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HUMBLE BEES GATHERING HONEY FROM PEA-FLOWERS.

Natural Worlds 1

Companion Album

Retyped, reformatted and slightly edited by Lisa Kelly

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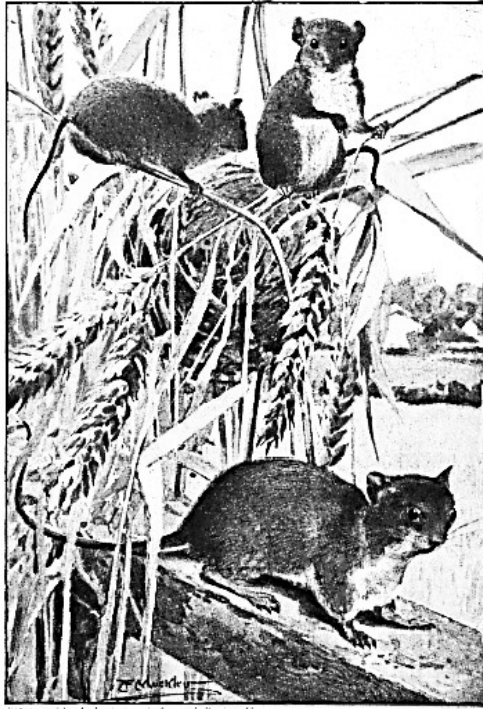
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Harvest mice with nest, above; and field mouse, below.

Wild Life in Woods and Fields

by Arabella Buckley

Retyped and reformatted by Lisa Kelly

INTRODUCTION

We three friends, Peter, Peggy, and Paul, walk to school together every day. We all love flowers and animals, and each day we try to find something new.

Peter is a little boy. He can only just read. But he has sharp eyes. He sees most things in the hedges. Peggy's father is a gamekeeper. She knows the birds and where to find their nests. Paul comes from the farm. He is a big boy and will soon be a teacher.

We meet at the big pond under the elm trees. Then we walk along a narrow lane, across the common, through the wood, and over three fields to the village school. In the pond we find all kinds of creatures. In the lane are beetles and mice, flowers and berries, birds' nests and wasps' nests. On the common the spiders spin their webs on the yellow gorse. In the ploughed field the lark hides her nest. In the grass field there are buttercups and daisies. In the cornfield there are poppies and cornflowers.

Paul is going to write down for us all we see and put it in a book.



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A GARDEN SPIDER AND BLACKBERRY BRANCH.

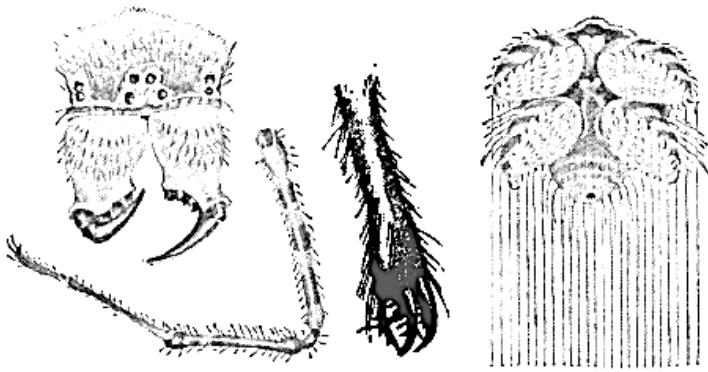
LESSON I-SPIDERS ON THE COMMON

When we cross the common on a fine summer morning, we see many spiders' webs sparkling in the sun. The webs on the gorse bushes are round. They are fastened to the gorse prickles by long silk threads, and each web has spokes like a wheel. These spokes are joined together with rings of silk. There are drops of gum all over the rings. It is these drops which sparkle like diamonds, and make the web so pretty.

The spider spins a little tent in the center of the web. In this tent she hides, till some insect flies against the gummy threads. Then she feels the web shake, and darts out to catch the fly before it breaks the threads.

We saw a little bee today fly right against the web on the gorse bush. Out came the spider from her tent. She bit the bee with her sharp fangs, tore off its wings, and then sat and sucked the juice out of its body.

Paul caught her, while she was busy, and showed us the two fangs with sharp points, which hang down in front of her head. Above them are her eight eyes, four large ones and four small ones. She has eight legs with such strange claws! Each one is like a comb. What do you think they are for? She uses them to guide the silk threads as she makes her web.



**HEAD, LEG, CLAW AND SPINNERETS OF A SPIDER,
MUCH MAGNIFIED.**

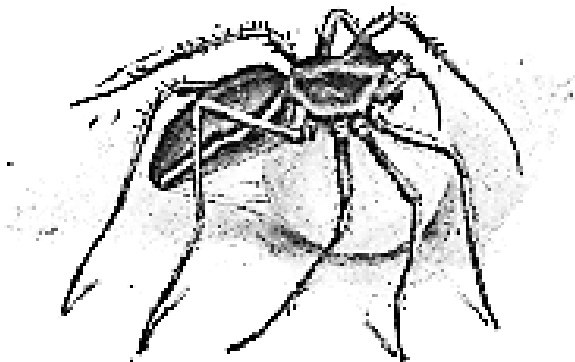
We turned her on her back and saw, under her body, six little pockets, out of which she pulls the silk. It comes out through tiny holes. She draws it through the combs on her legs, and so makes her web as she runs along.

Besides the webs on the gorse, there are webs all over the common close to the ground. These are not made with spokes like the round webs. The threads are mixed up like wool. For a long time we could not find the spider. At last one day Paul said, "Here is a hole right in the middle of the web. It goes down into the ground."

This hole was lined with silk threads. Just then a beetle crawled on to the web, and shook it. At once the spider darted out from the tunnel in the ground and seized the beetle. She was so quick that she had

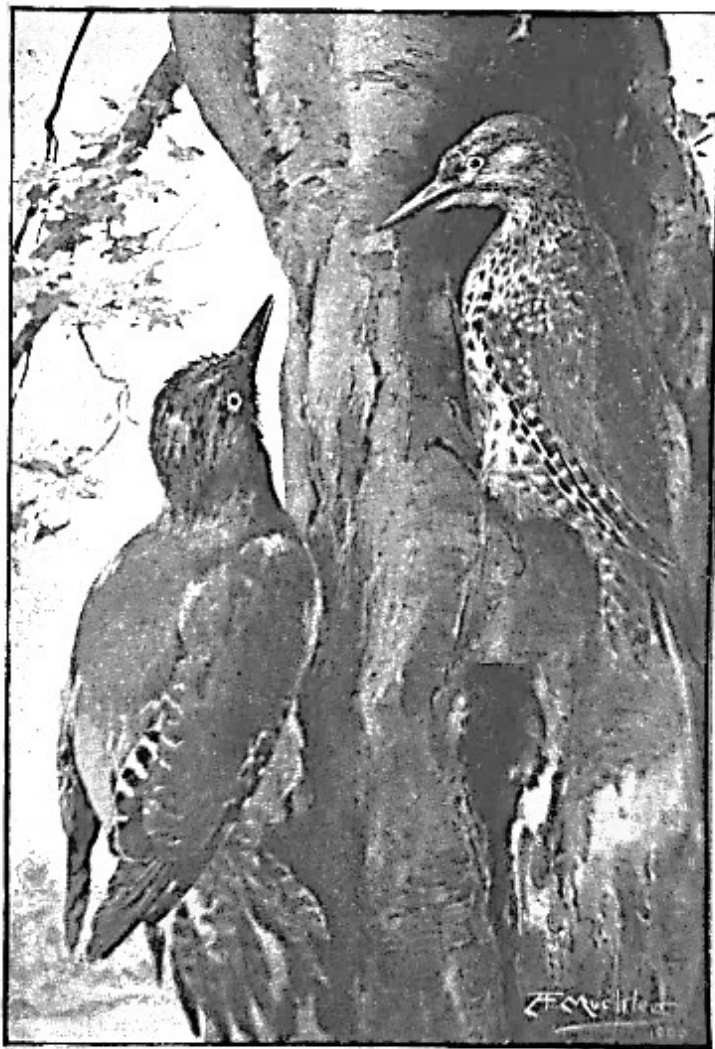
carried him down into her hole before I could catch her.

There are many spiders on the common which do not spin webs, though they hang from a thread. They spring on the flies and beetles on the ground, and are called “hunting-spiders.”



**HUNTING SPIDER WITH HER
EGG-BAG.**

The mother hunting-spiders carry their eggs about with them in a round bag. Peter caught one of these as she was running along with this white ball under her body. He took the ball away and put it on the ground. When he let her go, she ran up and seized it. He took it away three times. Each time she caught it up again, and at last ran away before we could catch her.



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WOODPECKERS.

OLD COCK BIRD, BELOW; YOUNG FULLY-FLEDGED BIRD, ABOVE.

LESSON II-THE WOODPECKER'S NEST

We were lying under the shade of the trees in the wood one afternoon. All was very quiet, when suddenly we heard such a strange cry. It was like someone laughing, "Yaffil, Yaffil, Yaffil." "That is the woodpecker," said Peggy. "Wait and see what he will do."

So we lay quite still under the tree. Soon the sound came nearer, and a great heavy bird, bigger than a large thrush, flew towards us. He was a beautiful bird. His wings were green, and so was his breast. He had yellow on his tail. His head was red, and he had a red streak on his throat. His beak was long and grey.

He came quite close to us, hopping along. Then he stopped, and a long shining tongue came out of his mouth, and went back so quickly that we could scarcely see it.

"He is eating ants," said Peggy. "The tip of his tongue is sticky and he draws them into his mouth."

Then he began to climb the tree so funnily. His tail is quite stiff and wiry, and he bent it against the tree, and pushed himself up, jump, jump, holding on with his sharp hooked toes. He jumped first to the right, then to the left. Then he ran round the tree and came out on the other side.

All the while he was trying the bark with his beak. Tap, tap, tap. At last he found a soft spot. Then he tore off the bark and ate the grubs, which had made the tree rotten in that place. After this he came down the tree again.

It was so funny to see him. He came down backwards tail first, using it to steady himself. Then he spread his wings and flew slowly away.

We crept after him, and by-and-by he stopped at an old elm tree and flew round it. Then we could see no more of him.

“His nest must be in this tree,” said Peter. “Give me a back, Paul, and I will soon find it.”

So Paul let Peter climb on his back till he could reach the branches of the tree. Then Peter caught hold of the boughs, and crept round the trunk. “Here it is,” he cried at last “There is a small hole, just big enough for a bird to creep in. But they have made such a big hole inside the tree. I can only just reach down.”



A WOODPECKER'S NEST.

Then Peter drew his hand back with the mother bird in it. Her head was not so red as the father's, and she had no red whiskers. He let her fly away, and then pulled out six white shining eggs.

"I can feel a number of soft chips of wood at the bottom of the hole," said he. "Shall I put the eggs back?" "Of course," said Paul; "then the mother will fly back and sit on them, and we will come again and see the little birds when they are hatched."

So we went away. But every day, as we came from school, we turned aside to see if the little woodpeckers had come out of their shells.

At last one day we saw the old woodpeckers carrying insects into the hole. After some time we saw the young birds out on the tree. They could not fly. But they ran about the branches, and jumped so funnily with their stiff tails.

A week later we saw them flying about, and when we came again they were all gone. Peter climbed up and found the nest quite empty.

LESSON III-SPRING FLOWERS

We are always glad when April comes. Then we can find many flowers on our way to school. Even in February there are snowdrops in the orchard, and Peter knows where he can sometimes find a primrose or violet in flower.

But we cannot get a good bunch till April. Before that the plants are busy growing their leaves.



DAFFODILS AND
ANEMONES.

The first bright flowers we find are the daffodils in the fields, and the anemones in the woods. We call the daffodils “Lent lilies” and we put them in the church at Easter. They have very long, narrow leaves which come straight out of the ground. Each flower hangs on its own tall stalk. It has a deep yellow tube in the middle, with a crown of pale yellow leaves round it. If you dig up a daffodil plant you will find that it has a bulb like an onion. Paul says this is why it blooms so early. It stores up food in the bulb in the autumn. Then it

uses this food in January to make its leaves and flowers.

The wood-anemone is Peggy's favorite flower. It is called the "wind-flower" because it nods so prettily in the wind. Its soft pink and white flower stands high up on a long stalk, which has three feathery green leaves half-way down. When the sun shines, it is a little pink and white cup, but when the clouds gather and the rain falls, it shuts up in a tight bud, till sunshine comes again.

Peggy once bit one of the leaves of the anemone. It burnt her tongue and tasted very bitter. Then Paul told us that the plant is poisonous. This is one reason why there are so many anemones in the wood. Animals will not eat the leaves, but leave them alone to grow.

The anemone has not got a bulb. It has a thick brown stem under the ground in which it stores its food.

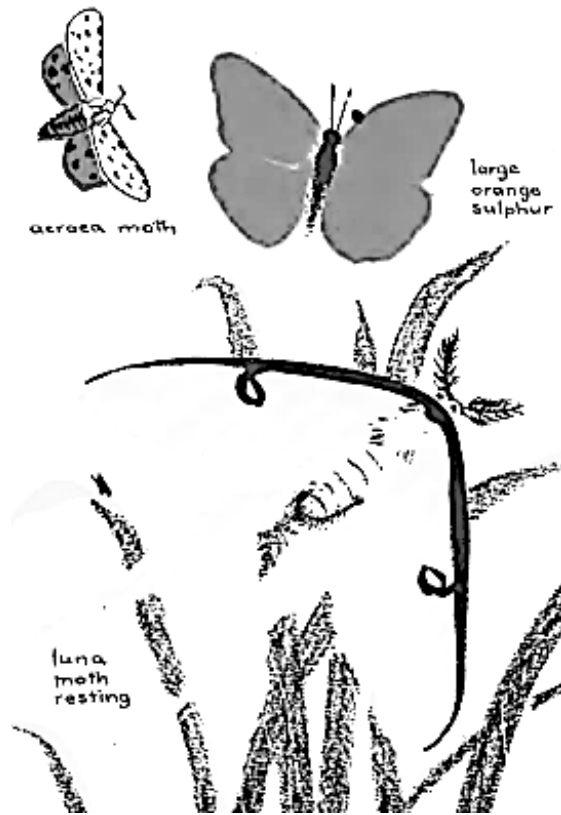
Before the daffodils and anemones are over, the primroses and violets cover the banks. It is pretty to watch the primrose plant on a wet morning. The leaves are not smooth. They have hills and valleys all along them. The water runs so cleverly down the valleys of the leaf. These guide it down to the roots, so that the plant can drink.

How busy, too, the bees and flies are. They settle first on one primrose, then on another. We know what they find there. If you pull off the yellow crown of the primrose, and suck the end of the tube,

you will taste something sweet. This is the honey that the bees come to find. And besides the honey they carry off some yellow dust from flower to flower. Paul says that this is good for the flowers, as we shall learn some day.

The honey in the violets is not so easy to find. But we have found it. When a violet looks straight at you, it shows five purple leaves and a little yellow beak in the middle. But if you look behind, you will find a small long bag, like the finger of a glove. We have often pulled this off and sucked it. It is full of honey. When the bee sits on the flower, and thrusts her head into the yellow beak in the middle, she sips out the honey with her tongue from the bag or spur behind the flower.

With primroses and violets and blue-bells the bees can now find plenty of honey to fill their hives.



The First Book of Bugs

by Margaret Williamson

Retyped and reformatted by Lisa Kelly



About Bugs

Not all the tiny creatures you see creeping and crawling and flying are truly bugs. When somebody says, "Ooh, look at the bug!" he might be pointing at a beetle with six legs, or a spider with eight legs, or a centipede with many legs. Or he might be pointing at a stink bug, which belongs to the only family scientists call bugs. But in this book, let's call them all bugs to make it easier, and, often where a bug is magnified, the outline beside it shows you about how big it really is.

If you watch a bug as it goes along about its business, you can find out what a bug's world is like. You can see what kind of legs and wings and feelers it has and how they work, and you can hear the noises it makes.

If you wait and watch long enough, you may even see it creep out of the hard, stiff suit of armor that all bugs wear, and walk off in the new and bigger suit that has been growing, all wrinkled, underneath the old one.

If you wait still longer, you might see how a bug's young are born and how they grow up. Perhaps you may even find out who its enemies are.

Bugs are so small that it is hard to imagine they can be strong enough to fight their enemies. But some of them can run or jump quickly, while others can fly away. A bug may have a sting, to sting its enemies, or strong jaws to bite them. Some bugs can run or jump quickly, while others can fly away. Even so, lots of bugs are killed. But there are always more. There are more bugs in the world than all the people and animals you can think of. That's mostly because bugs are born by the thousands — much faster than their enemies can eat them up.



Bugs do not think about things or make plans as people do. They are born knowing everything they need to know about getting food, and fighting their enemies, and building their houses. Even a young spider builds its first web perfectly, although it may never have seen another spider web. Its mother does not ever need to show it how. Not even scientists have figured out exactly how a bug knows these things. That is still a bug's secret.

Sometimes people get angry at bugs. Clothes moths chew up their swimming suits and mittens, cockroaches crawl over dishes in the sink, potato bugs eat holes in potato vines, Japanese beetles ruin the prettiest roses and termites chew wooden stairs in houses.

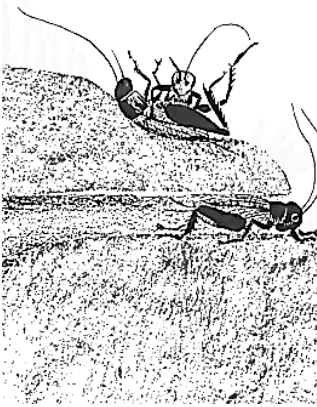
But bugs are valuable, too. After all, the honey for your waffles comes from bees, and silk for your dresses from silkworms, and the shellac that makes your furniture shine comes from scale bugs.

Even those same termites who tunnel through wooden stairs in our houses, eat old dead wood in other places where it is not wanted and make it part of the earth again. In that way, they save people the trouble of burning or burying lots of rubbish, and they make room for new animals and plants as well.

No bug really intends to be harmful or useful. It just lives its own life. Now you're going to see how some bugs live, what they eat, where they sleep, how long they live, and how they have fun.



Crickets and Their Cousins



Best of all, a cricket likes to sit in the sun and make music. If he's frightened, he'll stop playing, and jump like a jumping jack.

A cricket has a fiddle and a bow hidden in his two top wings. The top of each wing has ridges on it and the bottom of each wing has a row of small teeth like a file. To make his music, he crosses his wings one over the other and saws them back and forth.

A cricket can fool you. When he plays loudly, he sounds as if he were right beside you. But he can play very softly to make himself sound far away.

In the springtime, Mr. Cricket plays a love song to a lady cricket, who listens carefully with her knees. That's where crickets' ears are. She can't play music because she has no fiddle in her wings. Besides, after a while she is busy laying dozens of eggs in holes which she digs in the earth with her sharp pointed shovel. Later, she dies, but the young crickets can get along perfectly well from the minute they are born, even while they are in the egg.

The sun bakes the earth that covers the eggs and keeps them warm. When the young crickets have grown too big for the eggs, they push with their heads till the lids on their eggs fly open, and out they pop. They look just like grown-up crickets, but they are much smaller, and have no wings. They are curious, and push their way out of the earth to go adventuring. If they are lucky, and are not gobbled up by an ant or a lizard, crickets wander all summer long, hiding under leaves and stones, and usually waiting until night to hunt for food.

A cricket eats so much that soon its hard black suit, which cannot grow at all, splits open down the back and it creeps out in its new and bigger suit. Before the summer is over and a cricket is full-sized, it grows out of four or five suits. In the fall, it digs itself a house in the earth. It digs and scrapes and sweeps and rakes with its legs, and lifts pebbles out of the way with its strong jaws. It hollows out a tunnel just big enough to crawl through and a room at the end where it can just turn around.

A cricket's house is not where young grow up, like the bee's hive, and it is not a trap for bugs like the spider's web. A cricket's house is just for itself—a place where it can be safe and warm and snug, and it will fight fiercely if other bugs walk in by mistake.

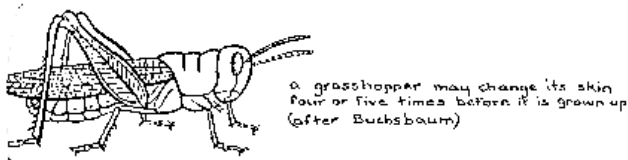
To find a field cricket's house, try the edge of a field where the grass is not so tall. Look closely, because the front door is just a tuft of grass. If the cricket is

not outside, you can bring it out by poking a straw down the tunnel.

Some crickets do not dig houses. Instead, when it gets cold they hop into people's homes and live in a crack where it is warm. In China, a friendly house cricket is often kept in a cage as a musical pet. Boys and girls carry the cages on strings around their necks and feed the crickets melon and lettuce from tiny dishes, or a spoonful of mosquitoes as medicine if their feelers droop.

Crickets have relatives who play music, too, on hot summer days and nights. The katydid plays a song which sounds like "Katy did, Katy didn't," by rubbing his wings together, much as crickets do.

A grasshopper makes his music by rubbing the files on his back legs across the ridges on his top wings, and he listens with the ears in his sides. When grasshoppers fly, they make a crackling noise by rattling all four wings.



Some of the crickets' relatives aren't so much fun to have around. Cockroaches come into houses, crawl over food, and nibble everything in sight. The female

cockroach carries around a bag with sixteen eggs inside. When she finds a warm crack to put them in, she leaves them there to hatch.

Grasshopper locusts travel in swarms as big as storm clouds in the sky. Wherever they land they eat every green, growing thing in sight. That's why farmers are so afraid of them.

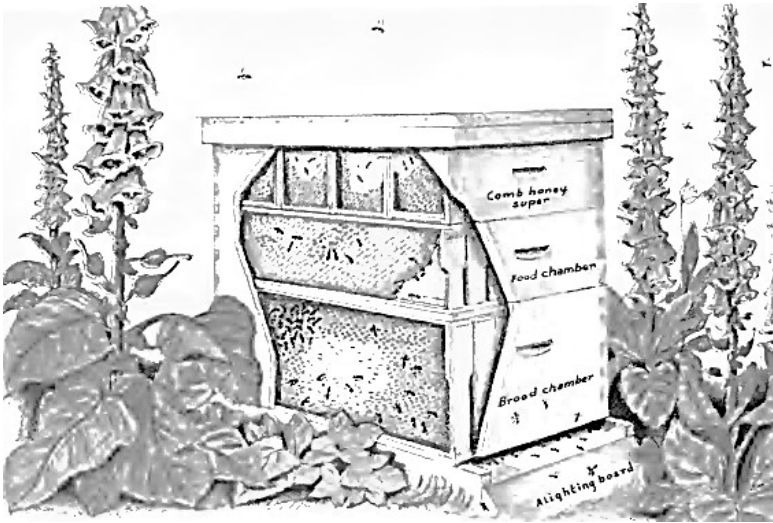
The cicada, who is sometimes called a locust too, is another bug musician, but he doesn't belong to the cricket or grasshopper family. He makes his whirring noise by squeezing the muscles in and out on two drums on his stomach, just as you can make a noise by pushing in and out on the bulging bottom of a pan.



As a young cicada, in a white suit, it may have for as long as seventeen years, tunneling through the earth, eating roots. Then it comes up to the air, climbs a tree, splits its skin, and walks out, a grown-up cicada with wings. No other six-legged creature takes so long to grow up.

Some bugs eat their old skins, but the cicada leaves its skin behind on the bark of a tree where you can find it quite easily, if you look.





The First Book of Bees

by Albert B. Tibbets

Retyped and reformatted by Lisa Kelly

BEEES ARE ALWAYS WORKING



Almost any day in summer, you can find a bee buzzing around in a garden or field or orchard. If you stand still and don't strike at it, you will be able to look carefully and see what kind of bee it is. As a rule, bees only sting people who seem to be bothering them or interrupting their work.

For bees are always working. Some kinds of bees work alone and live by themselves. Scientists call them "solitary" bees. Other kinds live in groups called "colonies," and they work together.

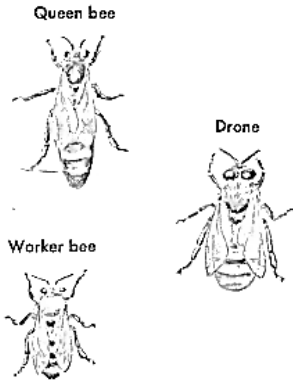
Many of the bees you are likely to see are honeybees, the kind that make the honey we eat. They live in colonies.

'The honeybees you most often see are beekeepers' honey bees that live in special boxes called hives, which have been set out for them. But there are others that are wild honeybees, who live the year around in hollow trees or in old barns, or in any safe, dry hole they can find. The wild honeybee colonies in this country were started when bees that people owned flew away from their hives and built colonies in the woods.

Some honeybees are brown or black and some have yellow bodies. But no matter what they look like, honeybees all live together in the same way. They all raise their young bees alike. They all make the honey that tastes so good on bread or pancakes. They all make the wax that we often use in candles or to polish furniture.

Of course, bees don't work for people on purpose. They make honey because it is their own food. They make wax to use in building their colonies. We are lucky that they often make more honey and wax than they can use. They will have much more than they need if the beekeeper who owns them helps them in various ways. This book will tell not only about honeybees and their unusually interesting lives, but also about the things a beekeeper does to make their work easier.

EACH BEE HELPS



There are many jobs to be done in a honeybee colony: keeping the hive clean, laying eggs, taking care of the young, storing away food, and other chores. This work is divided between two different kinds of bees in each hive: the queen and the

workers. The queen lays eggs. The workers do all the other tasks.

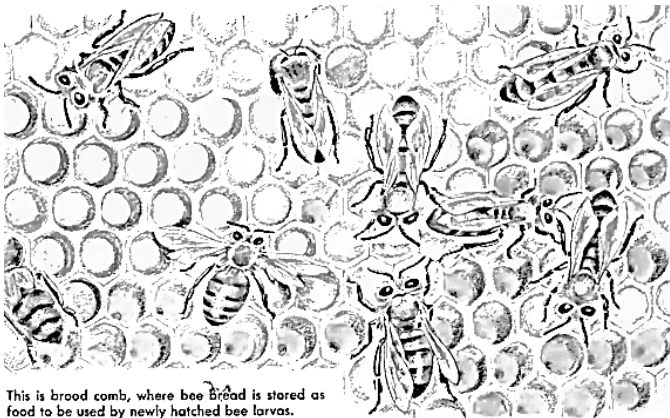
The drones are a third kind of bee in each hive. They are fat and lazy and do no work at all.

Once a bee has grown into a worker, a queen or a drone, it can never change. Each sort, even a lazy drone, is useful to a colony, which needs all three kinds in order to go on living. Later on in this book you will find out more about how each one helps.

MANY CHORES FOR WORKER BEES

But first, let's take a good look at a worker bee. It does very special work of many kinds. It collects nectar, a sweet liquid from flowers, and changes it into the honey that bees use for food. It gathers pollen, a fine powder found in flowers, and mixes it with nectar to make "bee bread," which is food for young bees. It helps build a storage place for all this food.

Worker bees are good housekeepers. They are nurses for the baby bees, too. There are always many jobs around a hive. Worker bees have lots to do, and they couldn't possibly get all their work done without special tools to help them. But the only tools they have to work with are the ones that grow right on their own bodies.



This is brood comb, where bee bread is stored as food to be used by newly hatched bee larvae.

BODIES WITH BUILT-IN TOOLS

A bee's body is divided into three parts. In front is the head. This has the eyes. Honeybees have good eyesight. They can recognize all colors but red, which they can't tell from black. And they seem to be able to recognize objects around their hives. They have a good sense of direction, so that they have no trouble in finding their own homes.

On their heads, bees also have two short feelers, which are noses, too. Bees have a keen sense of smell.

A worker bee's head has a mouth with strong jaws for chewing, and a long tongue with a spoonlike end. Around the tongue are parts somewhat like feelers. By using these and its tongue, a worker bee can make a tube to suck up nectar from flowers. A bee cannot cut the skins of fruit to suck the juices, but it can suck up juices from fruit already bruised and cut.

The middle part of a bee's body has four thin delicate wings, two on each side. A bee can move its wings very fast as much as four hundred times a second—and worker bees can fly very far, sometimes eight miles in one flight.

Each honeybee has six legs—three pairs—on its middle part. Worker bees' legs have all sorts of little brushes and other tools to help them.

The hind part of a bee's body is the largest, and has several of the worker bee's important tools. There is a honey sac or "honey stomach," which is a sort of extra stomach where the bee stores the nectar it has sucked up with its tongue. Also in this hind section are some glands for making wax. This wax comes out of little slots on the underside of a bee.

On the back tip of a bee is a sting—a sharp point connected to poison glands. This is a bee's weapon for protecting its colony from enemies.

A worker bee uses its various tools to help it with its many, many jobs.



House bees, cleaning cells



A bee lands on a kind of porch.

ARMED GUARDS

During the busy summer season, worker bees live for only about six weeks. They spend about the first three weeks of their lives as house bees, doing work inside the hives.

When a honeybee that is working in fields or gardens flies

home to its hive, it lands on a kind of porch before its front door, which is a crack that runs across one side at the bottom of the hive.

At the door it has to pass guards. These are young bees that are really armed—they have their stings for weapons. They know by smell the bees that belong to their own hive, and they stand there at the entrance, ready to drive away any robber bees that may come from other colonies to steal honey. If the robbers don't fly off immediately, the guards sting them to death. The guards also watch out for mice and other invaders and sting them, too, if they try to sneak in.

AIR CONDITIONERS

Near the doorway of the hive are other bees that stand and make a humming sound, but not because they are angry. They make the noise with their wings, which they are fanning very fast, to do the work of air conditioners. Some stand on one side of the entrance, facing in, and some stand on the other side, facing out. Their fast-fanning wings keep the air circulating. The moving air cools the hive in hot weather and keeps the honey from getting too soft and runny. It also helps dry some of the moisture out of the new honey that the bees are making.

