

*Nature Lessons for Young Explorers*

# THE INSECT FOLK

TINY NEIGHBORS, MIGHTY STORIES—  
MEET THE INSECT WORLD UP CLOSE.



MARGARET WARNER MORLEY



This edition published 2026  
by Living Book Press  
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ISBN: 978-1-76183-001-3 (hardcover)  
978-1-76183-000-6 (softcover)

First published in 1903.

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by

MARGARET WARNER MORLEY





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## **A WORD TO THE CHILDREN**

DEAR CHILDREN,—THE very best way to know the insects is to go and watch them. Watch them whenever you can, and each time you will find out something new. Books will help you, but you must watch, too. Look more than you read.

If you need to catch them, put them under a tumbler, and feed them and give them a drop of water every day to drink. Slip a card under the rim of the tumbler on one side so as to let in the air. If you do not know what to feed them, or if they will not eat, let them go after a day or two.

If you wish to kill an injurious insect, do it quickly and completely. Remember the insects are alive, and we should not make them suffer unnecessarily.

Of course you must try to make your captives feel at home. If they live in the sand, put sand in the tumbler and tie a piece of netting over the top so they cannot escape.

If they live in the water, put them in a tumbler of water. And when you have secured your captives, watch them as much as you can.

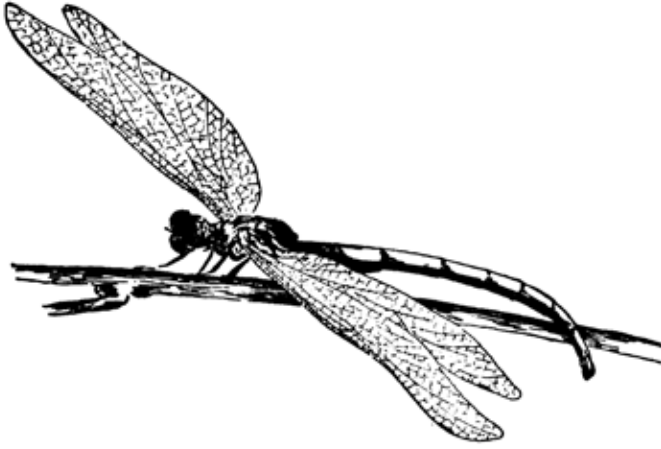
If you do not know how to pronounce the words in this book, study the glossary at the back and it will help you.

I hope you will have a very happy time getting acquainted with your little insect neighbors.

MARGARET WARNER MORLEY.

Boston,  
April 18, 1903.

**ODONATA,**  
**EPHEMERIDA,**  
**PLECOPTERA,**  
**THYSANURA**



## **OUR PRETTY DRAGON FLIES**

COME, CHILDREN; come with me.

Come to a pond I know of.

See how the water shines in the sun.

Over there is an old log lying on the edge of the pond.

It is covered with green moss, and a green frog is sitting on one end of it.

Let us go and sit on the other end.

Goop! he says, and—plump! he has jumped into the water.

That is too bad, frog; we did not mean to disturb you.

How pretty it is here!

See the pickerel weed growing out in the water with its arrow-shaped leaves, and its spikes of purple flowers.

See, down in the water are little fish, and very likely pollywogs are there too, and lots of queer little things.

But who is this darting over the pond?

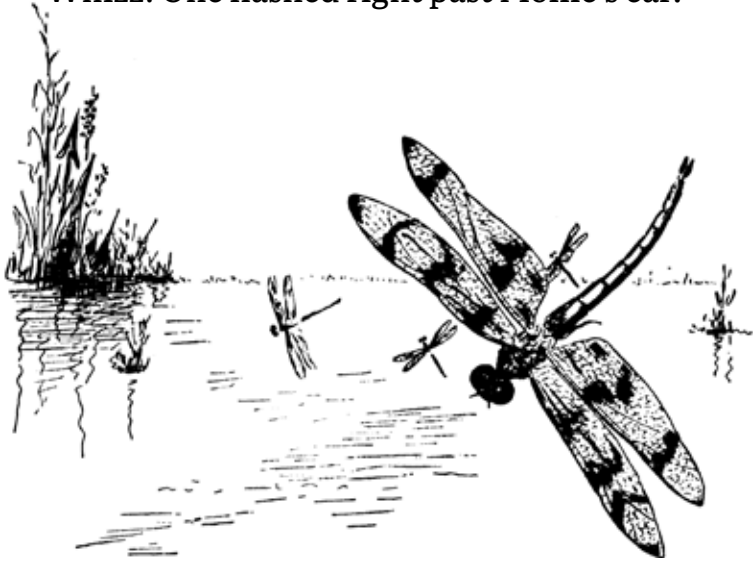
Ah, we know you.

You are our queer little, dear little old dragon fly.

Look, children; see the dragon flies darting about like flashes of light in every direction.

They are having such a good time.

Whizz! One flashed right past Mollie's ear.



Pretty people, I wish one of you would come and sit by us a little while, so we could get a good look at you.

What is that, Ned? You have found a large one lying on the ground?

Sure enough; it is a beauty too, with a green body and silver wings.

Something seems to be wrong with it; it does not fly nor try to get away.

What a big one it is!

My! my! what eyes!

Don't crowd, Amy; let little Nell see too.

What is that you say, Richard? "It catches mosquitoes and gnats and flies and other insects while flying."

Yes, and that is why it has such big eyes. We should need big eyes ourselves if we were to spend our time chasing mosquitoes.

Two eyes you have, little dragon fly, like the rest of us, but your eyes are not like ours.

No, indeed!

Each of your big eyes is made up of a great many small eyes packed close together.

Do you know, children, that some of the largest of the dragon flies have as many as twenty thousand facets, or small eyes, in each large eye?

Think of it! Forty thousand eyes in one little dragon fly head. It ought to see well.

These facets are six-sided, excepting those along the edge, which are rounded on the outside.



You cannot see their real shape without a microscope, they are so small. But here is a picture of some facets as they look under the microscope.

Eyes like these, made up of many facets, we call compound eyes.

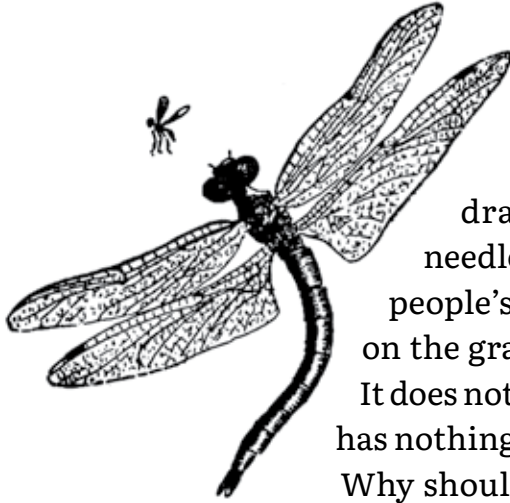
Most grown-up insects have compound eyes, though not many have as large ones as the dragon fly.

Only insects that chase other insects or that need to see in the dark have very large eyes.

See what a big mouth the dragon fly has. Its jaws do not show unless it opens its lower lip, which fits over its mouth like a mask.

I should not care to have it bite my finger.

It could not hurt very much, and its bite is not



poisonous, still  
I shall handle it  
carefully.

Some call the  
dragon fly a darning  
needle, and say it sews up  
people's ears when they lie  
on the grass. This is not true.  
It does not sew up anything. It  
has nothing to sew with.

Why should it want to sew up  
people's ears, anyway?

It does nothing unpleasant but bite fingers, and it  
never goes out of its way to do that.

If we let it alone, it always lets us alone.

It is our good friend because it catches mosquitoes.  
For this reason it is sometimes called mosquito hawk.

We should never kill a dragon fly.

Sometimes it is called a spindle, I suppose because  
it is long and slender like a spindle.

Down South the colored people believe the dragon  
fly brings dead snakes to life, and they call it snake  
doctor.

In some places it is called snake feeder.

But it has nothing to do with snakes, dead or alive.

The French have given it a pretty name, *demoiselle*,  
or damsel fly, and that is quite deserved, for  
the dragon fly is a graceful little creature, as  
pretty as pretty can be.



See, sticking out of the front of its head are two little feelers, or antennæ, as we must call them.

They are very short, but it does not need long ones.

Insects smell with their feelers, you know, but our dragon flies see so well they do not need to smell very well, I suppose.

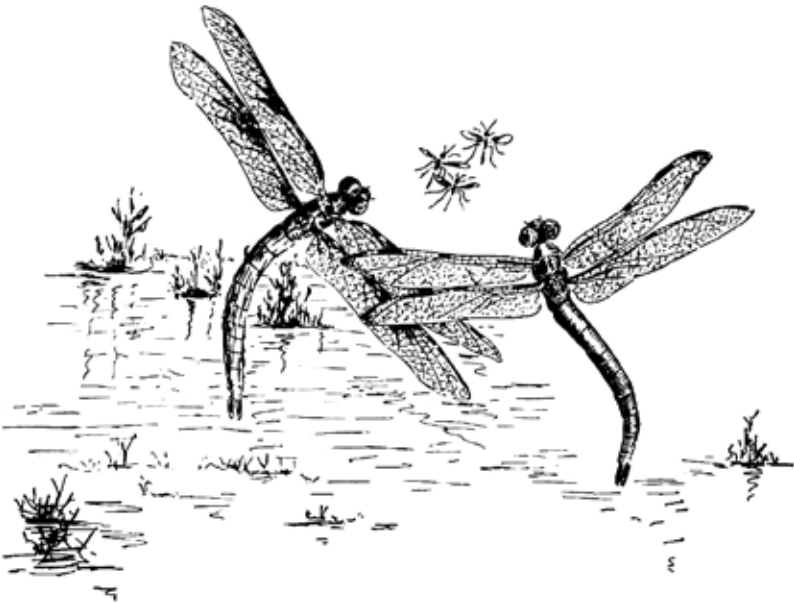
See how it can turn its head around. That is because it has a little short neck between its head and its body.

Its eyes, its mouth, and its antennæ belong to its head.

Of course our demoiselle can fly well; one need only look at those wings to know that.

To fly well is quite as necessary to one of its habits as to see well.

What would be the use of seeing an insect if it could not fly fast enough to catch it?



We all like your pretty wings, little dragon fly; they look like glass and they shine so in the sun.

How fast the wings can move! See that dragon fly skimming over the pond; its wings make a whizzing sound as it darts about.

Why does it zigzag so?

Why doesn't it fly in a straight line?

Yes, Mollie, you are right, it goes zigzagging along after insects.

It sees one it wants off at one side—whizz! around it turns after it.

Shouldn't you like to fly like that, children?

And yet we would not be willing to exchange our arms and hands for wings.

We could not whittle a stick nor write a letter if we had only wings.

In fact we could not do most of the things we now do.

I am glad I have my hands.

We are glad, too, that the dragon flies have their pretty, swift wings.

They have four wings, all nearly the same size and shape, you see, and they are all stiff and shining.

Some dragon flies, like this one we have picked up, always keep their wings spread out.

But over there, standing on the end of that stick, is another kind.

When it rests its wings are folded together.



What a pretty one it is! Do you see it?

It is small, but so pretty.

It is bright blue and shines as though it had been polished.

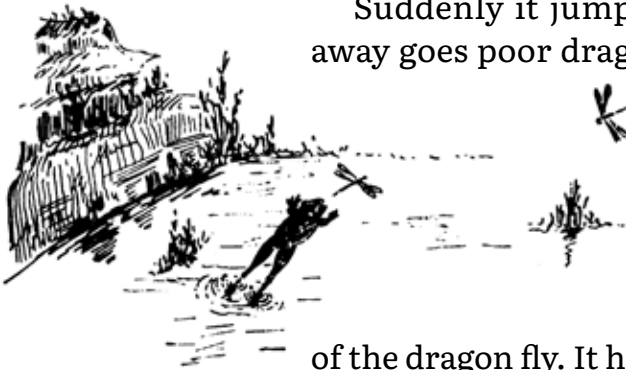
Sometimes birds catch these smaller dragon flies, though birds, as a rule, are not fond of any of them.

They are so hard and their wings are so stiff I should think a bird might almost as well swallow nails.

I am sure no bird could swallow one of the big ones, wings and all!

But frogs can.

A frog will try to swallow almost anything it can catch, and it watches for the dragon flies when they come to lay their eggs in the water.



Suddenly it jumps out, and away goes poor dragon fly into

that great wide frog-mouth.

Now look at the legs

of the dragon fly. It has six.

Every dragon fly has six legs.

They are rather short and small for so large an insect, but that is because it does not need large, strong legs.

You never saw a dragon fly dig a hole, or run, or even walk, did you?

Their legs are not arranged for walking. All six of them are directed forwards as though they were reach-

ing out after something. And so they are—reaching out after insects.

Dragon fly catches his prey while he is flying, and he grasps the insects with his feet.

He snatches one, and then what?

Does he sit down somewhere and eat it?

Not he, he is far too hungry for that; he continues his swift flight, and as he flies he eats.

As soon as he has finished one fly or gnat, zip! he snatches another.

He has an insatiable appetite, consuming hundreds of insects in the course of a day. Nor does he confine his attention to flies and gnats and mosquitoes and such small fry. He catches what he can. A large dragon fly will even gorge himself on one of the large-sized butterflies, and one has been seen calmly chewing away at an enormous wasp!

No, indeed, Mabel, the dragon fly does not eat the wings of the butterfly, it eats only the soft body.

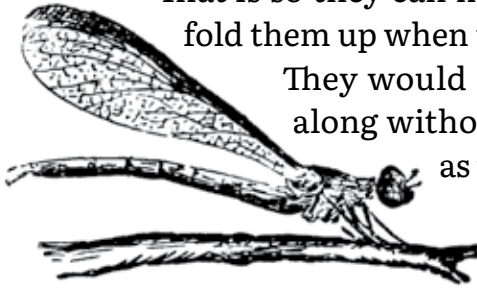
Probably nothing eats a butterfly, wings and all. Birds and insects sometimes catch butterflies, and you often see the bright wings lying on the ground. The wings of insects are not worth eating, and are almost always cast aside by the creatures that eat the insects.

Besides catching insects with their legs, the dragon flies cling fast to things with them, but when they wish to move they do not walk, they fly.

Yes, indeed, Frank, you are right; their legs are jointed.

That is so they can move them easily and fold them up when they want to.

They would find it as hard to get along without joints to their legs as we should.



Wouldn't we be stiff if we had no joints!

See, the legs and wings are fastened to the middle part of the body, the thorax, we call it.

All insects have the legs and wings attached to the thorax.

The rest of the body is the abdomen. See how long it is.

It is the long abdomen that gives the dragon fly its name of spindle, I suppose.

The abdomen is jointed, and it can curl up.

All grown-up insects have a head, a thorax, and a jointed abdomen.

What are you looking at, Charlie?

Something moving in the bottom of the pond?

Let us get it out.

Here, we will dip it out with this cup.

What a lot of stuff!

Sticks and mud—and—what is that?

Something alive, surely.

Let us put some clean water in the cup and examine what we have found.

My! my! what a queer little thing!

What do you suppose it is?

Ah, I know now, but I do not think you could ever, ever guess, not if you tried a week.

It is a young dragon fly!

It does not look much like its shiny-winged parents.

It looks like I don't know what, with a face like—well, when you look right in front of it, like a pug dog.

Queer! Well, I should think so! What is that, Amy? Am I sure it is a dragon fly?

Yes, there is no mistake; a dragon fly one day dropped an egg in the pond, and out of it hatched—this.

It will some day become a shiny-winged dragon fly and catch mosquitoes.

We will call it larva, and we will watch it a little while.

Look and see if it has a head, a thorax, and an abdomen.

Are there antennæ on its head? And has it eyes?

If you were to look at its eyes with a microscope, you would find that they are made of six-sided facets, like the eyes of the grown-up dragon fly.

They are compound eyes, but they are not as large as the eyes of the grown-up dragon fly.

How many legs has it? What are its legs fastened to?

Yes, Nellie, thorax is right.

Its six legs are fastened to its thorax. I am glad you remembered thorax.

Has it a jointed abdomen? and has it wings?

Look! did you see that?





It opened its innocent-looking face all of a sudden, just darted it out into a long-handled spoon, with hooks at the end, and hooked up that little grub.

Now it is holding the grub on the hooks in front of its mouth and eating it as greedily as if it were half starved.

So that is why its face looks so queer.

It is its long under lip all folded up in front like a mask that makes it look like a pug dog.

When it pleases it darts out that lip, and any unlucky insect or snail may fall a prey to its greedy appetite.

It is said that the larvæ of some dragon flies even eat pollywogs and small fishes.

Ned wants to know if “larvæ” means the same as “larva.”

Yes, it is the plural form of the word. When we speak of only one we say “larva”; when we speak of more than one, instead of saying “larvas,” we say “larvæ.”

The dragon fly larvæ are terrible gluttons, and hidden under the mask are strong jaws for chewing up their prey.

Their legs are quite large and strong, too, for they crawl about the bottom of the pond or up the stalks of the plants.

They do not move about very fast, but they do shoot out that under lip very, very, very fast indeed, so good-bye to any little live thing in the pond that comes within reach of it.

The dragon fly larvæ do not all look alike. They are different in the different species of dragon flies, and, like the rest of us, they change as they grow older.

Yes, May, you can keep the dragon fly larvæ until they change into dragon flies.

You must supply them with fresh water and with enough to eat.

And you must put a net over the bowl or aquarium in which you keep them, otherwise as soon as they are able they will fly away.

How can they fly without wings?

Oh, but they are going to have wings. You know they are young dragon flies in spite of their strange appearance.

Be sure and feed them enough, or else they will eat each other, and that would be a pity; and be sure there are some water plants for them to hide under and crawl upon.



You can give them a little fresh fish or a tiny bit of very fresh meat, though they like best the living things they find in the bottom of the pond.

When the dragon fly larva first hatches it is very small and its legs are rather long and spidery, but it eats and eats and eats,—my, how it eats!

And it grows and grows, and one day it finds its skin too tight.

A tight skin must be rather uncomfortable.

But the larva does not care much for its skin.

It merely splits it open down the back and pulls itself out.

Perhaps you think it must be yet more uncomfortable to be without a skin.

But it is not without a skin. It is covered by a new and soft one that soon hardens, and that is larger than the old one.

It wriggles out of its old skin as though it were an old coat, and leaves it clinging to the weeds in the pond.



Sometime you may find these cast-off dragon fly overcoats.

After it has shed its skin the dragon fly continues to grow. It keeps on growing until it has outgrown its new skin.

Then what do you think it does?

Yes, Charlie, that is right, it sheds this skin too.

When it sheds its skin we say it moults.

It moults several times, and at last little short wings appear. At first it has no wings at all, you know.

Amy wonders how the larva breathes under water.

Ah, Master Ned, you are laughing too soon. You think insects do not have to breathe, but you are very much mistaken, sir.

Insects do have to breathe.

They would die if they could get no air to breathe.

Some of the dragon fly larvæ have an odd arrangement for breathing under water. They have a sort of syringe in the end of the body, and there are breathing pores or gills in the syringe.

The water goes in and out of this syringe, and the larva breathes as the fish does, by means of its gills.

Yes, May, its gills are in its syringe, which seems very odd,—you see the dragon fly larva breathes at its tail end instead of at its head end.

Mollie thinks it is an upside-down, inside-out sort of a creature anyway. But it knows what it is about.

Ned wants to know how it can get any air to breathe when it lives under water.

The truth is, there is always air mixed in with water,

and it is this air the larva breathes when the water goes in and out of the syringe.

It uses the syringe for another purpose too. When it pleases it can shoot out the water with great force, and thus propel itself quite a distance.

By means of the syringe it can leap through the water faster than it can move by its slow-going legs.

Mollie wants to know if we can see the syringe.

No, it is inside the body.

But there is a kind of dragon fly that has a pair of gills outside, at the end of the abdomen, instead of the syringe inside.

The best I can do is to show you a picture of one. Some day we may find it in the pond.

Those two feather-like parts at the tail end are gills.

Yes, John, it can propel itself through the water by



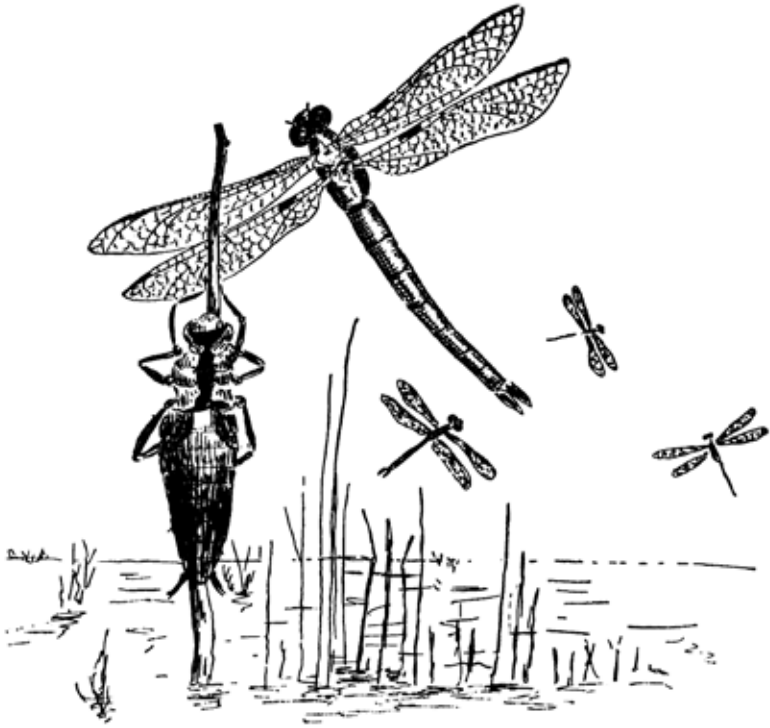
rowing, as it were, with these gills.

There are some species of dragon fly larvæ that swim by moving the

tip of the abdomen from side to side, as a fish moves its body when it swims.

But now let us return to our funny larva that lives at the bottom of the pond. It stays down there, eating and growing and moulting, for nine or ten months or even longer; then something very wonderful happens.

It suddenly feels a great desire to get up to the top of the pond.



It climbs up a weed or a stick until it is clear out of the water.

Then its skin splits down the back for the last time, and out there pulls itself, not a larva, but a weak-looking dragon fly, with soft and flabby little wings.

Now is its hour of danger, and now is the time for such birds as like the taste of young dragon flies to help themselves.

Catbirds seem to have a special fondness for these helpless insects, and have been known to eat them before the flabby little wings had grown stiff.

If the birds do not find the newly emerged dragon