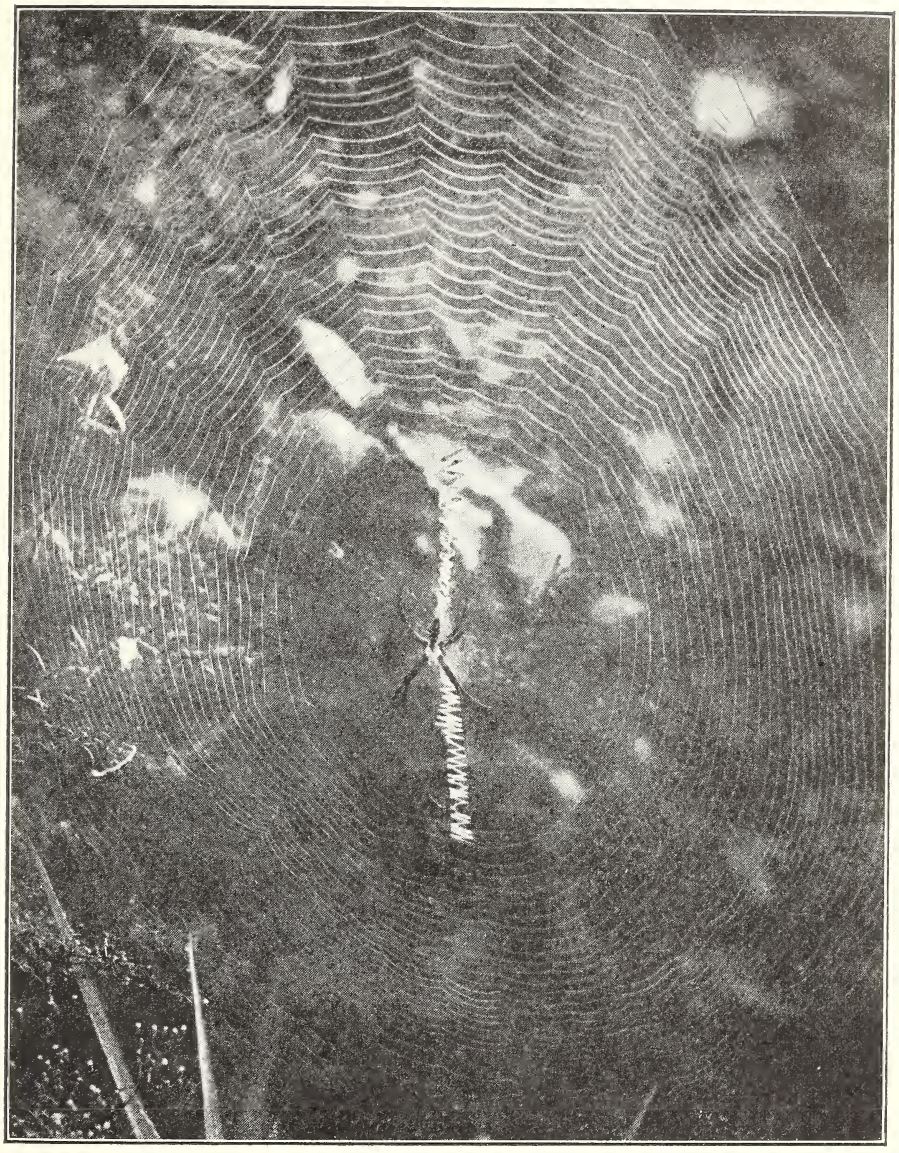
Where have you seen spider webs?
What did they look like?
What happens when you touch a spider web?

Spiders make webs in many places. They make them in the grass. They make them on trees and bushes. They make them in the house, too. Have your sharp eyes seen them in all these places?

The webs in all these places do not always look alike. There are many kinds of spider webs.

Spider webs in the house are almost always in corners. They are made of fine, silky threads. It is hard to see the webs until dust gets on them.

Spider webs in the grass are not so



Courtesy of "Nature Magazine."

SOME SPIDER WEBS ARE ROUND.

hard to see. Can you tell why? They are made of fine threads that shine like silk. These webs are almost always round. The webs on trees and bushes look like wheels made of silky threads.

All these webs are made to catch food for the spiders. Spiders eat grasshoppers, flies, and other insects.

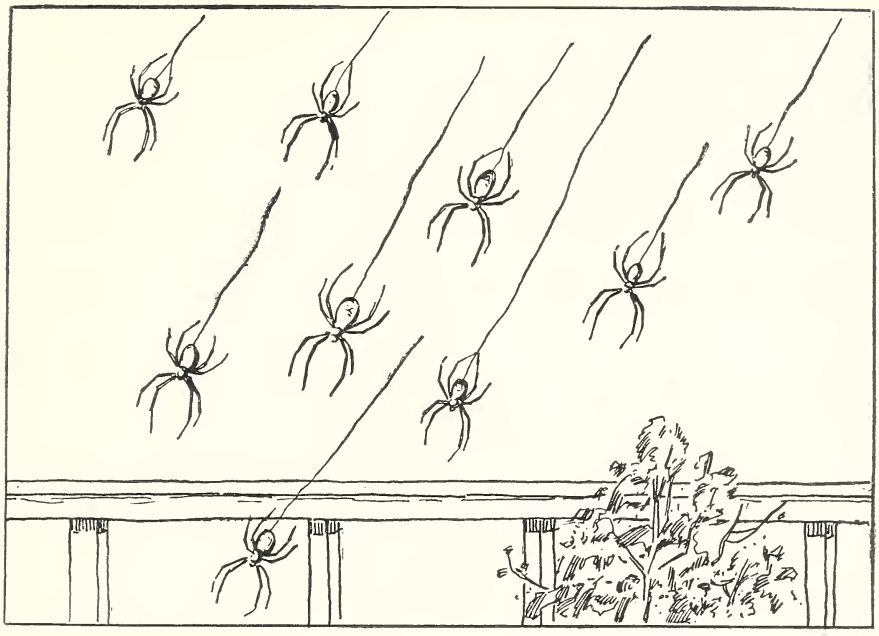
When a grasshopper hops into a spider web, the web holds it fast. Out comes the spider to eat the grasshopper!

When a fly flies into a spider web, the web holds it fast. Out comes the spider to eat the fly!

When any insect flies into a spider web, the web holds it fast. Then out comes the spider to eat the insect.

A spider spins its web of a kind of silk. The silk comes out of the spider's body.

Some spiders spin long, silky threads to help them sail in the air. The threads are very light. The spiders sail away



SOME SPIDERS CAN SAIL ON THEIR SILKY THREADS.

on the ends of their light, silky threads. They look like tiny balloons. The wind blows the tiny balloons and their light, silky threads. Sometimes it blows them a long way.

Spiders sometimes use their silky threads to climb down from high places. Men use ropes the same way that spiders use their threads.

If you have sharp eyes, you can find out how to tell a spider from a

Photograph by L. W. Brownell.

A SPIDER ON ITS WEB.

grasshopper. A spider almost always has hair on its body and legs. Has a grasshopper any hair?

Think of some more ways to know a spider. Here is a good way. A spider always has eight legs. How many legs has a grasshopper?

Spiders are our friends. We should not hurt them.

SOME THINGS TO THINK ABOUT

Here are five words. Can you put the right one in each sentence?

wheels, silk, friend, eight, food

1. Spiders have.....legs.
2. Some spider webs look like.....
3. Spiders make webs to catch.....
4. Spider webs look as if they were made of.....
5. The spider is our....., because it eats flies.

SOME THINGS TO DO

Find a spider web like a wheel. Draw it.

Draw other spider webs that you have seen.

Catch some spiders and put them into a big glass jar in the schoolroom.

Watch the spiders.

Catch flies and feed them to the spiders.

CHAPTER 3

HOW CATERPILLARS LIVE

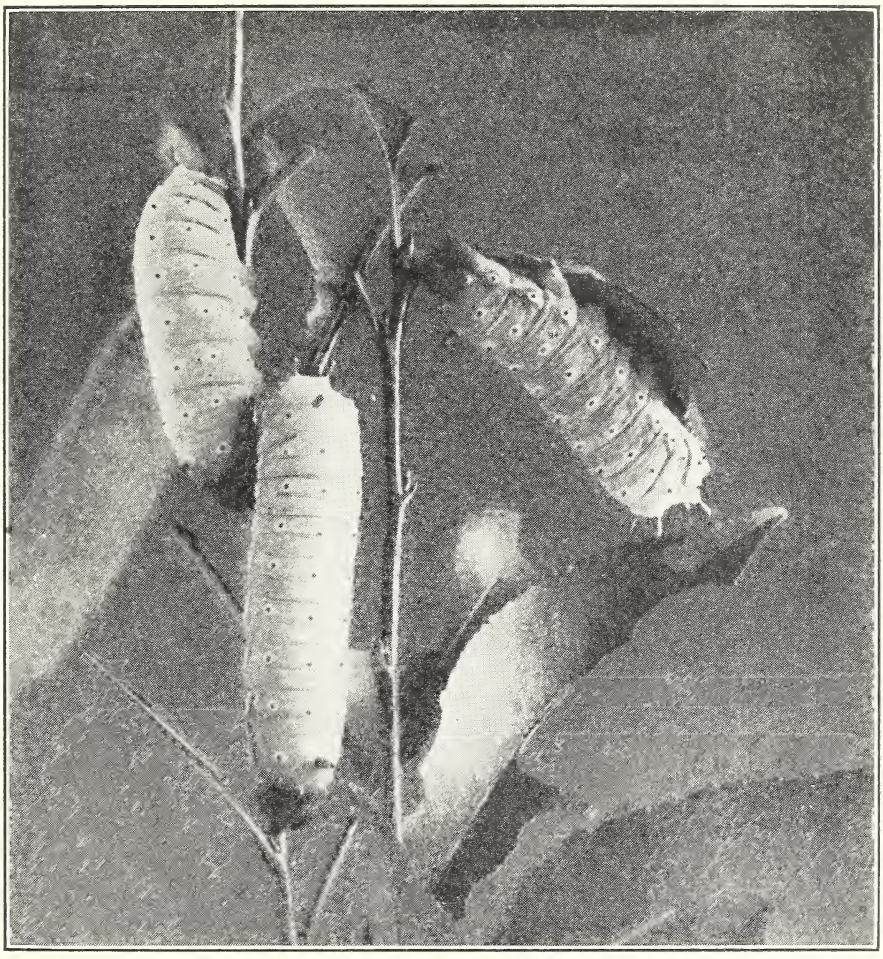
Have you seen any caterpillars?
What were they doing?
How did they look?

Fall is a good time to see caterpillars. Do you know where to look for them? Look in the grass. Look on the ground. Look on trees and bushes.

Boys and girls with sharp eyes will see many caterpillars. Which one of you can find the most?

Caterpillars like to eat green leaves. They eat the leaves on which they live. Have you seen any holes in leaves? The caterpillars make holes in the leaves when they eat them. Watch them to see how they do it.

Look at the caterpillar's mouth. Your



Photograph by L. W. Brownell.

CATERPILLARS LIKE TO EAT GREEN LEAVES.

mouth moves up and down when you eat. When the caterpillar eats, its mouth moves from side to side. Are your eyes sharp enough to see a caterpillar's mouth move?

Boys and girls grow when they get

Photograph by Cornelia Clarke.

OUT COMES THE CATERPILLAR IN A NEW SKIN.

as much food as they need. So do caterpillars. But caterpillars do not grow in the same way as boys and girls do.

When you grow, you get too big for your coat. Then your mother buys you a new one. When a caterpillar grows, it gets too big for its skin. Then the skin opens down the back. Out comes the caterpillar in a new skin. If you watch, you will see it happen.

All caterpillars do not look alike. Some are large. Some are small.

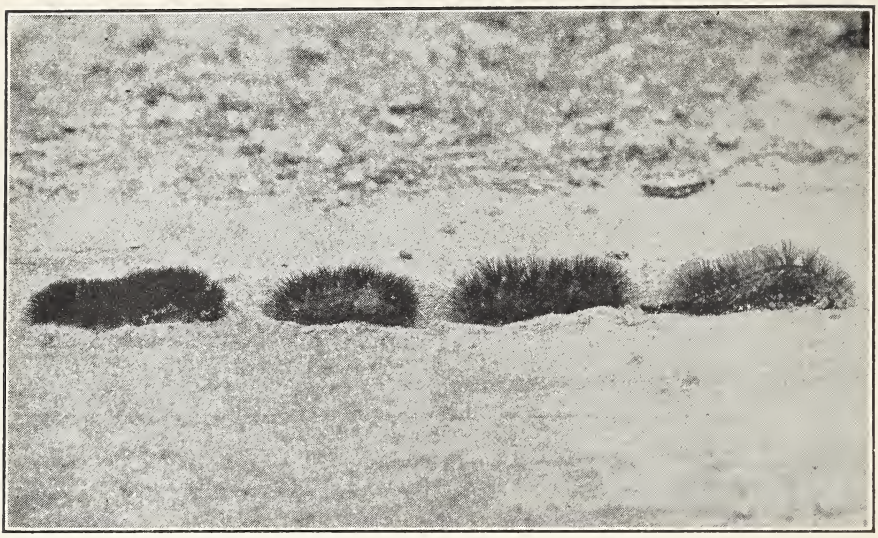
Some are brown. Some are green. Some are other colors. Some have hairs on their bodies. Some have no hairs.

Caterpillars are almost always hungry. So are birds. Many birds like to eat caterpillars, but most of them do not like to eat a caterpillar with hairs on it.

Grasshoppers can move fast. They can get away from the birds. Caterpillars are slow. They cannot get away from the birds, but hairs keep birds from eating some of them.

There is a caterpillar with hairs all over its body. It is the woolly bear caterpillar. Isn't that a good name for a caterpillar with hairs all over it?

Some woolly bears are dark brown. Some are light brown. Many are red-brown in the middle and black at both ends. You can find them in the grass or on the street. They are not hard to find.



Photograph by Cornelia Clarke.

WOOLLY BEARS CAN CRAWL FAST.

Try to pick up a woolly bear. It will roll itself up into a ball. It is hard to pick up.

The woolly bear crawls fast. If the caterpillars had a race, the woolly bear would beat the others. It crawls much faster than other caterpillars.

Watch caterpillars crawl. How many legs has a caterpillar? If you have sharp eyes, you will find out. You will see many other things, too.

Did you read about the children

who took grasshoppers to school? Sometimes they take caterpillars to school, too. They use their sharp eyes to find caterpillars. They take them to school in little boxes. Then they put them in the box that the grasshoppers lived in.

When they find a caterpillar, they take some of the leaves they find it on. The caterpillar likes to eat these leaves. The children put the leaves in a jar of water in the big box.

Every day they put the same kind of fresh leaves in the jar of water. They take out all the old leaves. They keep the caterpillar box clean.

Do you think you could take care of some caterpillars?

SOME THINGS TO THINK ABOUT

Some of these sentences are true. Some are not true. Tell which ones are true. Tell which ones are not true.

1. Caterpillars like to eat green leaves.
2. All caterpillars look alike.
3. Caterpillars can move very fast to get away from birds.
4. The woolly bear caterpillar has hairs all over its body.
5. Some birds do not like to eat caterpillars with hairs on them.

SOME THINGS TO DO

Bring some caterpillars to school and take care of them.

Watch the caterpillars.

Draw a picture of a grasshopper, a spider, and a caterpillar.

CHAPTER 4

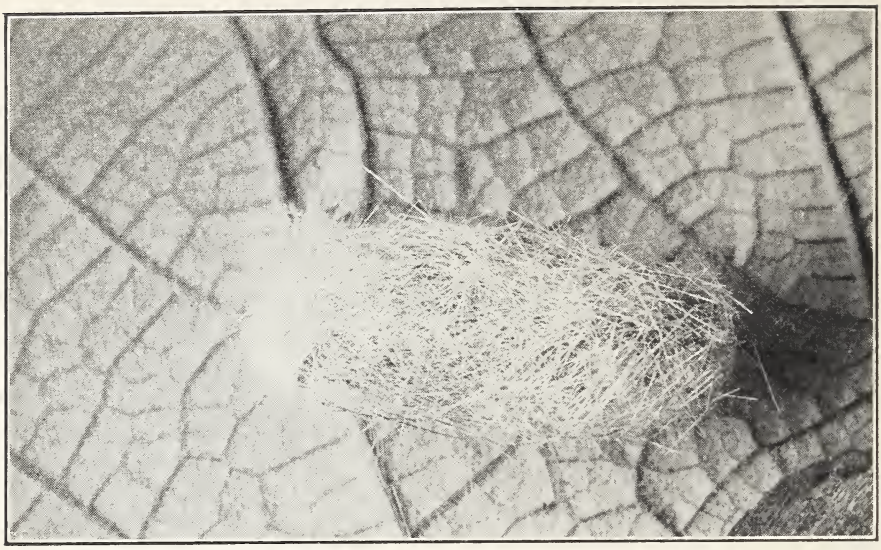
QUEER BED COVERS

Do you see as many caterpillars out
of doors as you did when school began?
Where have the caterpillars gone?

In the fall the woolly bear caterpillar goes to sleep. It sleeps all winter. First it finds a safe place to sleep. Sometimes it finds a safe place under a leaf on the ground. Sometimes the safe place is near the foot of a tree.

When the woolly bear finds a safe place to go to sleep, it rolls itself up into a ball. All winter it sleeps in this way. For a long time it has no cover. While the weather is very cold, it has no cover. When the warm weather comes in the spring, it makes itself a cover.

The woolly bear spins its cover of silk.

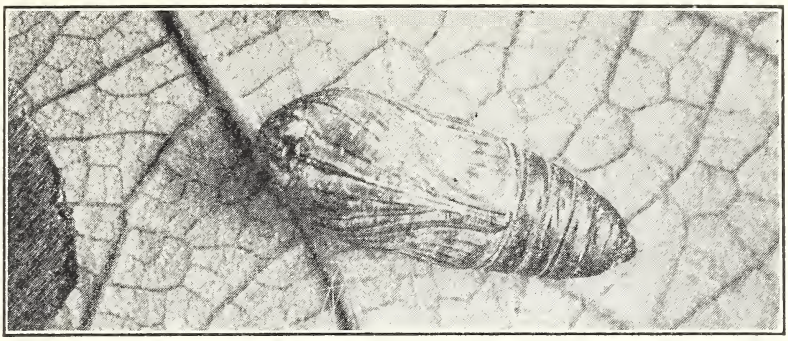


Photograph by Cornelia Clarke.

THE COVER LOOKS LIKE A BROWN BUNDLE.

The silk comes out of the caterpillar's lip. The woolly bear moves its head up and down, and from side to side, to spin its silk cover. It puts the cover all around itself. It puts it over its body, over its feet, and over the top of its head.

While the woolly bear is spinning its silk cover, its hair falls out. The hairs get into the silk and help to make the cover. The hairs and the silk make a thick cover for the woolly bear.



Photograph by Cornelia Clarke.

THE WOOLLY BEAR LOOKS LIKE THIS WHEN IT IS INSIDE ITS COVER.

When the cover is done, you cannot see the woolly bear at all. The cover looks like a little brown bundle. The brown bundle is very small. The woolly bear is inside the bundle.

The woolly bear goes on sleeping inside its cover. It does not sleep long. It wakes up near the end of May. Keep a woolly bear all winter and watch it. You will see something beautiful when it wakes up.

Many caterpillars spin silk covers for their winter sleep. Other caterpillars cover themselves up in other queer ways. Can you find out any of these ways?

SOME THINGS TO THINK ABOUT

These sentences tell you four things the woolly bear does. Tell which one it does first. Tell which one comes last. Tell which one it does next to last.

1. The woolly bear spins its cover.
2. The woolly bear goes to sleep for the first time.
3. The woolly bear finds a safe place.
4. The woolly bear looks like a little brown bundle.

SOME THINGS TO DO

Keep some woolly bears in a box all winter. Put the box out of doors in a safe place. Watch the caterpillars.

Every month draw a picture to show how they look.

CHAPTER 5

FLOWERS FROM THE GARDEN

Why do we grow vegetables?
Why do we grow flowers?
Have you a garden?

Billy has a friend named Ned. Ned lives near Billy's home. The two boys are in the same class at school.

Billy and Ned go to a school where the children learn to have sharp eyes. The children in their class took grasshoppers to school to watch. They watched spiders and caterpillars, too.

Billy and Ned both have gardens at home. Billy has a vegetable garden. Ned has a flower garden.

Ned's mother showed him how to make the flower garden. Ned made it in his back yard. Billy helped him when he could.

The back yard was not pretty. Ned

Photograph by Ewing Galloway, N. Y.

HE DUG THE HARD GROUND WITH THE HOE.

wanted it to be pretty, so he made the flower garden. He made it in the spring.

The ground in Ned's back yard was hard. Seeds cannot grow in hard ground. Ned went to the store and bought a hoe. He dug the hard ground with the hoe. He broke up the lumps of earth and made the ground fine and soft. Then he planted flower seeds.

He planted aster and cosmos seeds. The seeds were very small. Ned put a cover of fine earth over them. The sun kept the seeds warm. The rain kept the ground wet, but not too wet. Soon the seeds began to grow. Seeds grow well in warm ground that is wet but not too wet.

Green plants came out of the ground. There were green aster plants in Ned's garden. There were green cosmos plants there, too.

All summer the green stems grew. The green leaves grew, too. They grew and grew. The cosmos plants grew until they were as tall as Ned. The

Photograph from J. Horace McFarland Co.

THE ASTER FLOWERS WERE BLUE AND WHITE.

asters were not so tall. Ned could tell aster plants from cosmos plants even when there were no flowers on them. Can you?

All summer Ned kept the earth near his plants fine and soft. He kept it fine with his hoe. Plants that grow in soft earth have many flowers.

Late in the summer the flowers came. How happy Ned was! He said, "I

Courtesy of U. S. Department of Agriculture.

THE FLOWERS OF THE COSMOS WERE PINK AND WHITE.

worked hard. The flowers pay me for the hard work."

Some of the asters had white flowers. Some had blue flowers. The cosmos plants had pink flowers and white flowers on them. Ned could tell aster flowers from cosmos flowers even when they were the same color. Can you?

Ned picked many flowers. He took some of them to school. The teacher put them in water where all the children could see them. Everybody was glad that Ned had a garden.

Ned did not pick all the flowers. He left some of them on the plants. After a while seeds began to grow from the flowers that were left on the plants.

At first the seeds were green. Then they turned brown. The brown seeds were ripe. There were many ripe seeds where each flower had been.

Ned picked the ripe seeds. He put the aster seeds in one bag and the cosmos seeds in another bag. He put the bags away in a box. He will have cosmos seeds and aster seeds to plant in his garden when spring comes.

Ned's teacher asked which boys and girls had gardens during the summer. She put their names on the blackboard. Some boys and girls had flower gardens.

THE ASTERS AND THE COSMOS FLOWERS MADE THE GARDEN BEAUTIFUL.

She put pictures of flowers by their names. Some had vegetable gardens. She put pictures of vegetables beside their names. All the children wanted to have gardens the next summer.

SOME THINGS TO THINK ABOUT

Make five pictures showing five things Ned did in his garden. Put a 1 under the picture of what Ned did first. Put a 2 under the picture of what he did second. Put a 3 under the picture of what he did third. Put a 4 under the picture of what he did next. Put a 5 under the picture of the last thing Ned did in his garden.

SOME THINGS TO DO

Ask your teacher to put on the blackboard the names of boys and girls who had gardens.

Go to see a garden.

Make pictures of aster flowers and cosmos flowers.

Bring a few seeds to school. Do the other children know the names of your seeds? If they do not, tell them.

CHAPTER 6

HOW SEEDS TAKE TRIPS

Where have you gone on a trip? How did you go?

Why do seeds take trips? How do they go?

Did you ever take a trip? Perhaps you went on a trip to have a good time. Perhaps you went on a trip to live in a new home.

Seeds take trips, too. They do not go to have a good time. They go to find new homes.

Plants must have room to grow. If all the seeds of a plant tried to grow close to it, there would not be room for the new plants. Some of the seeds must find new homes, so they take trips. They go to find a place where there will be room for them to grow.

Courtesy of the Wild Flower Preservation Society.

DANDELION FLOWERS ARE YELLOW.

When you took a trip, perhaps you went on a train. Perhaps you went in an automobile. Some people take trips in airplanes. Some people walk. There are many ways of going on trips. Can you think of other ways for people to go on trips?

Seeds have many ways of going on trips, too. Let us think about one of the ways.

Photograph by L. W. Brownell.

EVERY FLOWER HEAD MAKES MANY SEEDS.

Are there any dandelions in your yard? Dandelion flowers are yellow. After a while they make seeds. Every flower head makes many seeds. The ripe seeds are brown. On each seed there is something that looks like a little sail of white silk. You have seen dandelions

PUFF! PUFF! AWAY GO THE LITTLE SAILS!

with white heads. The yellow flowers have become seeds with white silk sails on them. The wind takes the seeds on trips.

Did you ever play with a white

dandelion head? Did you ever blow it away?

Puff! Puff! Away go the little sails with the seeds on them.

Puff! Puff! Away go more sails and more seeds.

Along comes the wind. It blows. Puff! Puff! It blows the white dandelion heads. Away go the white sails with their brown seeds. The seeds are going on a trip. The wind takes them a long way.

Far away from the plant on which they grew the wind drops the seeds. The little brown seeds fall to the ground. Some seeds fall in the fields. Some fall by the road. Other seeds fall in people's yards.

Most of the seeds fall where they have room to grow. After a while there is a new dandelion plant wherever a seed fell in good earth and found a good place to grow.

There are other plants whose seeds are taken on trips by the wind. Do you know any of them? Use your eyes to find them.

SOME THINGS TO THINK ABOUT

Here is a list of things that carry seeds on trips:

wind, water, people, animals, birds

Make a list of the things that carry people on trips.

Make a list of some of the places to which the wind carries dandelion seeds.

Make a list of all the seeds you know that are carried to new homes by the wind.

SOME THINGS TO DO

Take a walk and get some ripe seeds to bring to school.

Watch to see in what ways the ripe seeds out of doors take trips.

Make pictures of the seeds, and of the ways they go to their new homes.

CHAPTER 7

ARE ALL PLANTS ALIKE?

What plants give us wood?
What plants do you know that grow in water?
What is grass?

Billy went for a walk with his father one afternoon in the fall. They went to the woods. They liked to climb the rocks and hills. Most of all they liked to see the trees and flowers.

The woods were beautiful. The leaves on the trees were red and yellow. The squirrels were getting ready for winter. There were many beautiful things to see.

Billy kept his eyes open wide. Do you know why? He wanted to tell the children in his school about his walk.

Billy and his father saw many

beautiful trees. The trees were very tall. They saw many trees taller than our houses. Some of the trees had green leaves, but most of them had red or yellow leaves.

There was a plant that looked like a little tree. It was a bush. The bush was not so tall as Billy's father. They saw many more bushes.

Billy said, "Do these bushes grow to be trees?"

Father said, "No, they are always bushes."

Then Billy's father saw a queer plant. Most of the leaves were green, but some were a beautiful red. The leaves looked like the picture. The plant was growing near the foot of a little tree.

Father said, "You should remember this plant. Do not touch it. It is poison ivy. It will make your body hurt."

Poison ivy is a vine. It looks like the picture. Poison ivy has little leaves.

Photograph by L. W. Brownell.

"ONE, TWO, THREE; DON'T TOUCH ME."

The little leaves are called leaflets. There are always three leaflets together. You should not touch the poison ivy vine.

There is an easy way to remember that poison ivy leaflets grow in threes. Here it is.

One, two, three; don't touch me.

Photograph by L. W. Brownell.

"LEAFLETS FIVE, LET IT THRIVE."

Most vines will not hurt us. Billy and his father saw one that looked like this picture.

Billy thought it was poison ivy.

Father said, "No, Billy, that is not poison ivy. Poison ivy has three leaflets together. How many leaflets has this vine?"

Billy counted five leaflets growing

close together. That meant that the vine was not poison ivy. Here is a way to remember the plant that looks like poison ivy but is not.

Leaflets five; let it thrive.

This plant is not poisonous. It will not hurt you.

They saw many little plants with flowers. These plants were not tall and hard like the trees. They were soft. You could push them over. The frost kills such plants. They do not live through the winter.

Out in the field they saw some water. A lake was near the woods. In it were many plants. They were growing in the water.

Billy saw one that he liked. It had a leaf like the picture. It was a queer leaf. It looked like an arrow. The name of this plant is arrowhead. Can you tell why?

Photograph by L. W. Brownell.

THE LEAF LOOKED LIKE AN ARROW.

They were walking in the field. "What is this?" said Billy. Billy had his eyes open wide.

"That is grass," said father. "There are many grasses. Some grasses are little and fine, and some are as tall as a man. Grasses are plants, too."

"What queer plants," said Billy.

The next day Billy told the children in his school about his walk. He drew pictures of trees and bushes. The other children cut vines and leaves from paper. They liked to hear about his walk. The other children thought they would like to take a walk, too.

SOME THINGS TO THINK ABOUT

From this list of words find the right word for each row of dots. There will be two words left over.

1. helps
2. man
3. kills
4. three
5. vine
6. five
7. tree
8. water

1. A bush is like a little.....
2. Poison ivy is a.....
3. Poison ivy has.....leaflets.
4. The frost.....some plants.
5. Some plants grow in.....
6. Some grasses are as tall as a.....

SOME THINGS TO DO

Bring some pictures of trees to school.

Draw pictures of trees.

Draw pictures of bushes.

Draw pictures of grasses.

Tell the children what you saw the last time you went for a walk in the woods or in the park.

Draw pictures of vines you can see at school or at home.

Photograph by Ferdinand Ellerman.

SOME CLOUDS LOOK LIKE BANKS OF SNOW.

CHAPTER 8

SKY AND CLOUDS

Have you ever watched the clouds?

What shapes do you sometimes see in the clouds?

What colors can you see in the sky?

Look at the clouds some afternoon. They may be large and white. They may look like large banks of snow. On some other afternoon the clouds may

look gray or very black. Have you seen white, gray, and black clouds?

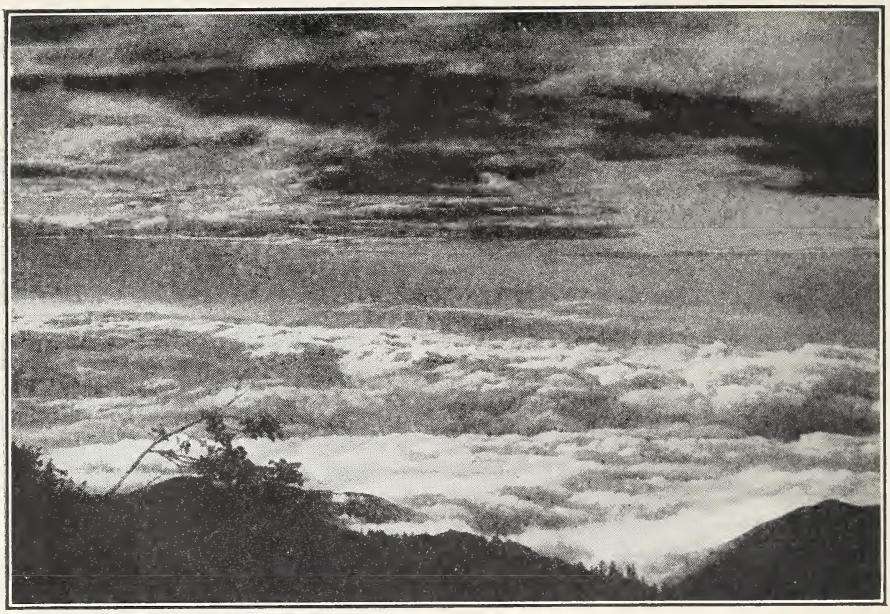
It is fun to watch the clouds go by! Watch the clouds over a house, or over a tree. How can you be sure they are moving?

Sometimes a cloud moves between us and the sun. The things we see do not look so bright then. We say, "This is a shadow." When the cloud moves away, we see the sun again. Have you seen shadows move? After the cloud passes by, the things we see look bright again. We say, "This is sunshine."

Sometimes clouds are near the earth. Some clouds hit the sides of hills. Other clouds are high in the sky.

In a cloud are tiny raindrops. These raindrops are very, very small. There are a great many drops in one cloud.

Sometimes the cloud cannot hold all the drops. They run together, and make larger drops. Then they fall from the



Photograph by Ferdinand Ellerman.

SOME CLOUDS HIT THE SIDES OF HILLS.

cloud. We say, "It is raining." What color are the clouds when it is raining?

We have all seen the blue sky. Is it always blue? Sometimes it is a pretty red color. Sometimes it is golden.

Look for the red sky in the morning. You may see it some morning as the sun comes up. Watch for pretty colors in the evening. What colors do you see as the sun goes down?

SOME THINGS TO THINK ABOUT

Here are some questions for you to answer.

1. Where are the clouds?
2. What colors are the clouds?
3. What is in a cloud?
4. How can you tell that clouds move?

SOME THINGS TO DO

Make pictures of some clouds you have seen.

Make a picture of falling raindrops.

Make a list of the colors you see in the sky.

Make pictures of the sky showing some of these colors.

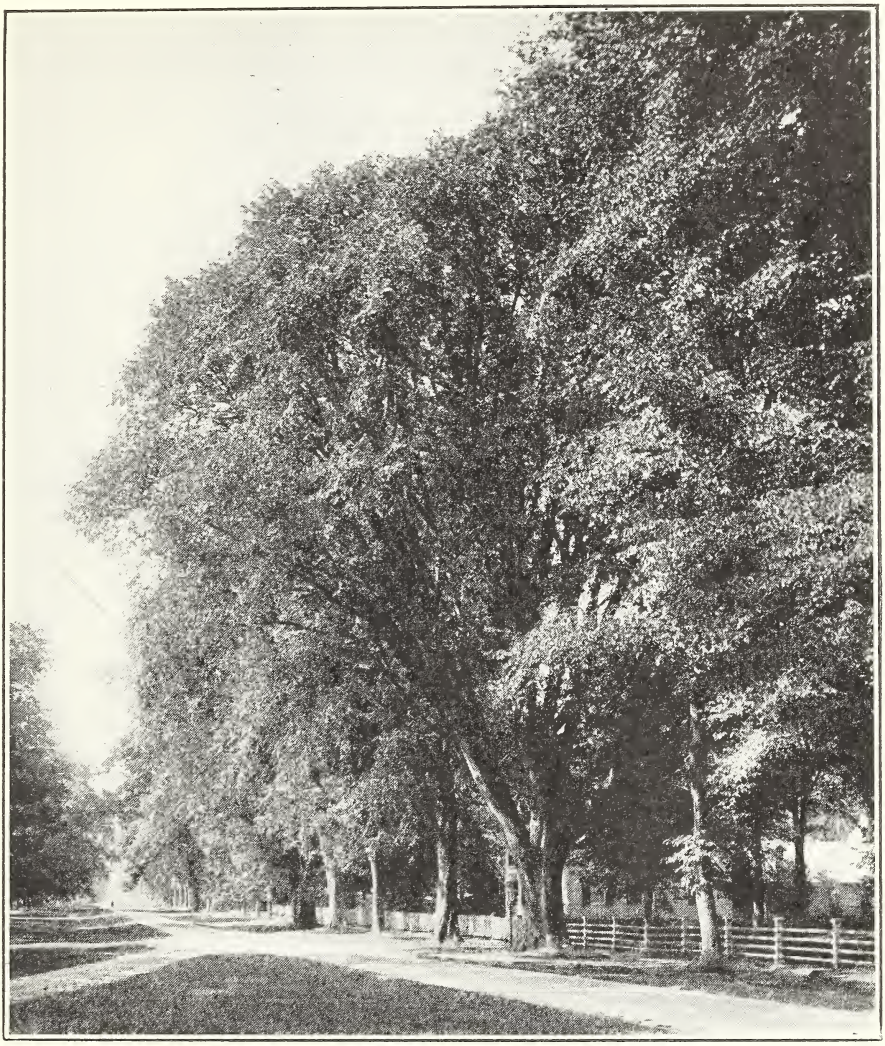
CHAPTER 9

OUR CLASS TREE

Where have you seen elm trees growing?
What color are the leaves in the fall?
Why do people plant elm trees?

There is a tree that the children in Billy's class like very much. It is a tall elm tree that grows in the school yard. The children like to play under the elm tree. They like to play in its shade when the sun is hot. They like to look at the big tree. They can see it from the window of their schoolroom.

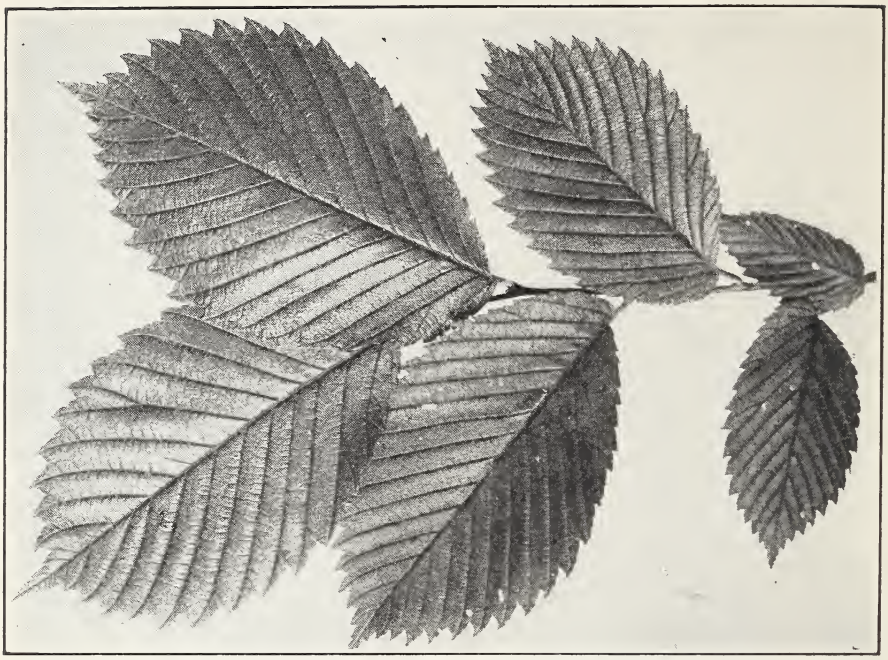
The elm tree is as high as the school building. It is a big tree. Billy's grandfather helped plant this tree a long time ago. It is many, many years old.



Courtesy of Boston and Maine Railroad.

BIG ELM TREES LIKE THESE ARE VERY OLD.

This elm tree was planted in good soil. The ground is not too wet or too dry. That is why the tree is so big and strong.

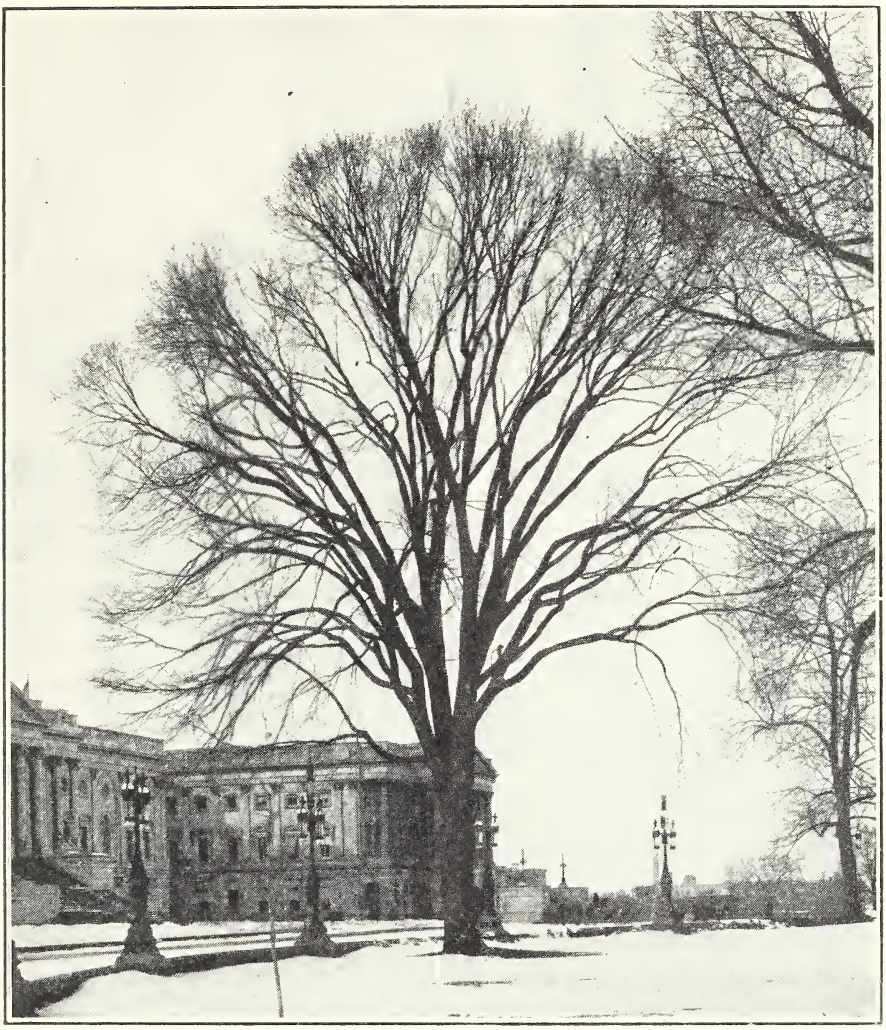


Photograph by L. W. Brownell, courtesy of "Nature Magazine."

ELM LEAVES LOOK LIKE THIS.

Billy found a green leaf of the elm tree one day. The leaf was on the ground under the tree. He took it to the teacher. It was like the leaves in the picture.

One day the children saw some yellow leaves on the tree. These leaves had been green in the summer, but in the fall the leaves of the elm and some other trees turn yellow and brown.



Photograph by E. R. Mosher, courtesy of U. S. Forest Service.

IT WAS BEAUTIFUL WITHOUT LEAVES.

The children liked to look at these beautiful leaves. Soon the leaves began to fall to the ground. The children watched them falling. They liked to hunt for the pretty leaves.

One day they looked at the elm tree, and they could not see any leaves on it. All the leaves had fallen to the ground. The children were sad. They wished the leaves could stay on all winter.

"How beautiful the elm tree is!" said the teacher.

"Why, I have not looked at it since the leaves fell off," said Billy.

Then the teacher showed the children twigs from the elm tree. They saw tiny buds on the twigs. The tiny buds were getting ready for the spring. In the spring leaves would come out of the buds.

The teacher made a picture of the elm tree. It did not have leaves, but it was beautiful. The children liked it. They saw that it was beautiful without leaves.

Only very sharp eyes can see some of the beautiful things about us.

SOME THINGS TO THINK ABOUT

Here is a game to play. Find sentences that tell about these words

1. elm tree
2. twigs
3. leaves
4. yellow
5. buds

SOME THINGS TO DO

Try to find an elm tree near your school.

Watch to see when the leaves change their color.

Draw pictures of elm trees you have seen.

Draw pictures of the leaf of the elm tree.

Draw a picture of the elm tree without the leaves.

CHAPTER 10

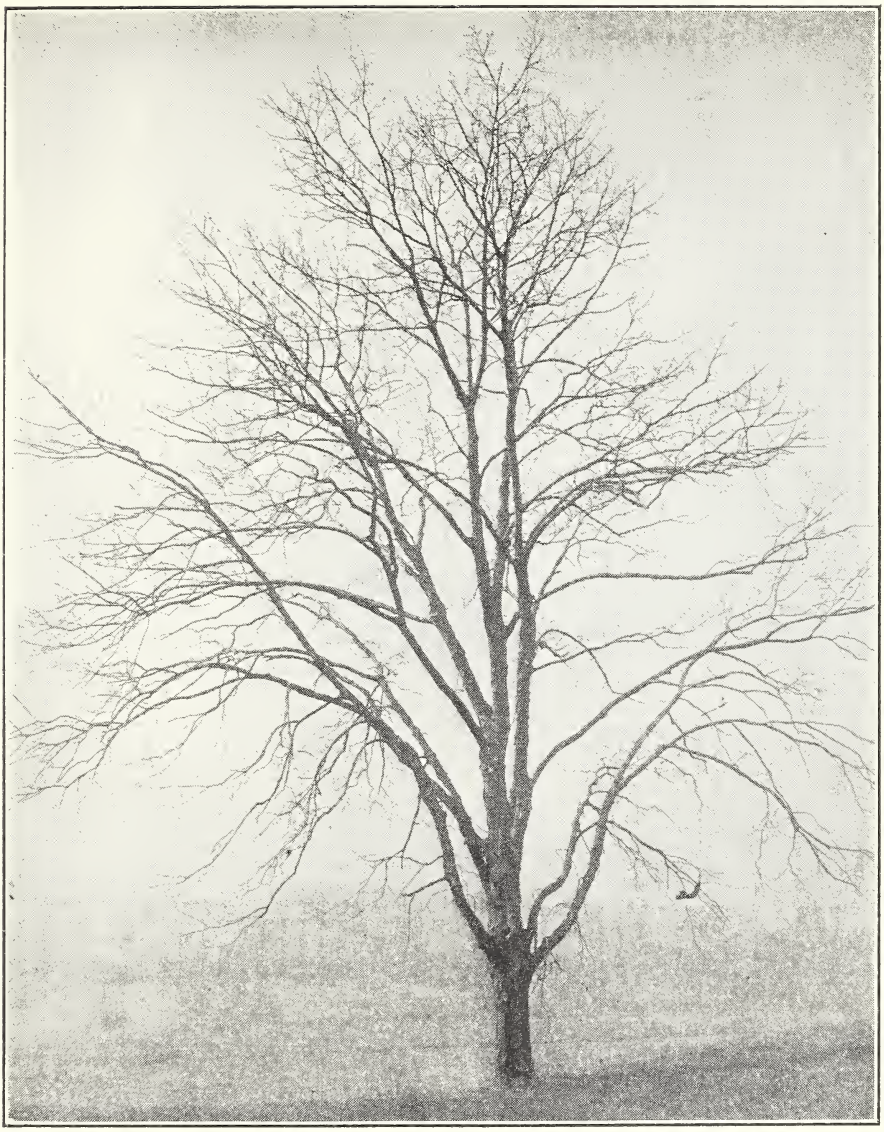
A NUT TREE

Where do nuts grow?
When do people pick nuts?
What nuts do you like to eat?

Hickory nuts are ripe in the fall. Children like to look for them in the country. The nuts fall from the trees when they are ripe. Then the children can find them.

If you cannot look for hickory nuts in the country, look in the park for them. Sometimes the trees grow in the parks. You may not find many nuts, because there are so many people looking for them. They may get them first.

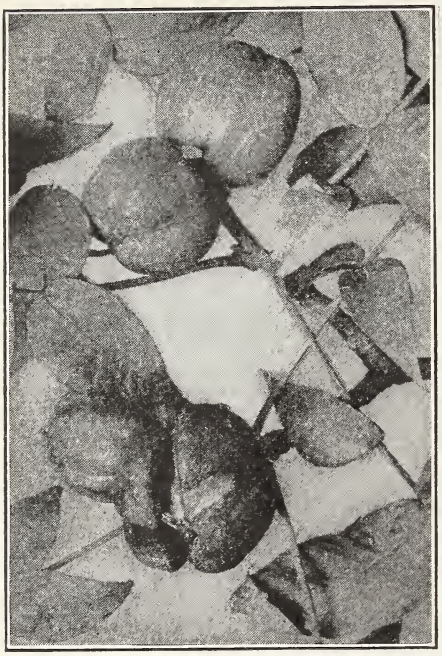
The nuts grow inside of little round green balls. Have you ever seen



Photograph by L. W. Brownell, courtesy of "Nature Magazine."

HICKORY TREES LOSE THEIR LEAVES IN WINTER, TOO.

these little green balls on the trees? Sometimes you must take the nuts from these balls. Many times the nuts drop



Photographs by L. W. Brownell, courtesy of "Nature Magazine."

HICKORY NUTS GROW IN THE GREEN BALLS.

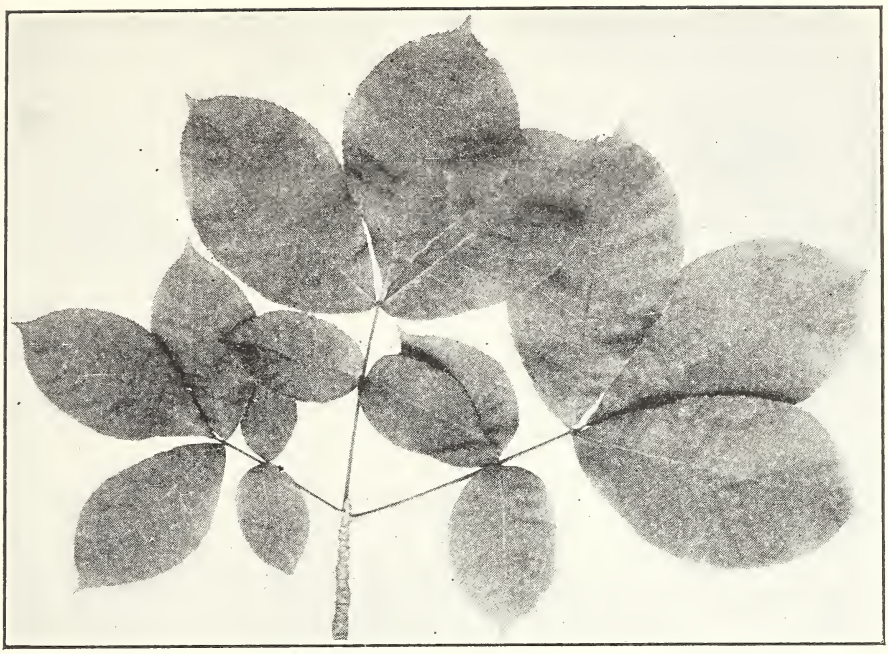
THIS KIND OF HICKORY HAS LONG PIECES OF LOOSE BARK.

out of the balls. Then you can pick them off the ground. The little green ball with the nut inside is the fruit of the hickory tree. Can you find the seed?

The hickory tree grows in good soil. Most hickory trees grow very tall.

There are many kinds of hickory trees. One kind has long pieces of loose bark. The bark is gray on the old trees.

Hickory leaves are large. Each leaf



Photograph by L. W. Brownell, courtesy of "Nature Magazine."

HICKORY LEAVES LOOK LIKE THOSE IN THE PICTURE.

has several leaflets. How many leaflets can you count in the picture? The leaves are yellow and green. In the fall the leaves turn brown and yellow.

Some hickory trees are used for wood. The wood is light and strong. Hickory wood is used in the wheels of some automobiles. Some people use hickory to make baskets. Wood of the hickory tree has many other uses.

The Indians used the hickory nuts for food. They gathered many of them in the fall and kept them to use in winter. Most people like to eat hickory nuts. They are good food. Children like nuts on cakes at Christmas time.

Some animals eat nuts. Squirrels like them very much. Sometimes they gather them before the children find them.

SOME THINGS TO THINK ABOUT

1. What color is the bark on the hickory tree?
2. Where do nut trees grow?
3. What is the fruit of the hickory tree?
4. When are hickory nuts ripe?
5. What color are hickory leaves in the fall?

SOME THINGS TO DO

Bring hickory nuts to school.
Look for hickory nuts in the green balls.
Draw pictures of hickory trees.
Draw pictures of the leaves.

CHAPTER 11

FALL WILD FLOWERS

What is a weed?
Where have you seen weeds growing?
Should weeds always be killed?

In the fields there is a plant with beautiful purple flowers. It is at least as tall as most boys and girls in the second grade. The leaf is long and green. It has edges like a saw. This plant is called ironweed.

The farmer calls this plant a weed. He does not want it to grow in his fields, because it takes the room and the food that useful plants need.

In the fall you may see another plant with pretty flowers. You will not need to hunt long to find it. This plant has tiny white flowers. The leaves look like feathers. The plant is yarrow.

Courtesy of the Wild Flower Preservation Society.

IRONWEED HAS PRETTY PURPLE FLOWERS.

People make a kind of tea with yarrow leaves. Some people drink the tea to make them well. You would not like to drink this tea. It does not taste good. When yarrow is young, sheep like to eat it. Some cows will eat it, too, but many cows will not.

The leaves and flowers of the yarrow

Photograph by L. W. Brownell.

YARROW FLOWERS ARE SMALL AND WHITE.

plant smell good. You can know the plant by the smell of the leaves.

Yarrow is not a big plant. It grows about as high as your knees. Sometimes the yarrow plant grows a little taller.

It grows best in dry fields. Many times you will find it along the road. It grows in many other places, too.

Yarrow also is a weed, but it has beautiful leaves and pretty white flowers.

One yarrow plant has many, many seeds. From the seeds young yarrow plants grow. Do you know why there are so many yarrow plants?

There is another weed that you should know. It has large leaves and white flowers. This plant is the Jimson weed. You should not play with Jimson weed. It is poisonous. You may die if you eat even tiny bits of it.

You can know Jimson weed by the beautiful flowers and the large leaves. The flowers are white. The leaves do not smell good. People do not like Jimson weed. This weed should always be killed.

In the fall you can see many

Photograph by L. W. Brownell.

THE JIMSON WEED FLOWERS LOOK LIKE THIS.

ironweeds, yarrow plants, and Jimson weeds if you use your eyes.

What happens to these weeds in winter? They make seeds in the summer and in the fall. Then they die. The frost helps to kill them. Next year new plants will grow from the seeds.

SOME THINGS TO THINK ABOUT

Some of these sentences are true. Some are not true. Tell which ones are true. Tell which ones are not true.

1. The ironweed has white flowers.
2. The yarrow has white flowers.
3. Jimson weed is poisonous.
4. Jimson weed has small leaves.
5. These weeds die in winter.

SOME THINGS TO DO

Make a list of the wild flowers you saw last summer.

Make a list of the flowers you see every day.

Draw pictures of the ironweed, yarrow, and Jimson weed.

Draw pictures of some other weed that grows near your home.

CHAPTER 12

A BIRD FRIEND

Did you see many birds last summer?
Can you find many out of doors now?
Where do the birds go in winter?

There were many things to see out of doors in summer. Boys and girls with sharp eyes saw many birds. Now cold weather is coming. We do not see so many birds. Where have they gone?

Last summer there were many grackles. There were grackles in the parks. You could see them in the streets. When you went to the farm, you could see them in the fields.

The grackle looks like a small crow. Do you know the color purple? The grackle is purple. It is so dark in color that it is almost black. It has yellow

Courtesy of the National Ass'n of Audubon Societies.

THE GRACKLE LOOKS LIKE A SMALL CROW.

eyes. Have you ever seen grackles in your yard?

The grackle is one of the first birds you will see in the spring. Grackles come before the leaves come on the trees. They come while the March winds blow. They are not afraid of the cold.

When you see one grackle, you will see many. They fly in flocks. Many birds together make a flock. A grackle likes to be with other grackles.

Courtesy of U. S. Bureau of Biological Survey.

A GRACKLE TAKES GOOD CARE OF ITS YOUNG.

In the spring grackles eat insects and worms. Would you like to have a grackle in your garden? Insects and worms eat plants. Boys and girls do not want insects and worms in their gardens. They want the grackles to eat them.

In the fall the grackles go to the corn fields. There they eat some corn.

When winter comes, there are not

many insects and worms for the grackles. There is no corn for them. They go away to places that are warm. There they can find food. When the insects and worms come back, the grackles come back, too.

Did you ever hear a grackle sing? He does not sing a sweet song. Have you ever heard the noise a hinge makes when it is rusty? The grackle's song sounds like the noise made by the rusty hinge.

SOME THINGS TO THINK ABOUT

Here is a game to play. Find sentences that tell about these words.

1. March winds
2. song
3. corn
4. insects
5. flock
6. purple

SOME THINGS TO DO

Tell in what kinds of places you have seen birds.

Tell what you have seen birds doing.

Make pictures of the things you have seen birds doing.

Find pictures of the birds you know. Make a scrapbook of the pictures.

Watch for flocks of birds.

CHAPTER 13

A TRIP TO MARKET

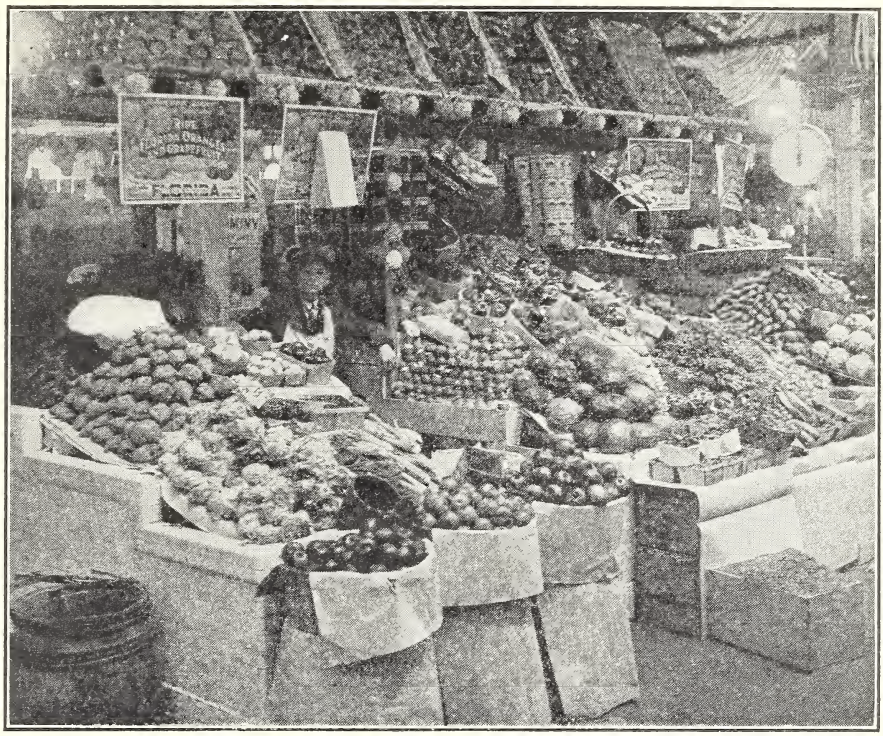
What do you eat for dinner?
What vegetables do you like to eat?

Vegetables are plants. When we say vegetables, we mean plants that we eat.

Most boys and girls have been to the vegetable market with older people. When they go to the market, they see vegetables all ready for people to buy.

Do you know that people eat only parts of most vegetables?

We take carrots home from the market. We are going to have them for dinner. We cut off the stems and the leaves. We clean the roots. The roots are yellow and sweet. We cook the roots for dinner. The carrot leaves are pretty, but we do not like to eat them.

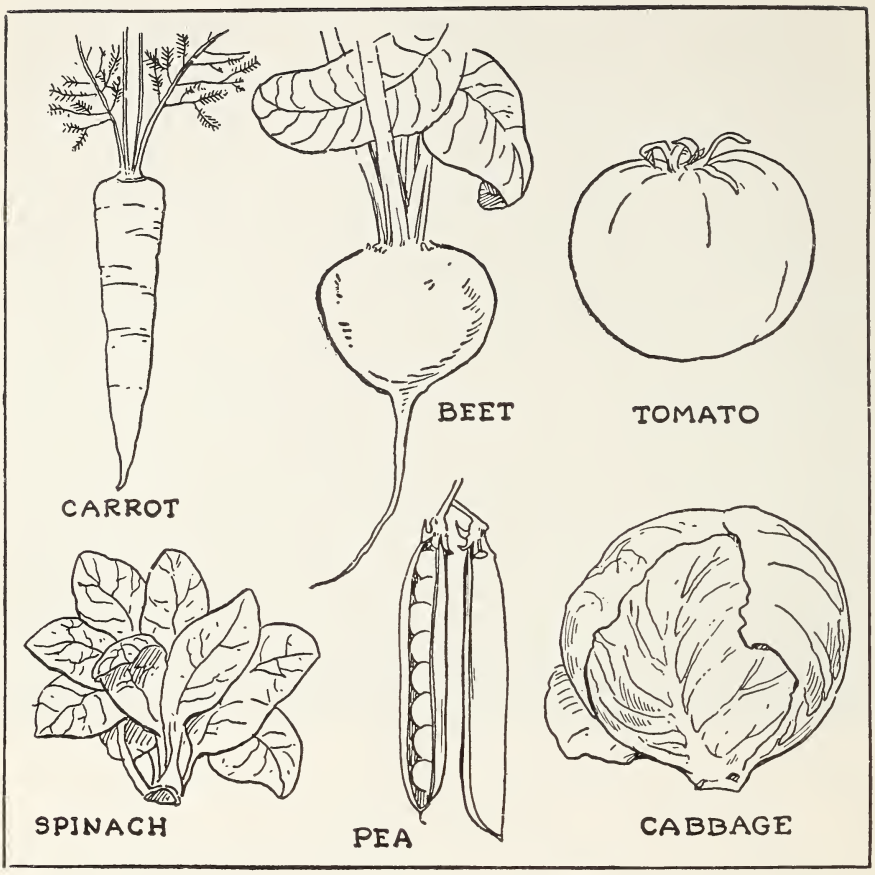


Courtesy of U. S. Department of Agriculture.

MANY KINDS OF VEGETABLES CAN BE SEEN AT THE VEGETABLE MARKET.

We find carrots in the market in the summer and in the fall.

Beets are roots, too. They are big and round and red. We find beets in the market in the summer. When we take beets home for dinner, we cut off the leaves. Then we clean the roots and cook them. The red beet roots are sweet and good to eat.



VEGETABLES ARE PARTS OF PLANTS.

CAN YOU TELL WHAT PART OF THE PLANT EACH OF THESE VEGETABLES IS?

Beet leaves are good to eat, too. The leaves are green and red. We eat the roots and sometimes the leaves of this vegetable.

There are other leaves that we eat. Can you think of some?

We find big baskets of spinach in the market. We eat spinach leaves. Spinach roots are not big. We cut off the roots and stems of the spinach plants. Then we cook the pretty green leaves. Spinach leaves are green and pretty even after they are cooked.

Before leaves open out they grow folded up in buds. Do you remember reading about the tiny buds on the big elm tree?

There are buds of some plants in the vegetable market. We buy them to eat. Some of the buds we eat are very large. We eat cabbages. There are leaves in a cabbage, but they are folded up. Cabbage is a very large bud. It is the bud of the cabbage plant. Every fall loads of big cabbage buds are ready for market.

Can you think of some other buds we eat?

If we go to market in the spring, we

Photograph from J. Horace McFarland Co.

CABBAGE IS A VERY LARGE BUD.

see bunches of red and green rhubarb. Sometimes the rhubarb has leaves on it. Sometimes the leaves are cut off before the rhubarb goes to market. Rhubarb is the stem of the leaf. It is sometimes called pie plant. Do you know why?

We eat the seeds of some plants. Sometimes there are peas in the vegetable market. They are seeds of the pea vine. These seeds are picked

from the vine before they are ripe. What color are the peas you see in the market?

There are not many peas growing in the fall. There are more peas in the market in spring and summer.

We eat the fruits of plants, too. Tomatoes are fruits. They are the fruits of tomato plants. You will see many tomatoes in the vegetable market.

A long time ago people did not eat tomatoes. They thought they were not good to eat. The tomatoes grew in the flower gardens then. People liked to see them grow because they are so pretty and red. Now everybody knows that tomatoes are good food.

Did you know that we eat so many parts of plants? We eat roots and leaves. We eat buds and stems. We eat seeds and fruit. All these parts of plants are ready for us to buy in the vegetable market.

SOME THINGS TO THINK ABOUT

Here is a game to play. Find sentences that tell about these words.

1. vegetables
2. carrots
3. beets
4. tomatoes
5. spinach

SOME THINGS TO DO

Make a list of the vegetables you can see at the market.

Make a list of the vegetables you eat each day.

Tell what part of the plant each vegetable is.

Make pictures of the vegetables you have read about in this story.

THE TURKEY GOBBLER, THE TURKEY HEN, AND LITTLE TURKEYS.

CHAPTER 14

THE TURKEY

Where have you seen a turkey?
How do you know it from a chicken?

The turkey is the bird of Thanksgiving. Turkey meat tastes good. We all know that.

Have you watched live turkeys? It is fun to watch them.

The turkey is a large bird, much larger than a chicken. The father turkey is called the gobbler. The mother turkey is the hen. The gobbler is much larger than the turkey hen. He wears more beautiful feathers. He has more red on his head. He has a deep voice.

It is fun to see a turkey gobbler strut. When he struts, he looks very fine. He spreads his tail feathers like a big round

Courtesy of U. S. Department of Agriculture.

THE GOBBLER HAS MORE BEAUTIFUL FEATHERS THAN THE TURKEY HEN.

fan. His wings touch the ground. He puffs out his breast. All his feathers stand out. He draws his head far back. How proud he looks!

"Gobble, gobble, gobble!" he says, as he struts up and down.

The turkey hen does not want you to come near her nest. She does not want you to see it. She goes away to make it when no one is looking. She hides it in

tall weeds, or behind a fence. You must have sharp eyes to find it.

Turkey eggs are larger than chicken eggs. They have little brown spots on them. We say they are speckled. Things with little brown spots on them are sometimes said to be "as speckled as a turkey's egg."

Little turkeys are larger than little chickens. They are not so pretty. They have long legs and long thin necks. Soon after they come out of the eggs, they can run after the hen. The turkey hen walks out over the fields to find food for them. The little turkeys run after her. Sometimes the hen takes them far from home. Then the farmer has to go after them to bring them back.

Turkeys eat the insects and worms that they find in the fields. They eat corn and wheat, too. Turkeys eat some sand and very small stones. They have no teeth to chew their food. The sand

Courtesy of the American Museum of Natural History.

IT IS HARD TO FIND WILD TURKEYS IN THE WOODS.

and stones grind it in the turkey's gizzard.

There used to be many wild turkeys in the woods. Now it is hard to find one. The turkeys that live on a farm are not wild birds. The farmer and his wife take care of them. They give them food and water. They build a house for them. They keep the turkey house clean.

If you know a farmer or a man at market who keeps turkeys, ask him to let you bring one to school. A big box with wire netting over the top and one side makes a good cage for the turkey.

Keep the turkey in the cage a few days. A boy or girl should give it fresh water every day. Other children should give it corn and vegetables cut up fine. Others should bring some sand and very small stones for it. Be sure to keep its cage clean.

SOME THINGS TO THINK ABOUT

Can you answer these questions? If you cannot, find the answers in your book.

1. What is the father turkey called?
2. How does the father turkey look?
3. Where does the mother turkey make her nest?
4. How do little turkeys look?
5. How should you take care of a turkey in school?

SOME THINGS TO DO

Write a story about the turkey.

Make a picture of a turkey with paints or crayons.

Cut a turkey out of paper.

Try to say "Gobble, gobble," just as the turkey says it.

Try to strut as the turkey struts.

CHAPTER 15

FLOWERS AND PLANTS FOR CHRISTMAS

What are bulbs?
When should bulbs be planted?
How can you grow bulbs in water?

Mary is a little girl. She is in Billy's class at school.

One day Mary brought some bulbs to school.

"Let us plant the bulbs and watch them grow," said the teacher.

Mary planted them. The other children watched and helped.

Then more children wanted to plant bulbs. They wanted to know what kind to buy. They went to the flower store. The man at the store told them to plant narcissus. The children thought narcissus and Chinese lily would be very pretty.

They filled flower pots with good soil from the garden. They all planted their bulbs in flower pots.

Then they needed a dark place for them. Where could they put them? Mary thought of the cupboard. That was a very good place. It was dark and cool.

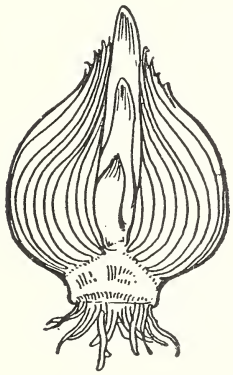
For several weeks they kept the flower pots in the cupboard. They kept the soil in the flower pots just a little bit wet. In this dark place the roots of the bulbs were growing.

Then they brought the flower pots out to the light. Some leaves had come up, but they were yellow. In the room they watched the leaves grow. Soon they were a beautiful green color.

Before very long green buds could be seen coming up between the leaves. The children watched them each day.

Mary wanted to know what was in the bulbs, so the teacher cut through one

bulb. In it they found leaves and a flower bud. They looked like this:

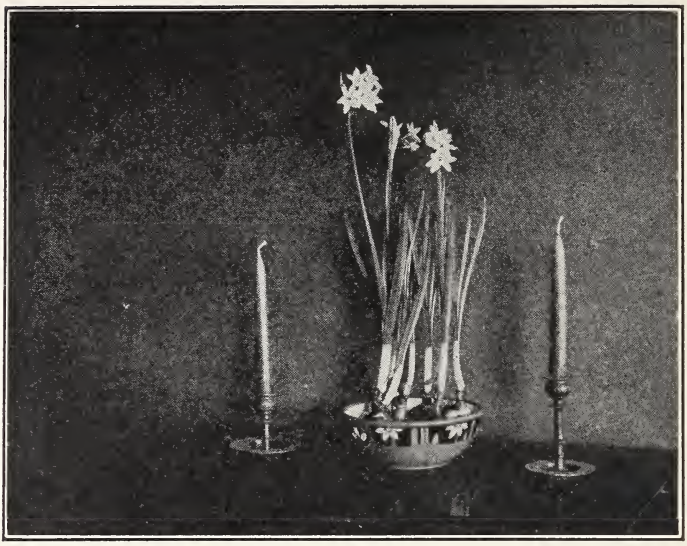


THEY SAW LEAVES AND A FLOWER BUD.

The teacher asked some of the children to plant their bulbs another way. They put the bulbs in a dish and covered them with tiny stones. They were careful to turn up the points of the bulbs. Then they put water in the dish.

They put the dish in the cupboard and kept water in it. The roots began to grow. When the children looked in the cupboard, they could see the roots growing in the water. Soon there were many roots.

The leaves were growing, but they



Courtesy of "Nature Magazine."

THE PLANTS HAD BEAUTIFUL WHITE FLOWERS.

looked yellow. It was time to put them in the light. The leaves were growing longer each day. The buds were growing, too.

Soon the leaves were green. The children watched the plants grow. They gave them water each day.

It was the week before Christmas. Would the buds open soon? Would they have beautiful flowers for Christmas? The children could not tell. The buds were getting bigger every day.

One day Mary said, "Oh, I have a flower."

Then they could all see the beautiful white flower. Soon there were flowers on the other plants. All the children had flowers for Christmas.

SOME THINGS TO THINK ABOUT

1. What kinds of bulbs did the children plant?
2. Where did they keep the bulbs they planted?
3. What was inside the bulb that the teacher cut open?
4. When were there flowers on the children's plants?

SOME THINGS TO DO

Plant some bulbs in dishes. Do it just as the children in the story did.

Plant bulbs in flower pots. Ask your teacher to show you how to do it.

Find pictures of bulbs and their flowers. Look in the seed books for them.

Make a picture of one of your plants with the flowers.

CHAPTER 16

A PET WE LOVE

Do you know a police dog when you see it?

Do you know a fox terrier when you see it?

Can you tell a police dog from a fox terrier?

Sandy is a police dog who lives on a farm. He belongs to a boy named Ben. The farm belongs to Ben's father.

Sometimes Ben goes to the city in the automobile with his father and mother. Then there is no one at the farmhouse but Sandy. Ben leaves him to watch the house.

Sandy is a good watchdog. One day a man whom Sandy did not know came to the house. There was no one at the house but Sandy. Ben had gone away

with his father and mother. Sandy growled at the man. He showed his teeth. The man did not come in. He went away.

When a friend comes to the house, Sandy wags his tail. That means he is glad to see the friend. He is willing to have the friend come in the house.

When Ben comes home, Sandy is very happy. He begins to bark when he hears the automobile coming. He jumps as high as Ben's head. He licks Ben's hands with his soft tongue. That means that Sandy loves Ben. Sandy is glad that Ben has come home.

Ben gives Sandy two meals a day. More than two meals is not good for a dog. He gives him bread, green vegetables, and some meat.

Sandy likes bones. He pulls the meat off a bone with his sharp teeth. He gnaws the bone. Then he digs a hole in the ground with his strong feet. He puts

POLICE DOGS ARE GOOD WATCHDOGS.

the bone in the hole and covers it with earth. When he wants the bone, he digs it up again.

Sandy and Ben have good times playing together. Ben throws a stick as far as he can. Sandy runs after it and brings it back. In the evening Ben goes to the field to drive the cows home to the barn. Sandy helps him.

One day Ben did not want to go to

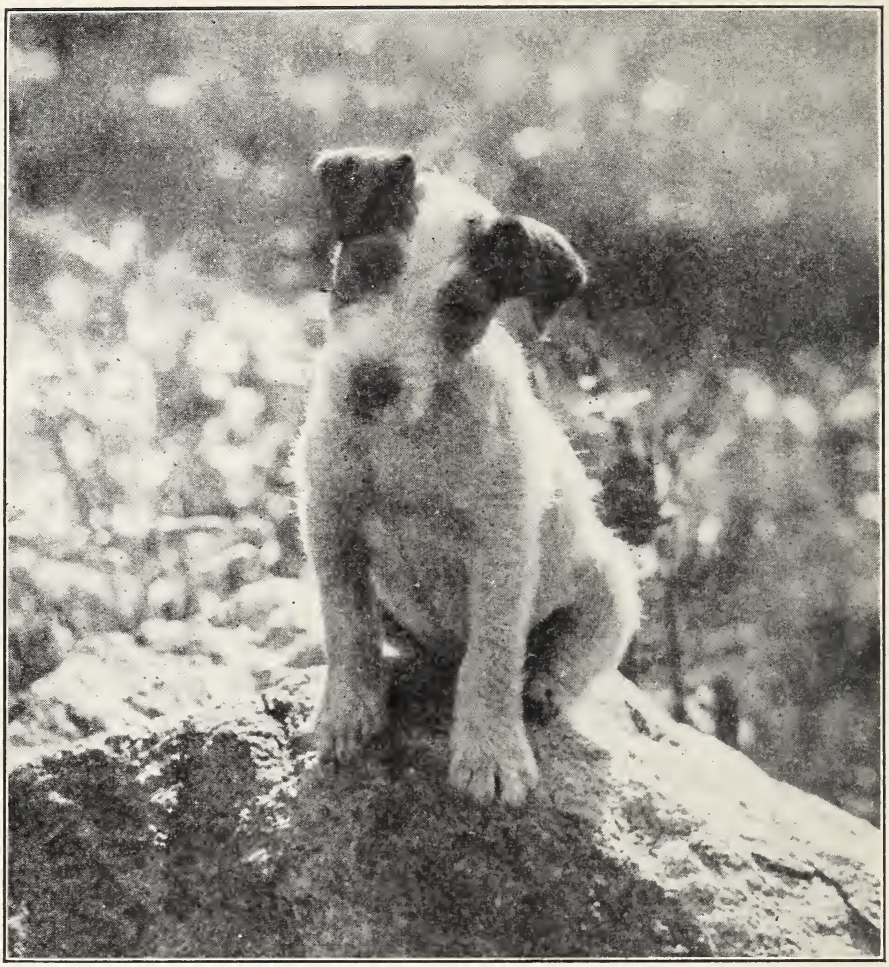
the field. He said, "Sandy, drive in the cows." Sandy went to the field and drove the cows in all by himself.

Police dogs are good dogs to take care of cows and sheep. They are shepherd dogs. At first they were all used to take care of cows and sheep. Then the policemen found out that they are good helpers. They are used to help the policemen in cities. That is why they are called police dogs.

One day Sandy was out in the field. He did a queer thing. He put his nose close to the ground and ran as fast as he could. What do you think he was running after? Ben could not see anything for Sandy to run after.

A field mouse had run across the field. Sandy did not see it, but he could smell it. His nose told him the way the field mouse had gone.

If you have a pet dog, you know that its nose is always wet. This means the



Courtesy of "Nature Magazine."

FOX TERRIERS ARE SMALL DOGS.

dog is well. If a dog's nose is dry, the dog is ill.

Have you looked at your dog's eyes? Sandy looks at Ben with his brown eyes. His eyes are always friendly when he looks at Ben.

Ben's friend, Joe, has a fox terrier. It is not so large as Sandy. Fox terriers are small dogs. Joe's fox terrier is white with brown spots. It barks a great deal. It likes to play. It sometimes plays with Sandy when Joe plays with Ben.

Joe gives his dog a bath every week. He has a tub in which to bathe the dog. He has dog soap and a towel for him. He bathes him in warm water and then wipes him dry. Joe likes to take good care of his fox terrier.

SOME THINGS TO THINK ABOUT

Here is a list of eight words. Can you put the right words in each sentence? You will have three words left over.

1. fox terrier
2. teeth
3. baths
4. police dog
5. nose
6. feet
7. meals
8. tail

1. A.....is a good dog to take care of cows and sheep.

2. A dog's.....helps him to find other animals.

3. Dogs can pull meat off bones with their sharp.....

4. When a dog is happy he wags his.....

5. A dog should have only two.....every day.

SOME THINGS TO DO

Bring your pet dogs to school. Have a dog show. Watch the dogs. Tell what you see them do. Make pictures of them.

Fix a meal for a dog, and feed him. Give him a drink.

Give your dog a bath. Be sure to wipe him dry.

A dog needs a box with a mat in it for a bed. Fix a bed for your dog.

Courtesy of U. S. Bureau of Biological Survey.

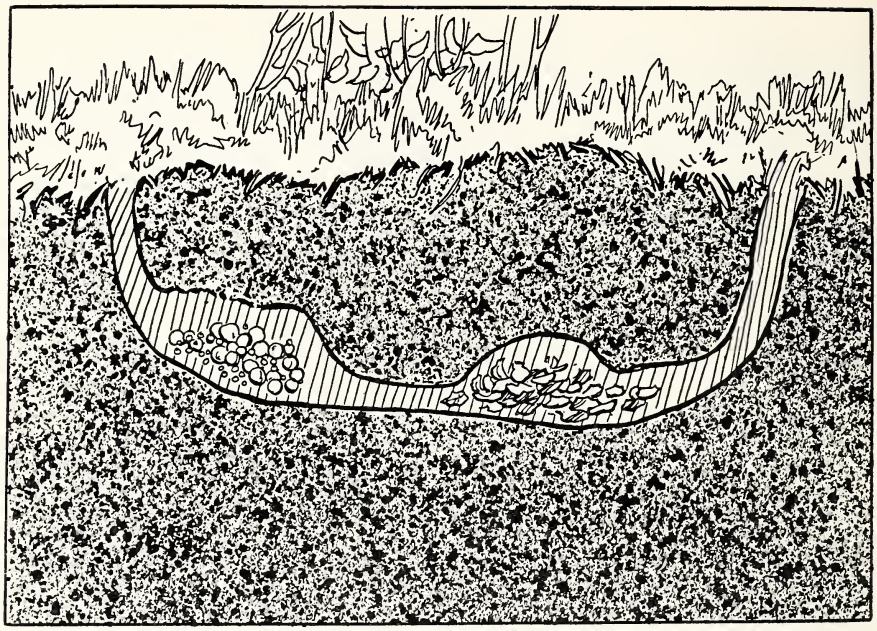
CHIPMUNKS LIKE TO EAT BERRIES AND NUTS.

CHAPTER 17

THE CHIPMUNK

Did you ever see a chipmunk?
How big was it?
What color was it?

One of the most beautiful little animals you will ever see is the chipmunk. Look for chipmunks where grass and trees grow. They like nut



THE CHIPMUNK'S BURROW HAS TWO DOORS.

trees and green grass. They like the sun, too.

Chipmunks live in holes in the ground or in old stumps. We call a chipmunk's hole its burrow. It digs its burrow with its feet.

The chipmunk's burrow has two doors. It has a front door and a back door. If a weasel tries to catch a chipmunk, the chipmunk runs to its burrow. It runs in the front door and

out the back door. It gets away from the weasel.

Men dig holes for cellars when they build houses. The earth they dig out, they take away in trucks. The earth the chipmunk digs out, when it makes its burrow, it takes away in its mouth. It has to make many trips to take away the earth.

The chipmunk can carry food in its mouth, too. Chipmunks like berries, apples, and nuts. They put away nuts in their burrows to eat in winter.

Watch a chipmunk getting nuts. It looks for them with its bright eyes. Sometimes it eats the nuts it finds. It sits up on its hind legs and holds the nut in its front feet to eat it. It is fun to watch a chipmunk eat a nut.

When a chipmunk is getting ready for winter, it puts some of the nuts it finds in its burrow. It carries the nuts to the burrow in its mouth. First it puts a nut

Courtesy of "Nature Magazine."

IT SITS UP AND HOLDS THE NUT WITH ITS FRONT FEET.

in one side of its mouth. Then it puts a nut in the other side of its mouth. This makes the chipmunk look as if it had the mumps.

The chipmunk jumps across the grass to its burrow. It goes down into the hole. It puts the nuts in the burrow.

In the fall the chipmunk goes into its hole to sleep all winter. It eats some of the nuts it has put away before it goes

to sleep. It sleeps a long time before it wakes up. When it wakes up, it eats some more nuts. Then it goes to sleep again.

When the sun is warm in the spring, the chipmunks come out of their burrows. They run about in the bright sunshine. They sit in the sun. We say they take sun baths.

Chipmunks stay on the ground more than squirrels do. They cannot climb trees so well as squirrels can. It is not hard to tell a chipmunk from a squirrel. Squirrels have long bushy tails. Chipmunks have shorter and smoother tails.

Chipmunks have coats of soft fur. Their coats are reddish brown. They have black stripes on their backs. Try to count the stripes when you see a chipmunk. Has a squirrel stripes on its back?

A chipmunk makes a good pet.

SOME THINGS TO THINK ABOUT

Make a picture of 1, 2, or 3.

1. Look for chipmunks where grass and trees grow. They like nut trees. They like the sun, too. The chipmunks run about in the bright sunshine.

2. The chipmunk's burrow has a front door, and a back door. If a weasel tries to catch a chipmunk, the chipmunk runs in the front door, and out the back door.

3. When a chipmunk eats a nut, it sits up on its hind legs and holds the nut in its front feet to eat it.

SOME THINGS TO DO

Find a place where chipmunks live. Watch for them.

Tell where you saw chipmunks.

Tell what you saw them doing.

Put a mark on the board every time you see a chipmunk. Count the marks.

CHAPTER 18

OUR CHRISTMAS TREE

Have you seen the berries on Christmas trees?

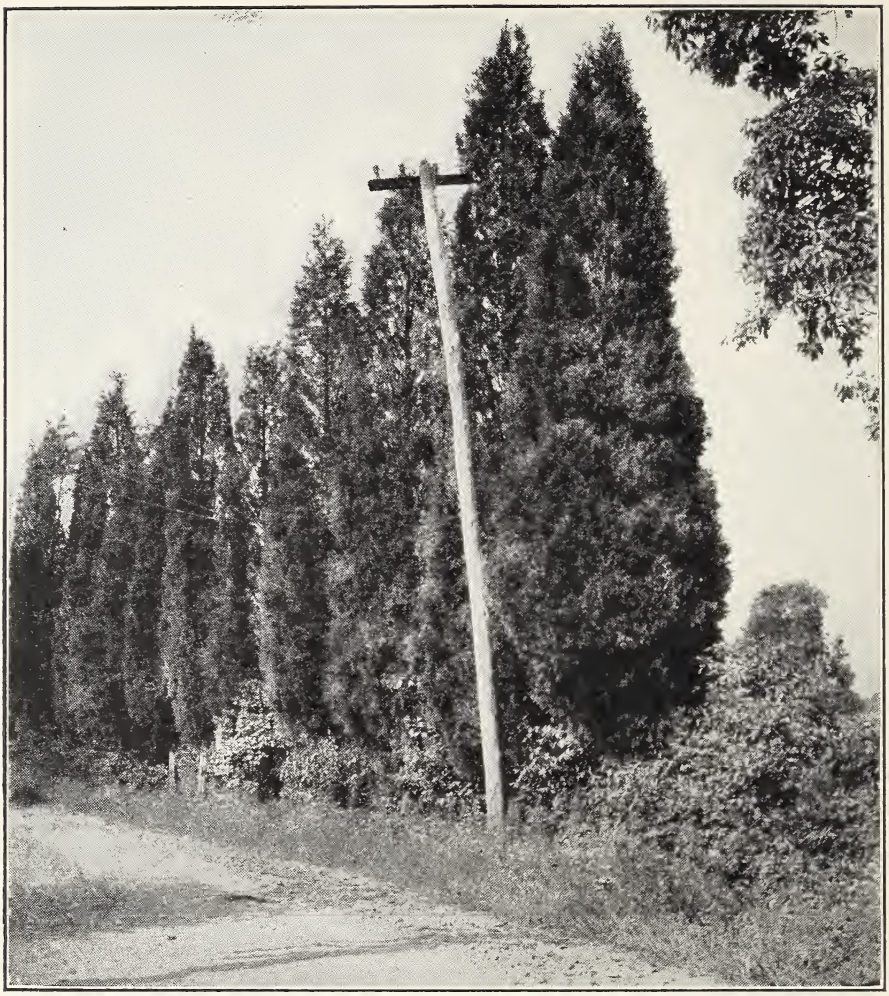
Do you like tall or short Christmas trees?

Where do Christmas trees grow?

One day Billy and his father went to the market to buy a Christmas tree. There were many Christmas trees standing in the market. There were big trees and little trees. There were many kinds of trees.

After they had looked at many trees, Billy saw one he liked. It was a beautiful red cedar tree.

This tree is not like the hickory tree and many other trees. Look at the hickory tree in winter. The leaves have fallen to the ground. The twigs are



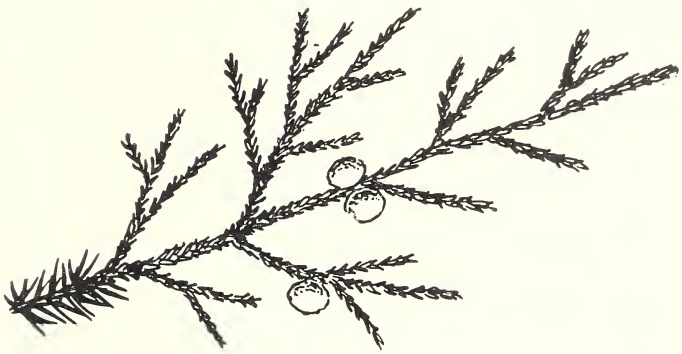
Courtesy of U. S. Department of Agriculture.

THE RED CEDAR MAKES A GOOD CHRISTMAS TREE.

bare. The cedar tree keeps its leaves all winter. You would not like a hickory tree for your Christmas tree.

You can always know the red cedar tree. It has two kinds of leaves. The

twigs have some leaves like needles and some short wide leaves. The leaves look like those in the picture. Only very sharp eyes can see the two kinds of leaves on the tree.



THE RED CEDAR TREE HAS TWO KINDS OF LEAVES.

Have you ever seen the fruit on the red cedar tree? It looks like a tiny blue ball. This fruit is ripe in the fall.

The red cedar grows in many places. It grows where many other trees do not grow. This tree grows well on dry, rocky hills. Sometimes it grows by lakes, rivers, and wet places.

The Christmas tree that Billy's father bought came from the country. The

trees were cut in the fields and forests. Then they were carried many miles on a wagon to the train.

At the railroad the trees were put on freight cars. Soon they were on their way to the city. The city was hundreds of miles away.

In the city the trees were taken from the cars. They were put on large trucks which took them to the market.

Would you like to grow a Christmas tree for your school? You can buy a tiny Christmas tree with roots on it. Then you can plant it in a box. After you have watched it grow for several weeks, you can put the box in the yard. Next year you will have a tiny Christmas tree for your room. After Christmas you can put the box with the tree in the yard again.

SOME THINGS TO THINK ABOUT

Put in the words that have been left out of these sentences. The dots show where the words should be.

1. The cedar tree keeps its.....all winter.
2. The red cedar has.....kinds of leaves.
3. The fruit of the red cedar looks like a tiny blue.....
4. The fruit is ripe in the.....

SOME THINGS TO DO

Tell where you have seen Christmas trees growing.

Draw pictures of Christmas trees.

Draw pictures of the red cedar tree.

Draw a picture of the hickory tree in winter.

CHAPTER 19

THE BEARS IN THE SKY

What time do you go to bed?

Is it dark when you go to bed in winter?

Do you ever look at the stars before you go to bed?

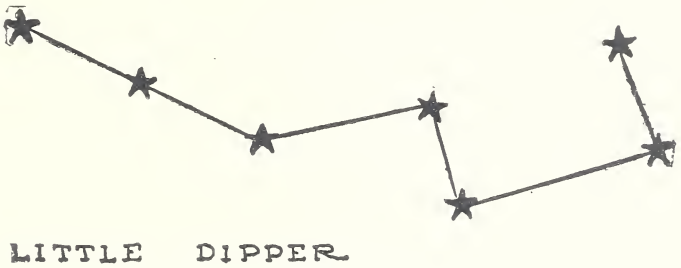
Long ago there were people who looked at the stars every night. They lived in warm countries. It was so

THE BIG DIPPER LOOKS LIKE THIS.

warm they could stay out of doors all night. Some of them were out in the

fields taking care of sheep. When night came, they watched the stars.

These people saw pictures in the sky made of stars. They saw a big dipper in the sky. A dipper is a cup with a



THE LITTLE DIPPER LOOKS LIKE THIS.

long handle. The big dipper made of stars looks like the picture on page 112. It is very beautiful.

They saw a little dipper in the sky, too. The little dipper made of stars looks like the picture on this page.

Some people said the stars made a big bear and a little bear. They thought the big bear looked like the picture.

They called the little dipper the little bear. They thought the little bear looked like the picture.

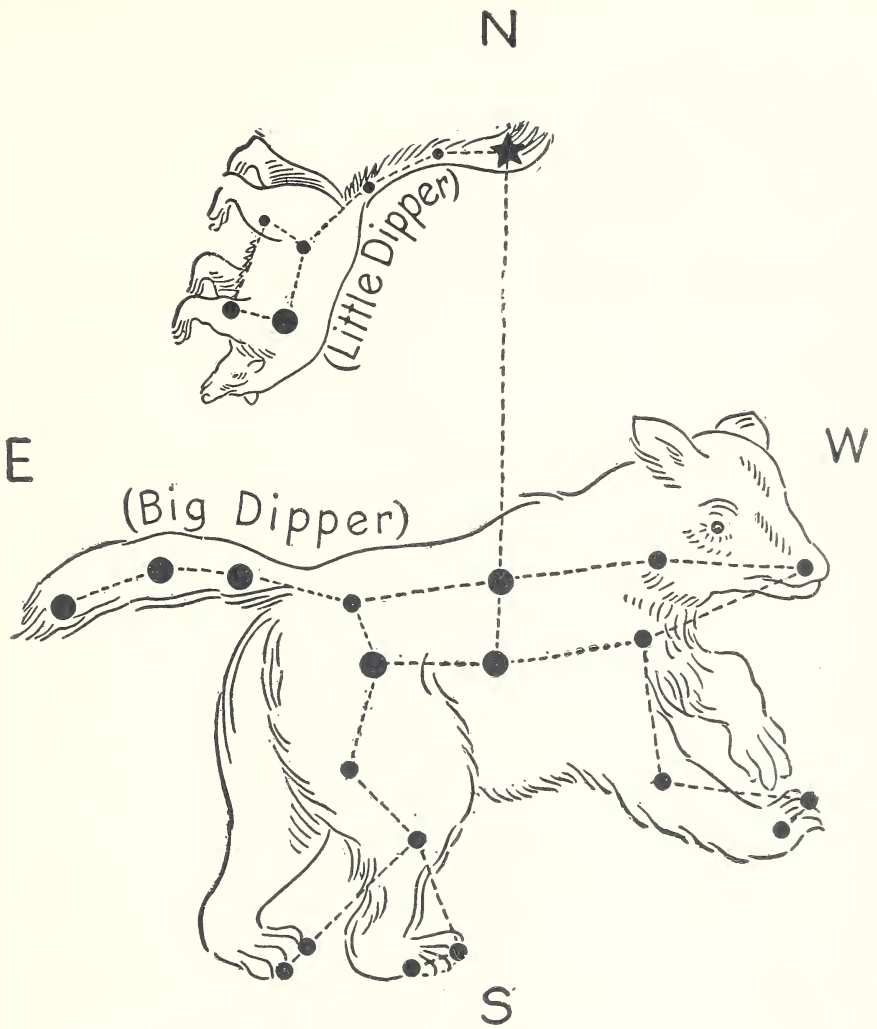
The people made a story about the big bear and the little bear. This is the story.

In a far away country there was a beautiful mother who had a dear little boy. The queen of the country hated the mother because she was so beautiful. The queen changed the beautiful mother to a bear.

The little boy cried because he could not find his mother. The mother who was changed to a bear cried for her little boy.

After a long time the boy grew up. He went out into the woods to hunt. He saw a big bear coming, and he was going to kill it. The big bear was his mother, but he did not know it. He did not know she was a bear.

The king saw what was going to happen. He said, "This poor boy must not kill his own mother. I will change him to a bear, too."



Courtesy of "Nature Magazine."

YOU CAN SEE THE TWO BEARS EVERY NIGHT.

He changed the boy to a little bear. Then he put both the bears up in the sky.

You can see both the bears every night unless there are clouds in the sky. When

there are clouds in the sky you cannot see the stars.

SOME THINGS TO THINK ABOUT

Make some pictures that tell the story of the big bear and the little bear.

SOME THINGS TO DO

Ask some one to show you the big bear and the little bear in the sky.

Count the stars in the handle of the big dipper.

Count the stars in the cup of the big dipper.

How many stars are there in the handle of the little dipper?

How many stars are there in the cup of the little dipper?

Draw the big dipper and the little dipper as they look in the sky.

CHAPTER 20

A WINTER BIRD

Do you know a bird that is red?
Why is it hard for birds to find food in winter?
How can we help them?

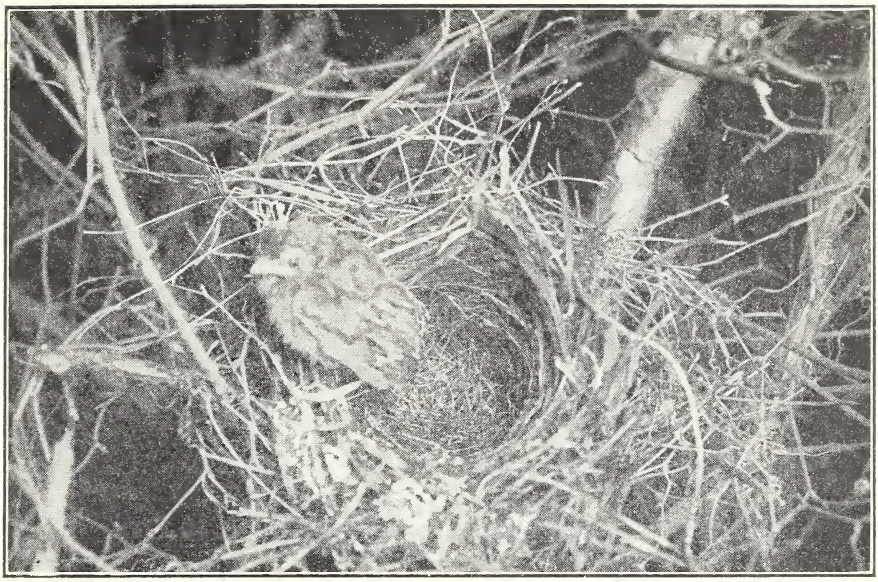
Most of our bird friends go away in winter. They cannot find enough to eat when the weather gets cold. There is a beautiful red bird that stays with us summer and winter.

This red bird is not so large as a robin. He is not so small as an English sparrow. All his feathers are red except the ones around his bill. They are black.

He has a thick strong bill. His bill is red, too. There are red feathers that stand up on his head. The feathers that stand up on a bird's head are called a crest.

Courtesy of the National Ass'n of Audubon Societies.

THE CARDINAL STAYS WITH US SUMMER AND WINTER.



From a photograph by B. S. Bowdish.

THE CARDINAL MAKES ITS NEST IN BUSHES OR VINES.

The bird is the cardinal. There is a color called cardinal red. Sometimes the cardinal is called the redbird. Both are good names, for they tell the bird's color.

The cardinal is a sweet singer. He sings to his mate. He seems to say, "Pretty girl! Pretty girl!"

On cold winter days he sounds as if he said, "What cheer! What cheer!"

Most people like the cardinal. It makes them happy to look at his bright

red feathers, and to hear him sing his song.

The mother cardinal is much like the father cardinal, but most of her feathers are not red. They are gray-brown. There are some red feathers in her wings and tail.

Cardinals eat seeds and grain. They find seeds on weeds, on grass, and on bushes. They find grain in the fields. They break the seeds with their thick strong bills.

All birds that eat seeds have strong bills. We call them seed-eaters. We know them by their bills.

When the snow comes, it covers the weeds. It covers the grass and bushes and the grain in the fields. Then the poor cardinals have a hard time to find food.

Have you ever put out food for the cardinals? You can put it on the ground, if you are sure there are no cats

GRACKLE

CARDINAL

BOB WHITES

HOUSE WREN

Photograph by Frank M. Chapman.

BIRDS LIKE TO BE FED IN WINTER.

near. It is better to put it on a table in the yard. Outside the window on the window sill is a good place to put the food.

You can put out little bits of bread and some bird seed. Cardinals will like that. They will like to have you put out corn, wheat, and sunflower seeds, too. Be sure to put out a pan of water. The birds will want a drink.

You will make the cardinals happy on

cold winter days by giving them food. They will make you happy with their pretty color and sweet songs.

You have a Christmas tree at Christmas. When Christmas is over, you throw the tree away. You can use your old tree to make a Christmas tree for the birds. This is the way to do it.

Set the tree up in your yard.

Make some little paper baskets. Put bread in some of the baskets. Put bird seed in some. Put corn and wheat in other baskets. Hang the baskets on the tree.

Put a pan of water under the tree every day. The birds need it, because it is hard for them to get water to drink in winter. Why?

Watch the birds that come to the tree. Do not go too close. Keep still. Then they will stay to eat and drink.

The downy woodpecker, the chickadee, the junco, the bluejay, and the English

sparrow may visit your Christmas tree. Learn to know them. Watch to see how they act. Listen to hear the sounds they make.

SOME THINGS TO THINK ABOUT

Another game called "Why." Find the answers to these questions.

1. Why should we put out food for the birds in winter?
2. Why should we keep still and not go too close when we watch the birds?
3. Why should we put out water for the birds in winter?
4. Why do you wish to have the cardinals come to your yard for food?
5. Why does the cardinal need a thick strong bill?

SOME THINGS TO DO

Put out food and water for birds. Be sure to put them in a safe place.

Make a Christmas tree for the birds.

Make a picture of the birds at the Christmas tree.

CHAPTER 21

WHAT THE SUN DOES FOR US

What makes the light in the daytime?
Why is it hot in summer?
Where is the sun at night?

Early, early in the morning before the sun comes up, everything looks gray and dim. The trees look gray, and the houses look gray. It is hard to see things, because it is dark.

Then it begins to be light. The trees are easier to see. The houses stand out clearly. There are lines of pink and red and yellow in the sky. The clouds turn white and red and gold. The sun is coming up.

Everything begins to wake up. The birds wake up. The insects wake up. People wake up. A few animals that

stay awake all night get ready to go to sleep.

Then the sun comes up. It is day. There is plenty of light, and we can see all about us.

The sun is like a big ball of fire. It is so bright that it hurts our eyes to look at it. The light from the sun is very bright. It shines down on the earth. It makes the green things grow greener.

Do you remember reading about the children who planted bulbs? When the leaves first came up they were not green. They had been growing in a dark place. When they were put out in the light, they turned green. Green plants need sunlight. If they do not get it, they will die.

People need sunlight, too. If they do not get it, they are pale and ill. Children need sunlight to grow and become strong.

You have read how little chipmunks

Courtesy of the Boston and Maine R. R.

IN SUMMER PLANTS GROW AND ARE GREEN.

like to sit in the sunshine. The bright sunshine helps them to grow and be strong. Sunshine helps the other animals, too.

When the sun comes up, the earth grows warmer. You know how warm the bright sunshine feels. The heat comes from the sun.

When do people make gardens? We

all know that spring is the time to plant most seeds. Do you know why? It is because the earth is warmer in the spring. The seeds cannot grow in cold weather.

Things need heat to help them grow. You can put a plant in the sunlight in very cold weather, but it will not grow. It will die from the cold.

The heat we feel comes from the sun. If we did not have the sun's heat, everything would freeze. Nothing could live on the earth.

When the sun is high in the sky, we are warmer than we are when it is low. On hot days in the summer we grow cooler in the evening. Even in the cold days of winter, we are warmer at noon. That is because the sun is high in the sky at noon. It is low in the sky in the evening.

When the sun goes down it gets dark. Then it is night. People sleep at night.

Photograph by Ewing Galloway, N. Y.

IN WINTER IT IS COLD.

Some animals sleep at night. Do you know some animals that do not sleep at night?

In summer the sun comes up very early. It goes down very late, so the days are long. In winter the sun comes up late. It goes down very early, so the days are shorter in winter.

In the winter it is cold. The sun does not give us much heat. The winter

months are December, January, and February.

In the spring it is warmer. The days are longer. The sun gives us more heat. The spring months are March, April, and May.

The days are very hot in summer. The sun is high in the sky. It gives us much heat. The summer months are June, July, and August.

The fall months are September, October, and November. It is getting colder again in the fall. The sun does not give us so much heat. It is not so high in the sky.

SOME THINGS TO THINK ABOUT

On the next page are five sentences without endings. Below the sentences are seven endings. Put the true ending on each sentence. You will have two endings left over.

Sentences

1. People sleep.....
2. The fall months are.....
3. The sun comes up early.....
4. Plants cannot grow.....
5. The spring months are.....

Endings

December, January, and February.
March, April, and May.
June, July, and August.
September, October, and November.
in the summer.
at night.
in cold weather.

SOME THINGS TO DO

Watch to see what time the sun comes up some morning in winter.

Watch to see what time the sun goes down some evening in winter.

At noon sit in the sunlight in your room. Does the sun give us heat? Tell how you found the answer.

Try to find out which is the longest day.

Try to find out which is the shortest day.

CHAPTER 22

WIND AND WEATHER

What part of the year is it now?
Can you see the wind?
Can you feel the wind?

When the winter comes, the days are cold. Why? Perhaps there is snow in the school yard. Some days are very cold. People cannot always keep warm on very cold days. When the days are very cold, we say the weather is cold.

Winter days are warmer at noon than early in the morning. Why? Sometimes there is ice in the yard on winter mornings. At noon the sun makes the weather warmer. Perhaps it is warm enough to turn the ice to water. Perhaps it is colder again at night. Then the water turns back to ice.

Courtesy of the U. S. Weather Bureau.

SOMETIMES THE WIND BLOWS SO HARD IT BLOWS DOWN HOUSES.

You can try a pan of water in the yard. On a very cold day it will turn to ice. Some days are warmer. Then the water will not turn to ice. The ice and snow will go away when the weather is warmer.

Do you like cold weather? Do you ever have very cold weather where you live? When do you have very cold weather?

Have you ever heard the wind

blowing? It is great fun to hear the wind on a cold winter night.

What is wind? The wind is air moving. Some days it moves fast. Then the wind is blowing hard. Is the wind blowing today?

Sometimes the wind is very strong. It pushes against us as we walk. It blows our hats away. It blows our papers. You can feel the wind as it blows.

The farmer uses the wind to make the windmill go. The windmill helps him do his work.

Have you a toy boat? Will it sail on the water? The wind makes some boats go. They are called sailboats. It is great fun to play with boats in the water.

Some of the large boats have sails. The wind makes these boats go. Some of the sailboats make long trips. People have fun on these boats.

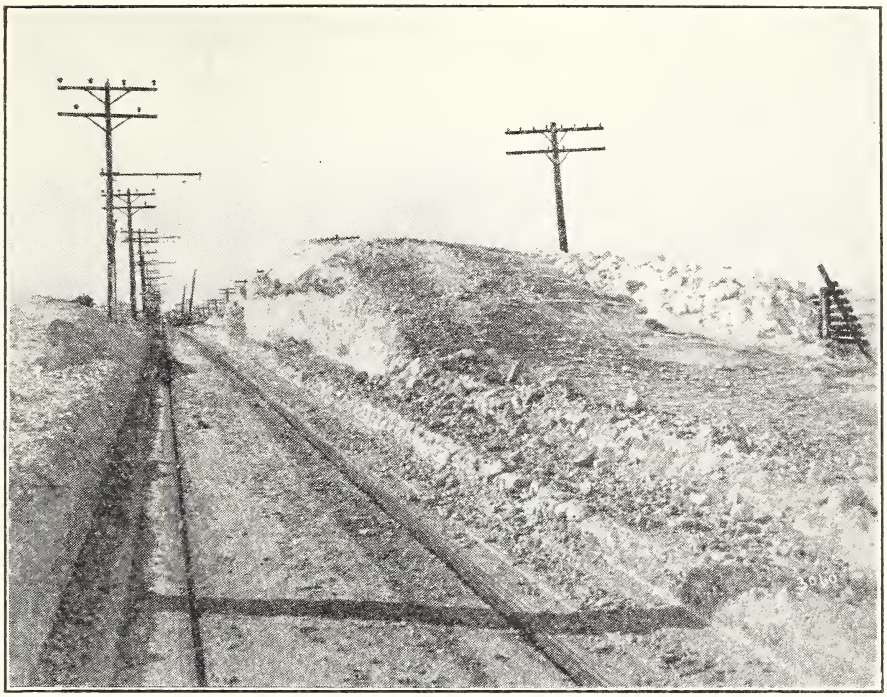
Courtesy of Eastman Kodak Co.

THE WIND MAKES SAILBOATS GO.

Have you ever tried to fly a kite? Can you fly it when there is not much wind? The wind takes the kite up and holds it.

Do you remember the wind last summer? For many days it was warm, but some nights the wind was cool. It made us feel cool. People like the cool wind in summer.

The wind does not always help us. Sometimes it blows down our homes.



Courtesy of U. S. Weather Bureau.

SOMETIMES THE WIND BLOWS THE SNOW IN BIG HILLS.

Often trees are blown over by the strong wind. The wind blows sand and dirt into our houses.

In winter the wind is cold. Sometimes it makes us very cold. The wind brings us snow and rain in winter. It blows snow on our walks and streets. Sometimes the snow is very deep. How do the men clean the snow from the streets?

The wind can do many other things. Sometimes it helps children in their play. Many times it helps men do their work.

SOME THINGS TO THINK ABOUT

1. When does water turn to ice?
2. What makes the ice turn to water again?
3. What is wind?
4. What does the wind do sometimes?
5. How does the wind help people?
6. What does the wind do for your kite?

SOME THINGS TO DO

Make a picture of the weather every day for a week. Draw a circle for each day. If the day is cold, make the circle blue all over. If it is warm, make it red. If it rains, make it gray. If it snows, make it white.

Maybe you can think of other ways to make pictures of the weather.

Make a toy windmill and let the wind blow it.

CHAPTER 23

TOYS WE LIKE

What happens when you throw a rubber ball on the floor?

Have you ever played with bow and arrows?

What makes the arrows go?

One day Billy's mother took him to the toy shop. It was the day before Billy's birthday.

Mother said, "Billy, what toy do you want for your birthday?"

There was a new toy in the toy shop. It was a bow and arrow set. Billy liked it as soon as he saw it. He thought what fun it would be to shoot the arrows.

Billy said, "I want the bow and arrow set. It will be fun to play with a bow and arrows."

Mother gave him the bow and arrow

Courtesy of Eastman Kodak Co.

BILLY LEARNED TO SHOOT THE ARROW.

set for his birthday. He tried to shoot the arrows. He tried many times before the arrows would go to the mark. He learned how to make the arrow go far and fast. He learned how much to pull the arrow against the string on the bow.

Father was glad to see Billy shoot so far and fast. He liked to watch Billy hit the mark.

Billy liked to see father shoot the arrows. Father had a strong arm. He could pull more on the string of the bow. Then the string of the bow shot the arrow farther and faster.

Boys use the bow and arrow for toys. They have fun with this game. Some men play a game with the bow and arrow. They play the game in the park. They shoot arrows to hit a mark. Their game is much like your game. Sometime you may see men playing this game.

The Indians used bows and arrows. They used bows and arrows to hunt with. The Indians put heads of stone on their arrows. Have you ever seen an arrow-head?

Father said, "Would you like to see an Indian arrow-head? Here is one the

Courtesy of Rodman Wanamaker.

THE INDIANS USED BOWS AND ARROWS.

Indians made. I found it on a hill in the country."

Billy said, "I want to find an Indian arrow-head."

Father said, "Open your eyes wide and hunt for them next summer in the country."

For many days Billy played with the bow and arrow set. Other children came to play with Billy. They liked to shoot the arrows.

One day Billy took his bow and arrow set to school. The children liked it. It was such fun to shoot the arrows.

Some of the children made a bow and arrow set. They made it like Billy's set.

SOME THINGS TO THINK ABOUT

Find the answers to these questions.

1. What toy did Billy like best?
2. What do boys do with the bow and arrow?
3. What did the Indians do with the bow and arrow?
4. Where would you look to find arrowheads?
5. What made the arrow go far and fast?

SOME THINGS TO DO

Look at the bent piece of wood in the bow.

Take the string off one end of the wood. Does it spring back? Is the wood bent now?

Put the string back again.

Try to put a string on other pieces of wood. Do they stay bent? Do they spring back when you take the string off?

Throw a ball on the floor. Does it spring up?

CHAPTER 24

THINGS THE AIR WILL DO

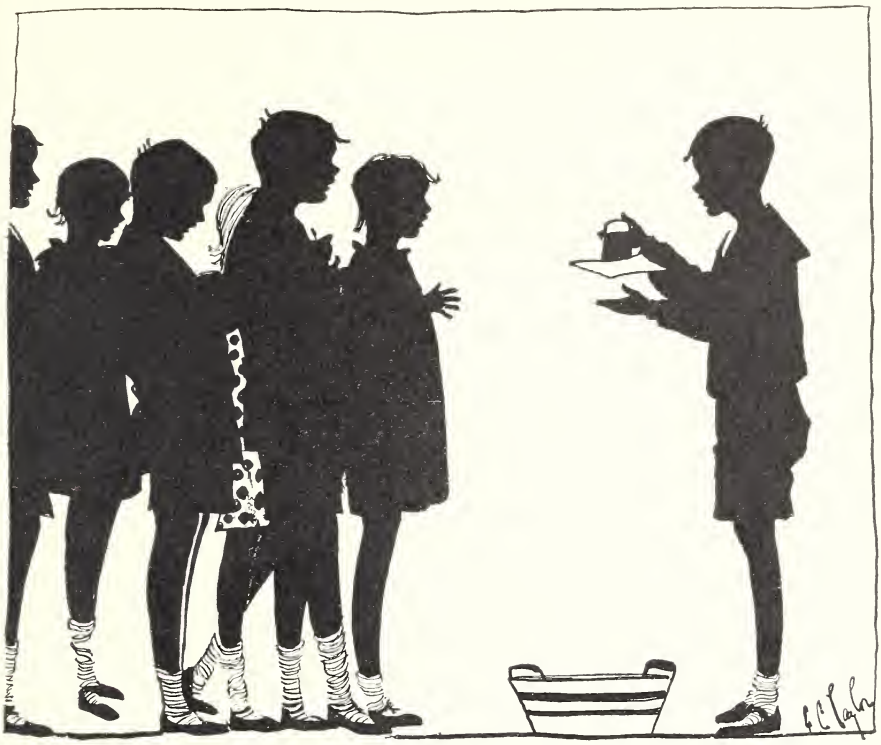
Have you seen anybody do tricks?
What tricks can you do?

Billy likes new games. He likes to do tricks.

Billy's father knows how to have fun with simple things. He knows how to use many things in the home for making toys. He can use tin cans, drinking glasses, and bottles for toys. He can do many tricks with them.

Billy can do a trick with a drinking glass and a piece of paper. His father showed him how to do it.

One day Billy showed Ned and the other boys this trick. He filled a drinking glass with water and covered it with a piece of paper. Then he held the paper



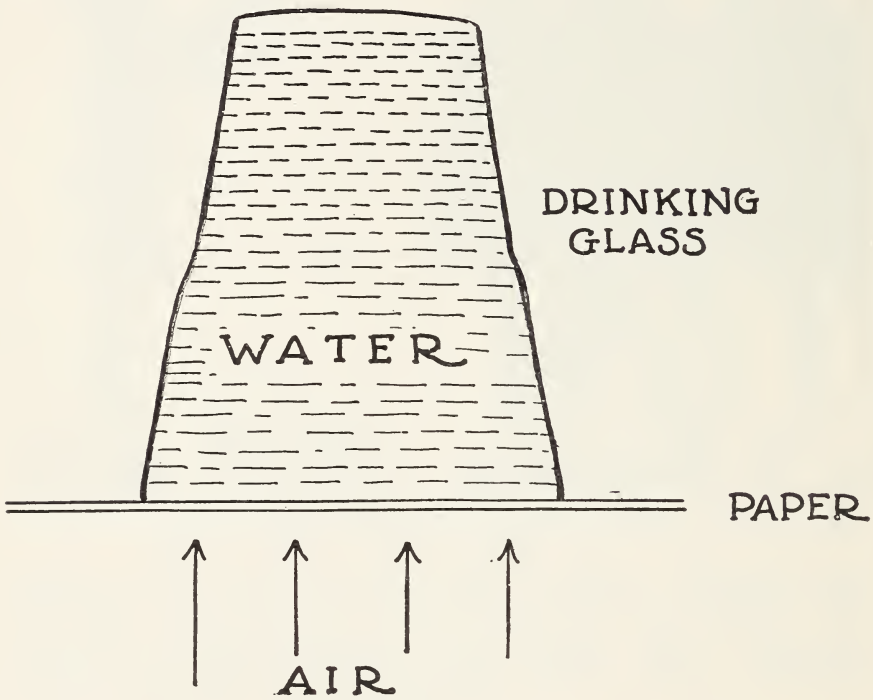
BILLY TOOK HIS HAND FROM THE PAPER.

on tightly and turned the glass upside down. He held the glass over a large pan. Do you know why?

When he did not get the paper on just right, the water ran out, but it went into the pan and not on the floor. Almost every time Billy got the paper on just right. When he took his hand away from the paper, what do you think happened? The water stayed in the glass.

Then Billy turned the glass right side up and set it on the table.

"Show us some more tricks," said Ned.



THE AIR HOLDS THE WATER IN THE GLASS.

"There is another part to this trick," Billy answered smiling.

"Let us see it," said the boys.

Billy poured some of the water from the glass so it was half full. Then he covered it with a piece of paper and turned it upside down again. What do

you think happened? The boys were sure the water would fall out. Billy held the glass as he did before, and the water stayed in.

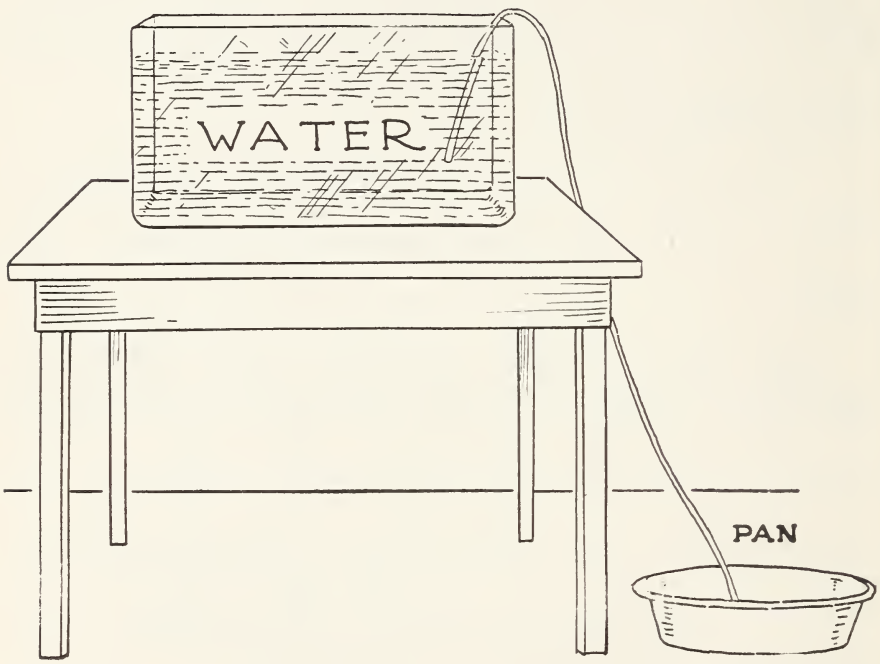
Ned wanted to know why the water stays in the glass when it is upside down. Billy told the boys what his father had told him.

"The air presses up against the paper. That holds the water in the glass," he said.

One day Ned's mother was cleaning the aquarium, where the fish live. She used a piece of small rubber tubing. It was about two feet long. She used the rubber tubing to carry the water out over the side of the aquarium.

The boys wanted to know how to do it, so Ned's mother showed them. She filled the rubber tubing with water. Then she took an end in each hand and held the tubing shut with her fingers. She put one end of the tubing in the aquarium.

The other end she let hang down over a pan. She took her fingers off both ends of the tubing. What do you think happened? The water began to run through the tubing.



THE AIR PRESSURE MAKES THE SIPHON WORK.

"What makes the water run?" said Ned.

His mother smiled, and said, "This rubber tubing is a siphon. When the siphon is just right, the water will run

through it. The air presses on the water in the aquarium. That is why the siphon works."

The boys liked this trick. They all wanted to try it. "That will be a good trick to show Billy," said Ned.

There are many other tricks that will help you have a good time.

SOME THINGS TO THINK ABOUT

Here is a game to play. Find sentences that tell about these words.

1. drinking glass
2. pan
3. air
4. rubber tubing
5. siphon

SOME THINGS TO DO

Try to run water from one drinking glass to another drinking glass.

Use the siphon to take water from a tub or a large pan.

Try to do Billy's trick with a glass of water and a piece of paper. Be sure to try it over a pan or a tub.

CHAPTER 25

SOME GOOD GAMES

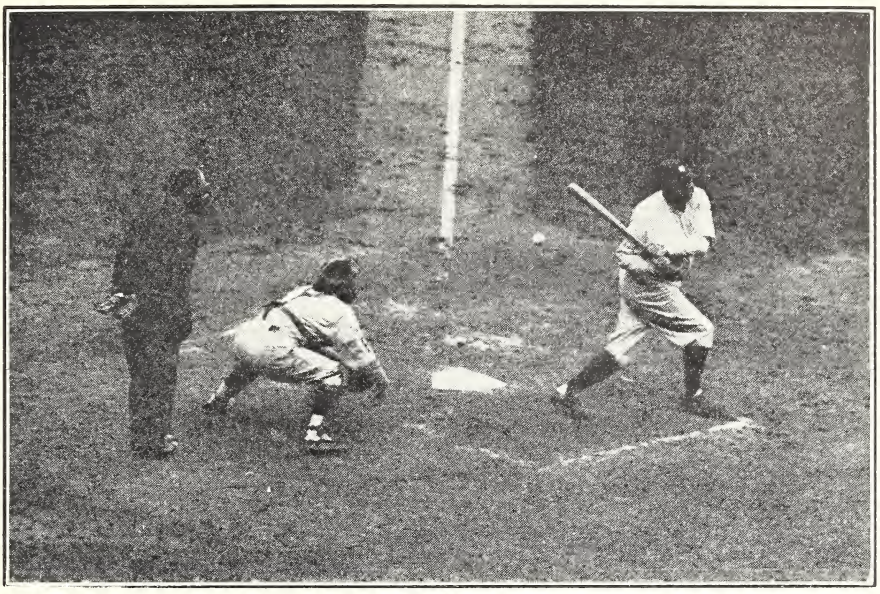
What games do you like best?
Do you like to play ball?

One day Billy's father took him to a ball game. Ned went with them.

They watched the pitcher throw the ball. The man with the bat hit the ball. This made the ball go back over the pitcher's head into the field.

Some men could make the ball go far out into the field. They hit it just the right way. Other men could not make it go so far. They did not hit it the right way.

The pitcher tried to throw the ball so the men could not hit it. He knew how to throw it hard. Sometimes the man with the bat did not hit it, and it went on to the catcher.



Photograph from Times Wide World.

SOMETIMES THE MAN WITH THE BAT DID NOT HIT THE BALL AND IT WENT TO THE CATCHER.

Then the catcher tried to catch it. Sometimes he could not catch it. Then it went on past him.

The ball players could throw the ball far across the field. They could throw it fast, too. They were strong men. They had thrown the ball many times before.

It was great fun to see a ball game. Ned liked to watch the pitcher. He wanted to be a pitcher, too, some day.

Ned and Billy like to play ball with

Courtesy of Eastman Kodak Co.

BILLY AND NED LIKE TO PLAY BALL.

the older boys. The big boys can throw the ball high into the air. They can do it because they are strong.

The big boys can bat the ball far into the field. Ned wants to be big so he can bat the ball, too. Sometimes he tries to bat the ball, but he cannot often hit it.

Then some other boy takes the bat and tries to hit the ball.

Billy watches the big boys catch the ball. He wants to catch it, too. The big boys let him go into the field. Sometimes he almost catches it. If he cannot catch it, he tries to stop it. Some day Ned and Billy may be ball players.

Have you ever played ninepins? Ned and Billy have played it many times. They stand the pins in their places. Then they roll the ball against the pins.

Sometimes they roll the ball several times before they can knock all the pins over. Then they stand the pins up again and roll the balls against them.

They have different balls to roll. Some are heavier than others. Ned found one that he could roll better than any of the others.

Ned and Billy have great fun playing games. Playing games helps to make them strong and happy.

SOME THINGS TO THINK ABOUT

Find parts of the story that tell about these words.

1. pitcher
2. catcher
3. bat
4. ninepins

SOME THINGS TO DO

Play a game of ball.

Play the game of ninepins. Try different balls to see which is best for the game.

Tell about other games that are played with balls.

CHAPTER 26

FIRE, A HELPER THAT MUST BE WATCHED

In what ways is fire useful?
Have you ever seen a fire engine?

When firemen are on their way to a fire, they go very fast. Do you know why? When people are not careful with fire, it may burn their homes. Firemen put water on a fire to put it out. Sometimes the fire is too big, and the house burns before they can put the fire out.

Children should not play with fire. Their clothes may begin to burn. If your clothes ever catch fire, wrap yourself in a quilt, a rug, or a blanket, and roll on the floor. Do not begin to run, for that will make the fire burn faster.

Photograph from Keystone View Co.

FIREMEN USE WATER TO PUT OUT BIGGER FIRES.

Fire needs air to burn. If you throw a rug over a small fire, it will put out the fire, because there will be no air. Firemen use water to put out bigger fires.

Have you ever burned your fingers? You know how a burn hurts. Have you ever seen a burned house? It does not look pretty. Fire must be carefully watched.

When fire is watched carefully, it is

Courtesy of New York Central Lines.

FIRE MAKES A STEAM ENGINE GO.

very useful to us. Can you think of ways in which fire helps us to be well and comfortable?

Fire warms us in winter. People usually burn coal to keep their houses warm. Sometimes they burn wood, and sometimes they burn oil. Do you like a warm fire at home?

Fire cooks our food. Most food tastes better when it has been cooked. What

kind of stove is used to cook your dinner?

Fire gives light. The Indians used to build great camp fires at night to give them light, and keep them warm. Have you ever camped out at night? Did you build a fire?

Fire makes a steam engine go. Have you ever seen the fireman of an engine open the door, and throw in some coal?

Fire burns up trash and rubbish. It helps us to keep our yards clean. Farmers burn bushes and limbs of trees that are dry. They get this trash out of their way.

You see that fire helps men in many ways. But we must watch fire carefully. We must know how to use it.

SOME THINGS TO THINK ABOUT

Find the answers to these questions.

1. Why must fire be watched?
2. How does fire help us?

3. What should you do if your clothing caught on fire?

4. How should you put out a small fire?

SOME THINGS TO DO

Visit a fire-engine house, and talk with the firemen.

Visit the fire that keeps you warm at school. Watch the fireman put coal on this fire.

Visit the place where trash is burned. Is it kept clean and neat?

CHAPTER 27

GOLDFISH

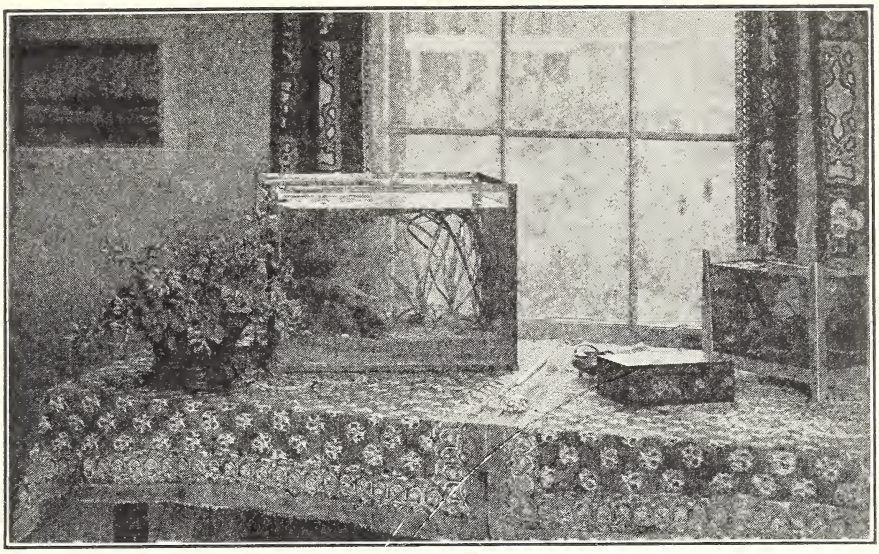
Has a fish teeth?
Has a fish eyelids?
Why does the goldfish keep opening its mouth?

You have all seen fish. You may have seen them in a lake or river. Perhaps you have some goldfish at home.

If there are fish in your home, they live in an aquarium. They cannot live in the air. They die if they are taken out of the water.

An aquarium is a home for animals and plants that live in water. You could not live in an aquarium, because you do not live in water. You live in air.

Would you like to have some goldfish



Courtesy of "Nature Magazine."

AN AQUARIUM WITH SQUARE CORNERS IS BETTER FOR GOLDFISH.

in your schoolroom? First you must make an aquarium ready for them.

An aquarium with square corners is better for goldfish than a round bowl.

On the bottom of the aquarium you place clean white sand. Wash the sand well before you put it into the aquarium.

The next thing to do is to put some water plants in the aquarium. Water plants can be bought at a pet store, where goldfish are sold. Ask the man who keeps the store what kind of plants

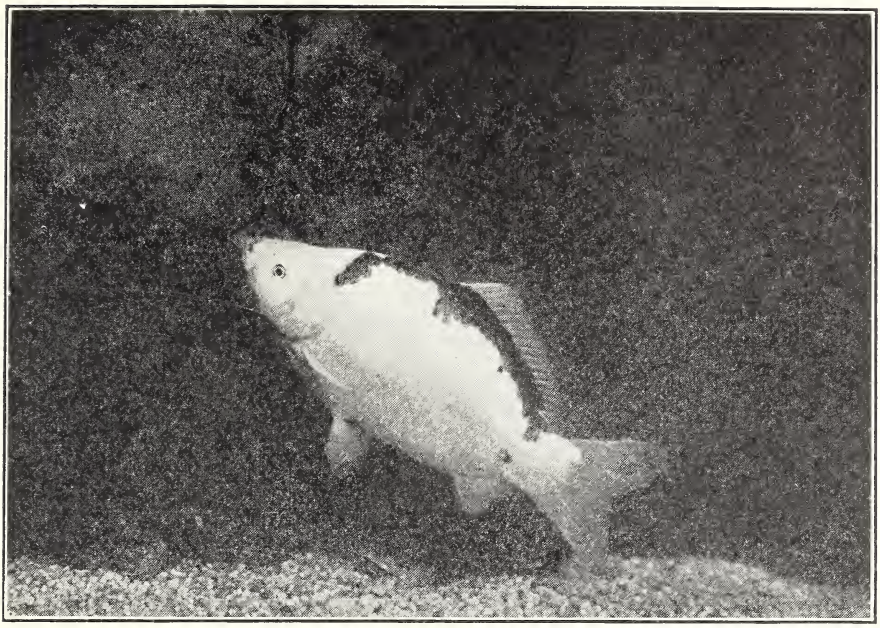
to buy for a goldfish aquarium. Plant two or three in the sand.

These plants will grow so that there will be more and more of them. Do not take any out unless they get so thick that the goldfish do not have room enough to swim. Water plants help to make a good home for fish.

The water for the aquarium should not be very warm nor very cold. It should be poured into the aquarium slowly, so it does not stir up the sand. It is a good plan to use a dipper at first.

There are two things you must be sure to do, if you want your goldfish to live. You must not put many goldfish into one aquarium. In most aquariums, two or three are enough. If you have a very large aquarium, you may have more fish. If there are too many fish in an aquarium, they will not live.

You must not give your fish much food. Too much food is not good for



Photograph by Elwyn Sanborn.

GOLDFISH HAVE BEAUTIFUL COLORS.

goldfish. Fish food that you get at the pet store is good food for them. The man at the store will show you how much to give the fish every day.

One or two water snails in the aquarium will help to keep it clean. You can get water snails at the pet store, too.

You will like to watch goldfish in an aquarium. They have beautiful colors. A goldfish is deep yellow on the back.

It is light yellow below. Its body is covered with scales.

The fish swims with its fins. Its tail helps it to swim, too.

SOME THINGS TO THINK ABOUT

1. What should you put into an aquarium first?
2. What should you put in next?
3. What other things should you put in besides the goldfish?
4. How does a goldfish look?
5. How does a goldfish swim?

SOME THINGS TO DO

Help your teacher fill an aquarium for your schoolroom.

Watch the goldfish. See how they swim.

Feed the goldfish. See how they eat.

Make a picture of the goldfish.

CHAPTER 28

WATER

Do you like to play in water?
What makes water turn into ice?
How can you change ice to water?

Last summer many children went to the lakes or to the seashore. They went with their mothers and fathers, or with their friends. Everybody likes to go to the lakes or to the seashore. Do you know what people do there? They play in the water. They go bathing. They wade in the water. They sail boats.

The grown people sail big boats. The children have little boats to sail near the shore. You do not have to go to the lakes or to the seashore to sail little boats. You can sail them in a little bit of water near home. Did you take off

Courtesy of Eastman Kodak Co.

DID YOU WADE IN THE WATER LAST SUMMER?

your shoes and stockings to wade in the water last summer?

People could not live without water. Have you ever waited a long time for a drink? Then, how good the water tasted! We must drink water to live. Every one should drink eight glasses of

water each day. Children should drink milk every day. The milk has water as well as good food in it.

We use water to bathe. We need a bath every day to keep us clean and well. We wash our hands in water several times each day. We use water when we brush our teeth at night and in the morning.

In our homes water has many uses. Water is used to wash our clothes. Our dishes are washed in water.

Animals need to drink water. Animals could not live long without water. Plants need water to grow. Some plants do not need so much water as others, but they all need some.

Large boats go on the water. Have you ever taken a trip on a boat? It is great fun to take a trip on a large ship. Ships go on lakes, rivers, and seas. People make trips on the ships. The ships carry many things for us.

Photograph by Ewing Galloway, N. Y.

IT IS FUN TO PLAY ON THE ICE.

In some places water is used to run mills. The water makes the mills go. Some mills saw wood. Other mills make flour. Have you ever seen an old mill by the road?

In winter water changes to ice. When the weather is very cold, water turns to ice in the lakes. Sometimes the water in rivers turns to ice in winter.

Have you ever watched boys and girls

skate? It is great fun to play on the ice, when it is thick and hard.

Some people use ice from the lakes. They saw it into blocks in the winter. They keep the blocks of ice in an icehouse until summer. Then they take the ice out to keep food cool for people.

We do not use much ice from lakes and rivers today. Most of our ice is made in factories. The factories make ice from clean water. This ice is cleaner than ice from most lakes.

We need water every day to live. It helps keep us well. It helps us have fun. It helps people do their work. It helps us travel.

SOME THINGS TO THINK ABOUT

Find the part of this story that tells:

1. How we play in water.
2. How water helps us to keep clean.
3. Where people used to get ice.
4. Why the ice we get now is better.

SOME THINGS TO DO

Find pictures of ships with sails.

Find pictures of people using water.

Tell how you played in water last summer.

On a cold night put a pan of water in the yard. What happens?

Put a piece of ice in a pan. Then put the pan on the hot stove. What happens?

CHAPTER 29

THE RABBIT

Why do rabbits have long ears?
Are the rabbit's hind legs larger than its front legs? Why?

A rabbit is a good pet.

People who have pet rabbits have to take care of them.

A pet rabbit needs a place to live. He should have a little house. Some people make little rabbit houses out of big boxes. Rabbit houses must always be kept clean.

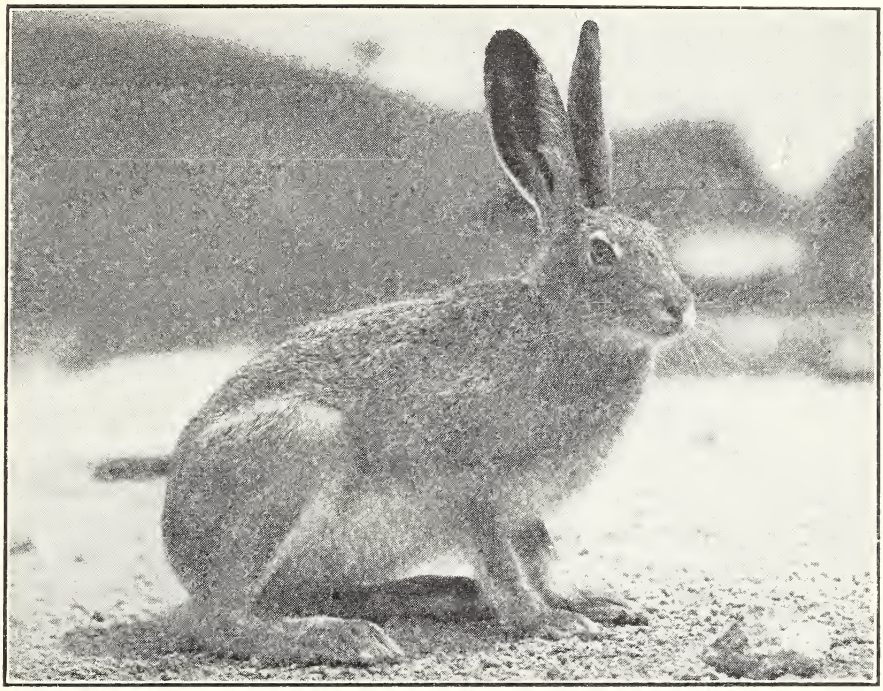
The rabbit needs two meals a day. It likes to eat lettuce, cabbage, carrots, and apples. Rabbits should not have cooked food. They do not like it, and it is not good for them.

A rabbit needs plenty of fresh, clean water to drink. It should have fresh water two or three times a day.

Photograph by J. C. Allen.

RABBITS ARE GOOD PETS.

Some rabbits are wild. They live out in the fields and near the woods. Wild rabbits have to take care of themselves.



Photograph by J. C. Allen.

RABBITS HAVE LONG EARS.

Many animals try to catch rabbits, because they are good to eat. Rabbits cannot fight very well. Instead of fighting, the rabbit uses its ears, its legs, its nose, its eyes, and its wits.

Along comes a fox. The fox is hungry. It would like a rabbit to eat, but the rabbit smells the fox a long way off. Away runs the rabbit. Its nose and legs have kept it safe.

Have you looked at a rabbit's nose? It moves all the time. It smells other animals a long way off.

Down in the grass is a snake. It wants a little rabbit to eat. As the snake gets ready to jump at the rabbit, it moves the grass. The rabbit hears the grass move. It hears every sound with its long ears. The rabbit makes a high jump. It has long hind legs for jumping. Hop! Hop! Away it goes. The snake cannot get it. The rabbit's long ears and long legs have kept it safe.

A hawk flies over the field. Hawks are big birds that eat rabbits and other animals. The rabbit is on the watch. It stands up on its hind feet to see over the tall grass. Its sharp eyes see the hawk. Away runs the rabbit. It runs through the tall grass. The tall grass hides the rabbit from its enemy. The rabbit's sharp eyes have kept it safe.

Sometimes, when a dog runs after a

Photograph by L. W. Brownell.

THE WILD RABBIT HAS JUMPED THROUGH THE SNOW.

rabbit, the rabbit runs to the briar patch. The rabbit can run under the briars without getting hurt. The dog cannot. The rabbit's wits have kept it safe.

Wild rabbits have to watch out for many dangers. They must use their noses, their eyes, their ears, and their

legs to be safe. They must use their wits, too. Pet rabbits do not have to watch for danger, but they cannot go out of their yards. A wild rabbit can run as far as it likes. Would you rather be a pet rabbit or a wild rabbit?

SOME THINGS TO THINK ABOUT

Find the answers to these questions.

1. What kept the rabbit safe when the dog ran after it?
2. What kept the rabbit safe when the snake moved?
3. What kept the rabbit safe when the hawk flew over the field?
4. What kept the rabbit safe when the fox came along?

SOME THINGS TO DO

Bring a pet rabbit to school and take care of it.

Watch the rabbit. Tell what it does.

Try to hop as a rabbit hops.

Put some flour in the rabbit's box, so it will get flour on its feet. Let it hop across the room. Draw the tracks it makes.

CHAPTER 30

BIRD HOMES

Where do young birds live?
What kinds of bird homes have you seen?

This story will tell you about two birds that build their homes in queer places.

The first bird is very small. It is much smaller than an English sparrow. It is brown. It has a short tail that stands almost straight up. It is very quick. It never keeps still. It sings a happy song. It likes to live near people. If you put up a bird house for it on your porch, it may come and live in it.

What bird is it? Guess.

It is the house wren. It gets its name because it likes to live near houses people live in.

House wrens make their nests in queer

"Nature Magazine."

THIS WREN LIVES IN A TREE.

L. W. Brownell.

THE HOUSE WREN IS A SMALL BIRD.

places. They will make a nest in a box or in a tin can. They have made nests in old shoes and old hats that were left out of doors. A man left an old coat hanging on the porch. A wren made a nest in the pocket of the coat. Wasn't that a queer place to make a nest?

After being away all winter, the wrens come back in April to make a home. They find a good place to build their nest. Then they carry twigs, hay, and feathers

in their bills to that place. They carry so much that they often have to pull some of it out again. The twigs and hay make the nest strong, and the feathers make it soft for the eggs and the little birds.

Both the father and mother wren work to build the nest. If other birds come near the nest, they drive them away. The father wren sings to the mother while they work. Soon the nest is finished.

The mother bird lays six or eight eggs. While she sits on the nest to keep the eggs warm, her mate sings a song to her.

When the young wrens hatch out, the father and mother work very hard. The little ones are always hungry. They must have soft food. The father and mother wren hunt spiders, worms, and insects for them. They carry the food to the nest in their bills. The young

Courtesy of "Nature Magazine."

BOB WHITE IS A LARGE BIRD, WITH BROWN, BLACK, AND GRAY FEATHERS.

wrens hold their mouths wide open. The old birds put their long bills into the little wren's mouths, and drop the food in. They do this many times every hour.

Many other birds come back in the spring to make nests. Keep your eyes open so that you may see birds building their nests.

If you go out into the fields and watch for birds building nests, you may see the other bird that this story tells about.

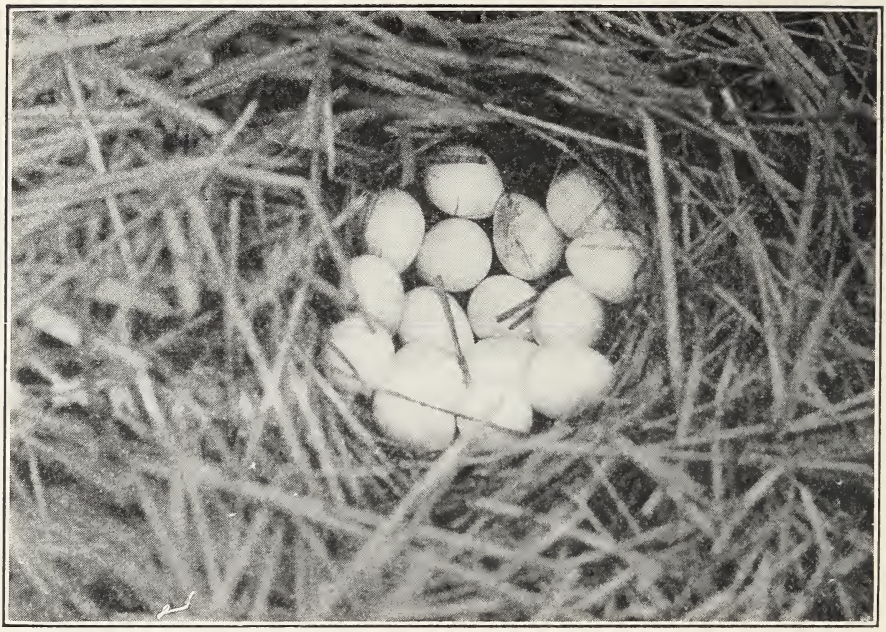
This bird lives in the country. It does

not make its nest in a bird house or a box or a tin can. It does not even build a nest in a tree. It has its home on the ground. Have you guessed what bird it is? We call it Bob White.

Bob Whites do not come back to us in the spring. They do not have to, for they never go away. Bob White never goes far from its home.

Bob White is a large bird. It is as long as a robin. Its body is much larger than the robin's body. Its feathers are brown, black, gray, and white. There are more brown feathers than any other color. The father Bob White has a white collar. You can tell him from the mother by this collar.

Bob Whites have large bodies and short wings. They do not fly much. You see them most often on the ground. They are hard to see because they are the color of the ground. If you are near one, it may fly up quickly. Its wings will make



Courtesy of "Nature Magazine."

BOB WHITE MAKES HIS NEST ON THE GROUND.

a loud noise. It will make you jump. The noise helps to keep Bob safe.

A Bob White's nest is hard to find. You may almost step on it without seeing it. It is in the grass in a field. Often there is tall grass that almost hides it.

Mother Bob White lays many eggs. Sometimes there are eighteen or twenty eggs in one nest.

The young birds are very pretty.

Photograph by J. C. Allen.

BABY BOB WHITES LOOK LIKE LITTLE CHICKENS.

They look like little chickens. Young wrens are blind and have no feathers when they hatch. Little Bob Whites are covered with down. They can run about the very day they hatch.

The mother Bob White takes them with her across the fields to find something to eat. She shows them where the food is. They pick it up with their own bills. They do not have to be fed as little wrens do.

Can you tell why young birds that hatch out on the ground can run about and take care of themselves?

SOME THINGS TO THINK ABOUT

This story has told you what the wren is like, and made you guess its name. Play a guessing game like that. Tell all you can about a bird you have seen, but do not tell its name. Let the others guess it. See who can guess most birds.

Can you guess these?

Is this bird a wren or Bob White?

It is a large bird.
Its nest is on the ground.
It says its own name.

Is this bird a wren or Bob White?

There are six or eight little birds in the nest.
The father and mother bird carry food to the little ones.
The father and mother fly back and forth carrying food.

Is this bird a wren or Bob White?

It may make its nest in a queer place, like a coat pocket.
It puts feathers in its nest to make it soft.
It goes away in winter, and comes back in the spring.

SOME THINGS TO DO

Watch for the birds that come back home.

Look for wrens and Bob Whites.

Try to sing like a wren.

Try to say, "Bob White," just as Bob White says it.

Find some pictures of these birds, and put them up in your schoolroom.

CHAPTER 31

A WINDOW GARDEN

How can you have flowers if you do not have a garden?

Can the children in the city have gardens?

In the country nearly all the people have gardens. They have plenty of ground to use for gardens. People in the city do not have much ground for gardens, but some of them have gardens just the same. The gardens may be tiny. They may be in boxes or flower pots, but they are gardens.

Some people in the city have good gardens, which they have planted for many years. Their plants grow to be big and strong. These people know how to care for their gardens.

Photograph from J. Horace McFarland Co.

GOOD GARDENS MUST HAVE CARE.

There are some poor gardens, too. The plants in them do not grow well. They never become big and strong. There are good gardens and poor gardens in the country, too.

Do you know why plants do not always grow? There are many reasons. You must know what plants need, so that you can take care of them.

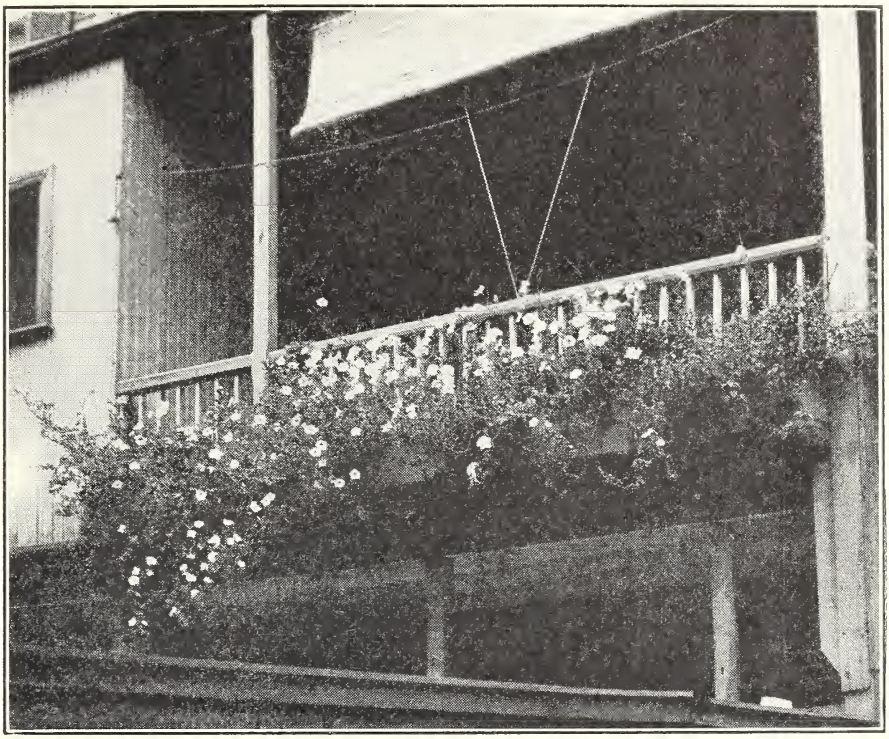
One of the first things to know is the right time to plant the seeds. Most seeds

are planted in the spring. While the ground is still bare and cold, you may buy the seeds. Then you will be ready to plant them when it is time. As soon as the ground gets warm in the spring, it is time to plant the seeds. They will not grow until the weather becomes warm.

Most plants grow in the ground. The soil gives them food. Good soil has plenty of plant food in it. Plants do not grow well in poor soil.

Have you ever seen plants that did not have water for a long time? They look dry and dead. If you give them water, they may grow again, but sometimes they are dead. Plants cannot grow without water, but the ground must not be too wet. Plants will die from too much water. They must have just enough.

Most plants do not grow well without sunlight. The light helps make them



Courtesy of U. S. Dept. of Agriculture.

YOU CAN HAVE A GARDEN OF YOUR OWN.

green. Some plants do not grow well in the house because there is not enough light there.

In Billy's school, the children learn to make tiny egg-shell gardens. Making the little gardens helps them to remember what plants need.

The children take egg-shells to school. They fill the egg-shells with good soil.

Then they plant several seeds in the soil. They do not plant many seeds, and they do not plant them deep.

Then they put the egg-shells in a light, warm place. They keep the soil in the shells just a little bit wet all the time.

The children look at the egg-shell gardens every day. They watch the little plants come up. When the plants grow too big for the egg-shells, they plant them in boxes or in the garden.

Do you think you could make an egg-shell garden?

Make a window garden.

If you do not have a big window box, you can use little boxes. You can get boxes at the store. Ask for boxes with smooth boards.

Fill the boxes with good soil and plant your seeds in them. If you take care of the little gardens, the seeds will grow.

SOME THINGS TO THINK ABOUT

Some of these sentences are true. Some are not true. Can you tell which ones are true? On a piece of paper put the number of each sentence. If the sentence is not true, write "No" beside the number.

1. Most seeds are planted in the fall.
2. Most plants grow in the ground.
3. Many plants grow well without light.
4. Most plants do not need much water to make them grow.
5. Light helps make plants green.

SOME THINGS TO DO

Make an egg-shell garden.

Make a window garden in a box.

Plant some seeds in two little flower-pots. Put one pot in a warm place. Put the other out in a cold place. Look at them each day. Tell what happens. Do seeds grow better in a warm or cold place?

Put a plant in a dark place. Give it water each day. Keep it in the dark place for about two weeks. What happens? Do plants grow better in the light or the dark places?

Try to find out whether or not plants can grow without water. How should you do it?

CHAPTER 32

OUTDOOR GARDENS

Have you ever helped plant a garden?
What did you do to help?
Does your school have a garden?

Billy's school has a good garden. All the children like to work in it. In the spring, they break up the lumps of earth so that all the soil in the garden is fine and soft. Then they plant the seeds.

One day in the spring Billy's mother gave him some little onions to plant in the school garden. The little onions are called onion sets. Billy took the onion sets to school, and everybody wanted to plant them that day.

The garden was all ready. The children had been working in the garden for several days. There were no lumps

BILLY'S FATHER AND MOTHER WERE GLAD HE HAD A GARDEN.

of earth left, and the soil was fine and soft. It was hard work but great fun. The children knew that plants grow better when the soil is fine and soft.

They started to plant the onion sets. They made rows of marks in the fine soil. These marks showed where the children would plant the onions. They tried to make the rows straight.

Then they pushed the onions under the ground with their fingers. They pushed them under until the ground just covered the tops of the onions. It does not take long to plant onion sets.

All the children planted little onions. The teacher gave them the onions. Each child planted one row. This was his own garden. All the children had little gardens in the school garden.

They wrote their names on thin pieces of wood. They pushed the pieces of wood into the ground. This showed each child where his garden was.

Photograph by L. W. Brownell.

THE CHILDREN PLANTED SUNFLOWER SEEDS.

It was several days before they saw the green leaves of the little onions. "Soon you will have onions to eat," said the teacher. "If you do not eat them all now, they will grow to be big onions. By fall you may pull them out of the ground again. They will be like the big onions in the market."

In another part of the garden the children planted sunflower seeds. Each child had a short row for sunflowers. They put the seeds in the ground and covered them.

"Seeds are little," said Billy. "Will they grow to be tall plants with big, yellow flowers?"

"Yes," said the teacher, "if you take care of them."

Do you have a garden at home? Billy had a garden at home, too. He liked to work in the garden. Billy's garden was a little one. He could make only five rows in it.

Photograph from J. Horace McFarland Co.

THE PLANTS IN THE GARDEN GREW.

Billy liked carrots, so he wanted to plant them in his garden. He planted the tiny, brown seeds in three rows. They began to grow. Before long he could see the tiny leaves. The warm sunshine helped to make them grow.

Billy could not see the tiny, yellow carrots in the ground, but he was sure they were there. There were too many plants in a row, so one day he pulled up some of them. Sure enough, there were little yellow carrot roots on the plants.

The carrots did not grow very fast. It was several weeks before they were big enough to use. One day he pulled enough for dinner. Billy's father and mother liked the carrots. They were glad that Billy had a garden.

In the other two rows he planted radish seeds. Soon he saw tiny leaves, where he had planted the seeds. The little leaves grew larger and larger. Then other leaves came up and grew larger.

The radishes grew faster than the carrots.

One day Billy pulled up a radish plant. What a beautiful red root! It was a radish big enough to eat.

SOME THINGS TO THINK ABOUT

Find out what words have been left out of these sentences.

1. Plants grow better when the ground is .....
2. The rows in the garden should be.....
3. Little onions are called onion.....
4. The warm.....helps to make plants grow.

SOME THINGS TO DO

Make a plan for your school garden.

Plant some onion sets in the school garden.

Plant some sunflower seeds and take care of them.

Draw a picture of your school garden.

Plant some carrot seeds at home in your garden. Read what you find on the package of carrot seeds.

Plant some radish seeds.

CHAPTER 33

TREES IN SPRING

What is Arbor Day?
What do you like best about trees?

Arbor Day means tree day. On Arbor Day many people plant trees. Arbor Day does not come on the same day in all places. When does it come in your state?

In some schools on Arbor Day the children read stories about trees. They sing songs about trees. They write stories about trees. Sometimes they plant trees at the school on Arbor Day. Have you ever planted a tree?

On Arbor Day people learn the uses of trees. They learn that trees are our friends. Trees help us in many ways.

You would not like to live in a place that had no trees. Trees help make our homes beautiful.

Photograph from Times Wide World.

ON ARBOR DAY MANY PEOPLE PLANT TREES.

Children like to play under trees in the summer. They like the cool shade.

Some trees are made into boards. The boards are used to build houses. The wood of some trees is used to make tables and chairs. Some of our pencils are made of the wood of the red cedar tree.

A great many trees are used to make paper. The paper in this book was made from the wood of some tree.

A long time ago many, many trees were burned. People burned them to keep warm. Now there are not enough trees to burn, so most people burn coal or oil to keep warm.

Trees help people another way. They give them fruit. Do you remember reading about the fruit of the hickory tree? Trees give us apples, pears, peaches, and many other fruits.

Do you remember the hickory tree in winter? It is not green like the red cedar and other Christmas trees. The hickory tree does not have leaves in winter.

In spring the hickory buds grow larger each day. If you keep your eyes open wide, you will see them. Soon the buds will open and send out the beautiful leaves.

Photograph by L. W. Brownell.

HICKORY FLOWERS LOOK LIKE LITTLE GREEN TAILS.

Most trees have flowers in the spring. If you keep your eyes open wide, you may see them. Sometimes the flowers on trees are hard to see. The hickory tree has strange flowers. They look like little green tails. They come after the leaves are out. You must keep your eyes open wide to see them.

Do you remember the story of the elm tree? On big elm trees you may not be able to see the flowers. They are small

and high up. On the little elm trees you may be able to see the flowers. They are brown or red. They come before the leaves are out.

Which do you like best, the elm tree, the hickory tree, or the red cedar tree? Do you think that your school will plant a tree on Arbor Day?

SOME THINGS TO THINK ABOUT

1. Think of ways in which trees help us.
2. Think of the name of the tree that is used to make pencils.
3. Think of the color of the flowers on a hickory tree.
4. Think of the time when most trees have flowers.
5. Think of what Arbor Day is.

SOME THINGS TO DO

Watch the buds open on the trees.
Look for hickory, elm, and red cedar trees.
Watch for the flowers on the trees.
Watch for the fruit after the flowers are out.
Plant a tree.

CHAPTER 34

SPRING FLOWERS

Do you know where to find some wild flowers?

How many wild flowers have you seen this spring?

When you go for a walk in the springtime, be sure to look for wild flowers. Out in the fields you will see beautiful little blue flowers. Some of them are almost white. The flowers are tiny, but sharp eyes will see a yellow spot in them. These flowers are bluets.

Bluets grow best in places where there is grass. There are many of them in sunny fields. Sometimes you will find them in wet places where there are rocks. Some bluets grow by the side of the road. They grow in crowds, but they are so small that many people never see them.

You must keep your eyes open if you want to find them.

The bees can always find bluets. Do you know why the bees visit them? They go to them to get food. Butterflies find the tiny flowers, too. Keep your eyes open and you will see them.

In the spring boys and girls may find a plant with very big leaves. It grows in the woods where the soil is good. The big leaves make the plant look like a green umbrella. This plant is the May apple.

May apple flowers are large and white, but they do not smell good. You must look under the leaves to find them. Some children do not know where to look for them. When you find them, they will be nodding to you.

Keep your eyes open and you will see the bees going to these flowers. Do you know why they go?

In the summer you may find the fruit

Photograph by R. W. Shufeldt, courtesy of "Nature Magazine."

MAY APPLE FLOWERS ARE LARGE AND WHITE.

THE FRUIT OF THE MAY APPLE IS YELLOW.

on the May apple plant. It looks like a little egg. When the fruit is ripe, it has a yellow color. Some people like to eat it. The fruit is not harmful, but the rest of the plant is poisonous. Do not eat any other part of the plant. The leaves and roots would make you very ill if you should eat them.

Another strange plant grows in the

DANDELIONS

BLUETS

MAY APPLE

JACK-IN-THE-PULPIT

woods in spring. Most children have seen the plant, but only boys and girls with wide-open eyes will find the flowers. The tiny flowers are on a big stem. They are green and yellow. The flowers are all in a little box made of a leaf. They are covered with a cap. Lift the cap and you can see the flowers.

The plant is Jack-in-the-pulpit. Can you find Jack? Jack is the stem with the flowers on it. The picture will help you find Jack. When you find Jack, you can find the flowers.

You can always know this plant by the leaf and Jack. Look at the picture of the leaf.

Jack-in-the-pulpit grows in the woods where it is not too dry.

You need not always go to the woods to find flowers. There are many beautiful flowers in the yards in the spring.

Tulips and hyacinths grow in yards and in the parks. You must have seen

Photograph from J. Horace McFarland Co.

IN THE SPRING THE TULIPS BLOOM.

red tulips in bloom. They look like the picture.

Did you try to grow hyacinths last fall? Some boys and girls like to grow them in school. Many people have them in their yards. Look at the picture. Then watch for them.

SOME THINGS TO THINK ABOUT

Find the answers to these questions.

1. Where do bluets grow?
2. Why do bees visit the bluets?
3. What color is the May apple flower?
4. What parts of the May apple plant are poisonous?
5. Where do Jack-in-the-pulpits grow?
6. What part of the plant is Jack?

SOME THINGS TO DO

Make a list of wild flowers.

Make a list of garden flowers.

Make pictures of the bluet, the May apple, and the Jack-in-the-pulpit.

Draw pictures of the places where you have seen the flowers.

CHAPTER 35

BUTTERFLIES AND MOTHS

Did you find woolly bear caterpillars last fall?

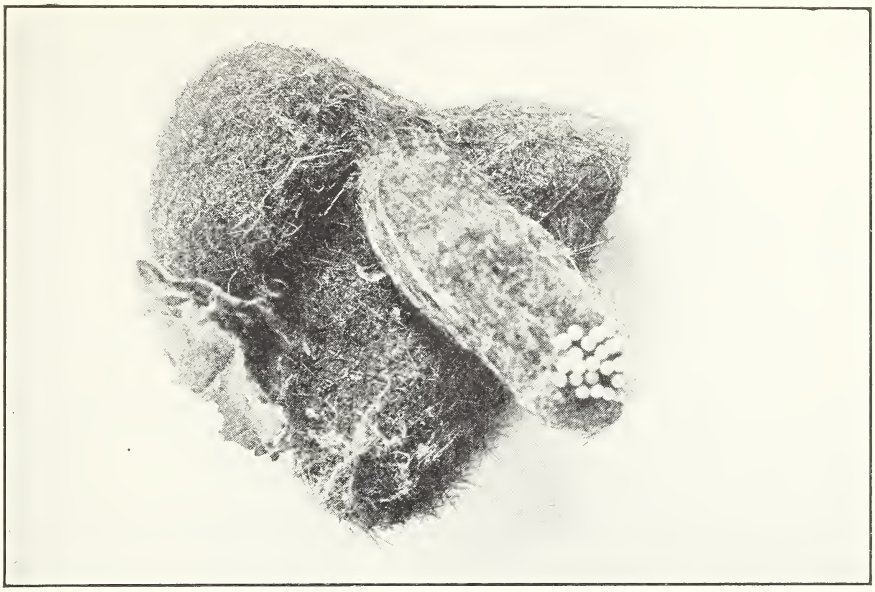
Did you see a woolly bear go to sleep?

Did you see it spin a cover around itself?

May is the time for the woolly bear caterpillar to wake up. It has been asleep all winter. It made a silk cover for itself a little while ago. In May it comes out of its cover.

What a change! You would not know your old friend, the woolly bear! It is not a caterpillar any more. It has changed into a moth. A moth looks like a butterfly. The woolly bear's name is now Isabella tiger-moth.

One way to tell a moth from a butterfly is that most moths fly at night.



Photograph by Cornelia Clarke.

IN THE SPRING THE WOOLLY BEAR COMES OUT OF ITS SILK COVER.

Butterflies fly by day. The Isabella tiger-moth flies at night.

The Isabella tiger-moth is dull yellow in color. It has black dots on its wings and body.

When the moth first comes out of its silk cover, its wings seem small. You know how paper looks when it is crumpled. That is the way the moth's wings look.

At first the moth hangs by its feet to

Photograph by Cornelia Clarke.

THE MOTH LOOKS LARGER THAN ITS COVER.

anything close by. It moves its wings very slowly. It fans them up and down. Slowly it fans its wings open, until they are wide and beautiful. Then the moth can fly.

The moth looks larger than the silk cover that was around it. The mother moth is larger than the father moth. Do you think that is strange? Many mother insects are larger than their mates.

The woolly bear is not the only caterpillar that wakes up in the spring. There are many others. Some are

changed to moths, and some to butterflies. Many people do not like caterpillars, but almost every one likes to see a moth or a butterfly.

SOME THINGS TO THINK ABOUT

Here are five sentences without endings, and here are seven endings. Put the true ending on each sentence. You will have two endings left over.

Sentences

1. Butterflies fly.....
2. Most moths fly.....
3. All caterpillars change to.....
4. Mother Isabella tiger-moths are larger than.....
5. Butterflies and moths have.....

Endings

mother moths.
father moths.
butterflies.
butterflies or moths.
at night.
by day.
beautiful wings.

SOME THINGS TO DO

Watch caterpillars that have been asleep all winter.

Try to see one come out of a silk cover.

Try to see one come out of a hard bundle.

Watch the moths and butterflies fan open their wings. After you have watched them let them go.

Make pictures of them.

CHAPTER 36

THE TURTLE

What animals do you know that have shells?

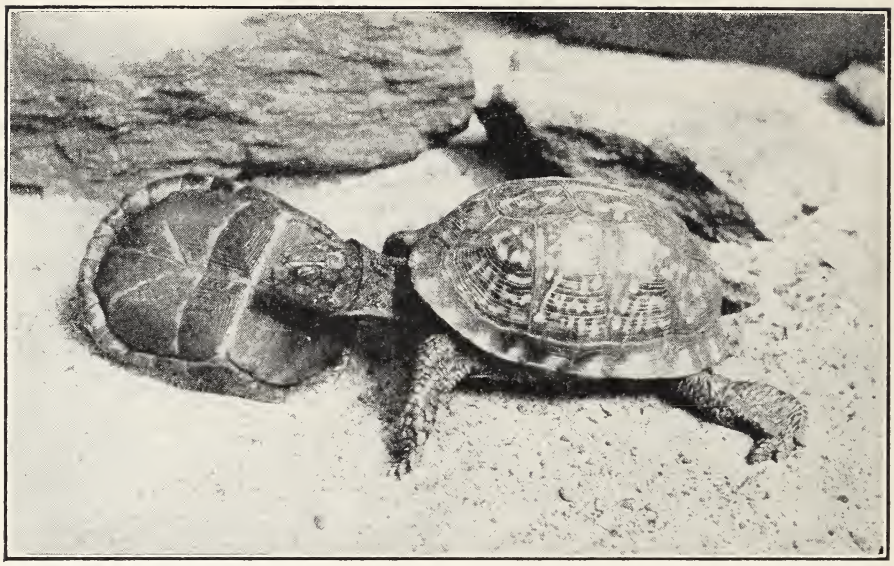
Do they ever come out of their shells?

What are the shells good for?

Perhaps you have heard that turtles are good to eat. Many birds and animals think so, but they have a hard time to get turtles to eat.

The box turtle has a shell that no animal can open. At the front and back are pieces that close tight. They are like little doors. They have hinges.

When a turtle walks, its head, legs, and tail are out of its shell. If an enemy comes near a box turtle, the turtle draws itself inside its shell. It closes the front door and the back door tight. Then it is safe.

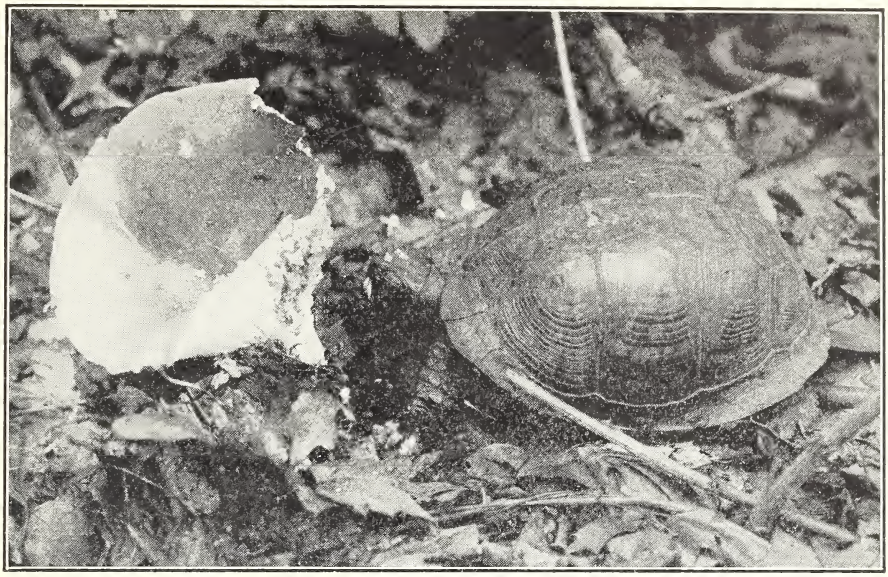


Photograph by R. L. Ditmars, courtesy of the American Museum of Natural History.

THE BOX TURTLE CAN CLOSE HIS SHELL TIGHT.

The box turtle's shell is dark brown. It has yellow spots on it. The shell is made of two pieces. One piece is on the turtle's back. The other piece is under the turtle's body. The little doors that go shut are on the piece that is under the body.

A turtle's head looks something like a snake's head. The mouth has no teeth. It has sharp edges, like a bird's bill. The turtle uses the sharp edges as we use our teeth.



Photograph by L. W. Brownell.

BOX TURTLES LIKE TO EAT TENDER PLANTS.

Box turtles like to eat tender plants. They like berries, too, and some insects. Sometimes you may find blackberry stains on the box turtle's mouth. What does that show?

Turtles walk very slowly. Have you read the story of "The Hare and the Tortoise"? Did the turtle win the race because it could move fast?

In the fall, box turtles dig burrows in the ground. They go into them, and stay until warm weather. What other

Courtesy of the American Museum of Natural History.

YOUNG TURTLES HATCH FROM EGGS.

animals do you know that sleep all winter long?

Young turtles hatch from eggs as young birds do. The mother turtle lays her eggs under leaves. Sometimes she puts them in a hole which she digs in soft ground. When the little turtles hatch, they take care of themselves. The father and mother turtle do not take care of their young as some other animals do.

Turtles do not work hard. They never move fast. Their shells keep them safe from their enemies. They live to be very old. You can find a box turtle in almost any field. Sometimes you will find one in the woods.

Sometimes people keep turtles as pets. They feed them lettuce leaves, berries, and little pieces of raw beef. Turtles eat earthworms, too. If you should ever have a turtle, be sure to give it water.

SOME THINGS TO THINK ABOUT

Find the part of this chapter that tells:

1. How the box turtle gets away from its enemies.
2. How the box turtle's shell looks.
3. How the turtle's head looks.
4. What turtles eat.
5. How turtles walk.
6. What turtles do in winter.
7. How the young turtles are hatched.
8. How to take care of a pet turtle.

SOME THINGS TO DO

Write a story about a turtle.

Bring a turtle to school and watch it.

Make a home for it to live in. Get a box made of wood. Put earth in the bottom of it. Put a pan of water in the box.

Feed the turtle every day. Give it lettuce leaves and berries. Find some earthworms for it. Give it small pieces of raw beef.

CHAPTER 37

A TRIP TO THE WOODS

Have you ever been on a picnic in the woods?

What have you seen in the woods?

One June day Billy said, "Mother, let us have a picnic."

"Where shall we have it?" asked his mother.

"In the woods," said Billy. "I will ask some of the other children to go along."

They took a picnic lunch and started for the woods. There were Billy's mother, Mary, Ned, and Billy.

The children had sharp eyes. They looked at everything along the way. They were very quiet. They did not want the birds to fly away from them.

THEY PLAYED A GAME IN THE WOODS.

When they came to the woods, Billy said, "Mother, please give me your handkerchief."

"What do you want it for, Billy?" asked his mother.

"I want to play a game," said Billy. "I made it up, after you put your

hands over my eyes in the toy shop. It is called 'Sharp Eyes.' "

"How do you play it?" asked Mary and Ned.

"You tie the handkerchief over your eyes," said Billy. "Then some one leads you to a place in the woods where you have never been before. He takes the handkerchief off your eyes, and counts ten. Then he puts it on again. You must tell all the things you saw while it was off. The one who sees the most things wins the game."

"Oh, let me go first!" cried Mary.

"No, let me," cried Ned.

"Let mother go first," said Billy.

So Billy tied the handkerchief over his mother's eyes. He led her to a place in the woods where they had not been before. He took off the handkerchief, and counted slowly, "One, two, three, four, five, six, seven, eight, nine, ten."

The children did not move. They did

not say a word. They did not want the birds and animals to go away.

Then Billy tied the handkerchief on again.

"What did you see?" cried the children.

"I saw a spider web on a bush. I saw the blue sky. I saw a big white cloud. I saw a hickory tree. I saw its branches moving in the wind. I saw a place where there had been a camp fire, and I saw a Jack-in-the-pulpit."

"You saw seven things," cried the children.

"Now a boy must have a turn. Come on, Ned," said Billy. He led Ned to another place. While he counted ten, Ned looked all around.

"What did you see?" asked Billy when he put the handkerchief back on Ned's eyes.

"The sun, the stream, and a cedar tree," said Ned.

"It's your turn, Mary," said Billy.

Mary saw a dandelion, a woolly bear caterpillar, a wren, an elm tree, a grape-vine, grass, and a bird's nest.

"You saw just as many things as mother," said Billy.

Then it was Billy's turn. Ned led him to a place on the edge of the woods. You could see a farm close by. He took the handkerchief off Billy's eyes, and counted ten.

"What did you see?" he asked, as he put the handkerchief back.

"A caterpillar, a grasshopper, a garden with vegetables in it, some turkeys in a field, a chipmunk, a cardinal, a ball in Mary's hand, and this box turtle." He pointed to a box turtle near his foot.

"Billy won! Billy won! He saw nine things," cried the children.

"I am glad you have sharp eyes," said his mother. "Now let us tell what we

THE CHILDREN PICKED UP THEIR LUNCH SCRAPS.

know about all the things we have seen."

They sat down to eat lunch. While they ate, they talked about the things they had seen. Then they picked up all their lunch scraps. They wanted the woods to look pretty.

There were many pretty flowers in the woods, but the children did not pick any. They let the flowers grow to make the woods look pretty. They let them grow to make seed.

"What a happy day!" said Billy, as he went to bed that night.

"All because you have used your eyes and your wits, Billy," said his mother.

SOME THINGS TO DO

Tell all you can about the things the children saw in the woods.

Take a trip to the woods.

Play the game the children in this story played.

Tell how to act if you want to see birds and animals.

Tell what you should do to keep the woods beautiful.

Make a class scrapbook that will show all the things you saw.

SUGGESTIONS TO TEACHERS

General

The theme of this book is the beauty of the world for those whose eyes are open to see it. For the most complete development of the theme, there should be daily observations of natural phenomena, many outdoor lessons in the neighborhood of the school, and longer field trips twice or, if possible, three times a year.

First-hand observation of each animal or plant in its natural surroundings and preliminary discussion based more or less upon the introductory questions of each chapter are essential to the development of the best values from the reading of the lessons.

No teacher need hesitate to take her class outdoors for study because of limitations of her knowledge. Begin very simply, with only a few of the most familiar objects. The lessons in this book describe only such things as may be found by any one within a short distance of almost any school.

The teacher should familiarize herself with a restricted territory. She should tell the children definitely what they are to look for. Nothing is more tiresome than aimless wandering, and children need the stimulus of a definite aim. The pupils should be encouraged to make their own discoveries, but the teacher should have a clear, underlying plan for the trip.

It is suggested that the use of this reader be correlated, so far as the ability of the group permits, with oral and written expression—song, stories, poems, dramatization—with games, drawings, paper-cutting, toy-making, the compiling of scrapbooks, and the making of specimen collections.

Chapter 1

A walk out of doors to look for grasshoppers, and preliminary discussion of what they do, and how they look, will stimulate interest in the reading unit.

The big box, suggested in "Some Things to Do," may be the simple affair described, which second grade children can make, or it may be an insect cage made for the second grade by an older class in Manual Training Shop. Directions for making a cage of simple type are given in *The Source Book of Biological Nature Study,* by E. R. Downing, p. 57, as well as in *The Handbook of Nature Study,* by A. B. Comstock, p. 375.

Encourage close and repeated observation, as well as the discovery of facts not given in the text. For example, ask the children which way their own jaws move when they chew. Then have them observe whether the grasshopper's jaws move up and down, as theirs do, or sideways.

Chapter 2

Observe spiders indoors and out. Look for various kinds of spider webs. Let the children discuss what they see.

Keep some spiders in a cage in the schoolroom for a few days. A glass jar with earth in the bottom and a twig, upon which the spider can spin, makes a good cage. Perforated paper or netting will do for a cover.

You may have to supply spiders for second grade pupils, as they are harder to catch than grasshoppers or caterpillars.

Chapter 3

For directions for making an insect cage, see "Suggestions to Teacher," Chapter 1. Put soft, loose earth to the depth of at least five or six inches in the bottom of the cage. The reason for doing so will appear in the next chapter.

Caterpillars are very particular about their food. If they are to be kept alive, it is necessary that the children notice the kind of plant on which they are found feeding, and bring fresh leaves of that kind each day.

A small jar to hold water may be sunk in the earth at one corner of the box. A piece of netting over the jar will prevent caterpillars falling in, and the stems of the leaf sprays

may be put through the netting into the water. This will keep the leaves fresh for a longer time.

The usual suggestion for outdoor observation and preliminary discussion applies here, as in previous chapters.

Chapter 4

This lesson should be read long enough after the lesson "How Caterpillars Live" to allow time for observation, and for the making of some cocoons and chrysalises. Caterpillars that do not spin cocoons, shed their skins and form chrysalises. These may hang all winter in protected places. A few are formed under ground. That is the chief reason for having several inches of earth in the insect box.

Keeping woolly bears in a warm room all winter often kills them. Sometimes when they are so kept, they make their cocoons in the fall, but this is unnatural. Normally they make them in the spring. It is much better to place their box out of doors in a protected place, where they will have the normal winter temperature. Be sure that the children keep up their observations monthly, until it is time for the caterpillars to spin in April or May. After that they should be watched daily.

Cocoons or chrysalises kept indoors during the winter should be sprinkled frequently with water.

Chapter 5

If possible have garden asters and cosmos in the schoolroom when the reading is done, and during the follow-up work.

Arrange with the owner of a near-by garden to let you take your class to see it.

Potted plants and window boxes should be considered gardens, as well as any plants grown out of doors.

Let the children cut pictures of flowers and vegetables from old magazines or seed catalogues.

Chapter 6

Besides dandelion, teach other flying seeds (milkweed, thistle, asters, goldenrod), and seeds with sails (maple, linden, catalpa).

Have the children make a field in the sand table. They will enjoy bringing in plants with ripe seeds to put into their field.

Chapter 7

If possible make a trip to the woods or to the park to see the plants mentioned in this lesson. Even in large cities these plants may all be observed on one field trip.

If it is impossible for your class to make the suggested field trip, branches, leaves, and living plants, brought into the schoolroom will serve to teach recognition of the plants. Pictures should be used to supplement such material.

Chapter 8

Have the children observe the clouds on several different days. Point out differences of shape and color in clouds. Encourage the children to observe clouds while they are at home, and to talk about the kinds of clouds they have seen.

Chapter 9

Find an elm tree in the school yard, park, or on the street, which the children may observe from day to day.

Call attention to the general shape of the tree and then have the children draw the shape, which may be distinguished at considerable distance.

Continue the operation as the leaves change color.

A visit should be made to the tree to observe the slender branches after the leaves have all fallen.

Let the children examine elm leaves and seeds.

Chapter 10

Take the children to see a nut tree in some field or park. Where such a trip is impossible, colored lantern slides should be shown as the next best materials.

Encourage the children to bring in different kinds of nuts, which may be placed in a small room museum. The museum need not be anything more than a store box with shelves on which the pupils may place their specimens. The box may well be painted and placed in one corner of the room.

The children should have hickory nuts, in the husk if possible, and leaves to examine.

Chapter 11

Such plants as ironweed and yarrow may be gathered and mounted on tablet paper and labeled. Others may be added to the list as time permits. If possible make a trip to see Jimson weed and warn the children not to collect or play with this plant.

On some of the mature plants you will probably find ripened seeds. Help the children to find them. Call attention to the number of seeds and the abundance of the plants.

Chapter 12

Grackles are birds common enough for nearly every child to see in the fall. If, however, no grackles can be found, stimulate interest in the observation of any bird that appears. Then have the children compare the facts about the grackle, which they have read, with those they learn at first hand about the other bird. If grackles are seen, observe other birds as supplementary study, for purposes of discussion and comparison.

In going out to look for birds, it must be remembered that loud noises, and sudden or rapid movements must be avoided, since they frighten the birds away. Children cannot begin to learn outdoor good manners too early.

Chapter 13

Take a trip to a market if there is one near the school. Encourage the children to bring in vegetables for this lesson. Help the children sort the vegetables into groups such as roots, stems, buds, etc.

Excellent pictures of most of the vegetables can be obtained from old seed catalogues.

Chapter 14

The importance of having live material available for study cannot be overemphasized. No picture collection, however good, can give the child the proper concept, or arouse the interest that live material unfailingly calls forth.

Chapter 15

Paper-white narcissus, Chinese sacred narcissus, and hyacinth bulbs are satisfactory for growing in the schoolroom.

Five or six Roman hyacinths can be planted in a six-inch flower pot. Put a layer about one-half inch thick of small stones in the bottom of the flower pot before you fill with the soil. Put the bulbs in the soil so that they are covered. The growing point should be turned up and just about even with the top of the soil.

The same bulbs can be grown in water. A six-inch glass dish will hold four or five hyacinth bulbs, or five or six paper-white narcissus bulbs. Put a few pebbles in the dish to cover the bottom. Then stand the bulbs in the dish and fill the space around them. Keep the pebbles covered with water.

Chapter 16

Let the children bathe and feed a dog.

Choose a gentle dog accustomed to children for bathing and feeding. Supervise the bath carefully; so that the dog is not made uncomfortable.

A dog should have one meal a day of bread and meat. The other meal may include milk, green vegetables, and prepared foods for sale at pet stores. Caution the children against the danger of leaving any small sharp bones in the food. Fish bones are especially dangerous. It is a wise precaution to run all of a puppy's food through a meat chopper.

Chapter 17

If your class is so unfortunate as to miss seeing a live chipmunk, the best substitute is a museum specimen. Where a museum trip is impossible, colored lantern slides are the next best material. Pictures can be had by every class, but should be wholly supplementary where live material is available.

Chapter 18

Obtain twigs of the red cedar from the nursery or the woods for this lesson.

Where it is possible make a trip to some field or park to see evergreen trees.

Four year old Norway spruce trees may be obtained from the Living Tree Guild, 303 Fifth Avenue, New York City, N. Y., at a price that makes it possible for a school to buy the trees. The trees may be planted in flower pots, boxes, or window boxes and cared for by the children. For several years they can be used for Christmas trees in the schoolroom or in the yard.

Chapter 19

Young children cannot find the star groups in the sky for themselves. They must be shown by an older person. Where a star party is practical, the teacher may meet a group of limited size, in the neighborhood of the school, to study the stars. With second grade children this must be done early in the evening, if at all, and careful arrangement must be made for the children's being brought and taken home.

Parents and older brothers and sisters are often able to point out the Dippers and other familiar star groups. The teacher should urge each child to have this done for him at home, if the star party is not feasible.

Chapter 20

Your class will get much happiness as well as an excellent opportunity to study birds, through carrying out the suggestions in "Some Things to Do." Have them put out bread crumbs, corn, wheat, suet, and a pan of water for birds. The suet should be tied to a branch of the tree, or otherwise secured, so that the birds can peck off small morsels of it.

Chapter 21

Encourage the children to make the observations suggested under "Some Things to Do."

Materials for this chapter and for Chaps. 22, 23, 24, 25, 26, 28, can be had ready for use in the set of Science Materials for Second Grade sold by the W. M. Welch Manufacturing Co., Chicago, Ill.

Chapter 22

Directions for making a simple paper windmill are given in *Our Physical World,* by E. R. Downing, pp. 121-122.

Chapter 23

Directions for making the bow and arrow are given in *A Field and Laboratory Guide in Physical Nature-Study,* by E. R. Downing, pp. 44-46.

Chapter 24

Rubber tubing for a siphon should have an opening of about one-fourth inch in diameter. If it is much larger you will have difficulty in making it work. Glass tubing may be bent into a U-shape and used instead of the rubber tubing. One side of the U should be about two inches longer than the other.

This chapter will mean much more to the children when the materials are shown and the experiments performed than when the chapter is merely read.

Chapter 25

Ask the children to bring a game of ninepins from home.

A set of ninepins might then be made in the Manual Training Shop with the help of an older class.

Other games illustrating transfer of energy may be studied in connection with this lesson.

Chapter 26

The following demonstrations are suggested for this lesson. Pupils in this grade are too young to experiment with fire, but they will enjoy the teacher's demonstrations.

Place a lighted candle under a glass jar. Watch what happens. This shows that air is necessary for burning.

Show by demonstration how a person should wrap himself in a blanket or rug if his clothes catch fire. Have pupils wrap themselves, and roll on the floor. Emphasize the need of doing this rather than running.

Chapter 27

If the question is asked, "Why do goldfish live longer and do better in an aquarium with square corners than in a round bowl?" the answer is that fish breathe air dissolved in water. There must be five square inches of water surface in contact

with the air for every goldfish one inch long. In explaining this to little children it is probably enough to say that in a round bowl the water does not get enough air to make it healthful for the fish.

Sagittaria is the best plant for an aquarium. This plant multiplies freely and should not be thinned out until it hides the fish, or leaves them too little space for swimming.

After water for the aquarium is drawn, it should be allowed to stand about two hours before it is put into the aquarium. This allows it to attain room temperature, and protects the fish from too sudden change.

In breathing, fish take the water in through their mouths. It passes over the gills, which extract dissolved oxygen, and comes out through the gill opening on each side of the head.

Chapter 28

Children will be glad to bring their toy boats from home for this lesson.

Show the children pictures of water wheels and ask them to bring other pictures of water wheels which they find.

The experiments with ice are simple but will help give the words meaning and lead the children to make observations.

Chapter 29

A pet rabbit in the classroom will afford not only stimulation for Science, but motivation for oral and written English and for art work.

A cage for a rabbit can be made of a large box with wire netting over the top and one side. A pan in the cage should be kept filled with fresh water, and the rabbit should be fed lettuce, carrots, cabbage, and apples.

Read "The Wonderful Tar-Baby Story" by Joel Chandler Harris.

Chapter 30

Take the children to observe a bird's nest. Be sure they keep silent, move slowly, and stay at such distance as not to disturb the birds.

A victrola record of bird songs will help to teach children to recognize certain songs and calls.

Pictures of wrens and Bob Whites should supplement observation of living material.

Chapter 31

Nasturtiums, beans, and petunias are suggested as good seeds for a window box. Nasturtiums, wheat, and oats do well for egg-shell gardens.

See that a window box has some drainage. The box should have several drainage holes in the bottom of it and should stand in a zinc tray. Guard against the children's tendency to keep the gardens too wet.

Perform the experiments suggested under "Some Things to Do."

Chapter 32

The penny seed packets may be bought in quantity and sold to the pupils.

Send for several of the leading seed catalogues in which you will find many suggestions for planting the garden.

You will find many of your questions about gardens answered in Farmers' Bulletins Nos. 818 and 1044.

In case the children do not have gardens it may be possible to take a trip to some school garden or to a garden of one of the parents.

Chapter 33

Fourteen Points for Tree-Planters *

1. A piece of burlap or canvas should be spread over the grass, so that the dirt from the hole may be thrown upon it.
2. Holes must be made large enough so that the roots may be spread out naturally without cramping. See also No. 6.
3. Dig holes larger in circumference at the bottom than at the top to prevent water lying about the roots.
4. Good, fertile topsoil must be used about the roots. If the tree is to be planted in impoverished ground, good soil should be provided for it.
5. Plant the tree the same depth it stood at the nursery (easily determined by the dirt ring on the trunk). This is very important.

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* *Nature Magazine,* April, 1927. Reprinted by permission.

6. Lay the roots out naturally and cut off all the broken or bruised parts. See also No. 2.

7. Press the earth down firmly, embedding every particle of the roots, and work it in under the crown.

8. With small trees the dirt will settle firmly if the plant is moved gently up and down as the hole is filled. With large trees use tamping stick.

9. Pour in water to top of hole after filling three-quarters full with earth. When this is settled complete filling-in process, leaving topsoil loose.

10. Trim broken or bruised branches, also small branches and limbs back to next largest stem. See diagram.

11. It is often best not to trim the leader or central stem, as a forked tree may result. Hardwood trees, like the oak and beech especially, should not have their central leaders trimmed.

12. Large trees or trees in exposed places should usually be staked. To prevent chafing, protect the tree with old hose or with burlap and sticks where the wire is attached.

13. After planting, it is better to leave a cultivated area about the tree than to sod close to it. This cultivated area should be from three to five feet in diameter.

14. Fertilizer, such as manure or compost, may be used either in the bottom of the hole or as a mulch, or both. Be careful not to allow manure to come in direct contact with the roots.

Trees may be obtained at a reasonable price for school planting from the Living Tree Guild, 303 Fifth Avenue, New York City, N. Y.

Chapter 34

Take the children to observe the wild flowers in a park or wood lot near the school.

Encourage observation and discussion of early garden flowers.

Chapter 35

Woolly bears cared for during the winter, as suggested in Chapter 4, will have spun cocoons late in the winter, and should change to moths in May.

Since most moths fly at night it will be comparatively difficult for second grade children to see live ones. Collections of

moths are so commonly made that nearly every neighborhood has at least one that may be borrowed for exhibition purposes. Pictures of moths are more satisfactory than of many other Science subjects.

Chapter 36

Take the children to look for turtles. Caution the children as to the right way to handle a turtle. The thumb and first finger should clasp the shell in the middle of the body. A snapping turtle should not be used as material for a lesson, as it is dangerous.

Chapter 37

Take your class on a trip to the woods. Play the game described in this chapter. It will stimulate habits of observation. While you eat lunch talk over the things the children have learned since they began their study of the out of doors.

WORD LIST

The following list arranged by pages contains words on which the teacher may desire to drill before the reading of the story is undertaken.

1 Billy
grade
Teddy bear

6 Hoppity Hop
hind
grasshopper

9 rubs

10 netting
sentences

12 bushes
alike
silky

14 insects
spins

17 jars
schoolroom

21 woolly bear
isn't

22 crawls

26 spinning

27 bundle
inside
wakes

29 vegetables
Ned

31 bought
hoe
dug
broke
lumps
aster
cosmos
stems

34 everybody
ripe

40 puff
wherever

43 poison ivy
vine

44 leaflets

46 meant
thrive
push
arrow
arrowhead

48 drew

49 dots

51 shadow
sunshine
raindrops

54 elm

58 twigs
buds

60 hickory

62 loose

65 weed
purple
ironweed
useful
feathers
yarrow

66 tea

68 Jimson weed

71 grackles

72 flocks

73 worms

74 hinge
rusty

75 scrapbook

76 carrots
roots

77 beets

79 spinach
folded
cabbage

80 bunches
rhubarb
peas

81 tomatoes

83 gobbler
strut

84 breast
gobble

85 speckled
chew

86 grind
gizzard

87 wire

89 bulbs
Mary
narcissus
Chinese lily

90 pots
cool

94 police dog
fox terrier
Sandy
Ben

95 growled
willing
licks
tongue
gnaws

97 drove
shepherd
helpers

99 friendly
Joe
tub
bathe
towel
wipes

100 mat

102 stumps
burrow
weasel

103 cellars
trucks
berries

104 mumps

105 bushy
smoother
reddish
stripes

107 red cedar
bare

109 rocky

110 railroad
freight

113 dipper
handle

114 hated

115 unless

117 English
sparrow
crest

119 cardinal
redbird
singer
mate
cheer

120 gray-brown
seed-eaters

121 window sill
sunflower

122 downy wood-
pecker
chickadee

123 junco
bluejay

124 daytime
dim
easier

125 awake
plenty
greener
sunlight
pale

127 freeze

129 December
January
February
April
June
July
August
September
October
November

133 windmill
sailboats

135 dirt

136 circle
maybe

137 rubber
shoot

139 farther
arrow-head

141 bent

142 tricks
tin
bottles
tight

144 poured
upside down

145 tubing

146 siphon

148 pitcher
bat
catcher

151 ninepins
knock

153 useful
fire engine
firemen
wrap
blanket

154 carefully

155 comfortable

156 stove
camp fires
steam engine
trash
rubbish
limbs

157 caught

158 goldfish
eyelids

160 stir

161 water snails

162 scales
fins

163 seashore
bathing
wade

165 bathe
brush

167 icehouse
factories

169 plenty

171 wits

172 snake
hawk

173 briar patch

174 tracks

175 porch
house wren

177 hatch

179 Bob White
collar
eighteen

186 bare

187 egg-shells

190 outdoor
onions
onion sets

195 radish

196 package

197 Arbor Day

199 peaches

202 springtime
bluets
sunny

203 May apple
smell
nodding

204 harmful

205 Jack-in-the-
Pulpit
hyacinths

208 moths
Isabella
tiger-moth

209 dull
crumpled

213 shells
box turtle

215 tender
blackberry
stains
Hare
Tortoise
win

217 raw
beef
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220 handkerchief

221 someone

223 iron

224 scraps

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