

**THROUGH  
FOUR SEASONS**

***Books by  
Edith M. Patch***

**NATURE STUDY**

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***Hexapod Stories***

***Bird Stories***

***First Lessons in Nature Study***

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***Holiday Meadow***

***Holiday Hill***

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**NATURE AND SCIENCE READERS**

***Hunting***

***Outdoor Visits***

***Surprises***

***Through Four Seasons***

***Science at Home***

***The Work of Scientists***

# THROUGH FOUR SEASONS

by

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YESTERDAY'S CLASSICS

ITHACA, NEW YORK

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ISBN: 978-1-63334-102-9

Yesterday's Classics, LLC  
PO Box 339  
Ithaca, NY 14851

# A LETTER TO THE GIRLS AND BOYS

Dear Girls and Boys:

You are the same children all through the year, but you do not look just the same in winter and in summer. Your January clothes are different from those you wear in July. Perhaps the color of your skin is changed, too. It will be a few shades darker during the season of brightest sunshine if you are outdoors as much as you should be. You may have more freckles in summer, and perhaps your hair will be bleached by the sun to a little different shade.

People do not do exactly the same things in spring as they do in the fall. Farmers plant seeds in the ground in the spring. In the fall they harvest food for winter use. Storekeepers show different things in their shop windows in summer and winter.

Fashions change in games as well as in work. You like to play some games in summer that would not be nearly so pleasant in winter.

People may be happy at any time in the year, and yet there is some difference in the kinds of happiness. The joy you have in looking at the first pussy willow or bluet or violet or other spring flower is not quite the same as that you feel in the jolly fall, when the chattering squirrel gathers his acorns and the trees let their gay leaves go fluttering down.

If people do not look and act and feel just the same at different times of the year, what about the rest of the world?

Well, a bobolink is the same bird in the fall as he is in the spring, although he does not look and act the same. In the spring he wears a suit of white and black and yellow, but in the fall his feathers show mostly olive and brown colors. He does not act the same, either. In the spring he sings a joyous bubbling song of many lovely, lively notes. In the fall he repeats, over and over again, one call that sounds as if he were answering the rest of the bobolinks, who are all making the same sociable sound.

You will understand that there is not room in one book to tell about more than a few of the wonderful things in the world, for a book is small and the world itself is very large. There are indeed more interesting things in the world than have ever been described in all the books that have been printed.

So suppose that you read the chapters in this book and think about them in a special way. Think about them as samples of what the world has to show. Then perhaps you will wish to look at the things of the world for yourselves.

We wish you happy hours—all through the year.

Your friends,

EDITH M. PATCH

HARRISON E. HOWE

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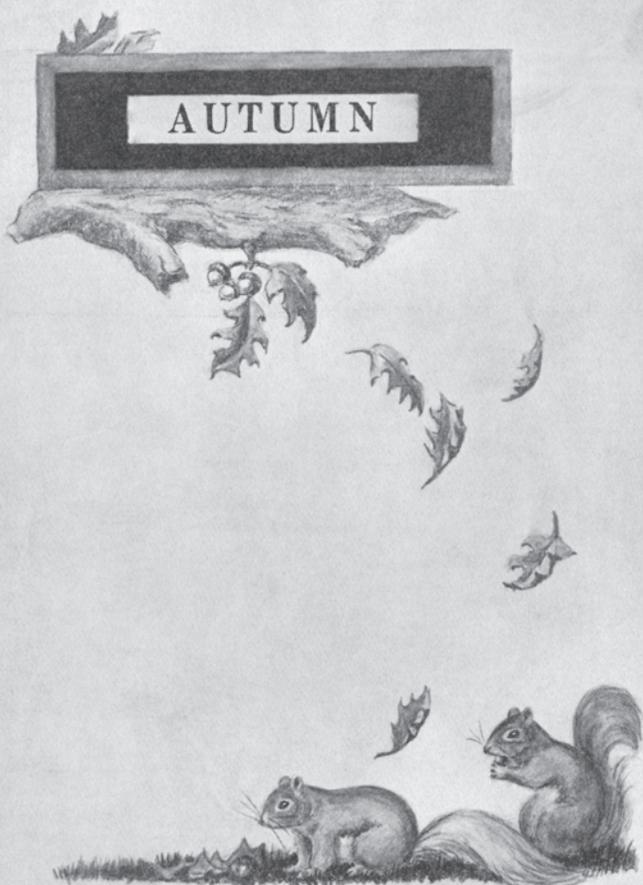
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AUTUMN





## CHAPTER I

# A WILD APPLE TREE IN FALL

An apple tree lived at the edge of some woods. It was called a wild apple because no person had planted it or taken care of it or given a name to the sort of apples it bore.

The tree grew from a seed that had been dropped near the woods more than sixty years ago. Would you like to guess how the seed was dropped? Nobody really knows, but of course anyone may guess about it.

Perhaps a crow picked the apple the seed was in and flew with it toward the woods. A crow has a funny way of picking apples. He flies very slowly to the end of a branch and takes the stem of the apple in his bill. He carries the fruit by the stem to some place he likes for a picnic ground. Then he makes joyful cawing chuckles as if he were rather pleased with himself, as no doubt he is.

Or it may be that some boy or girl about your age threw away an apple core while walking near the woods one fall day years ago. And perhaps the wild apple tree grew from one of the seeds in that core.

## *THROUGH FOUR SEASONS*

When the tree was old enough, it had apples every year. Some wild apples are hard and sour and bitter. Others are quite as good to eat as any apples that grow in orchards. The apples on the tree at the edge of the woods had pretty red skins and a delicious taste.

No man did anything for this wild tree, but it had some care in other ways.

Often a little bird with a black cap came and sang among its branches. He came during the summer, when many other birds also visited the tree. He came, too, in the fall, after most other birds had gone south. His name was Chickadee.



*His name was Chickadee.*

Chickadee took a great deal of exercise. Perhaps

## *A WILD APPLE TREE IN FALL*

that is why he had so good an appetite. He was nearly always hungry.

He did not eat any of the bright red apples, though. He never did seem to care for juicy fruits. But he found something else on the branches that he liked. He found some oyster-shell scales with eggs under them.

An oyster-shell scale is a tiny, dark brown object that is shaped somewhat like an oyster shell. It is larger at one end and curved. It is made with a sort of wax.

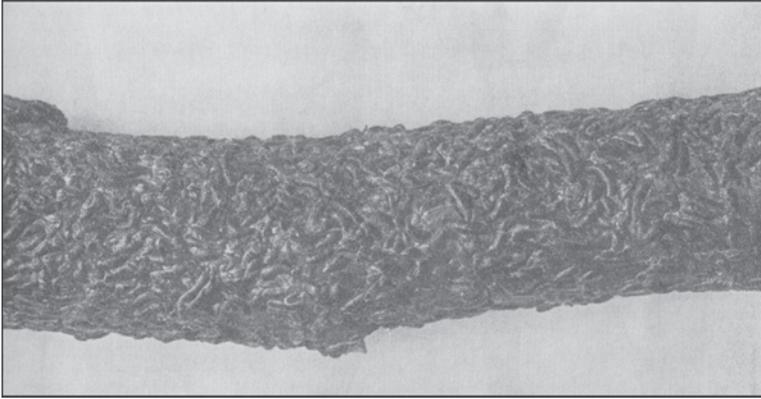
The insect that makes such a scale has parts in its body that are called wax glands. The wax that is formed in the glands is so soft that it can be pushed out through openings (pores) in the insect's body. But after the wax has been pushed out where the air touches it, it becomes hard. It is then a shiny shell-like covering for the insect. When the insect molts, its old skin is added to the scale.

This little insect lays all its eggs under the waxen scale that covers its body. Often there are more than fifty eggs under one scale. They stay under the scale all winter. That is, they do unless something happens to them.

Perhaps you know that a chickadee likes insect eggs. So between his songs he helps himself to what he finds under the oyster-shell scales.

A full-sized scale of this sort is only about one eighth of an inch long. So you can be sure that the fifty or more eggs it covers are very, very small. They are, indeed, so tiny that a chickadee can eat hundreds of them and still be hungry enough to hunt for more.

## THROUGH FOUR SEASONS



*Branch covered with oyster-shell scales*

Oyster-shell scale insects harm trees by piercing the tender bark and sucking the juice. So the more of these eggs a chickadee eats, the better for the tree.

There were other kinds of eggs on the wild apple tree in the fall. When Chickadee tasted them, he felt so cheerful he sang.

He liked the tent-caterpillar eggs, for one kind. Of course tent caterpillars did not lay the eggs, for no caterpillar can lay an egg. But tent caterpillars hatch from such eggs in the spring unless something happens to them before that time.

A reddish brown moth lays tent-caterpillar eggs in the summer. She puts three or four hundred eggs in one mass. The mass is like a ring around the twig. The moth covers her eggs with a liquid that hardens in the air. So the egg mass has a waterproof cover. It looks like shiny varnish with tiny bubbles in it.

Chickadee could pick through the waterproof cover with his strong little bill. And it was well for the apple

## A WILD APPLE TREE IN FALL

tree that he could find the eggs, for tent caterpillars eat apple leaves. A tree can spare some of its leaves very well, but it needs most of them itself.



*Egg masses from which tent caterpillars hatch*

In one way and another the wild apple tree gave much pleasure during the fall days. It furnished rosy apples to boys and girls and crows that came to pick some of them. Some of the fruit fell to the ground and supplied many picnic dinners to crickets and other little six-footed creatures.

A pretty striped chipmunk came for some seeds and whistled in a shrill way whenever he was disturbed at his feast. A gay, chattering red squirrel went off with some of the apple seeds. And a quiet little meadow mouse ran that way, now and then, for his part of the treat.

The tree was a sort of storehouse, too, of insect eggs,

## THROUGH FOUR SEASONS

as you have read. Woodpeckers and nuthatches helped the chickadee eat them.

So when you think of the wild apple tree, which had no person to take care of it at all, perhaps you will feel rather glad to know that these three kinds of birds came to visit it.

### *What To Do after Reading Chapter One*

#### READ

Choose one of the following subjects to read:

- (1) "Chick, D.D.," Chapter I in *Bird Stories*.
- (2) "Seeds That Pay for Their Rides," in Chapter 3 in *First Lessons in Nature Study*.
- (3) "Juicy Fruits," in "Some Food from Plants" in *Surprises*.

#### WRITE

Choose one of the following subjects and write about it. Write at least fifty words.

(1) *Chickadee*. Tell something about this bird. Tell what kinds of food he likes. Tell how he can help take care of an apple tree.

(2) *Apple Seeds*. Apples that are left on a tree fall to the ground in time. There would not be room for young apple trees to grow under the branches of the old tree. Write about some different ways in which apple seeds

## A WILD APPLE TREE IN FALL

can be carried to places where they may find room to grow.

(3) *Rose Family*. The apple tree belongs to the Rose Family. If you chose to read “Juicy Fruits,” tell about some other fruits that grow on plants of the Rose Family.

### AN APPLE HUNT

If you live in the country, *look at* as many different kinds of apples as you can find on trees. Tell what colors you see on the ripe apples. *Do not touch* any apples unless the owner of the tree gives them to you. (Remember your outdoor good manners!)

If you live in the city, *look at* as many different kinds of apples as you can find in stores. Tell all the colors you can see on the ripe apples. If you buy an apple, you may like to show it to the boys and girls in your class.

### AN APPLE SHOW

Ask your teacher if she would like you to have a little Apple Show in your room. Perhaps she will help you plan for one.



*Looking at potato plants*

## CHAPTER II

# HEALTHY POTATOES

Did you ever meet a plant doctor who spends his time looking at potatoes to see whether they are sick or healthy? Do you know how careful a farmer must be to keep his potato plants well?

Autumn is the time when potatoes are dug and stored for the winter. They should have smooth skins. Their flesh should be sound—without dark spots or streaks. They should, indeed, be healthy in the fall if they are to keep in good condition to eat during the winter, for sick potatoes are likely to rot or to become spoiled in other ways while they are lying in cellars or other storage places.

They must be well, too, if they are to serve as suitable seed potatoes in the spring.

Potatoes belong to the same plant family as tomatoes. A tomato plant has its seeds in fruits that grow in the flower clusters. So does a potato plant.

A man who wishes to have tomato plants in his garden grows them from seeds that are taken from ripe tomatoes. Potato plants, also, may be grown from seeds taken from ripe potato fruits.

## THROUGH FOUR SEASONS

However, for many good reasons, the farmer who grows potatoes for food does not plant potato seeds at all. He plants, instead, the potatoes themselves after he has cut them into suitable pieces. These are called seed potatoes or seed pieces, though there are no seeds in them. Potatoes have buds (often called “eyes”). Sprouts start from these buds and grow into new potato plants.

So you see that the farmer should have good sound seed potatoes to put away in the fall if healthy plants are to grow from them in the spring.

Even if the plants start from good potatoes, they may become ill later. Perhaps the plant doctor will come into the field and look at them and say, “These potatoes have *late blight*.”



*Leaves from a potato plant that has late blight*

Late blight is a disease caused by a kind of *fungus*.

## HEALTHY POTATOES

Funguses (or *fungi*) have no flowers or leaves. They cannot get food from the air and the soil, as can plants with green leaves. They must take their food from other plants or from animals. A *toadstool*, or *mushroom*, is a kind of large fungus. Molds on jelly or old bread are kinds of small fungi.

The kind of fungus that causes late blight is so small that you cannot see one of these fungi without a magnifying glass. Late blight may make brown places on the potato leaves. It may attack the stems and the potatoes in the ground.

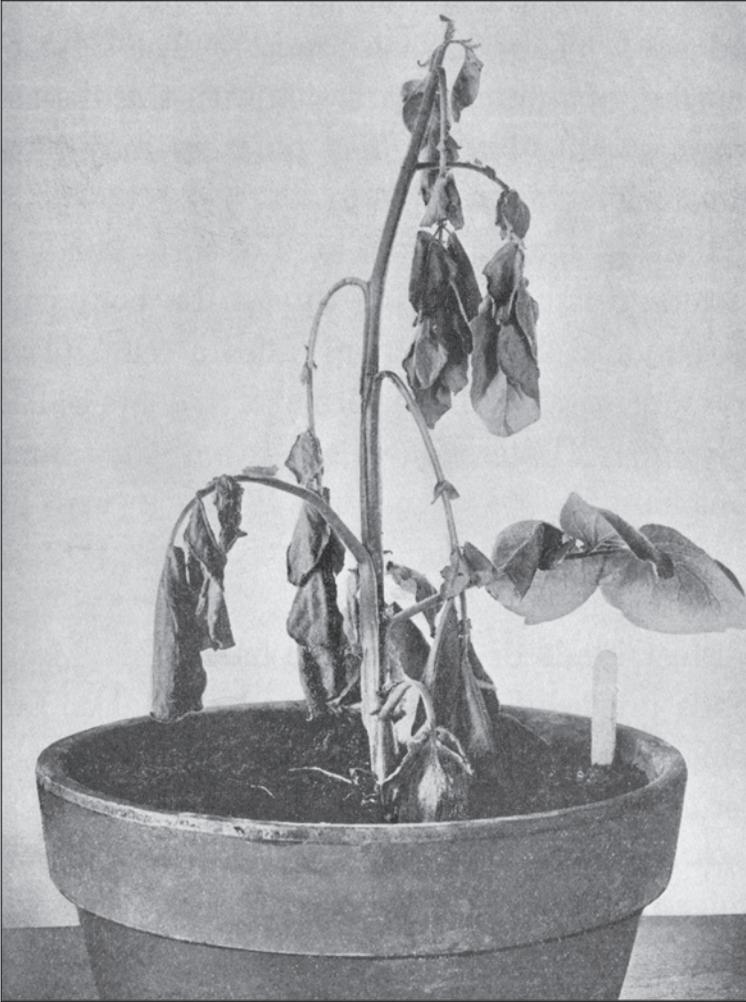
If a potato that is sick with late blight is planted, the new potato plants that grow from it are likely to have late blight, too. The stalks of such plants may be slender and weak.

As you have just learned, a fungus does not have flowers. It does not have seeds either. Instead of seeds, it has *spores*. The spores are very fine and blow about like dust.

Spores from the late-blight fungus may blow from sick leaves to well plants. They may be washed from the air on to plants by raindrops. So the disease may spread in damp weather. Sometimes whole fields of potatoes die from late blight.

Or the plant doctor may look at some potatoes and say, "They have *blackleg*." The base of the stem of a potato plant sick with this disease becomes quite black. The potatoes may have bad-smelling, rotten places.

Blackleg is caused by a kind of *bacterium*. A



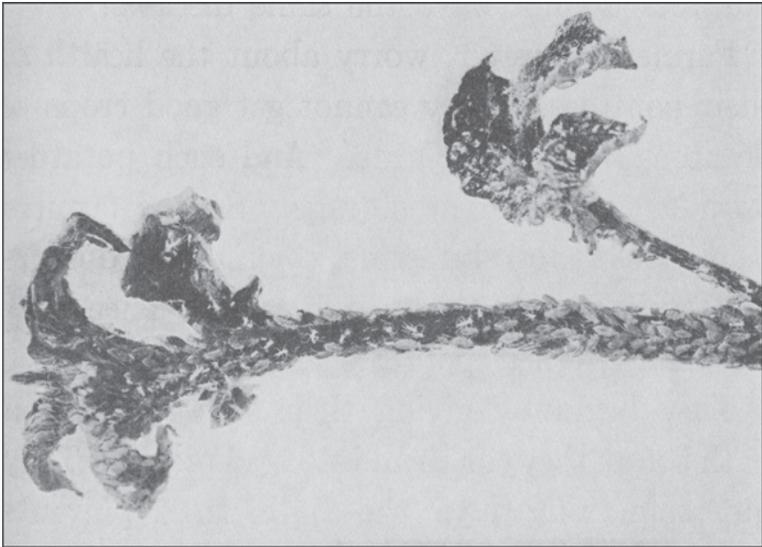
*This potato plant has blackleg.*

## HEALTHY POTATOES

bacterium is a tiny living thing. Its body consists of only one small part called a cell. (Two or more of these little forms of life are called *bacteria*.) Bacteria are so exceedingly small that hundreds of them could live in a drop no larger than the period at the end of this sentence.

Most kinds of bacteria are harmless. Many kinds are helpful to plants and animals. But some kinds cause diseases in plants or animals. Perhaps you know that *diphtheria* and *tuberculosis* are two kinds of diseases that bacteria may cause people to have.

There are still other kinds of potato diseases caused by fungi and bacteria. Late blight and blackleg are only two of them.



*Aphids on potato stem and leaves*

## THROUGH FOUR SEASONS

Sometimes plants become ill because *aphids* carry the juice of sick plants in their mouths and take it to well plants. Aphids are small insects with sharp, slender mouth parts. They thrust their beaks into leaves or stems of plants and suck the juices. If they feed on sick potato plants and later put their beaks into well plants, they may give the healthy plants some diseases in this way.

You do not need to worry about eating sick potatoes. You will not have late blight or blackleg or any other potato disease even if you taste potatoes from sick plants. People and potatoes do not have the same diseases.

Farmers, however, worry about the health of their potatoes. They cannot get good crops of potatoes from sick plants. And such potatoes are likely to spoil in storage. So the farmers read books and bulletins that plant doctors have written about potato diseases. Then they try to keep their potatoes healthy.

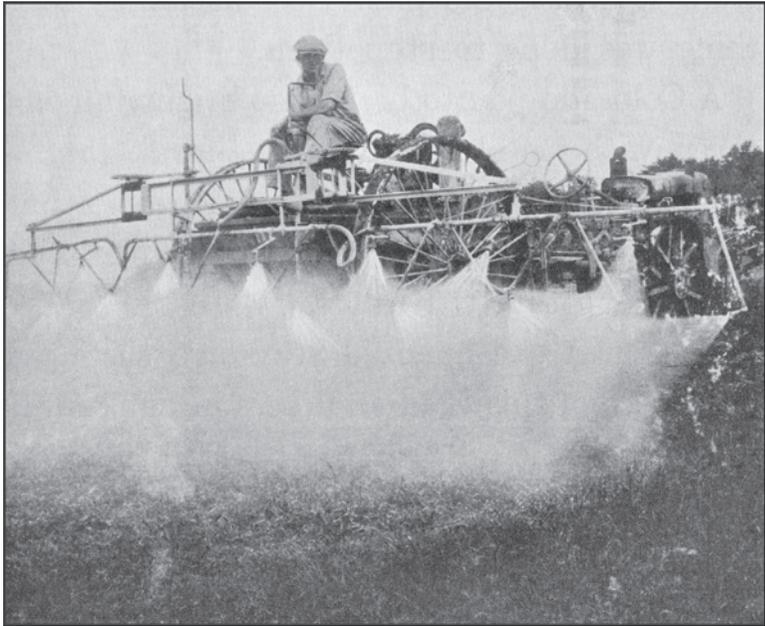
They begin by giving their seed potatoes a bath before they cut them into seed pieces. They put something into the bath that prevents certain diseases.

After the potato plants are growing in the field, the farmers spray or dust them to keep them in good condition.

*Bordeaux* is the name of one mixture that is used. This may be dusted over the plants in a dry form or mixed with water and put on as a spray. Bordeaux protects potatoes from late blight and some other diseases.

## HEALTHY POTATOES

When a farmer wishes to get rid of the aphids on his potato plants, he is likely to use a poison with *nicotine* in it. Nicotine is found in tobacco. This poison is mixed with other things and put on the plants as a dry dust or used in a wet spray. Nicotine kills aphids in a short time; so this is a useful poison.



*A power potato sprayer*

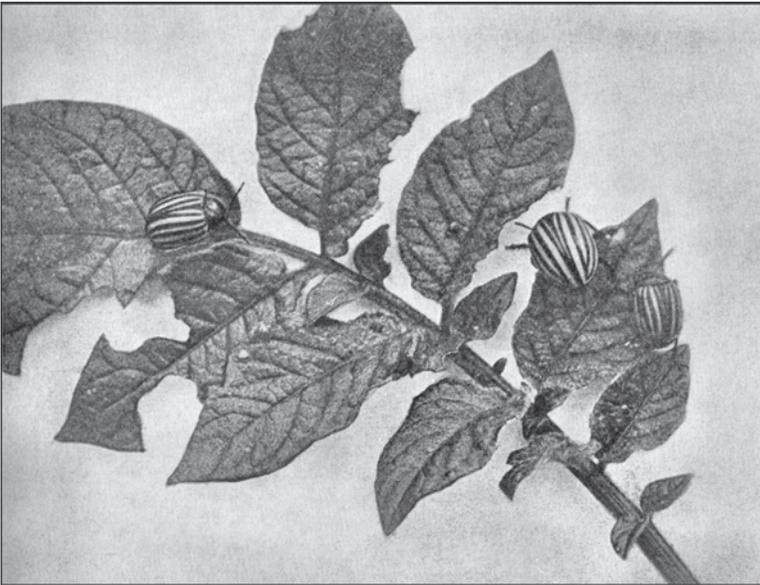
*Colorado potato beetles* are sometimes so numerous in a field that they could eat enough leaves to cause the plants to die unless something was done to stop them.

A Colorado potato beetle has bright tan wing covers with ten black stripes on them. It shuts the wing covers down over its back like a hard shell when it is not flying. The shell-like covers protect the thin red wings.

## THROUGH FOUR SEASONS

Less than one hundred years ago there were no beetles of this kind anywhere in our country except in the West near the Rocky Mountains. They lived on wild plants belonging to the Potato Family. They had never tasted potato leaves. After people planted potatoes in that part of the country, the beetles began to eat them. Each year some of them flew from one field to a new one farther on, until at last they reached all parts of the country where potatoes are grown.

The beetles lay their yellow eggs in clusters on the plants. The fat, reddish, wingless young that hatch from the eggs eat potato leaves even more greedily than the old beetles do.



*Colorado potato beetles*

Farmers save their potatoes from these insects by spraying the plants with a poison that has *arsenic* in it.

## HEALTHY POTATOES

The pests eat the sprayed leaves and die.



*A promising field of potatoes*

Even if there were no insects and no diseases to attack potato plants, farmers would need to be rather careful of this crop, for they have to keep the soil in good condition. Potatoes grow best in soil that is slightly acid, but not too acid. If the soil is too acid for the potatoes, *lime* must be added. Lime makes soil less acid. There must be, too, the right sort of plant food in the soil. Some food for plants is prepared in factories. It is one kind of *fertilizer*. Farmers often buy it and put it on the soil.

After the crop is dug, the potatoes must still have care. They must be stored in places that are cold enough, but not too cold.

## THROUGH FOUR SEASONS

So, in one way and another, potatoes need attention all through the year. When you taste a white baked potato that is so perfect that even the skin is good to eat, you may think of the farmer who took care of the crop. You may like to think, too, of the plant doctors who have learned so much about keeping potatoes healthy.

### *What To Do after Reading Chapter Two*

#### A POTATO SHOW

If your teacher approves, have a Potato Show at school. Perhaps a few members of your class will offer to bring samples of potatoes for the show.

Choose one of your class to pretend he is a plant doctor. Let the plant doctor say which potatoes he thinks look as if they have smooth, healthy skins. Let him cut a few of the potatoes to see whether the flesh is firm and sound or whether it has dark spots or streaks.

#### READ

Choose at least one of the following subjects to read:

(1) *Aphids*. You have just read something about potato aphids. The story of another kind of aphid may be found in the chapter of *Holiday Pond* that is called “Nim Fay, the Sap-Drinker.”

In Chapter 1 in *First Lessons in Nature Study* there is a section called “Aphids and Honeydew.”

## HEALTHY POTATOES

(2) *Beetles*. You have just read something about potato beetles. The story of another kind of beetle may be found in *Hexapod Stories* in the chapter called “Lampy’s Fourth o’ July.”

(3) *Tubers*. Read “Tubers” in Chapter 3 in First Lessons in Nature Study.

### ANSWER THREE QUESTIONS

Here are six questions. Answer any three of them.

(1) Does an aphid chew the leaves of a plant? If not, how does it feed?

(2) Tell two ways in which aphids may harm a plant.

(3) Look at the pictures of some aphids and some beetles. Then tell how the wings of an aphid differ from those of a beetle.

(4) Write a list of all the different kinds of beetles whose names you can remember.

(5) Tell one fact about each beetle in your list.

(6) Does a beetle chew food or suck it?

### TUBERS, ROOTS, AND BULBS

White potatoes are called *tubers*. These tubers are thickened underground stems. Beets, carrots, and turnips are thickened roots. Onions, as you know, are thickened underground leaf buds or bulbs.

*THROUGH FOUR SEASONS*

Look at a potato, a carrot (or beet or turnip), and an onion. Are there any roots on the potato tuber? Are there any “eyes” on the carrot or onion?

Cut a potato, a carrot, and an onion in halves. What differences do you find inside?

## CHAPTER III

# CORN

Sometimes the same name is given to several different things. The word *corn* does not always mean the same kind of grain. If a boy who lives in England says, "I ran through a cornfield," he means that he ran through a field of wheat or barley or oats or rye. But if a child who lives in this country says, "I ran through a cornfield," he means that he ran through a field of *maize* or *Indian corn*.

When people came from England to America, they found Indians raising maize. So they called it Indian corn.

Wheat, barley, oats, rye, and maize are some of the plants that belong to the Grass Family. Rice, too, belongs to the same family of plants. The seeds of these plants are grain that people use for food for themselves or for their horses and cows and some other animals. Such seeds are of great importance.

When the wheat crop is not good in some countries, the people suffer from hunger because they do not have bread enough. When the rice crop fails in China, many of the people there starve. But years when there



*This cornstalk is more than sixteen feet tall.*

## CORN

is plenty of grain for food, the people are happy. It is time to rejoice when the ripe seeds have been gathered. There have been celebrations in the fall at harvest time for many hundreds of years in different countries. Sometimes you may hear such a celebration spoken of as a “feast of the ingathering at the end of the year.”

In England, a long time ago, the old-time harvesters brought home the last bundles of grain very gaily every year. Some of the girls, in bright dresses, rode in the carts. Other reapers danced to the music of pipes. They sang:

We have plowed, we have sowed,  
We have reaped, we have mowed,  
We have brought home every load,  
Hip, hip, hip, harvest home!

Our own national harvest festival in the United States of America is the holiday known as Thanksgiving Day.

Long before there were any white people in America to have Thanksgiving Day feasts, Indians had thankful celebrations. They did not have the kinds of corn known as wheat or barley or rye or oats. But they had their maize, which they loved. They told stories and sang songs about it in their own language. Some of these have been changed to English words, so that we can understand them. This is one of them.

AN INDIAN HYMN OF THANKS TO  
MOTHER CORN

See! The Mother Corn comes hither,  
    Making all hearts glad!  
Making all hearts glad!  
Give her thanks, she brings a blessing;  
    Now, behold! she is here!

Indian corn has been a very important crop for white people in this country ever since they learned about it from the Indians.

There are now many varieties of this kind of corn. Some kinds have white seeds, or kernels; others have yellow kernels; and still others have kernels that are nearly black.

The stalks of some kinds of corn grow taller than a man and have big ears. The stalks of some kinds are so short that you could reach their tops. They have small ears with little kernels that are used for pop corn.

You know that people eat sweet corn while the kernels are young and tender. Perhaps you like to nibble unripe kernels from a cob yourself. You may have eaten sweet corn that has been cut from the cobs and canned.

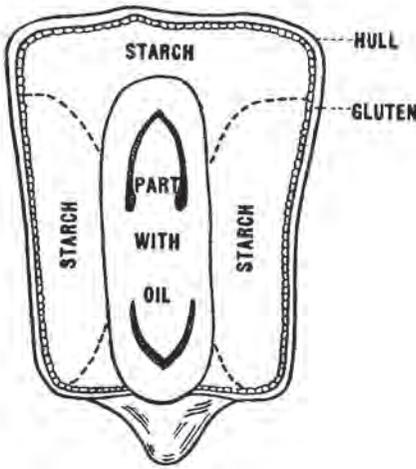
Sometimes kernels of ripe corn are soaked in something that loosens the *hull*, or horny outside covering. Then the loose hulls are rubbed off under water. Great quantities of such hulled corn are prepared

## CORN

and sold in cans. One name for it is *hominy*. Many people think it makes delicious porridge.

Coarse corn meal and fine corn flour are made from ripe, dry kernels that are heated and ground in mills. Such meal and flour are used in many kinds of food.

Some of the dry ground corn that is not used in the meal or flour is sold to farmers to feed their cows. It is called *hominy feed*; but of course it is not at all like the soaked hulled corn, called hominy, that makes good porridge.



*Inside the hull are gluten and starchy and oily parts.*

Inside the tough, horny hull, there is a part of the kernel that has a great deal of starch. In the center of the starchy part, there is a smaller portion of the kernel that has oil in it. There is *gluten* between the hull and the starchy part.

A little more than half of the kernel is starch. This can be separated from the rest as tiny white particles. Starch does not dissolve in cold water. In hot water, however, it changes to a sticky substance. This sticky stuff can be used, as laundry starch, to make

## THROUGH FOUR SEASONS

clothes stiff. Or it can be used, as cooking starch, to make food thick—like cornstarch pudding.

Hot sticky starch can be changed to a sweet syrup by adding a very little acid to it. The acid itself is sour, but it changes the starch to a good-tasting, sweet substance that is called *corn syrup*. Millions of bushels of corn are used every year for making this sweet syrup.

The acid that is added to the starch and hot water has a long name. It is called *hydrochloric acid*. This is a dangerous acid when it is strong. But when a very little of it is mixed with a great deal of water, it is useful to us in many ways.

People make hydrochloric acid for use in factories in changing cornstarch to corn syrup. But they do not make all the hydrochloric acid there is in the world.

You use hydrochloric acid yourself every day. But you do not need to buy it. You have some in your stomach. It is in your *gastric juice*. Perhaps you know that gastric juice helps your food to digest in your stomach. And would you like to know what the hydrochloric acid in your gastric juice does? It changes starch into sugar for you. So when you eat cornstarch in corn food, hydrochloric acid in your digestive juices helps change the starch to sugar. This acid does the same thing when you eat wheat starch in bread or rice starch in boiled rice or potato starch in cooked potatoes.

Starch food is important for you to eat. But your body cannot use the starch itself. The starch must be changed to sugar first. That is one way hydrochloric acid helps you.

## CORN

The gluten of the kernel is used as *gluten meal*. The hull, or covering of the kernel, is ground into *bran*. A good kind of food for cattle is made by mixing gluten with bran.

The middle, oily part of the kernel is important, too. The best oil that is taken from this part is used for food. It may be eaten, instead of olive oil, with salads. It may be used, instead of butter or lard, in cooking. This maize oil is sold in stores. Oil from corn that is not good enough for food may be used in making soap or glycerin.

Fall is the time of year when you can find cornstalks cut and standing in the field. They are in bunches called *corn shocks*.

But the seeds of these plants are with you all through the year—in one form or another—for there are more than one hundred different products made from maize seeds and sold in stores. We have told you in this chapter about only a few of these many things. Can you find out what some of the others are?

Perhaps this fall you will visit a farm and run through a field of the kind of corn called maize. Perhaps you will hunt in one of the shocks for an ear of corn. Then what will you do? Will you take off the husk from the ear and look at the rows of kernels? Will you think of some of the things that can be made from the seeds of this wonderful plant that belongs to the Grass Family?



*Three good ears of Indian corn*

*What To Do after Reading Chapter Three*

**A CORN SHOW**

If your teacher is willing, have a Corn Show at school. Bring samples of the grain that boys and girls in this country call corn. Bring samples of the different kinds of grain that children in England call corn.

Let one member of the class bring an ear of unripe maize. It may be raw or cooked. Give each child one or more kernels. Find the hull. Find the starchy part. Find the oily central part.

Soak a dry ripe kernel of maize until it is soft enough for you to find these parts.

Bring pictures of different things that can be made from maize. These pictures may be part of the Corn Show.

**READ**

Read "Other Grains and Their Uses," Chapter 5 in *First Lessons in Geography*.

**INDIANS AND PILGRIM FATHERS: A PLAY**

As you have probably learned, the people of the first English colony that settled in Massachusetts are known as the Pilgrims. They sailed from Plymouth, England, in September and landed in Massachusetts in December. They did not have enough food to last them all winter.

## *THROUGH FOUR SEASONS*

The Indians let them have some of their corn.

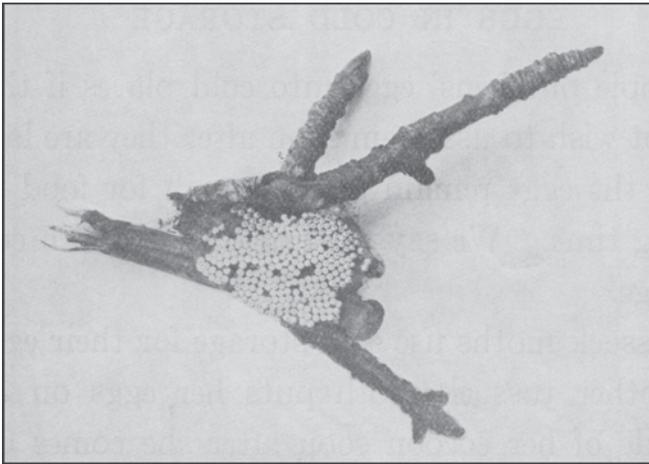
Perhaps you will like to have a play in school. Some of you may pretend that you are the hungry men, women, and children of the early Massachusetts colony. Others of you may pretend that you are Indians coming with corn to give to the Pilgrims. Plan what the different players will do and say.

## CHAPTER IV

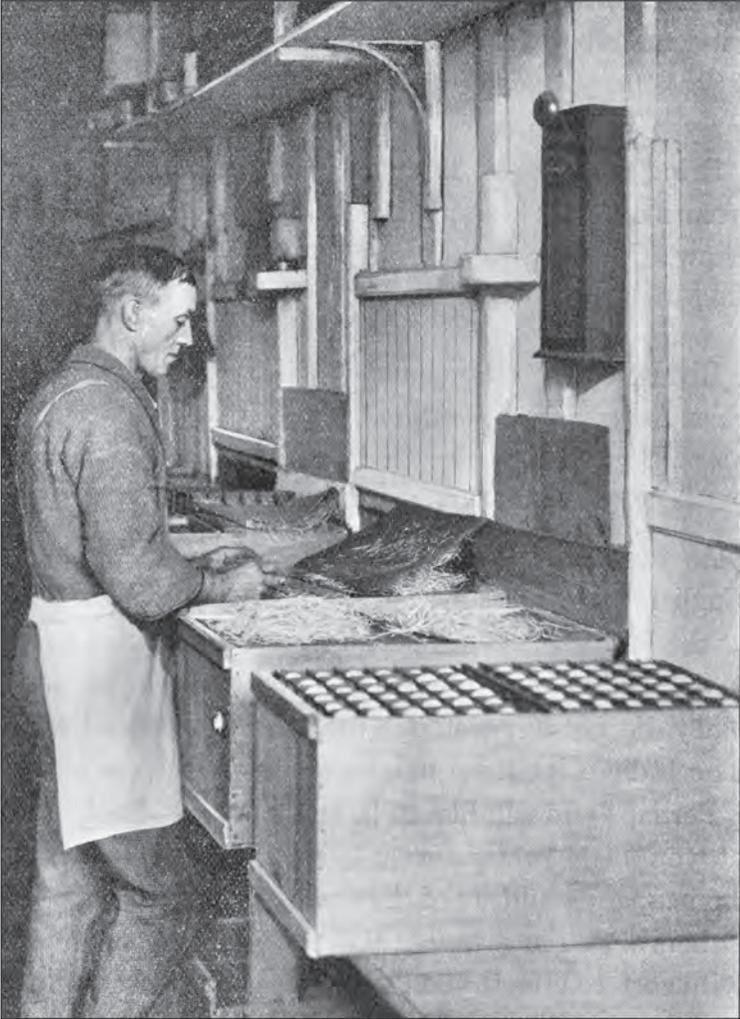
# EGGS IN COLD STORAGE

People put hens' eggs into cold places if they do not wish to use them soon after they are laid. Then the eggs remain good enough for food for a long time. We say that such eggs are in cold storage.

Tussock moths use cold storage for their eggs. A mother tussock moth puts her eggs on the outside of her cocoon soon after she comes out of it. The eggs stay there all winter. They are so cold that they cannot



*Eggs on a tussock moth's cocoon*



*Hens' eggs in cold storage*

## *EGGS IN COLD STORAGE*

spoil or hatch. In the spring they are still in good condition. They hatch when the weather becomes warm enough. Then the young tussock caterpillars begin to eat leaves and grow.

Crickets use cold storage for their eggs. They do not leave their eggs exposed in the air, as tussock moths do. They poke holes in the ground and lay their eggs there. These eggs remain cool and fresh all through the winter months. The ground becomes warm in the sunshine when spring comes. Then the eggs hatch, and the young crickets come out of their little caves or cold cellars. They hunt for food and begin to grow.

There are many other kinds of insects that live through the winter in the egg stage. That is why there are so many young insects every spring.

Some kinds of fish, too, put their eggs into cold storage. Salmon do this.

Pacific salmon leave the Pacific Ocean and travel up fresh-water streams until they find good places to deposit their eggs. Atlantic salmon, also, leave salt water and seek suitable places in fresh water for their eggs. Sometimes people keep salmon eggs in hatcheries.

The salmon of the west coast and of the east coast both deposit their eggs in the fall. Their eggs do not hatch until the next spring, when the water becomes warmer. This cold storage does them no harm.

The Atlantic Ocean, you know, reaches all the way from North America to Europe. There are salmon, called Atlantic salmon, that travel up the rivers in England and

## THROUGH FOUR SEASONS

France and Norway and some other places in Europe. These are the same kind of fish that travel up some of the northern rivers in eastern United States and Canada.

Wherever salmon live, they must have fresh water for their eggs. That is why they go into rivers and lakes.

We say fish are *spawning* when they lay their eggs. The spawning season for the Atlantic salmon is in November, after most of the leaves have fallen from the broad-leaf trees.

A salmon is a beautiful fish most of the year. But during the spawning season it grows lank and changes its shape. Its fins become thick and its skin is slimy. A father salmon changes even more than a mother salmon does. His jaws become curved like hooks.

After the spawning season, the Atlantic salmon go back to the sea if they can get there. They live in salt water about half of the year.

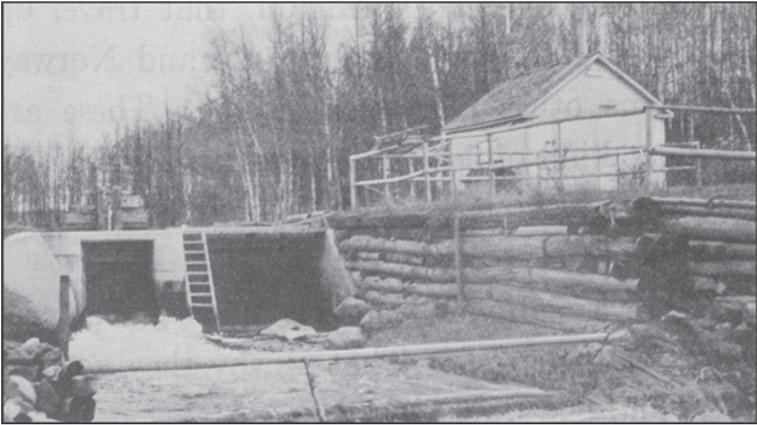
But some salmon live in lakes from which they cannot escape to the sea. So they stay in fresh water all through the year. These fish are said to be *landlocked*, because they are locked away from the sea. Landlocked salmon do not grow so large as the salmon do that live part of the time in salt water.

The mother salmon seek shallow water when they are ready to lay their eggs. They go near the edges of lakes or into brooks that flow into the lakes.

Men have made pens, or pounds, in some lakes by driving long posts into the bottom of the lakes. They

## *EGGS IN COLD STORAGE*

catch some of the salmon and put them into the pounds before they lay their eggs. The men in charge of these fish handle them carefully. They take the eggs and place them in fish hatcheries. These eggs are kept in very cold water until it is time for them to hatch. Then the water is kept as warm as the water in the lake in springtime when the sun is shining on it.

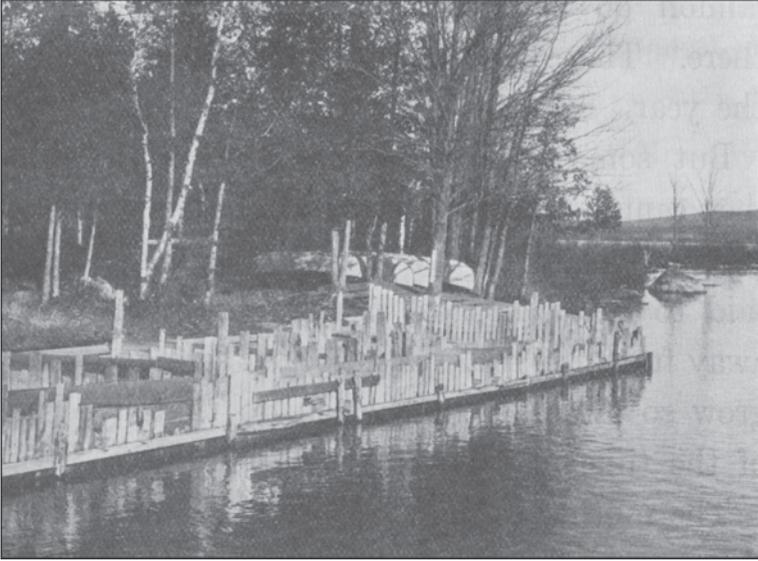


*This building is a fish hatchery where salmon eggs are kept in cold storage.*

Eggs of landlocked salmon are about the size of small peas. They look rather clear, like grains of cooked tapioca, but they have a pinkish yellow tint.

The picture on the next page was taken in November while the salmon were spawning near the edge of the lake. The fish that live in this lake are landlocked. Some of them are caught each fall and put into the pound. The eggs taken from these fish are cared for in a fish hatchery. The baby fish that hatch from the eggs are kept in the hatchery and fed until they are several months old. Then they are set free in different lakes and streams.

## THROUGH FOUR SEASONS



*A salmon pound in a Maine lake*

### ***What To Do after Reading Chapter Four***

#### **USE A GLOBE**

Look at a globe to find the location of the Atlantic and the Pacific oceans.

Find England and France and Norway. Find the United States. In the United States find Maine, the most northern state in the East. Find the state of Washington, in the West.

The Atlantic salmon is a rather northern fish. It does not travel very far south.

Why do you think the same kind of salmon (Atlantic salmon) go up the rivers of Maine and England and France and Norway?

## EGGS IN COLD STORAGE

Why do you think this same kind of salmon does not find its way to the rivers of Washington at spawning time? Where would it have to travel to get there?

### READ

Read “How We Get Food from the Sea,” Chapter 8 in *First Lessons in Geography*. Read about fish hatcheries on pages 207–209 in *Introduction to World Geography*.

### HUNTING FOR FISH PICTURES

Look up the names of different kinds of fish in a dictionary (or encyclopedia) and see the pictures near them. Perhaps there is also a full page of pictures of fish among the pictures at the back of the dictionary.

Look for the picture of the salmon on that page. See how many fins the salmon has. Do some of the other fishes on that page have the same number of fins? Do some have a different number? Find a fish with fins that are different in shape from those of a salmon.

Look for some fish pictures in papers that are given you to cut up. If you find some good pictures, put them on a chart or in a scrapbook.

### WRITE

Write four sentences, using in each sentence one of the following expressions:

- |                     |                     |
|---------------------|---------------------|
| (1) spawning season | (3) cold storage    |
| (2) landlocked      | (4) fish hatcheries |



*A monarch butterfly*

## CHAPTER V

# GOING SOUTH

Many people stay in the same part of the country all through the year. But some people go north for the summer and south for the winter. They look across some northern hill in the fall. They see the crimson and scarlet and golden leaves of trees and bushes with, here and there, the steadfast color of evergreens. They know that before many weeks the red and yellow colors will be gone. Only the evergreens will show against the white snows of winter. So they make their plans to go south—by land or by water or by air.

Such travelers go because they choose and not because they must. They find it pleasant to be in different places during different times of the year. There are creatures, however, that travel at certain times because it is natural for them to do so. When the right time comes, they feel like going and so they go. This feeling is so strong that they cannot stay—it is stronger than a choice. It is a necessary part of their lives.

Most kinds of insects stay in the same region all through the year. But there are certain butterflies that

## THROUGH FOUR SEASONS

leave the North and fly to the South, where they spend the winter months.

Monarch butterflies are common in the northern parts of the country in the summer. They may be found wherever milkweeds grow. Their eggs are laid on these plants, and the pretty black and white and yellow caterpillars eat the leaves. These striped caterpillars change to green *chrysalises*. Later the chrysalis cases are torn open by the grown butterflies that come out of them.

After they come out of the chrysalis cases, the monarchs go from flower to flower and feast on the nectar they find. After a while, however, they gather in flocks and fly to the South. Their wings are buff and black on the under side and rich reddish brown and black on the upper side. The flocks of these flying insects look like enormous clouds when they pass overhead. They rest during the night on convenient trees. Then the trees look as if they had beautiful buff and tawny leaves.

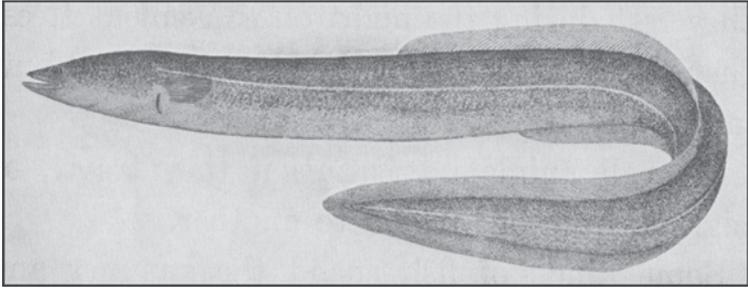
We call animals *migrants* if they travel, or migrate, from one region to another.

Some kinds of fish spend the summer and winter in the same or neighboring places. But many kinds of fish have times of migrating. In another chapter you read about salmon that migrate from salt water to spend their spawning season in fresh water.

Eels leave their fresh-water homes and go into salt water before they lay their eggs. Great numbers of these fish travel together. They take an interesting journey.

## GOING SOUTH

After they leave the lakes and rivers where they have been living, they travel far, far away. At last they reach the deep waters that lie to the south of Bermuda. This is the place where they spawn. One mother eel may have as many as five or ten million eggs. So all the mother eels that go south to that spawning place must deposit millions and billions of eggs.



*This eel is twenty-five inches long.*

Chickadees and woodpeckers and some other birds stay in one region all through the year. But many kinds of birds are migrants that travel northward in the spring until they come to their nesting places. In the fall they go south, where it is easy for them to find food.

Bobolinks are such migrants. They go so far south, indeed, that they cannot wait for the leaves to turn yellow and red before they start. Some flocks begin their journey the very last of July. Others follow at different times during August.

The birds of course do not need to buy tickets or maps or compasses before they go. But they do get ready for their journey in some ways. They have new suits of feathers. The fall traveling coats of the bobolinks are

## THROUGH FOUR SEASONS

nearly alike. The fathers and sons look almost like the mothers and daughters. All are dressed in dull buff, streaked and spotted with dark brown and black.

The father bobolinks seem to forget their marvelous spring songs when they lose their showy black and white and yellow feathers. They do not have much to say except "Chink." "Chink," indeed, is the bobolinks' fall signal—a sort of password for the migrating flock. They need a signal, for they fly by night as well as by day. So they call to one another, and each bird can tell when it is near the others. Sometimes people, listening at night, hear voices calling, "Chink! Chink!" high in the air. Then they know the bobolinks are going south.

These birds do not travel very fast at first. They need fuel for their journey. They do not get gasoline for engines of course, but they must have fat in their bodies. The oily fat is a sort of fuel for them.

Bobolinks catch a great many insects during their stay in the North. They feed their nestlings with grasshoppers and other meadow insects. They help the grass crop in this way and save a great deal of hay for northern farmers. The young bobolinks must have insects to eat. This meat food is good for their growth.

But while the flocks are going southward, they find delicious grains that are soft and milky. They stop for picnics now and then. Wild rice, growing in marshes in New Jersey, Maryland, Virginia, and other places, is a favorite food of the bobolinks. It is starchy and they become fat as they eat it. They like cultivated rice, too. In the South these birds are called rice-birds.

## GOING SOUTH



### *The bobolinks' journey*

The flocks that pass through South Carolina go south to Florida. But they do not stop there. Their travels are not yet half over. They fly across the water to Cuba and rest there for a while. From Cuba the migrants fly to Central or South America. Many of them, however, stop in Jamaica and spend some time there in October. They are known as butter-birds on that island, because they are so very fat.

There is no place for them to rest during the long flight from Jamaica to the coast of Central or South America. They must fly at least four hundred miles

## *THROUGH FOUR SEASONS*

across the water. People think they take this long flight in a single night. But they are not too tired to go on and on. They fly over great forests. They go across the Amazon River. At last they reach marshy places along the Paraguay River; there they have their winter homes.

The fields in northern United States are not without flocks of birds in winter even though all the birds that nest there have gone south. Snow buntings, or “snowflakes,” as they are also called, fly from arctic lands to this part of the country to spend their winter.

These migrants do not mind the weather they find in the northern part of our country. They run on the hard snowy crust without freezing their feet. They wade through soft snow, leaving little trails behind them. On sunny days they take snow baths as cheerfully as hens take dust baths in hot summer weather.

Snow buntings need migrate only far enough to find fields where the snow is not too deep to cover the seedy tops of meadow plants. In such places they twitter happily while they feast on the seeds.

Before the snow is quite gone from these fields they start back to their northern homes. There in warm, sunny spots, during the arctic summer, they make their nests—lining them, oftentimes, with hair shed from the coats of reindeer.

*What To Do after Reading Chapter Five*

**TRAVELING WITH BOBOLINKS**

Suppose that you could follow a flock of migrating bobolinks. You might start with some of these birds that had spent the summer in the most northern state on the eastern coast (Maine) and go with them to a marshy place near the Paraguay River in South America.

Make a list of some of the places where they might stop for food and rest.

Look on a globe or other maps for all the places you have in your list.

**TRAVELING WITH EELS**

Suppose that you could travel with some eels that migrated from a river in northeastern United States. Look on a globe or other maps to see where you would go before you could find a place in the Atlantic Ocean south of the Bermuda Islands.

**THE MIGRANTS**

I may not go to tropic lands,  
Where summer comes in winter time,  
To seek what birds, sojourning there,  
Make holiday in sunny clime.

## THROUGH FOUR SEASONS

And yet they are not strange to me—  
Those prairie birds of Paraguay.  
I hear their jubilating tones.  
I recognize their fair array.

For tropic zones cannot retain  
The joy of \_\_\_\_\_ in spring.  
That they may camp on northern meads,  
They hither haste with eager wing.

Copy these twelve lines of verse and put the right name of migrating birds in the tenth line. Ask your teacher the meaning of any word in these lines you do not understand. Then write the same thoughts in prose form.

## READ

Read one or more of the following selections:

(1) “Bob, the Vagabond,” the last chapter in *Bird Stories*.

(2) “A Creature of Mystery—the Eel,” pages 22–24 in *Nature Narratives*, Volume I.

(3) “Migratory Butterflies,” pages 55–57 in *Nature Narratives*, Volume I.

(4) “Snowflakes,” a chapter in *Holiday Meadow*.