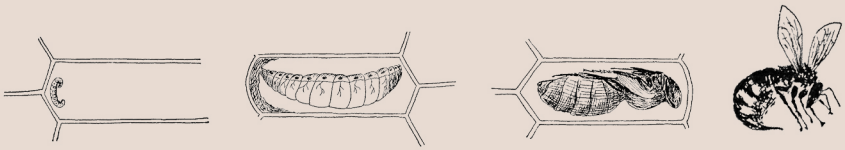

Nature Lessons for Young Explorers

THE BEE PEOPLE

MEET MISS APIS—
TINY WORKER, MIGHTY WONDER.

MARGARET WARNER MORLEY

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by

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INTRODUCTION

BEES AND flowers belong together. We cannot understand the one without the other. For, you see, bees get their food from the flowers, and the flowers need the bees to enable them to form their seeds.

The flowers that we like best have bright-colored petals. The petals of a rose are pink or white or yellow. The petals of a violet are purple, and those of a forget-me-not are blue.

Sometimes the petals are separate, as in a rose or a buttercup, and you can pull them off one by one. Sometimes they are all grown into one piece, like the funnel-shaped flower of the morning-glory.

The bees can see the bright colors of the flowers a long way off. They can also smell them, for bright flowers are generally fragrant.

Flowers make a sweet juice on purpose to feed bees and other insects. We call this sweet juice nectar, and the bees take it home and make honey of it.

The flowers like to have the bees come and take the nectar. Why, do you suppose? If you have studied flowers, you will know; if you have not, I must try to tell you.

You know there is a yellow dust in some flowers. It gets on your face when you smell of them.

The Wild Rose, with five separate petals.

The Morning-Glory, with the petals grown together into a funnel.

Sometimes flower dust is brown and sometimes it is white. If you shake a golden-rod in the fall, a cloud of yellow golden-rod dust will fly out. This dust is called pollen.

Nearly all flowers have it. It grows in little boxes called anthers; and when the anthers are ripe, they burst open and let out the pollen.

You know how the anthers in a lily look. They swing on the ends of the six long slender stems that stick out of the lily flower.

Nearly all flowers have anthers, but some do not have stems to the anthers. Sometimes the anthers grow right against the inside of the flower, but wherever they may be, they *always* contain pollen.

In the centre of the flower is another part that looks a little like an anther; its stem is long, and it is marked *stigma* in the picture. This stigma is

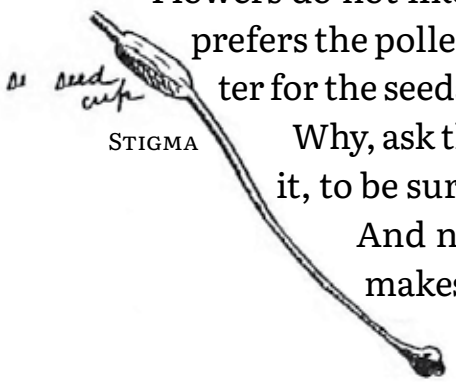
not filled with pollen. It is just a sticky knob.

When it gets ripe it gets sticky. If any pollen touches it, the pollen sticks fast. If you take away the petals and the anthers and their stems from the lily, this is what you will have left.

You see it is the stigma and its long stem, and there is another knob at the other end of the stem opposite the stigma. This other knob is hollow. It is a seed-cup and is filled with seeds. The seeds cannot grow without pollen.

If the pollen gets on the stigma, then all goes well. The sticky stigma holds it fast. It finds its way down through the long stem to the little seeds. It nourishes them, and they grow. But if the pollen does not come, the seeds die.

Flowers do not like their own pollen. One lily prefers the pollen from another lily. It is better for the seeds. But how to get this pollen? Why, ask the hairy-coated bees to bring it, to be sure.



And now you see why the flower makes nectar. It wishes to coax the

bees to come. When the bees go down to the bottom of the flower after nectar, they will be sure to get their coats dusty with pollen. Then they fly to another flower, and some of the pollen on their coats is rubbed against the stigma and stuck fast there.

The nectar is always placed so that the bees have to touch the anthers and the stigma of the flower on their way to the feast.

Many flowers have bright lines or spots leading to the nectar that the bee may lose no time in finding it. These are called nectar guides, and you can see them very plainly in the morning-glory.

Many other insects besides bees visit flowers. Butterflies and moths and flies and even some beetles are fond of nectar and pollen, and they all carry pollen about from plant to plant.

When insects carry pollen to the stigmas, we say they *fertilize* the flowers. Unless a flower is fertilized, it will bear no seed.

Bees eat pollen as well as honey, and while gathering it from different flowers they are sure to dust the stigmas.

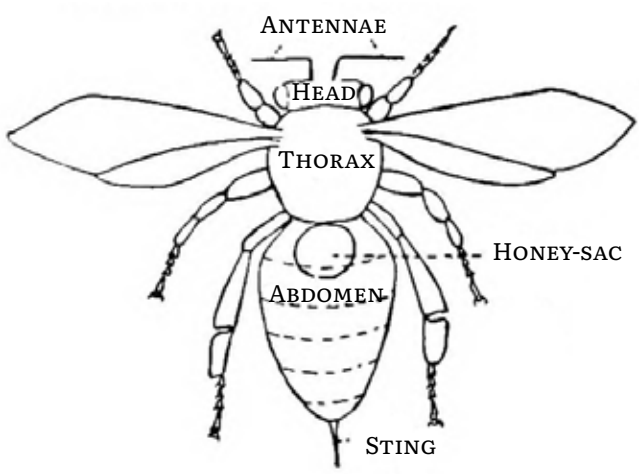
Flowers can be fertilized only by pollen from other flowers of their own kind. Lilies can be fertilized only by pollen from other lilies, and roses by the pollen of other roses. Lily pollen cannot fertilize

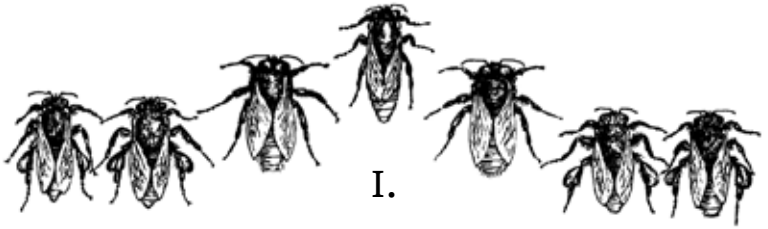
a rose, nor can any pollen fertilize any flower but one of its own particular kind.

The three chief parts of a bee are the head, the thorax, and the abdomen. The head bears the antennæ, tongue, and eyes.

The thorax has attached to it the wings and legs.

In the abdomen are the honey sting and the honey-sac.





I.

APIS MELLIFICA[1], OR THE HONEY-BEE

THE HONEY-BEES are buzzy, fuzzy little pepper-pots.

They have pretty, shining wings, but if you so much as touch one of them you will see what happens!

You cannot wonder that they do not like to have you come too near, for they are such little creatures that even a small child must seem to them like a tremendous giant.

How would you like to see a great warm creature as large as a hill come lumbering up and try to put a finger the size of a church steeple upon you?

I am sure you would do anything to keep it away, and if you had a good sharp sting you would use it. So we must not blame the Bee People for stinging us.

It is the only way they have of telling us to keep away and let them alone.

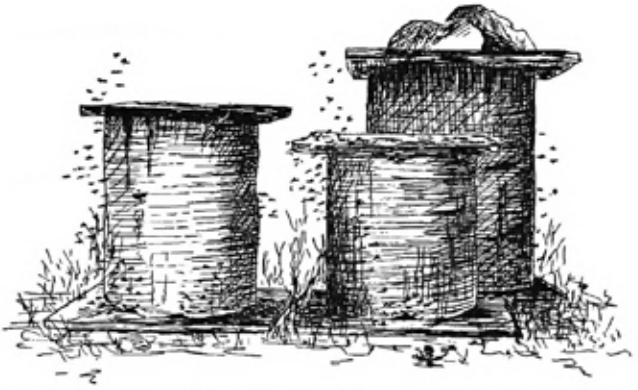
1 The modern scientific name is Apis Mellifera

Modern Hives.

They are friendly enough to their own relations, as you will agree when you learn that there are sometimes as many as sixty thousand of them living happily together in one family.

Sometimes we build houses, which we call hives, for them, and sometimes they live in a hollow tree in the woods.

The hives we usually make in these days are square-cornered boxes that can be opened to take



Bee Gums.

out the honey or to attend to the bees. In some parts of the country an old-fashioned hive called a "bee gum" is still used. If you go to the mountains of North Carolina, you will see a great many bee gums. Nearly every cabin has a row of them in its yard, and they are made by chopping down hollow sweet-gum trees and cutting off lengths of about three feet.

Sometimes other hollow trees are used, but they are all called "gums." The mountaineers stand the "gum" on a board or a stone, and put another board or stone on top for a roof. All the holes are plastered up with mud except those near the bottom, where the bees go in and out. The mud is used to keep out moths, which otherwise might get in and spoil the honeycombs.

A row of bee gums standing beside a log cabin on a mountain-side is very pretty.

A skep is a hive made of twisted straw, and in old times was used more than any other, particularly in England. It had a peculiar shape, and to this day when we

Skeps.

say a thing is hive-shaped, we mean it is shaped like the skep.

Once in a while honey-bees make their home in the hollow walls of a building, and there is a house in a New England city where bees have lived for a number of years. They are under the roof somewhere, and there they stay safe, and year after year store up honey which nobody can reach. Stories are told of old houses whose hollow walls, when they were pulled down, were found to be filled with honeycombs. It is not easy to get honey that is stored in the walls of houses, as the bees fight bravely for their property.

Honey-bees are small people, being only about twice as large as common house-flies. Some are brown all over, and some that were brought here from Italy have tan-colored abdomens, but all of them—the brown bees, the Italian bees, and the other kinds of hive bees in this country—are called by the same name, *Apis Mellifica*. *Apis* is the Latin word for bee, and *mellifica* is the Latin word for honey-making; and they have this pretty name because they make and store up quantities of good honey, which we like to eat.

The Bee People are sun-lovers, and all summer long on bright days you may see them hurrying about. But in the wintertime you would look in

vain for them, no matter how brightly the sun might shine, for they are the Friends of the Flowers and seldom leave home except when there are blossoms for them to visit.

Many flowers keep a dainty table spread for the bees. Cups of nectar and dishes of ambrosia are ready for them to eat and drink and carry home.

If it were not for these gifts from the flowers, the honey-bees could not live, as they get all their food from their flower friends.

White Clover, from which a great deal of honey is made.

II.

APIS MELLIFICA AND HER EYES

HERE COMES a little brown lady whose name is *Apis Mellifica*. She is making her wings go so fast that they buzz like a humming-top. Straight as an arrow she goes to that morning-glory flower. All at once the buzzing stops; little Miss Apis has landed feet down and right side up on the nectar guide.

Such great eyes as stare at you when you look her full in the face! No wonder she saw the bright flower a long way off and came straight to it.

She has more eye-space for her size than an owl, which is saying a good deal. In fact, her head looks as if it

were nearly *all* eyes—for two large ones cover the sides. And if you will believe me, in the space between the two large eyes, right on top of her head, are three small ones!

MISS APIS'S FACE.

Unless you shave Miss Apis's head you can see but one of these small eyes at a time, as there is a tuft of hairs in front of each, which hides it unless you are looking right down into it. In the picture Miss Apis's head has been shaved.

Five eyes!

But that is not all. Each of her two large eyes is made up of about six thousand three hundred *very* small ones.

Really, Miss Apis, twelve thousand six hundred and three eyes are a goodly supply for one bee.

It is fortunate that she does not have to keep count of them, for if she counted an eye every second it would take almost four hours to get to the end, without stopping to take a sip of honey, or even to say, *Oh, dear me!*

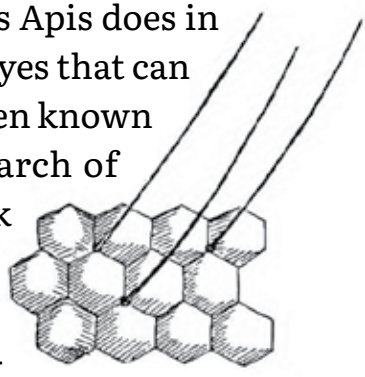
How would you like your mother to look at you out of more than twelve thousand eyes when you had been doing something naughty? Two eyes are bad enough at such times. Let us hope that young bees never do wrong.

Just imagine a naughty little bee looking up to find twelve thousand six hundred small eyes and three large ones solemnly staring at his wickedness!

The truth is, all the thousands of small eyes that make up each large eye work together and act as one eye.

Miss Apis's large eyes are called "compound eyes" because they are made of so many small eyes, or "facets."

The facets are so very small that you cannot see them except by the aid of a microscope; and here is a picture showing you a portion of the eye considerably magnified.



Whoever goes as far as Miss Apis does in search of flowers needs good eyes that can see a long distance. She has been known to fly four or five miles in search of flowers; just think of going back and forth from hive to flowers and flowers to hive any such distance as that! As a rule, however, Miss Apis goes only a little way, half a mile or so, but even for this she needs good, far-seeing eyes.

And she has them—for her compound eyes are very far-sighted.

This is probably the reason she needs the three

small eyes, which are nearsighted and enable her to see things close at hand.

Although she possesses such a prodigious number of eyes, Miss Apis has no eyelids. No, indeed! She has eye-hairs instead, that point outward and do not prevent her seeing, but keep dust and pollen from getting into her eyes.

If you look back at the picture of the facets, you will see some of these hairs. She combs her eyes every time she combs her head, and this does not seem at all funny to her, for, you see, she is used to it.

Wild Grape.

III.

HER TONGUE.

MEANTIME, WHILE we have been gossiping about Miss Apis's eyes, she has gone off.

There she is, just landing in another morning-glory blossom. She strikes the nectar guide as a shot strikes the bull's eye, then down she tumbles to the very bottom of the flower. Here are the nectar cups, five of them, filled full of sweet, clear nectar, for it is early in the morning, and Miss Apis is the first to arrive. She wants this nectar to carry home and make into honey, but how is she going to get her head into the tiny openings that lead to the nectar?

You need not worry about that. She knows what to

do, and all at once produces a long, shining, brown tongue and thrusts it deep down into the nectar. Here is a morning-glory that must have had an X-ray turned upon it, for we can see right through it to where Miss Apis is reaching her brown tongue down to the nectar.

This tongue is almost as queer as her eyes. Not that she has twelve thousand six hundred tongues. Oh, no; one tongue like hers is quite enough, as you probably will agree when you know more about it.

ENJOYING A DROP OF HONEY.

It is a long tongue and a strong tongue, and curls about, lapping up the sweetness, as you can see for yourself if you catch her and give her a drop of honey.

But now she has licked the morning-glory dry and — but what has she done with her tongue?

It was almost as long as her body a moment ago, and now it is gone.

Miss Apis, what have you done with your tongue?

Where is your tongue, Miss Apis?

MISS APIS, MISS APIS! YOUR TONGUE, MISS APIS?!

But she only looks at us out of her twelve thousand

six hundred large eyes and her three small eyes, and says not a word.

Her tongue is all right, and she knows how to hold it.

There, she is going to speak! Buzz... b-u-z-z-zz... No, that is her wing music; her tongue is still silent. Off she goes and leaves us in despair concerning it.

Now she has deposited herself in another flower — and sure enough — yes — there is that l-o-n-g, b-r-o-w-n tongue wriggling around in the nectar cup.

I will catch hold of it and pull it, Miss Apis, if you do not tell me what you did with it.

"Will you?" she seems to say, solemnly looking at us out of her twelve thousand six hundred and three eyes.

No, we will not, because it is gone again.

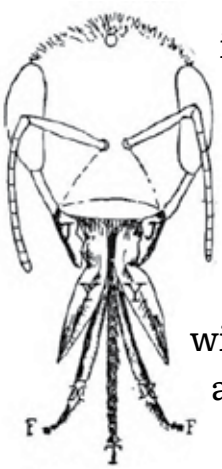
I think, in spite of her solemn and owl-like looks, she is laughing at us.

Saucy Miss Apis, what *do* you do with your tongue?

"I know what you do with yours," she seems to say, and flies off.

But now I know. I saw her do it. She pulled it in, just as you do yours when you have put it out of your mouth. But hers is such a large tongue it could not be pulled into her mouth at all. The best she could do was to pull it up as short as possible, and then fold it back into a nice little groove under her head.

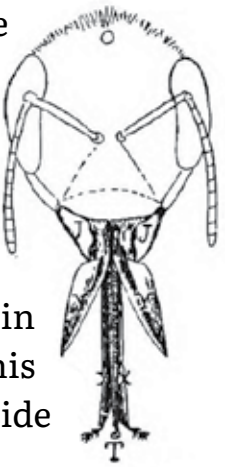
It is a very useful tongue and a very queer one. It has to reach down into long flower-cups, and so



it must be long. It has to lap up honey, and so it must be flexible. It has to find its way through very small openings, and so it must be as slender as a thread.

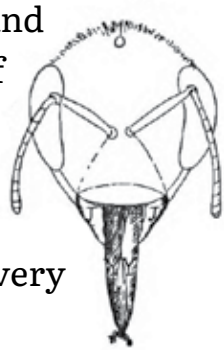
It often has to come into contact with the hard parts of flowers and plants, and so it must be protected.

It is protected by two hard, horny sheaths — one covering the upper side of the tongue (T); the other covering the lower side. The lower sheath is made of two long pieces, X, X, that can be separated, as you see in the picture. Each has a little feeler (F) at the end. Usually they lie side by side with their edges overlapping, underneath the tongue. They make a little trough in which the tongue lies, as you see in this next picture. They protect the under side of the tongue.



The upper sheath is also made of two horny pieces, Y, Y, that can be separated from each other. They lie side by side when not separated, and their inner edges overlap, so that they form a covering to the upper side of the tongue. So, you see, when the two sheaths are in their right places

they make a tube about the tongue, and the tongue is run out at the point of the sheaths when the bee wants to lick up nectar.



Miss Apis has her tongue-sheath separated into so many parts for a very good reason.

If the sheath were a closed tube, pieces of honeycomb or grains of pollen or other substances might get wedged in when she was licking up honey or nectar and give her a great deal of trouble. But as it is, if anything gets caught, all she has to do is to separate the parts of her tongue-sheath and clear it out.

Miss Apis's tongue is surrounded by rings of hairs which hold fast the nectar and enable her to draw it up into her mouth through the tube made by her tongue-sheaths.

The very tip of her tongue is like a little round plate and helps her to lick up the honey.

You see by now that Miss Apis's tongue is a very sweet tongue—in fact, a honeyed tongue, as we might say. We speak of poets and orators as having honeyed tongues, but I leave it to you if any of them can equal Miss Apis in this.

If you look in Miss Apis's face when she is not eat-