

THE STORY OF BEES

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CHILDREN'S SCIENCE SERIES

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PREFACE

The Story of Bees is the fourth in the Children's Science Series. It was prepared by the Pennsylvania Writers' Project, sponsored by the Pennsylvania Department of Public Instruction.

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CONRAD C. LESLEY
Acting State Supervisor



The Worker Bee is Busy from Sunrise to Sunset.

THE STORY OF BEES

There is an old story told to show how wise King Solomon was. But the story really tells how wise the Bee is.

It happened this way. Several thousand years ago in the kingdom of Israel, some men were arguing about King Solomon's wisdom. One of them said that the King, wise as he was, could still be fooled. The other said that no one could fool Solomon.

They decided to put the King to a test. One of them picked a flower from

the field and the other made a false one exactly like it. Indeed the flowers were so much alike that it was the hardest thing in the world to tell the difference.

Then the two men came before the King and knelt at his feet, holding out the two flowers.

"O Most Mighty King," they cried, "your goodness and understanding are spoken of far and wide. We wish very much to test your wisdom so that those who doubt you will be ashamed. Here are two flowers alike as two peas in a pod. No one but the maker can tell which is real and which is false. Show us, O Great King, which is the true flower and which is the untrue, and your enemies shall be made weak by the strength of your wisdom."

King Solomon took up the flowers,

smiling. He looked at one and he looked at the other. Truly, they were alike as two peas in a pod. Each one's petals were just as rosy as the other's. Each one's stem was just as green as the other's. Each one's smell was just as sweet as the other's.

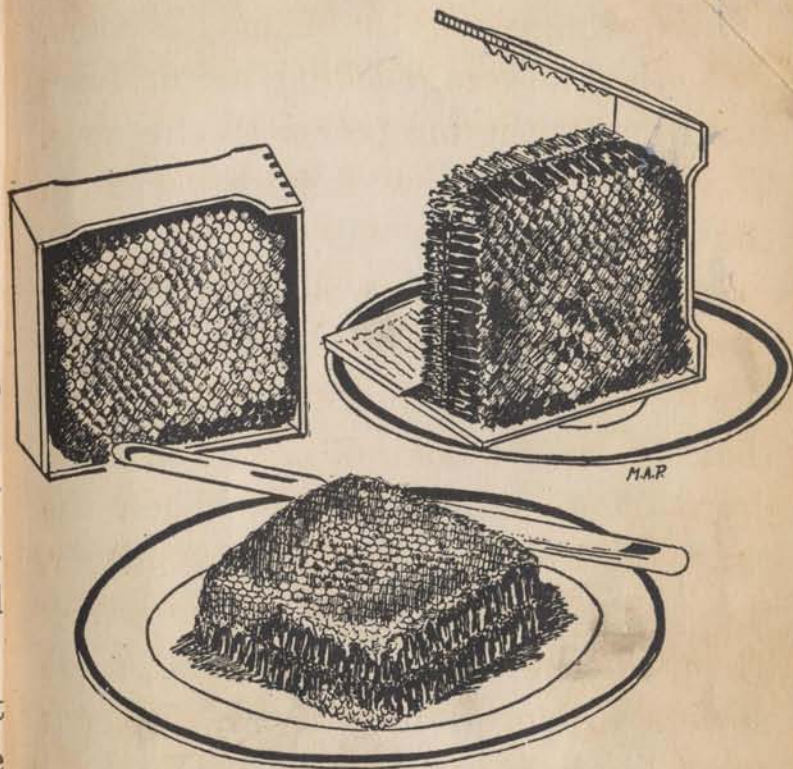
And for a while Solomon himself could not for the life of him tell the difference. He just sat and sat there, with a frown on his face. But suddenly he began to smile again. For nearby he heard the buzzing of his friend the bee. Closer and closer the bee came, close to Solomon's head. Then, whirling about for a moment, it settled on one of the flowers.

Then the King gave a great laugh. "This is the true flower," he said pointing, "and this is the false." And everybody marveled at his wisdom. But King

Solomon knew that it was not he who was able to tell the difference. It was the bee who had shown him.

Telling a real flower from a false one is a very easy thing for a bee to do. The bee is a wonderful little creature and she knows many things. She knows how to make wax. She knows how to gather nectar and turn it into honey. She knows how to change an ordinary worker bee into a beautiful Queen bee. She can fly miles from her home and never get lost.

But the most wonderful thing about her is that she is the only insect in the world that makes something that man can eat. There are a few other insects that make something that man can use. One of these is the silk worm, but he only makes something for man to wear.



The Thick Syrupy Honey which Comes to Our Table.

With the break of dawn and the opening of the flowers, the worker bee leaves her hive to begin the day. From morning till night she visits the morning

glories, the roses, the fruit blossoms, and other flowers, sucking nectar from them and gathering pollen as she goes. The nectar is the sweet juice buried in the flower.

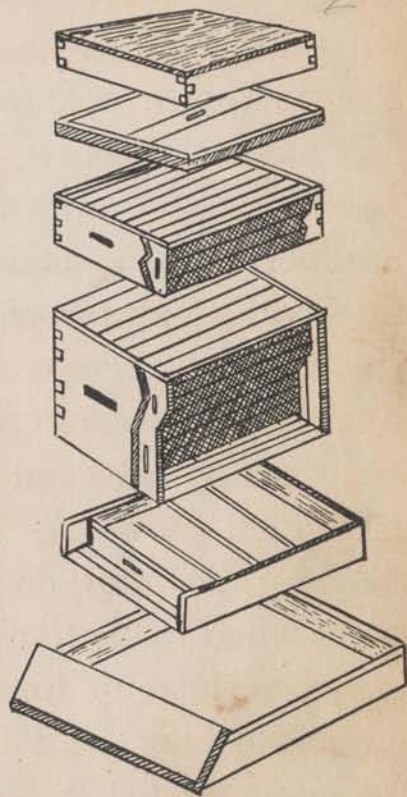
Pollen is the golden dust that can be seen in the center of a blossom. The bee picks up so much of this golden dust that she cannot hold all of it, and some drops off on other flowers. When the right kind of pollen falls on a flower, the seeds of the flower become ripe. Then, when the seeds are planted, more flowers will grow from them. So bees are a big help to farmers.

Heavily loaded with nectar and pollen the bee flies back to her hive. Sometimes she lives in the hollow of a tree. Sometimes she lives in a hive that has been made for her by a farmer. If she

lives in a tree, bears and other wild animals may steal her honey. If she lives in the farmer's hive, the farmer takes the honey.

But the farmer is kinder than the bear, for he leaves enough honey for all the bees to eat. And sometimes when they don't get enough nectar from the flowers, he gives them sugar-water so they will not go hungry.

The hive the farmer builds looks like



The Hive Looks like a Box of Drawers.

a box of drawers, or a tiny square house with many stories. As the number of bees in the hive grows, the farmer will add more stories.

Before the entrance of the hive there are worker bees on guard against enemies. Still others sit in the doorway, just fanning their wings for hours at a time. The fanners are driving the stale air from the hive and pumping fresh air into it.

When the worker bee, loaded with nectar and pollen, enters the hive, a crowd rushes up to see what she has brought. Like children with their mother's market basket, they all try to get a piece of the sweets. She pushes them aside and makes her way to the place where the nectar and pollen are to be stored. Here she sometimes

rests for half an hour or so before unloading.

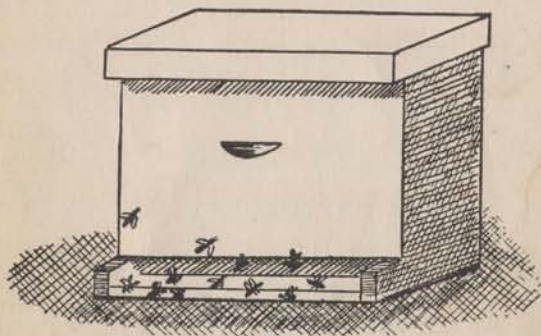
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All through the hive are little six-sided rooms, side by side as well as on top of each other. These rooms are called cells, and their walls are made of wax. The walls are so thin that three thousand of them would be no thicker than a penny candle.

The wax that the bees use to build their cells oozes out of the under side of their bodies. As a flat piece of wax comes out, the worker bee tucks it under her chin, just like a napkin. There the wax stays soft. When the bee passes an unfinished cell, she places the piece of wax on it, smooths it, and polishes it. Then away she goes, dancing happily. Bees always seem to dance at their work.

The cells at the bottom of the hive

form the nursery. Some of them are used as cradles for the young. In some, little bee eggs are hatching. In others, the Queen Bee may even now be laying



There are Worker Bees on Guard against Enemies.

eggs that will grow into more Queen Bees, workers and lazy drones.

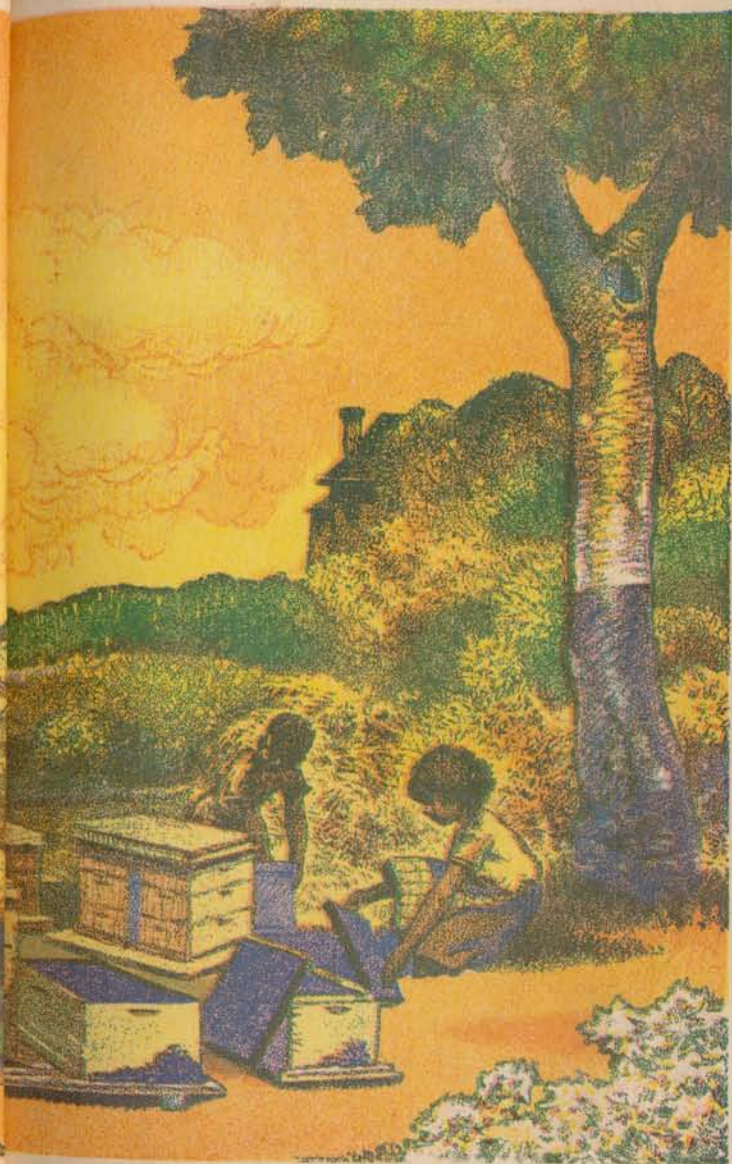
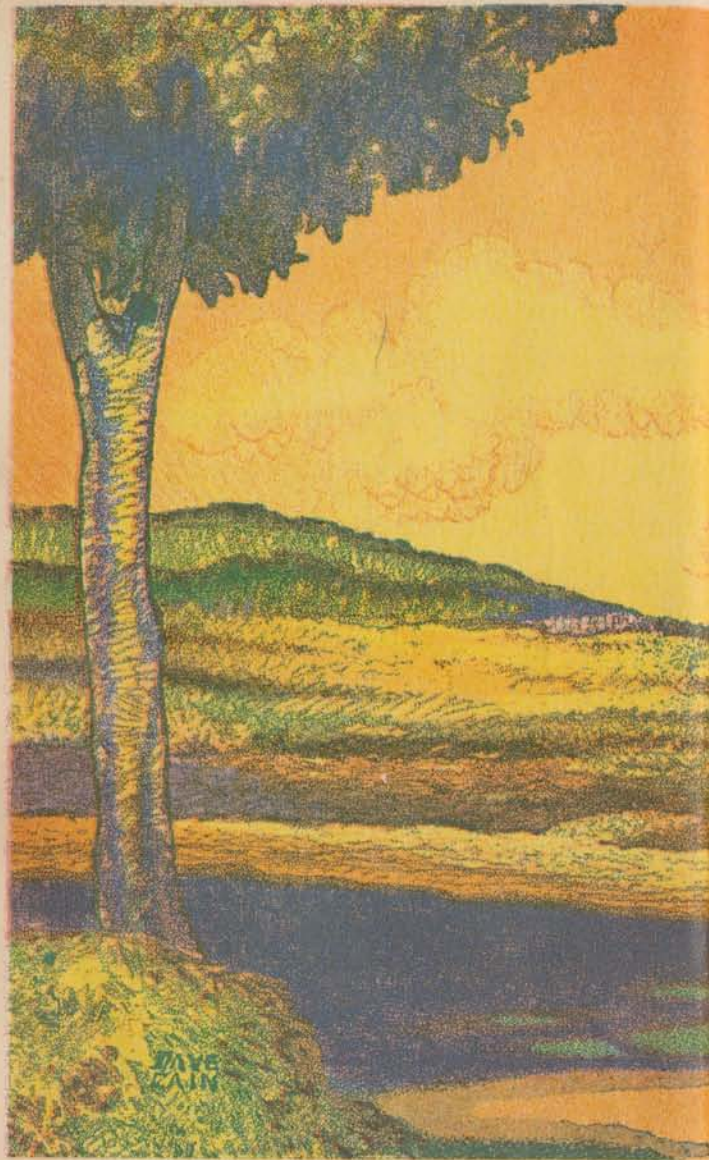
The honey cells are higher in the hive. Here the worker bees are packing the honey and pollen that they will use for food during the winter when the flowers are gone and the flow of nectar stops. Here perhaps are the drones — fat hairy

fellows — feeding at a day long dinner.

The worker, the Queen and the drone bees all look a little different from one another because all do different things within the hive. The worker and Queen are females; the drone is a male.

The worker is about half an inch long. She has six legs and two pairs of wings. On her flat head are two feelers, and she uses them sometimes as we use our fingers when we are feeling our way in the dark. At her back, just where a tail might be, is a stinger. When she stings someone, the stinger is torn from her body and she dies. But she loves her hive and her Queen so much that if necessary she is willing to die protecting them.

The worker bee is often in danger, because she flies so far from home. Her



stinger helps to frighten away enemies. But she also has marvelous eyes to warn her when enemies are near. The two eyes that stick out on the sides of her head are large and have many sides like diamonds. On the top of her head are three small eyes, but no one knows whether she can see with these eyes or not.

All bees have many hairs on their bodies,



She Rolls the Pollen into a Ball on her Leg.

to a ball on one of her legs and is ready to carry it home for food.

and the worker bee makes good use of hers. As she speeds from one flower to another, the pollen clings to these hairs. When she has enough, she rolls the pollen in-

The drone is larger and fatter and hairier than the worker, but he has no stinger. The Queen Bee is the largest and longest of all. Her abdomen is especially large because the many eggs she lays each day are stored there. Like the worker, she has a stinger, but her hairs are short and thin.

All day long, as the Queen lays her eggs, there are worker bees attending her. They clean her and they feed her, because she doesn't leave the hive to find her own food. They even chew her food for her, because she must have so much food to make eggs that she needs help to digest it. It is not strange at all to see a Queen bee stick her tongue into a worker's mouth and drink the food the worker has been chewing for her.

As the Queen lays her eggs in cell

after cell, the worker bees follow to make sure that the eggs are warm and safe. In each cell they have placed food so that when the egg hatches, the baby bee will have something to eat. Then they close the cell with wax and let the egg lie there until it hatches.

After a while out comes a little live thing that looks like a worm. This is called a larva. The larva eats all it can and falls asleep in a sort of shell that has grown around its body. While it sleeps it grows. And while it grows it changes. At last when it awakens, the worm robe falls off and there is a beautiful young bee. She rubs her nose and brushes her hair and begins to look for her first breakfast.

Eggs that are to be hatched into drones are put into larger cells. These cells

contain more food and the drone larvae eat more than the worker bee larvae before they fall asleep in their little shells.

But the eggs that the workers nurse most carefully are the ones which will grow into Queens. When they decide to hatch a Queen, they build some very large cells. Then they take worker eggs and put them in these large cells. Around the inside of the cells the workers spread a special kind of food called royal jelly.

It is the magic in this royal jelly that makes the worker egg grow into the wonderful Queen Bee.

When the first young Queen steps out of her cell she looks for any Queen eggs that haven't hatched. If she finds any she kills them, so she will be the only young Queen in the hive.

But the old Queen is still there. Sometimes the young Queen kills her. Sometimes they live together in peace for a



Sometimes the Young Queen
Kills the Old Queen.

while. But that can't last long, for the hive would become crowded with two mothers and all their children.

The old Queen will have to go soon, and her loyal followers will go with her.

A few days after her birth the young Queen leaves for her wedding flight. She meets one of the drones in the air, and when she returns she is ready to lay her eggs.

And the drone! What a helpless creature he is! He does not work at all, he gets in everybody's way, and just fills himself with the sweets his worker sis-

ters carry in. So he gets very big and very fat. He is waiting for only one thing — to be married, to the new Queen.

The worker bees let the drones live in the hive and eat all they want until the wedding. They know that one of the drones must marry the Queen so there can be more young bees. But after the wedding all the drones are driven out to starve or freeze, or to be killed by other insects. For without a stinger, the drone cannot protect himself.

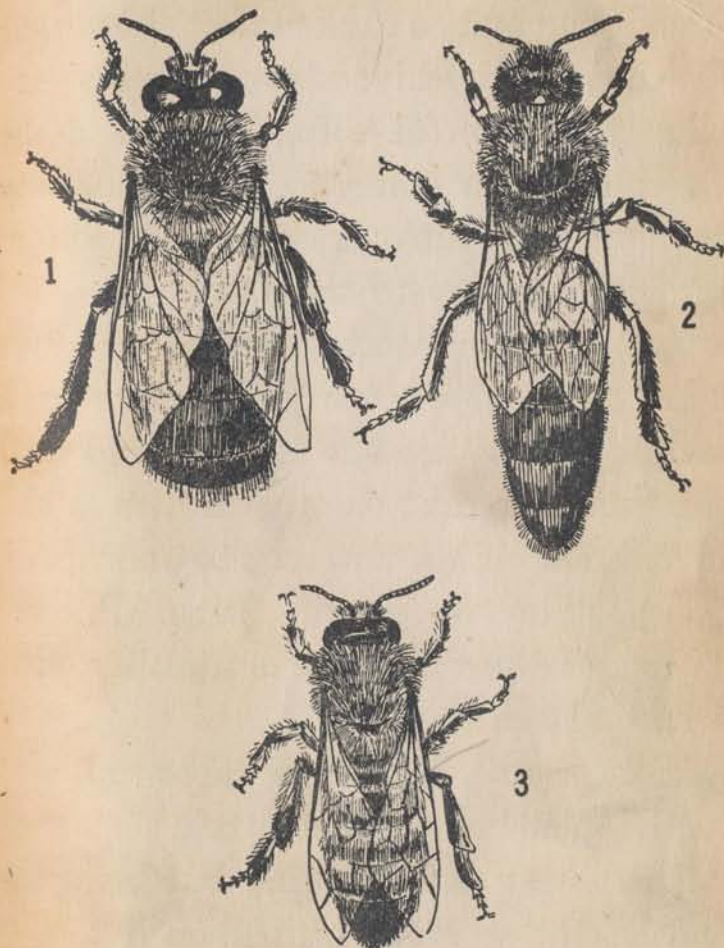
It is the workers who really run the hive. Without them, there would be no hive at all, no babies, no Queen, not even a drone.

The worker bee is busy from sunrise to sunset almost from the day she is born. When she is young she acts as nurse to the larvae that will later grow

into other bees. After a while she must help to pack the pollen as the older workers bring it in.

Now the young worker leaves the hive for the first time. She plays around the entrance like a happy kitten. She rushes here and there, tumbling and whizzing about and teasing the fat drones that loaf nearby. In the meanwhile she learns how the outside of the hive looks and where it stands. Later, when she goes a long way to gather nectar she can always find her way home again.

Soon afterward she makes her first trip to the flowers. She spins around them, hopping here and there. When she returns, she brings back her first ball of pollen, and there is no more excited bee in the hive than this one. She



The Drone (1), Queen (2), and the Worker (3) All Look a Little Different.

is so proud and so excited that she whirls all through the hive showing everybody what a wonderful thing she has done. Of course, the older bees have already brought in thousands of balls of pollen. It's an old story to them.

Soon after the worker gathers her first ball of pollen, she learns to make trips for nectar. When she is able to do this, she begins to take on other duties in the hive. She builds honeycombs and ripens honey. She sweeps and cleans. She repairs and glues loose parts together with a special bee glue.

In fact so hard does she labor that she really kills herself with work.

The Queen does nothing but lay eggs and let the workers wait upon her. So she can sometimes live for two or three years, mothering the hive summer after

summer. But the worker bee will hardly live longer than six or seven weeks. While a human being can rest and rebuild his body when he sleeps, the body of a bee does not do that. The harder the bee works, the shorter is her life. But she enjoys her work. So when there is nectar in the flowers and work to be done, she drives herself on and on, up until her last days.

When we do a hard day's work most of us aren't ready to stay up all night doing more work. We want to go to bed and rest. But that is not how the bees feel. Often they stay up late to work on the nectar gathered during the day. They fan their wings and shake this nectar in their mouths a drop at a time. It becomes the thick syrupy honey which comes to our table.

When a farmer comes past a hive late at night and hears the happy buzz-buzz of the workers as they chew over their nectar, he himself feels happy too. He knows he is going to have a large honey crop.

The bees themselves seem to be excited when they have a good day. Often in the evening the farmer sees them parading around in front of the hive, buzzing merrily, and looking like holiday crowds at Easter time.

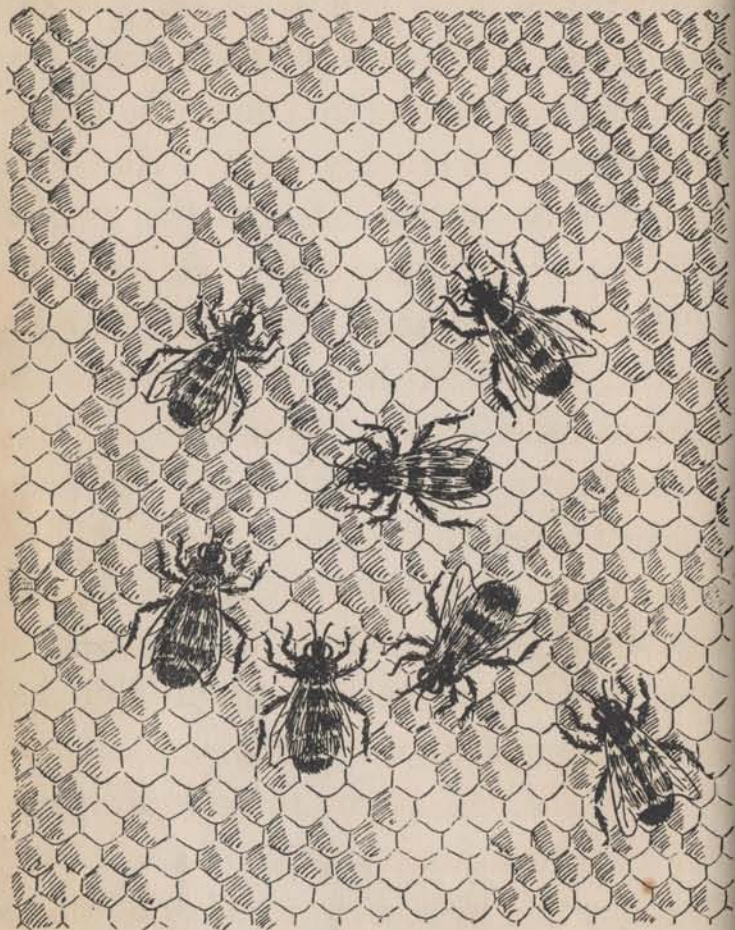
When there is plenty of nectar the bees will be good-tempered. We can tell how a bee is feeling by the kind of buzz she makes. A high hissing kind of buzz means that the bee is angry. Perhaps the flowers haven't been giving as much nectar as she likes. Perhaps some person or animal has frightened her.

But if she is well fed, and her hive is full of honey and people let her alone, there is no more pleasant insect than the honey bee. Then her buzz is like the purr of a contented cat, and the farmer who hears it is also contented.

When unhappiness begins to spread in the hive, then the farmer must keep his eyes open for swarms.

Bees may swarm for many reasons. Maybe there are two Queens in the hive and one of them is leaving with her followers. Each of those who will leave with the swarming Queen fills her sac with honey so there will be enough for all to eat until a new home is found.

Sometimes the workers go out and find a new home. Then they go back for the Queen and guide her to it. But more often the old Queen marches to the door



Drones Feeding at an All-day Dinner.

of the hive when all is ready, spreads her wings and soars away, followed by her workers' army. When the Queen stops to rest, her army stops. When she flies on, they follow.

The farmer who keeps the bees tries to prepare for the swarming time by putting empty hives in places where the bees can see them. Then they will not fly too far away.

The farmer knows, too, that if he can pick up the Queen Bee and place her in a new hive, all the others will rush after her, make her comfortable and begin building new cells or honeycombs again. The Queen will begin to lay new eggs. The workers start out for new honey. The old life in a new home has begun again.

There are other reasons for swarms.

There may be illness. The hive may be smelly. There may not be food nearby. Sometimes they just want to return to the old life in the wilderness. They want to live in the trees again as they did long ago.

Sometimes the farmer will try to prevent swarming by cutting the Queen's wings. He knows that the swarm will not go very far from the Queen. If the Queen cannot fly far away, the farmer will always be sure of capturing the swarm again.

But if the farmer takes care of his bees and gives them enough to eat, and a big enough hive, his bees will not run away from him.

Bees like comfortable homes, just as we do, and hardly ever move away without a good reason.

But even in a comfortable home, bees have troubles. In winter they have to keep the hive warm enough so that they will not freeze to death. Many times a farmer has come upon a cold hive. Before the entrance are the dead bees which have been carried out of the hive by the live bees within.

To keep warm in the winter time the bees come close together inside the hive. They move quickly around and rub against one another, moving their wings all the time. This keeps them warm, just as it keeps us warm to stand close to someone else.

Like us, bees have sicknesses. They get stomach aches and fly about slowly, and don't dance at their work.

And like men, bees have enemies. There are some bees who don't like to

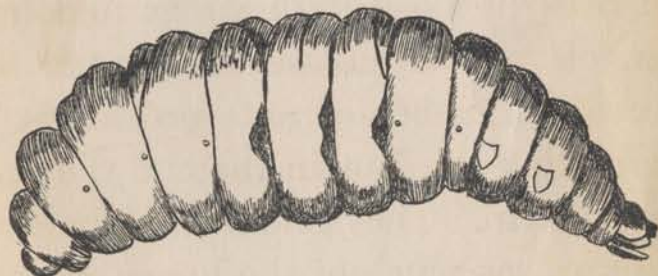
work for a living. And so they try to get into another hive to steal food.

When a robber bee comes near a hive, she goes very slowly at first. She circles about, and then suddenly darts into the hive. Now if she had gone into that hive as if she had always lived there, the other bees would never have noticed her. But a robber bee always acts like a robber. She is afraid because she is doing something wrong.

When the other bees notice the robber, they all rush at her. And off she flies at full speed to save her life.

But bees have worse enemies than robbers. In the south of the United States there is a kind of ant which attacks the beehives and destroys every bee there.

At first these ants come out a few at a time. They steal a little honey here.



M.A.P.

The Larva Falls Asleep in its Shell and Wakes up a Beautiful Young Bee.

and a little honey there. The honey feeds the old ants and the young ones. After a while the young ones grow up, and there are enough ants to make an army. Then this ant army comes marching up to the hive in thousands.

There is a terrible battle. Many of the bees lie dead with wings and legs torn off and heads cut to pieces. Of course, a number of ants are killed in the battle too. But in the end the ants usually win. They climb into the hive and steal as much of the honey as they can carry.

Farmers take special care to protect their hives from these ants. They look for ant nests and pour boiling water over them.

There is one story that shows how bees get the better of some ants.

A few of these ants were beginning to rob a hive. But there were not enough ants to make a big war on the hive. And the bees could not kill them because of their hard shells. What did the bees do? They picked up every ant that tried to climb into the hive. Then they carried the ants across a stream, so that the ants could not cross the water to come back to the hive again.

That's how wise the honeybees are!

Of course there are other bees besides honeybees, and in their way they are just as wise and just as clever.

Like the honeybee, some are social. That means they live together in large numbers. Others live alone. These are called solitary.

The miner bee is a solitary bee. She makes a hole in the ground, builds a



All Day Long there are Worker Bees Attending the Queen.

nest there, and lays her eggs. Carpenter bees are very much like miner bees, but they bite into solid wood to make their nests. Sometimes they will make a long hole in a stump of wood. They lay an egg at the bottom of the hole and cover it. Then they lay another egg and cover it, and so on. The wonderful thing about this is that the last egg to be covered is always the first to hatch, making way for the one under it!

The solitary bees make up a little family of mother, father and a few babies.

Bumblebees are social bees. But they don't stick together as the honeybees do. At the end of the summer, the female bees leave the hive and find hiding places for the winter. The drones all freeze to death. In the spring the females

come together and build a new hive again.

The honey of the bumblebee is not very good for us to eat, but bumblebees are very useful to the farmer. They help him grow a good clover crop.

Bumblebees are the only bees with tongues long enough to get deep into the long-necked clover blossom. And as the bumblebees pass from clover to clover they carry the clover pollen from one blossom to another. Then the clover seeds get ripe and much clover grows from them. The farmer's cattle get fat and his ground gets rich and fertile. So even the bees that don't make honey for men can be of use in other ways.

The best way of learning about the bees is to go out to a farm, and watch them work. The farmer will give us

something to cover our hands and face, so we won't get stung. After a while the bees will even come very close without stinging us.

We should never be afraid of a bee. She will not sting unless we try to hurt her or her hive. She is really a very friendly insect, as well as a very useful one.



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Writers' program
Story of bees

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