Nature and Science Reader Book 4

Through Four Seasons

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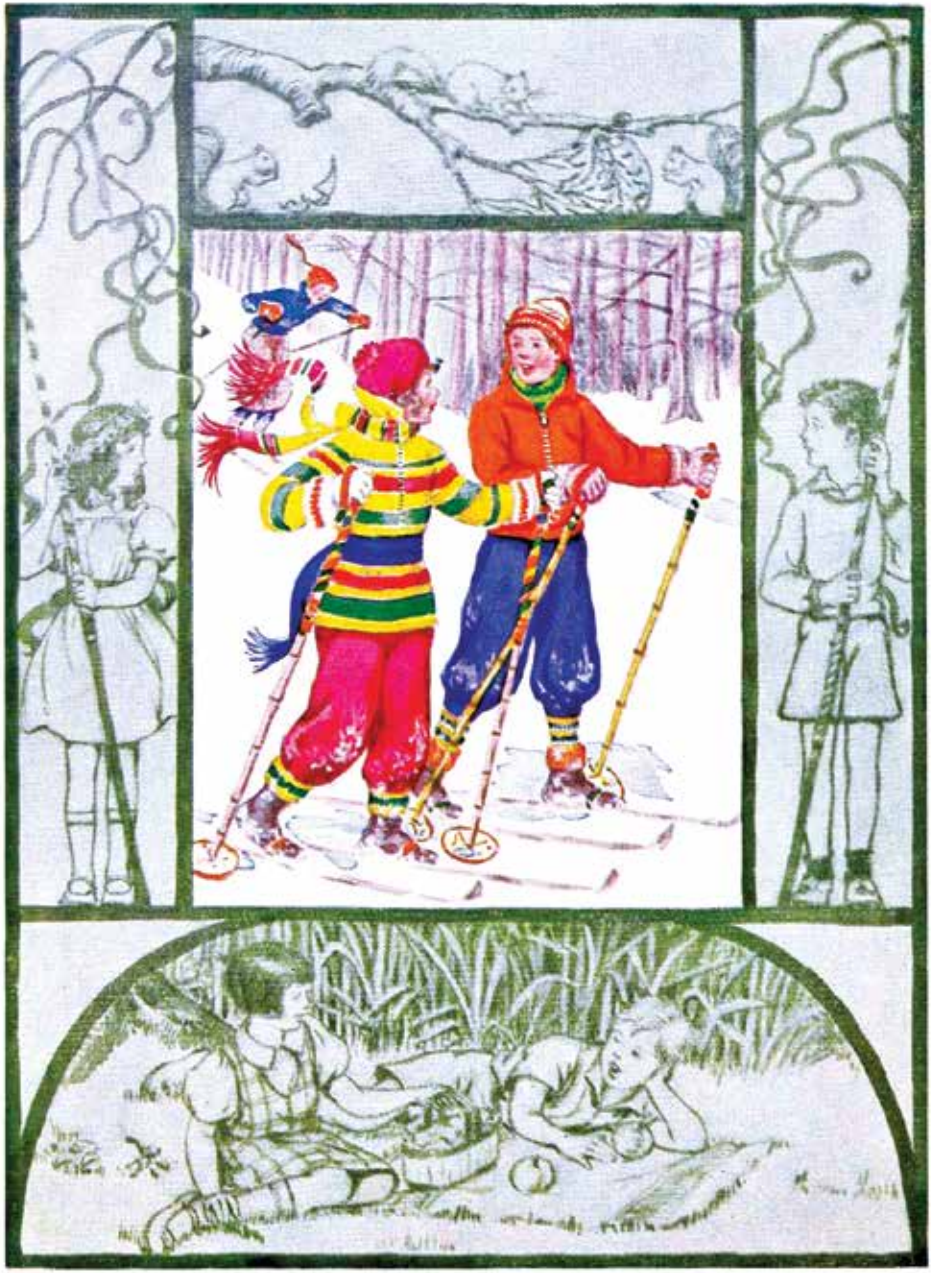
by

Edith Patch



Contents

SUMMER

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

AUTUMN

CHAPTER ONE

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.

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.

From "Bird and Animal Book," courtesy R. Bruce Horsfall

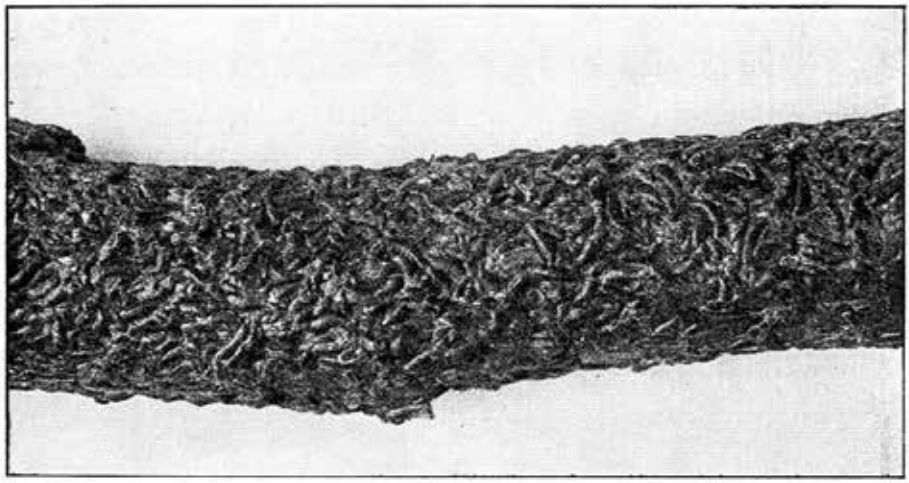
HIS NAME WAS CHICKADEE

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.

Chickadee took a great deal of exercise. Perhaps 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.



Courtesy Cornell University Agricultural Experiment Station

BRANCH COVERED WITH OYSTER-SHELL SCALES

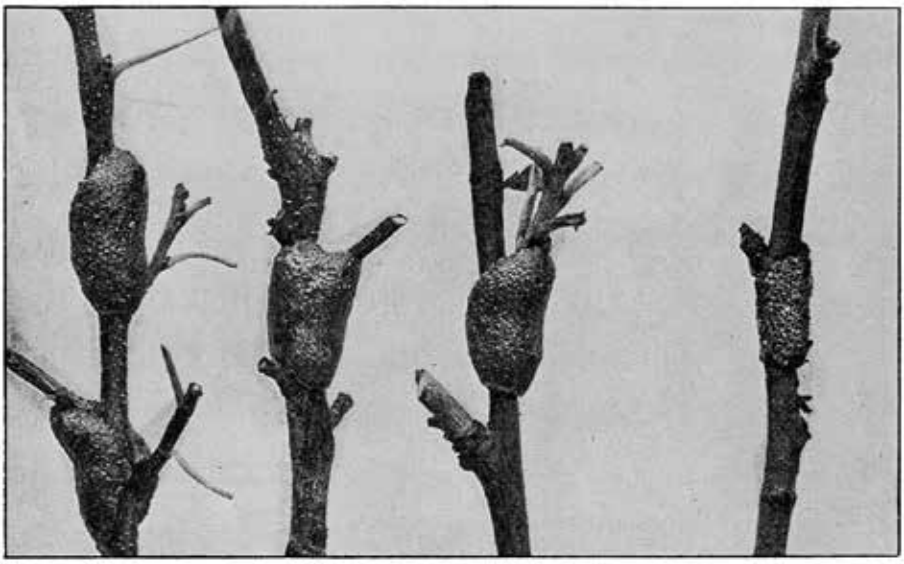
The insect that makes such a scale has parts in its body that are called wax glands. The wax that is formed in the glands is so soft that it can be pushed out through openings (pores) in the insect's body. But after the wax has been pushed out where the air touches it, it becomes hard. It is then a shiny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

Oyster-shell scale insects harm trees by piercing the tender



Courtesy Cornell University Agricultural Experiment Station

EGG MASSES FROM WHICH TENT CATERPILLARS HATCH

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 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.

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, 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[1]

Choose one of the following subjects to read:

(1) "Chick, D.D.," Chapter I in *Bird Stories*.

(2) "Seeds That Pay for Their Rides," pages 59-62 in *First Lessons in Nature Study*.

(3) "Juicy Fruits," pages 76-84 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.

1 Suggestions for reading will be made from time to time. See page xxx for a list of the books that are mentioned.

(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 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.

Courtesy U.S Dept. of Agriculture

LOOKING AT POTATO PLANTS

CHAPTER TWO

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?

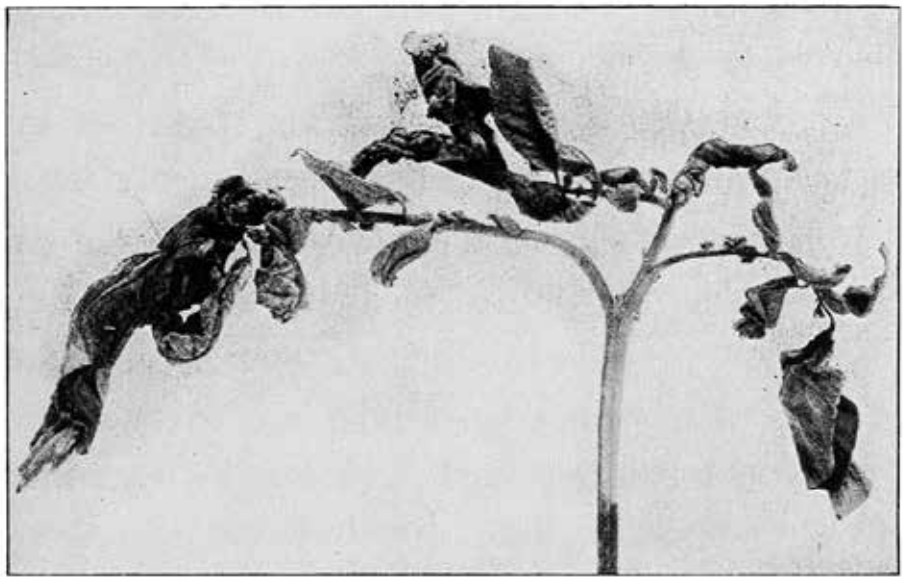
Autumn is the time when potatoes are dug and stored for the winter. They should have smooth skins. Their flesh should be sound - without dark spots or streaks. They should, indeed, be healthy in the fall if they are to keep in good condition to eat during the winter, for sick potatoes are likely to rot 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.

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



Courtesy Maine Agricultural Experiment Station

LEAVES FROM A POTATO PLANT THAT HAS LATE BLIGHT

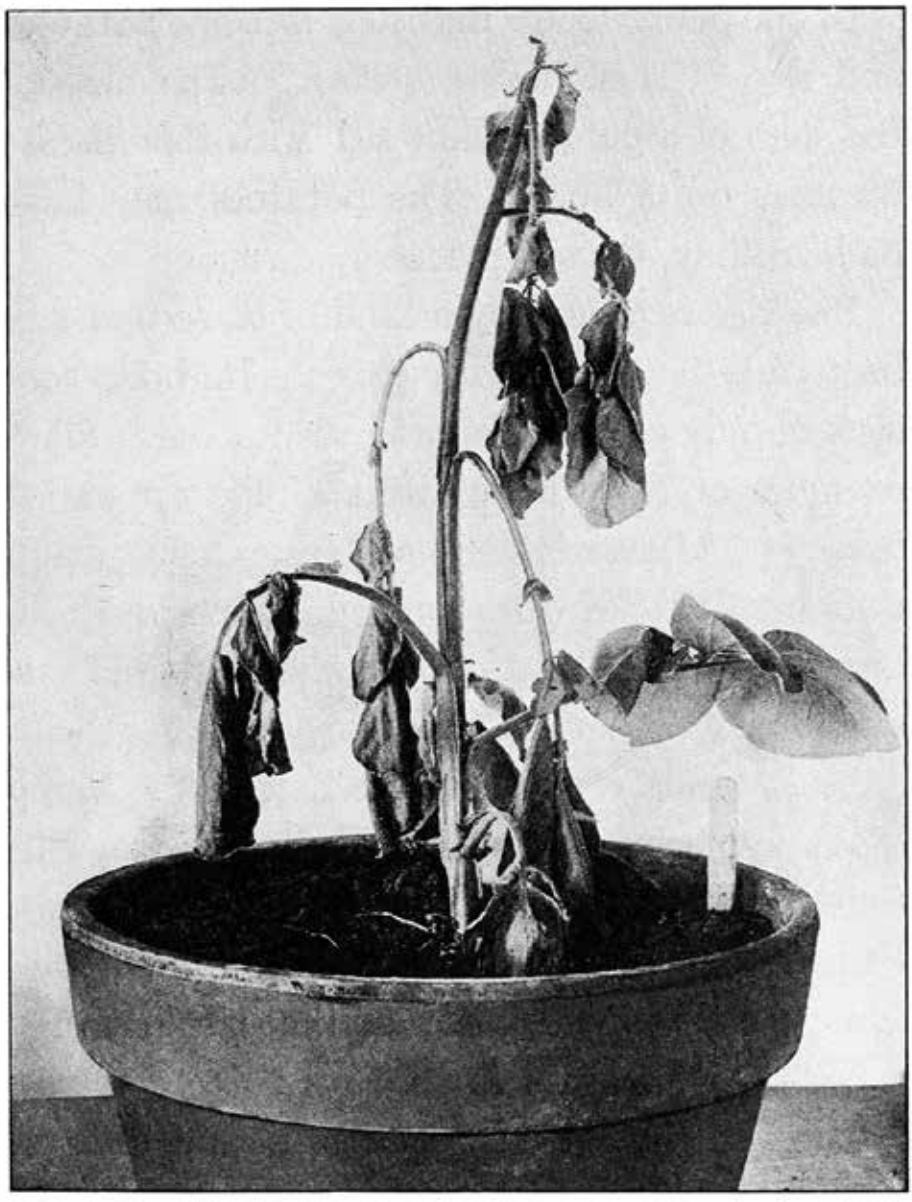
called "eyes"). Sprouts start from these buds and grow into new potato plants.

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*."

Late blight is a disease caused by a kind of *fungus*. Funguses (or *fungi*) are plants. They 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 fungus plants without a magnify-



Courtesy Maine Agricultural Experiment Station

THIS POTATO PLANT HAS BLACKLEG

ing 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 onto plants by raindrops. So the disease may spread in damp weather. Sometimes whole fields of potatoes die from late blight.

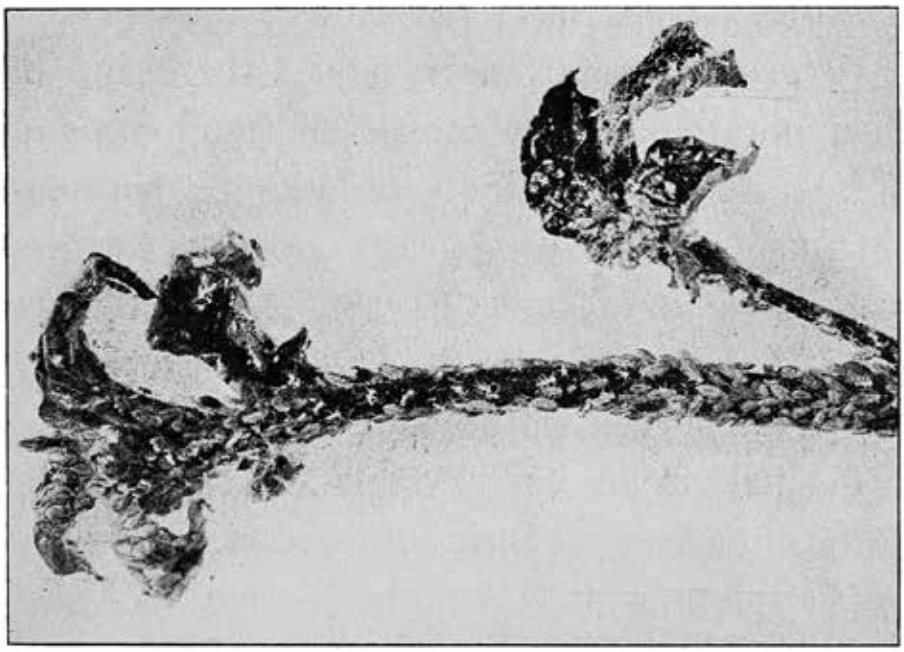
Or the plant doctor may look at some potatoes and say, "They have *blackleg*." The base of the stem of a potato plant sick with this disease becomes quite black. The potatoes may have bad-smelling, rotten places.

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

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 mouthparts. They thrust their beaks into leaves or stems of plants and suck the



Courtesy Maine Agricultural Experiment Station

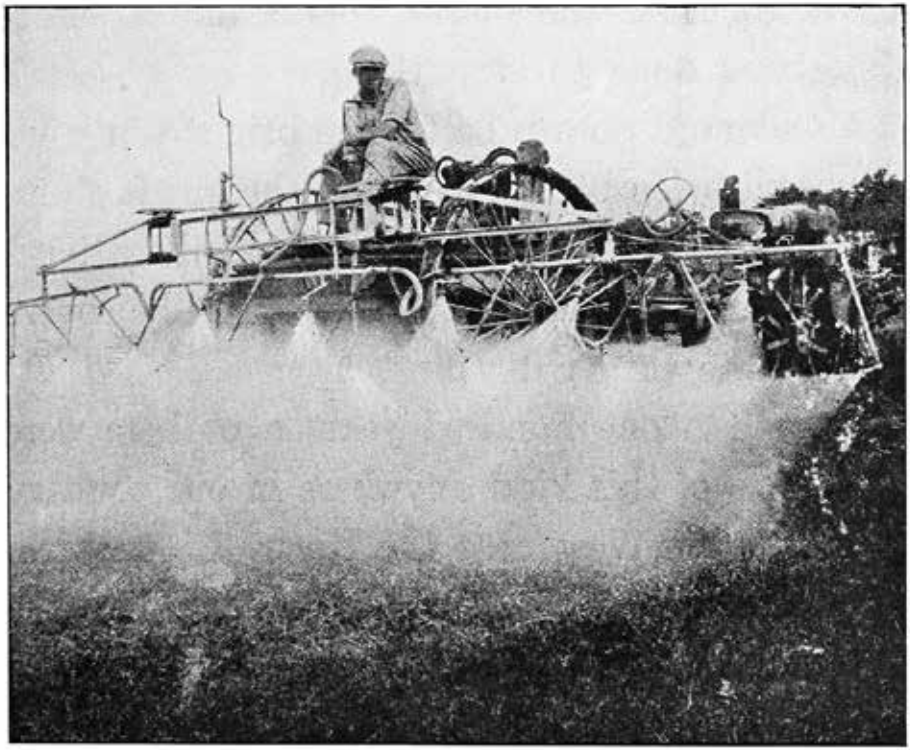
APHIDS ON POTATO STEM AND LEAVES

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.



Courtesy Maine Agricultural Experiment Station

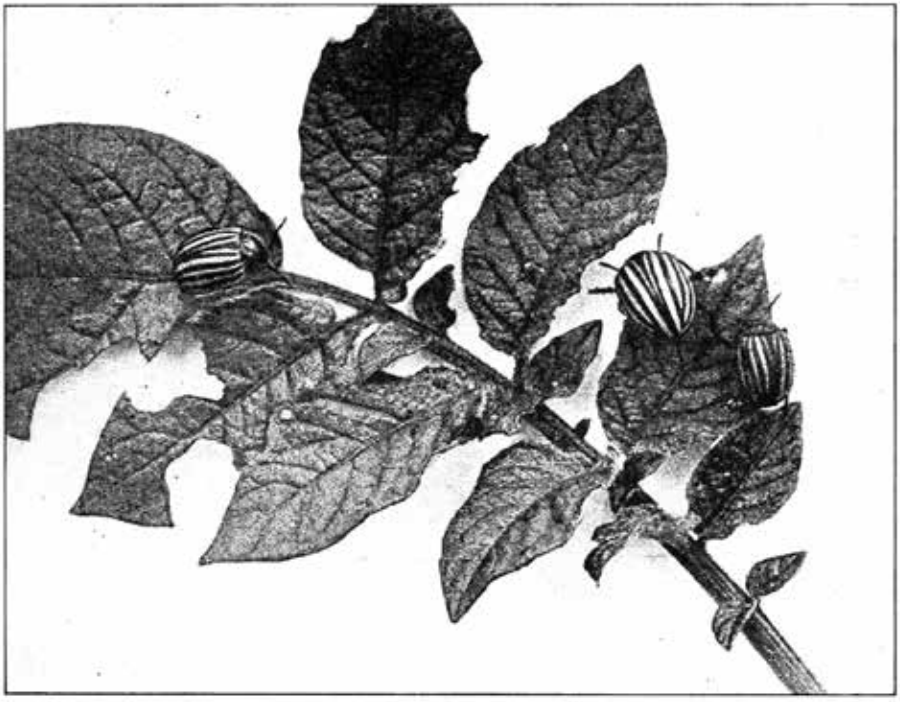
A POWER POTATO SPRAYER

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.

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.

Colorado potato beetles are sometimes so numerous in a field



Courtesy Cornell University Agricultural Experiment Station

COLORADO POTATO BEETLES

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.

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.

Courtesy U.S Dept. of Agriculture

A PROMISING FIELD OF POTATOES

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.

Farmers save their potatoes from these insects by spraying the plants with a poison that has *arsenic* in it. The pests eat the sprayed leaves and die.

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.