INSECT LIFE

"Eyes and No Eyes" Series

by Arabella B. Buckley

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“EYES AND NO EYES” SERIES Book VI

INSECT LIFE

BY

ARABELLA B. BUCKLEY

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CONTENTS

CHAPTER I

WHAT IS AN INSECT?

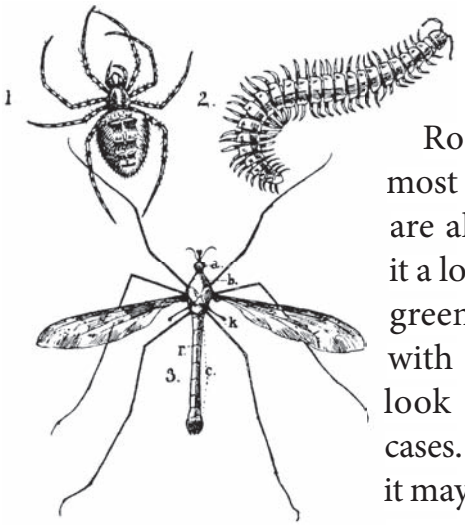
It is a lovely summer morning. Let us shut up our books and wander in the garden and field, in search of insects. The best way is to take a few card match-boxes with us, and drop one insect into each as we find them. Then when we get back to school, we can put them separately under tumblers.

Insects are so small that we often pass them by. But they form three-fourths of the whole animal kingdom, and they do us so much good and so much harm that we ought to know about them.

As we start I see a Cabbage Butterfly in the kitchen garden, and a beautiful Red Admiral flitting about among the flowers. We will take the Cabbage Butterfly, so that she may not lay her eggs on our cabbages.

Next stop at this rose-tree, there are a number of tiny insects, on the flower-stalks. If you look closely, you will see that each one has his beak buried in the stem, so as to suck out the juice. These are plant-lice. Each one is called an Aphis (*see* picture, p. 77), and in the plural they are called Aphides.

We must syringe the tree with soft soap and tobacco water, or it will soon be covered with these insects, for they increase at the rate of more than a million in a month, and they stick out all the sweet sap from the plants to which they cling. On the same tree you will very likely find a Lady-bird, for she feeds on aphides.

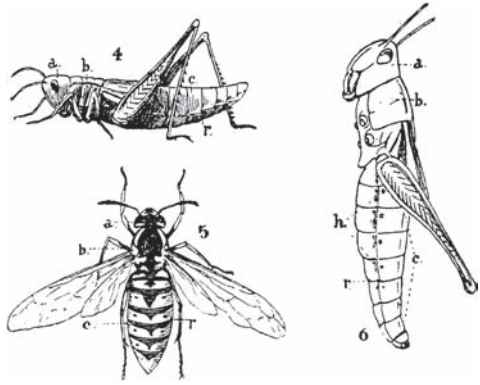


1. SPIDER
2. CENTIPEDE
3. DADDY-LONG-LEGS
k. Knobs or balancers

Now look into the flower of this old Cabbage Rose, which grows in most cottage gardens. You are almost sure to find in it a lovely Rose-beetle with green shining wings shot with gold. Take it up and look at the bright wing-cases. While you are looking, it may open these cases and spread out the transparent wings underneath; but if it flies away you can easily get another.

Now, look! At your feet runs a beetle which is not half so pretty. It is the Cocktail, or Rove Beetle (*see* p. 33), often called the Devil's Coach-horse. As you pick him up he will cock up his tail and squirt out a very disagreeable fluid over your fingers, while he raises his head and snaps with

his jaws. So drop him in his box quickly. The fact, is, he is terribly frightened, and hopes to make you set him free.



4. & 6. GRASSHOPPERS
h. **Breathing-holes**
5. WASP ***r.*** **Rings** ***a.*** **Head**
b. **Thorax** ***c.*** **Abdomen**

Now we will go out into the newly-mown field, and there you will see a number of small green Grasshoppers hopping about. They have been hatched under the earth-clods, and are eating the tips of the young grass. Some will have wings, but others, which are not fully grown, will have none. Pick one up and make him too a prisoner.

Next try to find a Wasp or a Bee. You can pick it up in your handkerchief and drop it in its box. We must go down to the river to find a May-fly or a Dragon-fly, and near there we shall easily get a Daddy-long-legs. But if there is not one to be seen, a Blue-bottle or a Gnat will do.

You will wonder that I have not asked for a Spider. You had better get one, and also a Hundred-legs or Centipede, if you can find it.

When you have put these specimens under their glasses, look carefully at them. You will find a difference between the spider, the hundred-legs and all the others. The spider has eight legs and the centipede a very great many, while all the others have only six.

Now look at the Grasshopper, the Wasp, and the Daddy-long-legs. You will see very clearly that their bodies are divided into three parts—*(a)* the head; *(b)* the front body, on which the six legs and the wings grow; *(c)* the hind body, which has no legs on it, even when it is very long, as in the daddy-long-legs and the May-fly. You cannot see these divisions quite so well in the beetle because its wing-cases cover the join between the front and hind body.

We had better call these three divisions by their right names—*(a)* head; *(b)* front body, or, *thorax*; *(c)* hind body, or, *abdomen*. It is because insects are cut into these three parts that they have their name. It comes from the Latin "inseco" (*I cut into*). The Spider's head is not clearly divided from its body, and a Centipede has not three divisions. For this reason, and because they have not six legs, some naturalists separate them from the true insects. This is why I did not call them insects.

Another thing you can notice well in the little green Grasshopper: his body is divided into rings *(r)*, from his tail up to his head; and you can see the same

in the wasp and the daddy-long-legs, the aphis and the cocktail beetle. All insects have ringed bodies.

It is these rings which enable the Wasp to bend her abdomen *(c)* when she wants to sting and to breathe. You can see, as she stands, how it keeps moving up and down all the time. This is because she is breathing. How do you think she does it? Not through her mouth as we do, but through her sides.

If you look closely at the grasshopper you will see along the sides of his body, some little black dots (*h*, p. 3), one in each ring. These are breathing holes, and through them the air goes in and out. They are smaller in a wasp, but they are there, and she is pumping the air in and out of there.

Now that we have put aside the spider and the centipede, those that remain are true insects. But there is a difference between the daddy-long-legs and the rest, which you must notice. This is that *they* all have four wings and *he* has only two. This would be very strange if it were not that we can find some remains of the right number. He has two little knobs (*k*) behind his front wings, and with these he balances himself. So he has two wings and the stumps of two more.

There is a great deal more to be learnt about these insects. But I want you to remember now that they have six legs; that their body is divided into three parts: that you can see the rings in their hind body or abdomen; that their legs and wings grow on the front

body or thorax; and that they never breathe through their mouths. Also that while bees, butterflies, and beetles have four wings, flies have two wings and two stumps.

Find as many insects as you can, and notice their different parts.

CHAPTER II

PARTS OF A CATERPILLAR

In the last lesson we found the full-grown insects very easily. But it is often more difficult to know some of them when they are young. Grasshoppers, crickets, and plant-lice, when they come out of the egg, are very much the same as when they are grown up, except that they have no wings. But the daddy-long-legs begins its life as a grub underground. The lady-bird when young is a kind of caterpillar and runs over the plants eating plant-lice. And beetles are grubs with six small legs before they grow into perfect beetles with wings.

The caterpillars of Moths and Butterflies are easy to find, so we will look at one in this lesson. There is hardly any time in the summer that you cannot find a caterpillar. Those of the Orange-tipped Butterfly come out first in April. In May the Cabbage Butterfly lays her eggs, and soon the caterpillars are eating the young cabbage leaves. A little later you may find among the nettles the black caterpillars with white spots (2, p. 19) which will turn in June into the Peacock Butterfly; or the dark green caterpillars of the Red Admiral. These

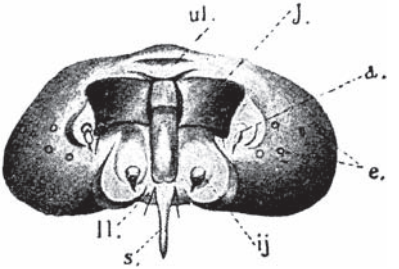
are hidden in a bunch of leaves generally tied up with caterpillar silk.

If you do not find either of these you cannot miss the heaps of little black caterpillars striped with yellow which feed under the leaves of nettles, and turn into the small Tortoiseshell Butterfly. These caterpillars are very useful in killing nettles, so the butterfly is one you should always be glad to see. Then towards the autumn the caterpillars of the big Hawk-moths do a great deal of mischief. If you go out in the evening or early morning you may find the caterpillar of the Spurge Hawk-moth feeding on the green spurge in the hedges. It is a fine creature three inches long, with three bright lines on its back, and yellow spots on each ring.

But the most common one, which I have often found, is the caterpillar of the Privet Hawk-moth (*see* coloured picture, p. 16), which feeds in the evening on the privet hedge or the lilac bushes. It is from three to four inches long, and is a bright apple-green, with seven sloping violet stripes on its sides, and a horn at the end of its body. Its head is green, edged with black, and the breathing holes on its sides are circled with bright orange.

It destroys the hedges terribly, for it is very hungry and wants to store up food so that it may grow into a moth. Though its body is soft, its head is hard and horny, and as its mouth has nothing to do in breathing, or making any noise, it can be used all the time for eating.

It is made of a great many pieces, but the parts you can see well are the large upper lip *(u l)* and the two broad strong outer jaws *(j)* which move to and fro sideways as it gnaws the leaf. As soon as a piece is cut off the caterpillar tucks it into his inner jaws *(i j)*, where it is chewed and swallowed. Under the jaws is the flat lower lip *(l l)*, through which passes a little tube. Look well at this tube *(s)*. It is the place from which comes the silk, which he uses to spin his cocoon, in which he sleeps while his butterfly body is growing.



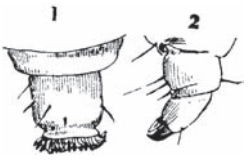
CATERPILLAR'S HEAD

ul. Upper Lip — *j.* Jaws
a. Antennæ — *e.* Small Eyes
ij. Inner Jaws — *ll.* Lower Lip
s. Spinning Tube

You remember we read in Book I. that the spider spins her web out of silk which comes from six little pockets under her body. But a caterpillar or a silkworm brings its silk out of its mouth.

Now look at the legs. There are three pairs, one on each ring of the thorax. They have joints in them and claws at the end (2, p. 10). These are true legs, and they are hard and horny like the head. When the caterpillar turns into a moth these six legs will remain. But it has also some cushion feet (*see* p. 16), on the other rings of its body, which it uses to hold fast to the twigs. These are not true legs, but only fleshy cushions (1, p. 10) with

a ring of hooks under them, and they will disappear with the caterpillar's body when the moth grows up. There are generally four pairs of cushion feet behind the true legs, and two pairs at the end of the body, but some caterpillars do not have so many. Do you know those called "Loopers," which bend their body into an arch or loop? You may often find them on the currant bushes, where they do a great deal of mischief. They have only six true legs and four cushion feet at the end of their body, and they walk in a curious fashion. They hold firmly to the twig by their front legs, and then draw up their cushion feet till their body makes a loop in the air. Then they let go with their front legs and lift up their head like an elephant raises his trunk, and stretch forward further up the twig.



1. CUSHION FEET OF CATERPILLAR.
2. JOINTED LEGS

As a caterpillar is always eating, his skin becomes so full that there comes a time when he cannot put in any more food. Then he remains quiet for a few hours, and swells out his rings. His skin splits and he creeps out, with a new soft skin ready underneath. This will stretch, and very soon he is eating away as merrily as ever.

He does this about five times in his caterpillar life, and then he stops eating and remains without moving for some days. His colour fades, and when he splits his skin and shuffles it off, all the parts of the butterfly or

moth are to be seen underneath, soft and unfinished. Soon a kind of gum oozes out over them. This hardens and keeps the tender body safe from harm while it is growing.

Now he is called a *chrysalis*, or sometimes a *pupa* or doll; and, indeed, he looks like a crumpled doll as you see his legs bent together and his head folded down over them under the hard gum. The pupa of a butterfly is generally broad at the top and narrow at the bottom, and it has ridges and prickles on it (3, Plate, p. 19). But the pupas of moths are shaped more like an egg, and are smooth (3, Plate, p. 16). Moths generally wrap their pupa in a silk bag or cocoon, but butterflies leave theirs naked, and fasten it to a stem or a blade of grass with a silken cord (5, Plate, p. 19).

The caterpillar of the Hawk-moth works its way down into the ground and lies in a hole which it lines with silk. I had one in a large flower-pot once for many months. After about seven months, or sometimes much longer, the pupa wriggles up to the top of the ground, and then breaks through its cover and comes out as a moth.

Bring in some caterpillars, each with the plant on which you find it. Keep them fed and watch their changes.

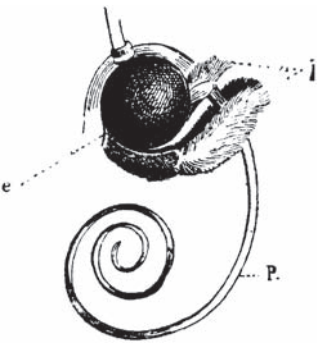
CHAPTER III

FAMILIAR MOTHS

When Moths creep out of their cases they no longer do us any harm. They spread their wings and fly about sipping honey from the flowers. Their strong jaws have almost disappeared, and feathery lips take their place. Their inner jaws have grown very long, and are rolled together into a long double tube (p. 13)—very like a tiny elephant's trunk. When the insect is not using this trunk it is rolled up under its lip, but when it wants to reach the honey in the flowers it unrolls the trunk and thrusts it into the blossoms.

In the early morning, or evening in August, you may see the Privet Hawk-moth (1, p. 16) with its beautiful rose-coloured wings striped with black, thrusting its head into the honeysuckle in the hedge. Or the large brown Humming-bird moth may be hovering in the sunshine over a bed of flowers in the garden, or sucking honey out of the deep flowers of the evening primrose. You may know it partly by the humming noise it makes with its wings, and partly because it does not settle on the flowers, but sucks as it flies.

Then there is the Death's-head Hawk-moth, which is the largest moth in England, and has this curious name because the grey marks on the back of its thorax are something like a skull. It has brown front wings, and yellow hind wings, with dark bands across them, and its feelers and trunk are very short. You may find it, if you look out after sunset in the autumn, fluttering over the hedge, for it is not nearly so rare as people think, only it always flies by night.

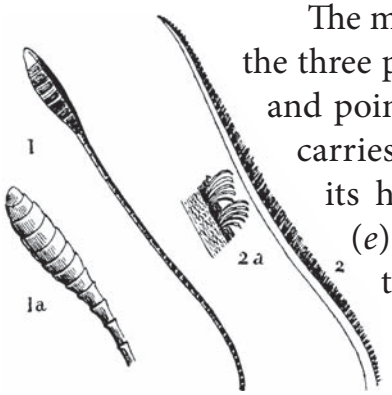


HEAD OF A MOTH

e. Large Eye *l.* Lips
p. Proboscis or Trunk

If you get one of these big moths you will be surprised to see how different it is from the caterpillar out of which it grows. The six legs are still there on the three rings of the thorax, but there are four splendid wings above them. These wings are made of very fine transparent skin, and are covered all over with scales, which are arranged like tiles on a roof. However carefully you take hold of a moth or a butterfly you will always find some fine dust left on your fingers. Each grain of this dust is a lovely scale, and it is these which give the moth its beautiful colours. Moths and butterflies are called *Lepidoptera*, because this word means "scale-winged." The caterpillar had six small eyes, so tiny that we did not notice them. The moth has these still, but it has besides two glorious globes (*e*, above) on

each side of its head, cut into hundreds of little windows, so that the moth can look every way, although the eyes do not move. The eyes of the Death's-head moth shine like red lamps in the dark night.



1, 1a. ANTENNÆ OF BUTTERFLIES
2. ANTENNÆ OF THE PRIVET HAWK-MOTH, WITH PLUMES AND SCALES (2a)

The moth is plainly divided into the three parts. Its hind body is oval and pointed, its broad front body carries its legs and wings, and its head carries the big eyes (*e*), the delicate feelers, and the sucking trunk (p. 13). The feelers or *antennæ* of moths are broad in the middle and pointed at the end, and they have tiny feathers on them. By this you may know moths from butterflies. For the antennæ of butterflies are nearly always round and thick at the ends like a club and have no feathers on them.

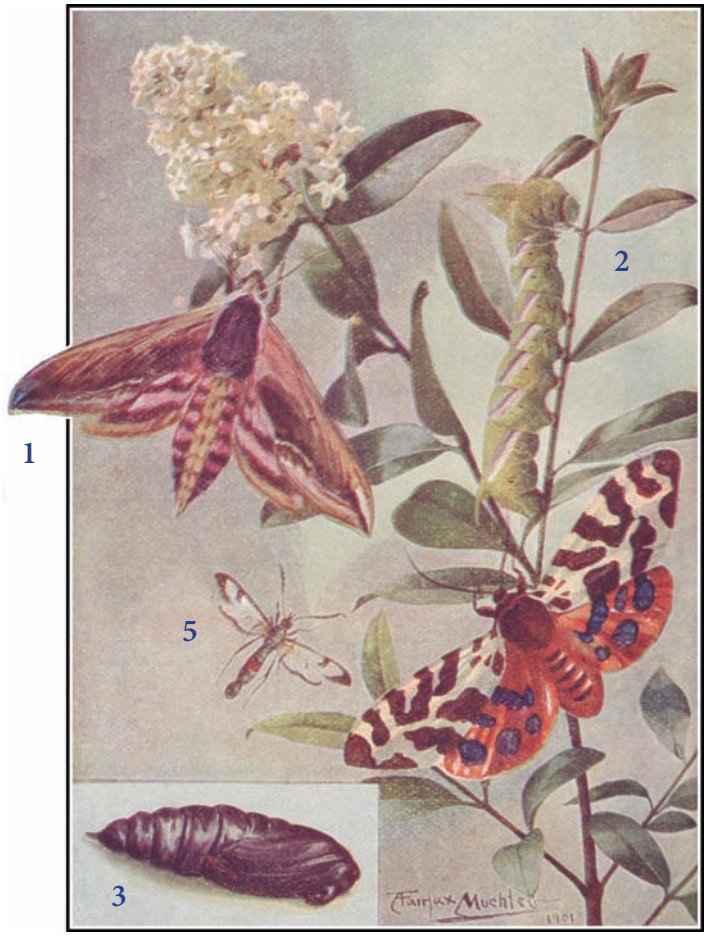
Another difference between them is, that butterflies fold their wings *upwards* over their backs so that the upper side of the wings touch each other, while moths lay theirs *down* on their backs like a roof on a house.

One common moth you may find is the Goat-moth. It has a short body and brownish white wings

with wavy black lines on them. You will find it resting on the leaves of the willow or poplar. It does not fly about much, for it has no trunk, and does not eat any food during its short moth life. It only wants to find a place on which to lay its eggs, which will hatch into a naked red grub. This grub will bore its way into the tree and live there for years, eating the wood.

SIX-SPOT BURNET MOTH WITH ITS CATERPILLAR AND COCOON

Many moth grubs live inside trunks and branches. If you look over the currant bushes on a hot summer's day you will often find a pretty little moth with a narrow yellow and black body, thin legs, long feelers and clear transparent wings, very unlike most moths. This is one of the Clearwing-moths (5, Plate, p. 16), which have scales round the edge of their wings only. It is so lazy that you will easily catch it, and it looks so like a gnat that it is called the Gnat Clearwing. This moth lays its eggs in the twigs of the currant bushes, and its little yellow caterpillar, with a black line on its back, eats its way into the pith of the twigs. You should always clear away the dead or faded twigs on the currant bushes, for fear these caterpillars should be in them.



1. PRIVET HAWK-MOTH 2. CATERPILLAR
3. CHRYSALIS 4. TIGER MOTH
5. CLEARWING MOTH

Another moth which you may find flying in the bright sunshine is of a dark blue-green colour, with six bright crimson spots on its wings. It is the Six-spot Burnet-moth, whose cocoons you may find in May fastened on the blades of long grass in the meadow. By August the moth is out and flits from flower to flower.

There is one more moth which you will like to know, because its caterpillar is the Woolly Bear, or Hairy Man, which curls itself up in a ball when you pick it up. It is very fond of feeding on the lettuces and strawberries, and when it is ready to change it bites off its long hairs and weaves them into its cocoon. When the moth comes out it runs about the flower beds in the evening and does not fly very high. But everyone knows it as the Tiger-moth (4, opposite), for it is the grandest moth we have. Its front wings are cream coloured with wavy brown stripes on them. The hind ones are bright scarlet spotted with black. Its thorax has a bright red band on it, and its abdomen is scarlet with black bars. If you can find a Woolly Bear in the early summer and keep it in a box with a piece of wire over it and give it plenty of dead nettles to eat you may see its cocoon and the grand Tiger-moth which comes out of it.

Try to find a Hawk-moth, a Clearwing-moth, a Tiger-moth, and the cocoon of the Burnet-moth. Bring in caterpillars and cocoons, when you can find them, always with a piece of the plant on which they feed.