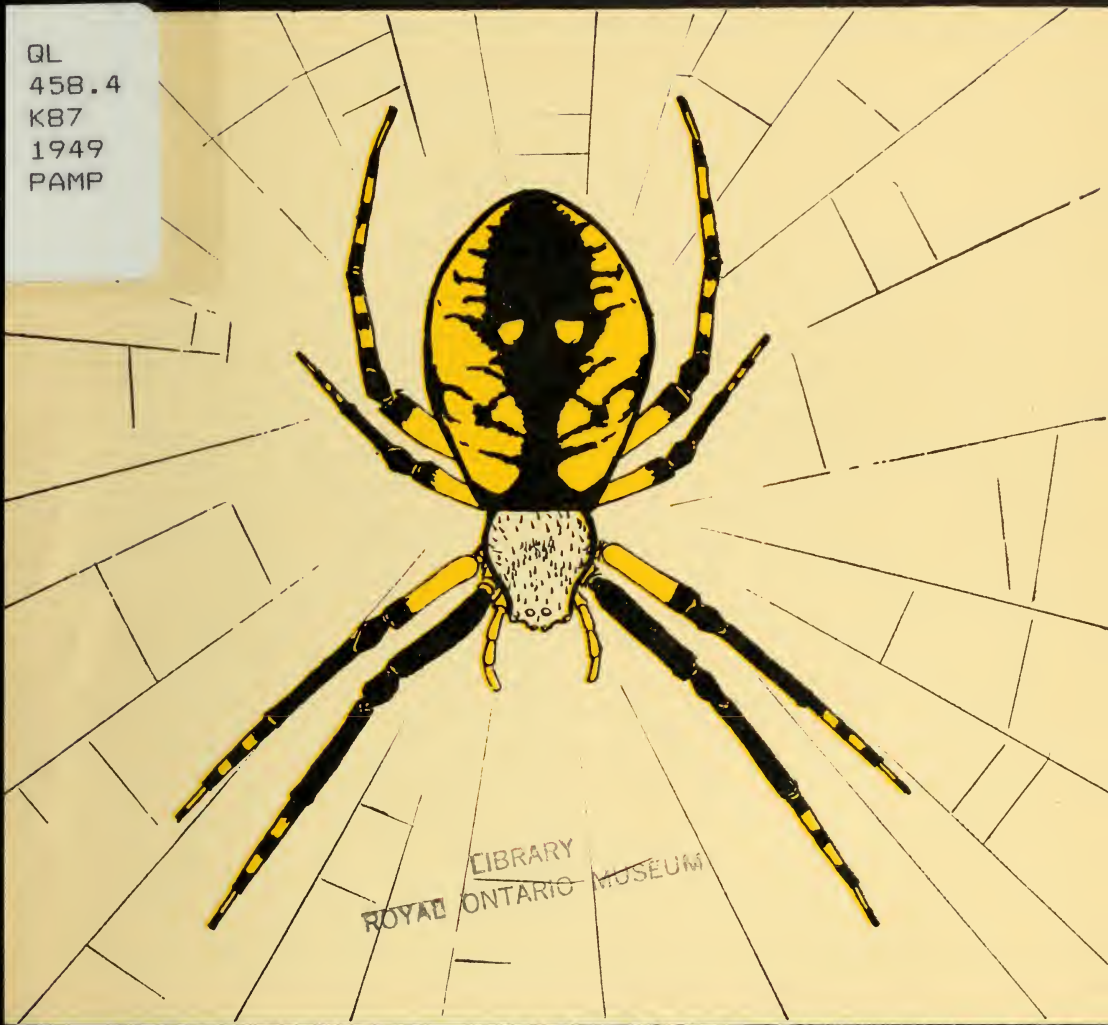
Spiders

By J. B. Kurata



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SPIDERS

BY
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SPIDERS

Spiders are such harmless creatures

Little Miss Muffet sat on a tuffet
Eating her curds and whey;
Along came a spider and sat down beside her
And frightened Miss Muffet away.

EVER SINCE YOUR CHILDHOOD DAYS YOU HAVE BEEN TAUGHT to associate frightening experiences with spiders. The fairy tales and ghost stories you read usually included large, black sinister spiders to form the background for the more gruesome chapters. You also learned to associate dirty, deserted buildings and untidy cellars with spiders and their dust-collecting webs. Is it any wonder, therefore, that the spider is so unpopular? Is it any wonder that so few naturalists make a study of spiders? And yet the spider is one of the most interesting animals inhabiting our earth, a fact with which you will concur when you have finished reading this booklet.

No doubt you will say, "Perhaps spiders are interesting creatures, and I know that they have been associated with fairy tales and ghost stories, but is it not true that spiders will bite you?" Yes, some spiders will bite you, but so will many other animals possessing jaws, if you annoy them. You also know that when a spider captures an insect it inoculates its victim with a poison; but the majority of spiders, particularly those found in Ontario, produce poison in such small amounts that the effect upon humans is scarcely more toxic than a mosquito's bite. You should bear in mind that many of the bites attributed to spiders are actually the work of insects. If a spider should fall upon your hand, or the back of your neck, it will not bite you. Why should it? It does not feed on the blood of warm-blooded animals. Of course, if you capture a spider in your fingers, or if, when you are attempting to remove a spider from the back of your neck, you happen to press it against your skin, it may bite you. The spider is simply attempting to protect itself, and if you bear this in mind, and act accordingly, then you will never receive a bite from a spider.

So, you see, spiders are comparatively harmless creatures, if you treat them with the same respect as you do any other animal. And spiders are very interesting creatures if you will but take time to study them. When you learn more about spiders and can identify the common ones found in your garden and in your house, you will come to like them as much as other animals that we usually consider as "pets."

Spider Relatives

Before you can study and appreciate any group of animals, you should be familiar with its near relatives so that you can understand the reasons why they have been placed on a particular level among the great host of living things.

Spiders belong to the Arthropoda, which includes all backboneless (invertebrate) animals that possess a tough skin (termed an exoskeleton) on the outside of the body, and jointed legs. For instance, the lobster is classified as an arthropod because it possesses a hard, shell-like exoskeleton and jointed legs. Scorpions likewise possess an exoskeleton and jointed legs. Insects, water fleas, sow bugs, crabs, shrimps, millipedes and centipedes all belong to the Arthropoda.

Now, some of the animals listed above possess more legs than others. Centipedes and millipedes possess many legs. Insects possess six legs. The lobster has five pairs of walking legs. Spiders, however, and their close relatives, possess four pairs of walking legs and a pair of feeler-like "legs" which are termed pedipalpi. The arthropods possessing four pairs of walking legs are placed in a group by themselves. This group has been termed the Arachnoidea.

In addition to possessing eight walking legs, the arachnoids do not possess feelers or antennae such as are found among the insects and lobsters, and, what is the most important characteristic, the body can be divided into but two distinct regions, namely the part to which the legs are attached, known as the cephalothorax, which simply means that the head and thorax are fused together, and the rather bulbous portion known as the abdomen.

A word or two about the near relatives of spiders is in order. The "daddy-long-legs" or harvestman is the long-legged spider-like animal that you may have seen crawling leisurely over an old fence or up the side of a house or barn.

The several small parasitic mites, species of which are known to attack man, are usually red in colour. If you have ever kept chickens or canaries then you will be familiar with these minute parasitic relatives of the spider. The small pseudoscorpion somewhat resembles a minute crab in shape, and you will find them beneath logs and stones or walking across your parlour carpet. They feed upon other small animals which they grasp in their crab-like first pair of legs. You may never have seen a live scorpion but you have, undoubtedly, seen pictures of them. They are usually quite large, and the abdomen, instead of being bulb-like, is long and slender and is terminated by a poisonous sting. The scorpion closely resembles the small pseudoscorpion, the word meaning "false scorpion." All of the foregoing are near-relatives of spiders; a part of the Arachnoidea.

A Spider's Anatomy

In addition to possessing four pairs of walking legs, only two body divisions (the cephalothorax and abdomen) and leg-like appendages termed pedipalpi, spiders may be distinguished from most of their close relatives by the presence of eight bead-like eyes arranged in two or three rows along the front of the cephalothorax. Some of the eight eyes are larger than others. No one really knows whether a spider has good eyesight or not. We do know that the wolf spiders and jumping spiders are able to see their victims, but the web-spinning spiders appear to rely upon the motion of their webs to inform them that an insect has been captured.

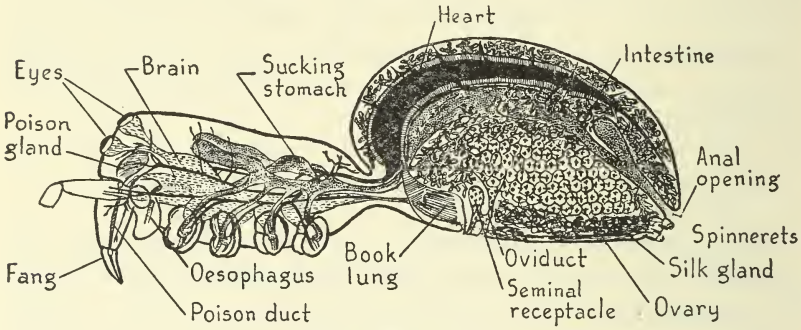
The jaw-like appendages at the front of the cephalothorax are termed chelicerae, and it is by means of these structures

that the spider is able to inoculate its victims with poison, and also crush the juices from the victims' bodies. The basal portion of the chelicera is broad and usually armed with a number of stout teeth. The end portion is fang-like in shape. The poison is carried from a poison gland through a narrow duct to the apex of the fang of the chelicera, as shown in the following drawing.

The spider's body is usually covered with large and small hairs. Although the majority of species are covered with dark brown or black hair, some of them possess coloured hairs and

scale-like hairs that break the light into beautiful, metallic, rainbow-like colours. Indeed, the colour pattern on some spiders forms an easy identification mark.

It is difficult for us to imagine that a creature as small as a spider possesses such anatomical structures as a heart, stomach, intestines and brain. We usually associate such structures with the higher animals, such as frogs, birds and mammals. Perhaps if spiders grew to be as large as frogs and birds we would then be aware of their complicated internal anatomy.



Spider Anatomy

Spiders possess a well-developed brain. It occupies a considerable portion of the cephalothorax and, unlike the compact brain mass with which we are familiar in the higher animals, it is divided into a number of finger-like processes. A great many nerve fibres, both large and minute, pass from the brain to all parts of the body.

The digestive tract of spiders consists of a long, narrow tube(termed the oesophagus)that connects the mouth opening to a bulbous sucking stomach. The body fluid of the spider's victim passes through the oesophagus by the force exerted by the sucking stomach. From here the body fluid passes into the intestinal tract, which is a long, straight tube, slightly swollen at the middle, that terminates at the anal opening. It is within the intestinal tract that the body fluid of the victim is digested.

The spider's heart is a large, sausage-shaped structure located near the upper surface of the abdomen. A fine tube passes from the heart into the cephalothorax where it divides

into a number of long finger-like tubes. The heart is enclosed in a delicate sheath, known as the pericardium. The blood, which is colourless and contains mostly amoeboid corpuscles, is pumped to the book lungs. Here it gets rid of the carbon dioxide and picks up oxygen. It then flows into the pericardium from whence it enters the heart by way of three small openings. This aerated blood is then pumped to all parts of the body, flowing into spaces(termed sinuses)and thus bathing all parts of the body.

Spiders breathe by means of book lungs. A book lung is composed of from fifteen to twenty leaf-like plates. There are usually two book lungs located on the underside of the abdomen near the junction of the cephalothorax and abdomen. The blood flows into the leaves of the book lung, and the air, entering through external openings, is thus brought into close contact with the blood.

The silk produced by spiders, which they use in making their webs and cocoons to protect their eggs, issues from three pairs of appendages known as the spinnerets. The spinnerets are located at the hind end of the abdomen and have the appearance of a small group of minute cones. A fluid is secreted by a number of silk glands. This fluid is forced through hundreds of minute tubes located in the spinnerets. When the fluid comes in contact with the air it hardens, thus forming a silk thread or a cord of silk threads.

Spiders are egg-laying animals. In the female, the ovary (the structure producing the eggs) may occupy a considerable portion of the abdomen. The males, since they do not lay eggs, do not possess ovaries but, instead, they possess testes. The testes produce sperm cells. Since the eggs are much larger than sperm cells, the latter being microscopic, female spiders are always much larger than males. Indeed, the males of many spiders are so small that you may have mistaken them for young spiders. The eggs pass from the ovary down a slender tube, termed the oviduct. They then pass the opening to a small tube, termed the seminal receptacle, in which the sperm cells from the male spider are stored. In this way the eggs become fertilized.

Have you noticed how many organs mentioned concerning spiders are essentially the same as our own? So, you see, the internal anatomy of a spider is most interesting because we

can observe in it so many structures that are similar to those possessed by man. The plan is basically the same, though details vary.

Spiders' Eggs and Baby Spiders

You may have seen the egg-mass or egg-sac of a spider. All species of spiders cover their eggs with a silk cocoon. These silken cocoons, containing a number of eggs, may be suspended like brown pendants from the web of the female spider, or glued to the undersurfaces of logs, stones, and leaves. Other kinds of spiders, as if afraid that some other animal might destroy their eggs if left beneath a log or stone, carry them about with them. You may have seen a dark-coloured spider running rapidly over the dry grass or leaves, carrying a slate-coloured egg-sac attached to the tip of her abdomen. Others, such as the large *Dolomedes* spider that is so common around small lakes and ponds, carry their egg-sacs in their jaws.

Whatever device the various kinds of spiders employ to ensure protection for their eggs, the young spiders eventually hatch, which takes place within a short time after the eggs have been laid. When the baby spiders, referred to as spiderlings, hatch from their eggs, they are still encased in the egg-sac. Most kinds of spiders must chew their way through the silk cocoon surrounding them, although the females of a number of kinds assist the spiderlings in this task by applying their more powerful jaws to the tough silk envelope. In the case of those spiders that carry their egg-sacs with them, the young spiders on hatching may cling to their mother. The *Pisaurid* spider builds a web for her children which is termed a nursery web. But the brothers and sisters of a family of spiders do not always live in harmony with each other. For instance, there are a number of kinds of spiders that deposit their eggs in a tough silk cocoon which is attached to a clump of grass or the twig of a tree or bush in late summer. The mother spider dies, and the spiderlings remain in this silk cocoon throughout the winter. But when the time comes for the spiderlings to emerge in early spring and summer, only a few fat well-developed spiderlings actually make their appearance. You see, the spiderlings, brothers and sisters, have been feeding upon one another throughout their long stay within the cocoon.

You may have noticed that when a caterpillar grows to a certain size it sheds its skin. Spiders do the same thing. When the spiderlings reach a certain size, which of course varies for the different kinds of spiders, they shed their skins. The new skin is much softer and more elastic, and so the spider eats and eats until it finally fills out this new skin which, by this time, has become hardened. It then sheds this skin and so acquires a new one, and so on. In this way the spiderlings grow up.

Now, as you can well imagine, if a female spider deposited fifty or a hundred eggs or more in one particular place there would eventually be too many spiders, unless they ate each other or unless some other animal ate them. So, in order to prevent such overcrowding, some kinds of spiders make use of their silk to carry them to a less congested locality. The spiderling, about to take his first trip by air, climbs to the top of some upright blade of grass or twig of bush or tree. He then points the tip of his abdomen towards the sky and begins to let out yards and yards of fine silk. Being very light, the silk is caught by the wind. When the spiderling, who has been holding fast to the blade of grass or twig, feels that the pull of the wind upon the strand of silk is strong enough he lets go and off he sails, carried by the wind. At times the tiny spiderling floating through the air may be caught in a strong updraft of air, and in this way he may be carried many hundreds of feet above the ground. Eventually, when the wind dies down or if the long silk thread becomes entangled in the branches of a tree or bush, the spiderling comes to rest again probably in a spot far distant from his birthplace.

There are many kinds of spiders that do not rely upon their silk to carry them to other places. Of these, the wolf spider and the small jumping spiders travel from place to place by using their legs. If you have ever watched a wolf spider running over the surface of the ground, you will realize that it would not take it very long to be far away from the place where it was born.

The Spider's Diet

Spiders feed for the most part upon insects. It is not unusual, however, for the female spider to seize and devour the father of her children; nor, as we have seen, is it unusual for brothers to eat their sisters and sisters their brothers. So,

you see, spiders will eat almost any living animal smaller than themselves. Some of the very large spiders, not found in Ontario, have been reported as feeding upon small birds, and others on such large animals as mice, fish, and snakes, although such cases are exceptional.

When a spider captures an insect it inoculates it with poison. Then it squeezes the body fluid from its victim by crushing the insect's body between its chelicerae and the large bases of the pedipalpi. The solid parts of the victim's body are discarded; you may have seen the shrivelled remains of insects adhering to the web of a spider, grim reminders of a spider's meal.

Spider Silk

You have, no doubt, examined a spider's web and marvelled at the delicacy and strength of the thin strands of silk. You may also have noticed that the silk found in a spider's web is not uniform in thickness, and that some of the strands are covered with a sticky substance and others are not. In the webs of a number of kinds of spiders you will find a rather dense zig-zag strip of silk located in the central portion. This particular band of silk is termed a stabilimentum. Its use is not clear but it is supposed to add strength to the web. The eggs of spiders are, in many species, covered with layers of silk which in some cases forms a rather tough skin-like covering. Indeed, spiders do not make a single kind of silk but many kinds.

As has been previously mentioned, the silk is derived from silk glands. There are at least seven distinct silk glands, although not all of them are to be found in a single species. Each gland produces a particular fluid which on coming into contact with the air gives rise to a particular kind of silk. Each kind of silk has its particular function.

You may have seen a spider running along a twig of a tree, and, when you alarmed it, you may have noticed that it immediately fell from the twig and then remained swaying back and forth on the end of a delicate thread of silk. Now this thread is known as a dragline. When the spider was running along the twig it produced a dragline, attaching it to the twig every so often by means of a small patch of silk which has been termed an attachment disk. If at any time the spider is alarmed by one of its numerous enemies, such as a parasitic

wasp or an insectivorous and spider-eating bird, it simply leaps from the twig and remains attached to its dragline.

When an insect is caught in a spider's web the spider, feeling the gentle tugs upon the web by the struggling insect, rushes to the attack and, having administered its paralyzing poison, covers the victim with a heavy layer of silk. This enveloping band of silk has been termed a swathing band.

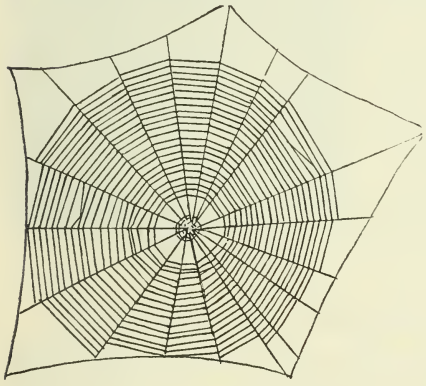
In constructing a web, the spiders produce sticky threads, termed viscid threads, to which their victims adhere. We have already noted that the silk used in constructing the cocoon surrounding the eggs is quite different from that used in constructing the web. And so you see there are many kinds of spider silk, and each one is produced for a definite purpose.

Types of Spiders' Webs

As you are well aware, the webs of spiders vary greatly in shape and design. Some of them resemble a wheel, others a funnel, and still others a flat sheet. Hence, it is possible, in a rough way, to classify spider-webs. You should remember, however, that the classification as given below is by no means exact because, as you will discover, some spiders build a web that combines one or more types of webs. However, for most of the common web-making spiders the following classification will prove very useful:

Orb Web

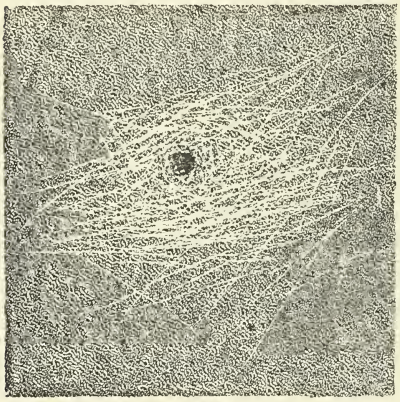
This is the type of web with which most of us are familiar. It closely resembles a large wheel with fine radiating spokes connected by delicate silk threads. The owner of the web may rest in the central portion or hub, or in a hidden retreat among the leaves or twigs of the bush to which the web is attached. The spokes of the web are made of non-viscous silk. The unwary insect flying into the orb web becomes entangled in the viscous threads. The insect struggles to escape and thus sets up a vibration in the web



which, like a radio signal, informs the spider that a victim has been captured. The spider, running along the non-viscous radiating spokes of the web, hastens to the attack. Within a short space of time the insect, having first been inoculated with poison, is wrapped in mummy fashion with layers of fine silk. You may have seen insects caught in an orb-web that were surrounded with silk, or perhaps you have watched the spider busily engaged in securing its prey to the web in this manner.

Funnel Web

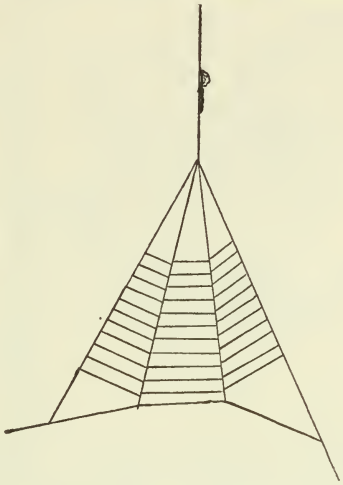
In the early hours of the morning, just as the sun is rising above the surrounding hills and trees, hundreds of small spider-webs may be seen in the dew-covered grass near the ground. These small webs closely resemble funnels, and hence they have been termed funnel webs. The owner of the web is *Agelenopsis*, commonly known as the *grass spider*. If you examine the web very closely you will notice a number of strands of silk above the main body of the web. These strands of silk are known as "trip threads." If an insect happens to fly over the flat portion of the web, it comes into contact with the trip threads, which cause the insect to fall on to the main body of the web to which it adheres. Meanwhile the grass spider is hiding in a silken tunnel at one end of the web, the opening to which is quite obvious. The vibration of the web caused by the struggling insect informs the grass spider that an insect has been captured. The spider rushes forth, grasps the insect in his chelicerae and pedipalpi, and drags the victim into the silken tunnel. Here the grass spider can enjoy his meal, hidden from his enemies and without risk of losing his prey.



Triangular Web

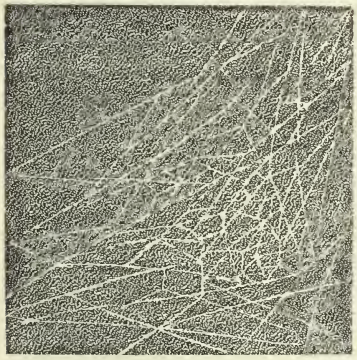
Of all the kinds of spider-webs, none is more ingenious than the triangular web. As you can see from the illustration, the web is triangular in shape. The narrow end of the

triangle is terminated by a single strand of silk. The owner of the web holds on to this thread, allowing a small portion of slack thread to remain free. When an insect comes into



contact with the web, the spider shakes the web vigorously, thus entangling its prey. You will find these small triangular webs on the tops of dead trees in wooded areas.

Irregular Webs

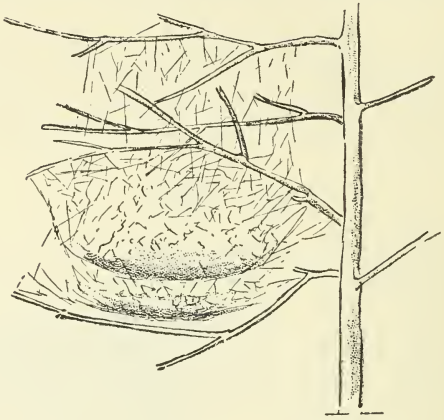


You are, no doubt, familiar with the common house spider. You know that it builds a very untidy web in the corners of rooms, particularly between the rafters in the cellar. The web has no definite shape. It is an irregular mass of fine silk threads, of which the viscous ones capture more dust than insects. The owner of the web hangs beneath the web.

Sheet Webs and Dome Webs

There are a number of spiders that build platform webs or sheet webs. The main portion of the web is a flat sheet of silk with a few trip-threads over it. Some of these sheet-building spiders elevate the central portion of the web so that

it assumes a dome shape and hence they have been termed dome webs. Still others, as if taking the best ideas from both types of webs, have combined the dome and the sheet,



the former usually extending above the latter. Insects in flight coming in contact with the trip-threads fall onto the sheet where they become entangled in the viscous silk.

Collecting Spider-webs

Perhaps you would like to make a collection of spider-webs. At first thought this may seem an impossible task, but it is not so difficult and the results obtained are most interesting. All you need in order to collect spider-webs is a small insect spray gun filled with a very thin solution of white shellac and a few pieces of black cardboard. You can make this shellac solution by mixing a tablespoonful of white shellac in four ounces of alcohol. When you find a spider-web that you would like to add to your collection, simply spray the shellac onto the web until all of the threads are coated. Then bring the piece of black cardboard up against the back of the web. The web will adhere to the cardboard, giving you the complete web which can be distinctly seen against the black cardboard. You must be careful in bringing the cardboard through the web not to move the cardboard from side to side. Follow through the web with a single movement and do not attempt to gather any of the silk threads extending beyond the limits of the piece of cardboard. If you wish to make a permanent mount of the web collected, cover it with a piece of wax paper, gluing the latter along one side of the cardboard. This will prevent the web from being rubbed off.

There are a great many different kinds of spiders. Some of them are very large, such as the *Dolomedes* that you may have seen running over the rocks and logs on the shore of a lake or large pond. Others are very small, such as the minute kinds that inhabit the leaf-strewn floors of wooded areas. It would be quite impossible to consider all of the kinds of spiders to be found in Ontario in this small booklet, and so we will restrict our attention to the more conspicuous families of spiders, those which you will find as you walk over a grassy field or through a woodland glade.

There are very few common names applied to spiders. You may refer to a large spider that you find in your garden as a "garden spider," or to one living in a grassy field as a "grass spider," but such common names are of little value if you wish to refer to a particular spider or a particular family of spiders. In order to overcome this difficulty of referring the various families of spiders to a common name, which names you will discover are different in different parts of the country, we are going to use the scientific name for the particular family. For instance, there are a great many different kinds of spiders that build a funnel-shaped web, and they have been referred to as "funnel web" spiders or "grass spiders." All of these spiders that build funnel webs belong to the Family *Agelenidae*. Now, we are going to use the name Agelenid when we refer to a spider that belongs to this particular family. This is a much better common name than "funnel web" spider or "grass spider" because no matter where you go the scientific name *Agelenidae* is always the same, and if you are talking to a specialist on spiders he will understand what you mean when you refer to an Agelenid spider that you have collected, whereas he may not know what you mean by a "grass spider."

How to Use an Identification Key

Let us imagine that you have the following objects in front of you: a tea cup, a saucer, a spoon, and a fork. You can easily recognize any one of these objects because they are so different in appearance from each other. But let us suppose that you have never seen a spoon before and that you happened to find one. If you consulted someone who was familiar with this particular object, he would be able to identify it

for you. Failing this, you would have to consult a book in which you would find an illustration of a spoon by means of which you would be able to identify it. Now, there is a very simple way for identifying various objects which does not require illustrations, although they may be used in order to clarify the written word. A system known as a key system is employed, and here is a sample of such a key as it would apply to the identification of any one of the four objects which is listed above:

1. Round and flat, the edges slightly raised.....*saucer*
   Not as above..... 2

2. A small container used for hot liquids; sides steep; bottom flat; usually two and a half to three inches deep.....*tea cup*
   Not as above..... 3

3. A metal object which is broad at one end and with a long narrow handle; broad end with three or four sharply pointed prongs.....*fork*

4. A metal object which is broad at one end and with a long narrow handle; broad and without prongs and slightly concave for holding a small quantity of liquids or solids.....*spoon*

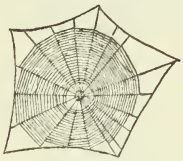
Now, let us imagine that you are going to use the above key in order to identify the spoon. You read the first line opposite figure "1". You decide that this description does not apply to the spoon because the spoon is not round and flat. So, you read the next line which tells you to proceed to figure "2". You read the description given for the tea cup and you decide that it does not apply to the spoon, and so you proceed to figure "3". You read the description given for a fork and decide that it does not apply to the object you wish to identify because the spoon does not possess prongs. So, you proceed to the next description given for a spoon and you decide that it does apply to the object you wish to identify and the name of the object, namely a "spoon," is determined.

So, you see, an identification key is a very simple aid when distinguishing a particular object from a number of others.

You will also note in the step-by-step procedure that you are dealing with one of two possibilities. Having decided which one describes the particular object you wish to identify, you then proceed to the next two possibilities, and so on. The two possibilities considered under each number are referred to as a couplet. In the above key there are four couplets.

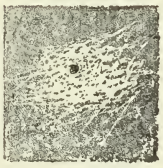
Now, examine the following four drawings representing four kinds of spiders. Then, using the key, see if you can identify specimen "C". Note that if the spider spins a web, the web is included with the drawing of the spider.

1. Web-spinning spiders....2
   Spiders that do not spin a web.....3



A

2. Plump-bodied spider; web-shaped like a large wheel (orb-web).....*Argiopid*
   Body more slender; web funnel-shaped.....*Agelenid*



B

3. Distinctly crab-shaped; usually found in flower heads.....*Thomisid*
   Not crab-shaped; not usually found in flower heads; jumps when alarmed or in pursuit of prey.*Salticid*

D

C

Specimen "C" is a Salticid spider belonging to the family Salticidae, which are commonly referred to as jumping spiders. If you were unable to obtain the correct answer then follow through the key again in this manner:

Under couplet "1" there are two possibilities, either the spider spins a web or it does not. Since no web is shown in the illustration then you realize that specimen "C" does not spin a web. Therefore, you proceed to couplet "3".

Under couplet "3" there are two possibilities, besides others that are given for further support to your conclusions. Specimen "C" is definitely not crab-shaped and therefore it could not be a Thomisid; therefore it must be a Salticid.

Now see if you can find the family name for the other three spiders. The correct answers are given at the end of this chapter.

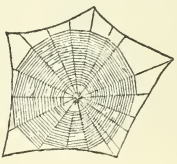
Once you have mastered the use of the above simplified key you will not experience any difficulty in following through a more complicated key dealing with all of the common families of spiders which you are likely to encounter. You will notice that small outline drawings have been included with the key in order to assist you in making an accurate identification. Once you have become thoroughly familiar with the common families of spiders you will be able to identify them at sight. Eventually you will wish to know the specific name for spiders. For instance, the common house spider is a species (or kind) of Theridiid. Its scientific name is *Theridium tepidariorum*. You will find the scientific name for some of the common spiders that you are most likely to see given under the chapter heading for that particular family. However, since this small handbook is intended only to introduce you to the common families of spiders, you will see and collect a great many kinds of spiders which you will be unable to identify to their scientific names by means of this handbook.

A—Argiopid; B—Agelenid; C—Salticid; D—Thomisid.

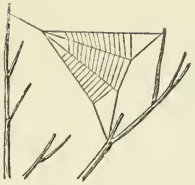
Key to the Common Families of Spiders

1. Web-making spiders....2
   Spiders that do not make webs.....9
2. Orb web spiders.....3
   Spiders that do not make an orb web.....4
3. Small orb web found among branches of ground juniper. Web horizontal; spider very small and with distinct hairy brushes on front legs....*ULOBORID*

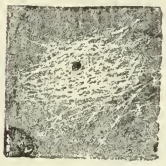
   Large orb web; found in a variety of places such as tall grass, bushes or buildings.....*ARGIOPID*



4. Small triangular web that resembles a portion of an orb web. Small spider that resembles a bud of a twig.
ULOBORID
Web not triangular.....5

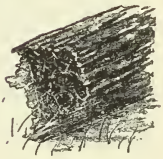


5. Funnel-shaped web usually found in grass or in the corners of buildings. Long-legged, active gray spiders
AGELENID
Not as above.....6



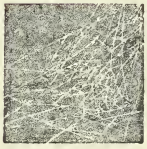
6. Web sheet-like or dome-like with trip threads forming an irregular web above the main web *LINYPHIID*
Loose, irregular web 7

7. Irregular web with a distinct opening to a retreat and somewhat resembling a funnel web. Medium sized spiders
AMAUROBID



Irregular web without a distinct opening and not resembling a funnel web.8

8. Irregular web usually found among branches of trees, bushes, grasses and buildings...*THERIDIID*



Irregular web found among rocks and vegetation growing on the shore of a lake or pond; nursery web
PISAURID

9. Crab-like spiders; usually found in flower heads and resembling the colour of the flower. . . *THOMISID*
Not as above. 10

10. Ground-inhabiting spiders possessing long legs and moving rapidly when alarmed; usually dark brown in colour. 11
Not as above. 12

11. Found running over the ground in fields and wooded areas; of medium size. . . . . *LYCOSID*
Found along the margins of lakes and ponds, also found on plant heads such as nettles and others; of large size. . . . *PISAURID*

12. Small to medium-sized spiders that jump when alarmed; usually distinctly marked with bright colours and contrasting bands; usually found on the ground, but one species, banded with white, commonly found on buildings *SALTICID*

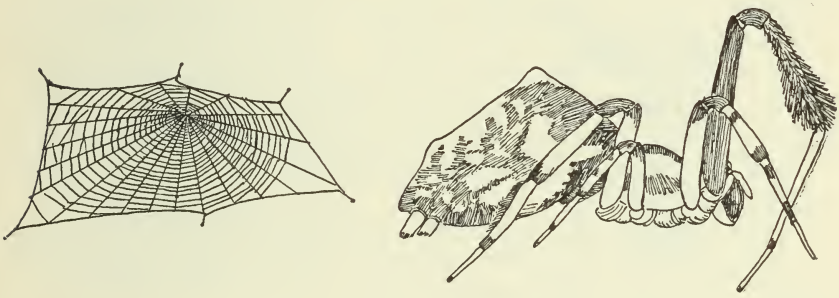
Not as above. 13

13. Small spiders found beneath logs and stones where they hide awaiting their prey . *GNAPHOSID*

Small spiders found on vegetation, particularly coniferous trees; some of them make silken tubes in leaves; usually light in colour. . . . . *CLUBIONID*

There are only two families of Canadian spiders that build orb webs, namely the Uloborids and the Argiopids; therefore, if the orb web is vertical in position then you know that (with exceptions; see next sentence) it belongs to an Argiopid, and if it is horizontal then you know that it belongs to an Uloborid. Of course, you must also bear in mind that some of the Uloborids make vertical webs but they are so characteristic in shape, being triangular and with only four supporting threads, that you will have no difficulty in identifying them as the webs of the Uloborids. In Ontario the Uloborid web is usually found on top branches of the ground juniper.

There is another interesting characteristic of the Uloborid webs: they contain a hackled band instead of the ordinary



viscid thread. If you examine the cross-pieces of an Uloborid web with a strong magnifying glass you will find that what appears to be a single strand of silk to the naked eye is actually made up of two parallel silk threads upon which the viscid threads are placed. The two parallel threads have been termed the "warp" and the viscid threads the "woof."

There are only two genera of Uloborids found in Ontario, namely *Uloborus*, belonging to the group of horizontal web makers, and *Hyptiotes*, belonging to the group of triangular web makers.

You will find the webs of *Uloborus* among the branches and twigs of small, low-lying bushes. In Ontario they are more commonly found among the twigs and branches of the ground juniper. The owner of the web has long front legs which are usually extended forward. The abdomen is pointed

on the back. At first glance, you may think that the spider is a small dead leaf or a piece of brown bark that has been caught in the web and held near its centre.

Uloborus americanus is the only species found in Ontario. You will be able to identify this member of the family by comparing your specimen with the drawing above.

The peculiar triangle webs of *Hyptiotes* are more commonly found among the twigs of dead shrubs and trees along the sunny margins of wooded areas. At first glance you may think that the web is part of an orb web of an Argiopid spider. But if you examine the web closely you will find that there are four main strands converging on a single strand that is attached to a small, dead twig. The owner of the triangle web resembles a small brown bud attached to the dead twig. It will be found at the end of the single strand of silk. When the spider feels the familiar tug of a struggling insect, it immediately releases the single strand of silk, which it has been holding with its front pair of legs. The web becomes looser and tends to collapse, surrounding the captured insect. The spider then tightens the single strand of thread again, bringing the web closer around the body of the insect. If the insect continues to struggle violently, the spider may loosen the web again, and so on.

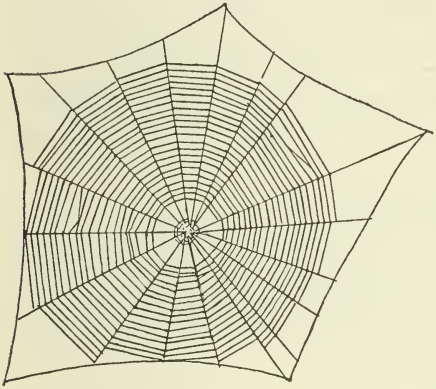
If you should find the triangular web of an *Hyptiotes*, place a live insect on the web and watch how the spider snares its prey. The web will sway violently back and forth as the spider tightens and loosens the single strand of silk.

Hyptiotes cavatus is the only species found in Ontario. It is a very odd-looking spider, as you can see from the drawing above. The cephalothorax is decidedly smaller than the large, bulbous abdomen. The latter is covered with large and small hairs, and the back is somewhat warty in appearance.

Argiopids

The Argiopids are sometimes referred to as "orb-web" spiders because they construct the round, wheel-like webs with which we are familiar. Occasionally one of them will construct a web in the corner of your cellar and, since this web is rather sticky, particles of dust will cling to it. Perhaps you would refer to it as a cobweb, the word "cob" being derived from the Flemish word "cobbe" meaning a spider.

Occasionally you will find the maker of the orb web resting back downwards or head downwards, depending upon the position of the web, on the centre or hub of the web. Some of them, such as the "shamrock spider," *Aranea trifolium*, build a retreat among the leaves of the bush to which the web is attached. The cephalothorax is short and depressed and the abdomen either bulbous or long and slender. The legs are usually long and armed with a number of stout spines. Although the majority of Argiopids are not vividly coloured, there are some of them that are marked with contrasting bands of yellow and black and others that bear a characteristic leaf-like pattern on the dorsal surface of the abdomen.



A few species present a bizarre appearance, the abdomen bearing peculiar wart-like swellings.

Of the various species of Argiopids which you are likely to see among the bushes at the margin of a wooded area or in the tall grass of meadows and marshes, the most abundant and strikingly coloured is *Argiope aurantia*. This attractively coloured spider (above) is marked with bands of bright yellow and black. It constructs its web, most often, in the tall grass of meadows and around the margins of marshes. Occasionally you will find it in your garden, and so the common name of "garden spider" has been applied to it. The web is rather large and there is a peculiar zig-zag band of silk near the centre, termed the stabilimentum. You may also find the spider's cocoon containing her eggs. The cocoon is a bag-like structure and contains many small yellow eggs. It is believed

that the young spiders hatch in late summer but remain dormant within the cocoon throughout the long winter months, emerging from the cocoon with the return of warm weather in spring or early summer.

Argiope trifasciata is somewhat similar in appearance to *Argiope aurantia*, being marked with yellow and black. However, it is somewhat smaller and, unlike *aurantia*, its abdomen bears a number of ring-like bands giving it the appearance of being segmented.

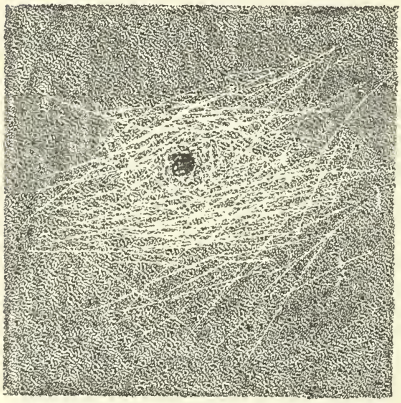
The large buff-coloured spider that has a distinct shamrock pattern on the dorsal surface of its bulbous abdomen and which you have no doubt seen in your garden, is *Aranea trifolium*.

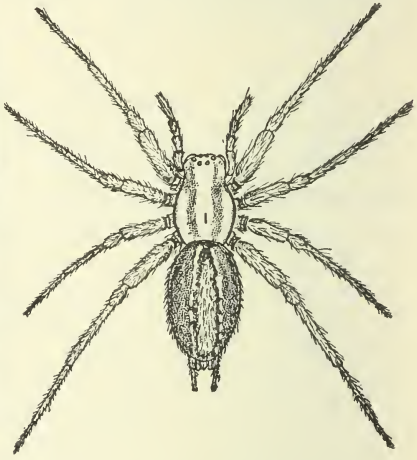
The genus *Tetragnatha* includes the orb-web spiders that are long and slender and possess long jaws. They are most abundant around the margins of marshes and ponds.

Leucauge venusta, a medium-sized Argiopid, is a brilliant metallic green suggesting the vivid colour of some of the tropical butterflies.

Agelenids

You are no doubt familiar with the funnel-shaped webs constructed by the Agelenids, because they are so abundant in all pasture fields and grassy areas. The webs are usually





built close to the ground. Some of them, however, prefer the corners of buildings and one particular species, *Tegenaria derhami*, may be found in the dusty corners of your cellar or

around the window frames. You may never have seen the spider that constructs the funnel-shaped web because it remains concealed in its tube-like retreat. If a fly happens to fall upon the sheet-like portion of the web, however, the Agelenid rushes forth, injects a paralyzing fluid into its victim, wraps it securely with silk and then drags it into its retreat, there to feast upon its body fluids.

The grayish spiders that you may have seen running rapidly over the cellar floor after you had removed the funnel webs from the window frame were most likely Agalenids. They are usually dark brown or gray in colour. The legs are long and hairy. The cephalothorax is large and almost equal in size to the abdomen. The head portion of the cephalothorax is marked off by two shallow grooves.

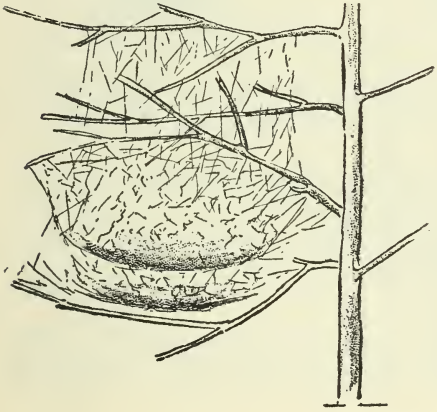
Agelenopsis potteri is the Agelenid commonly found in grassy areas. The funnel webs of this spider are most conspicuous in the early morning when the sun's rays are reflected from the dew-covered webs.

Tegenaria derhami is the species that most commonly occurs in the dusty corners of cellars, woodsheds and window-sashes. The body and legs of this Agelenid are much stouter than in Agelenopsis.

Cicurina brevis is the species commonly found among the dead leaves on the ground in wooded areas.

Linyphiids

The Linyphiids are small and often attractively coloured spiders. They live among the lower branches of plants, under leaves and other surface litter in shady woods, or in caves and



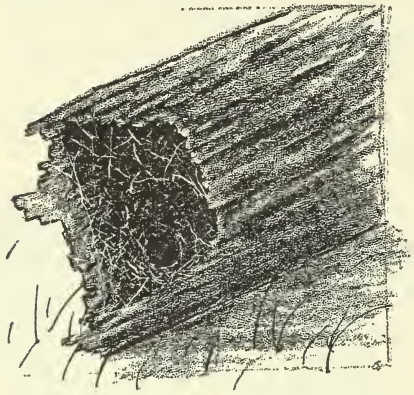
cellars. The webs are usually sheet-like in form and are supported by threads above and below. In some species the sheet of the web is curved upward or downward in a dome-like or saucer-like fashion. The owner of the web rests upside down beneath the web.

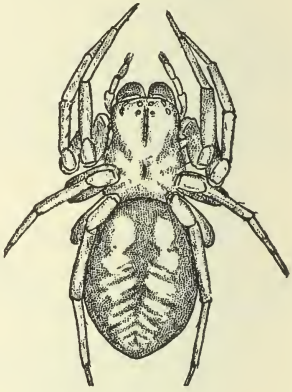
Ceraticelus fissiceps is one of the most ubiquitous and attractively coloured of the Linyphiids. It is only a sixteenth of an inch in length. It is creamy white in colour with a distinct orange spot on the upper surface of the abdomen.

Linyphia communis builds a double dome web. The spider's body is dusky brown in colour with a central dark band extending the length of the abdomen on the upper surface. This dark central band merges into lighter bands on each side of it.

Amaurobids

The Amaurobids inhabit wooded areas for the most part. Their small, irregular webs will be found in the hollows and crevices of tree stumps or in the cracks in rocks. If you ex-





amine one of these webs you will find a small, shallow funnel-like opening marking the entrance to the tubular retreat of the owner of the web.

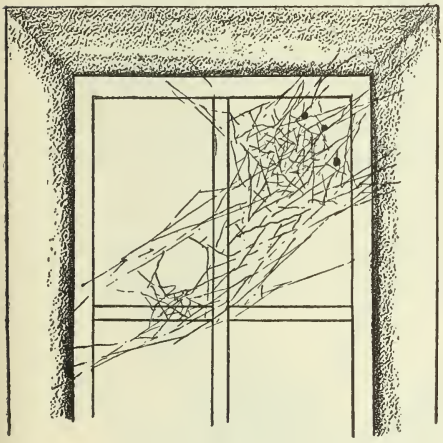
These woodland spiders average approximately a quarter of an inch in length, and they are usually brown in colour with an indistinct pattern of a lighter colour on the upper surface of the abdomen. The cephalothorax is quite large and bears a median depression.

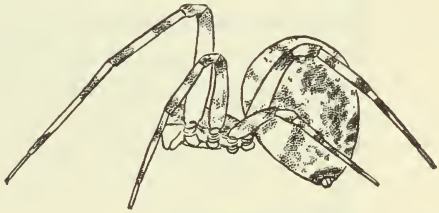
Amaurobius bennetti is the most ubiquitous species of the family in Ontario and the one you are most likely to see and collect.

The irregular webs found in cellars or in the corners of the rooms of your house are made by a species of Theridiid. They will also be found on fences, among rocks and between the leaves and branches of low trees and bushes.

The Theridiids are generally small and light-coloured, with large, round abdomen and slender legs. All of the eyes are about equal in size and are arranged in two rows across the front of the cephalothorax. They will be found resting on their webs in an upside-down position.

The cocoons containing the eggs of Theridiids commonly occur on the web, and there are usually three or more of them on one web. They are soft, silken, balloon-like structures.





You may have seen the mass emergence of the young spiderlings from their cocoon, at which time the web seems to be a moving mass of minute pale-coloured spiderlings.

Theridion tepidariorum is the Theridiid that is of such common occurrence in our homes, and acts as such an efficient dust-collector, much to our annoyance.

Latrodectus mactans has been found at Turkey Point and Point Pelee in Ontario. It has been commonly referred to as the *black widow spider* because it is jet black in colour and the female is reputed to eat her mate. One of the most obvious characteristics of this species is the presence of a distinct red hour-glass mark on the under surface of the abdomen. Although this species has not yet been reported from any other

locality in Ontario, it may occur in woodsheds and other outdoor buildings in various parts of the province along Lake Erie. You should remember, however, that there are a great many species of spiders that are dark brown or black in colour, and hence you should not conclude that a spider is a black widow merely because of its dark coloration. If you are in doubt, place the spider in a vial containing some alcohol, and then examine it carefully for the red hour-glass on the underside of the abdomen. The bite of the black widow spider is painful and, in some cases, will cause severe complications and blood poisoning. There have been records of death resulting from the bite of this spider, but how reliable these reports are is open to question.

Pisaurids

Most of us have had the experience of seeing a large brown spider running over the wooden surface of a dock or pier and then disappearing from sight in some crack or crevice. This large spider is one of the Pisaurids that commonly occur along the margins of lakes and ponds.

The Pisaurids, instead of capturing their prey in a web, hunt and pursue their victims. However, they do build an irregular web upon which the cocoon containing the eggs is placed. It has been termed a "nursery web" because its sole function is the protection of the spiderlings.

Dolomedes scriptus is the large Pisaurid which is so commonly seen running along the shore of lakes and ponds. You may have observed that this large spider is able to run over the surface of the water. Minute hairs upon the last few segments of its legs capture air and thus act like water-wings, keeping the spider afloat.

Thomisids

You may have had the experience of examining the yellow petal of a flower and finding what appeared to be a portion of it moving slowly away and disappearing from sight over the side of the flower. A closer inspection reveals it to be a crab-like spider that was hiding among the yellow petals of the flower awaiting the arrival of some winged insect.

Some Thomisids possess the property of changing their colour to match that of the flower upon which they are resting. The same species may be creamy-white, yellow, or green in colour.

Misumena calcycina is the common crab spider that you may have seen on the flowers of the goldenrod. It is usually light yellow or greenish-yellow in colour.

Xysticus, of which there are a number of common species, is found among the leaves and sticks on the forest floor. They are usually grayish-brown in colour with a wide variety of patterns of a lighter colour on the top of the abdomen.

Lycosids

The gray-coloured spider that runs rapidly over the forest floor and meadows, dragging a balloon-like structure behind it, is a Lycosid. At first glance it seems as if the spider possessed two abdomens. A closer examination, however, reveals that the spider is carrying its cocoon attached to its spinnerets.

The Lycosids are usually gray or brownish-gray in colour. They run rapidly when disturbed. Although the majority of them are to be found in grassy areas, particularly low-lying meadows or the grassy margins of marshes, some of them

inhabit sandy beaches along the shores of lakes and large ponds. These sand-inhabiting species dig holes in the sand and line the holes with silk. Some of them build a turret around the entrance to their tunnels and hence have been termed "turret spiders." They remain in their tunnels during the heat of the day, venturing forth during the night in quest of their prey. If you wish to find one of these sand-inhabiting Lycosids, look for their tunnels or turrets. When you have found a likely tunnel, insert a long grass stalk into the burrow until it strikes the bottom of the tunnel. Then, following the grass stalk, you can dig the sand away until you reach the bottom of the tunnel where you will find the occupant.

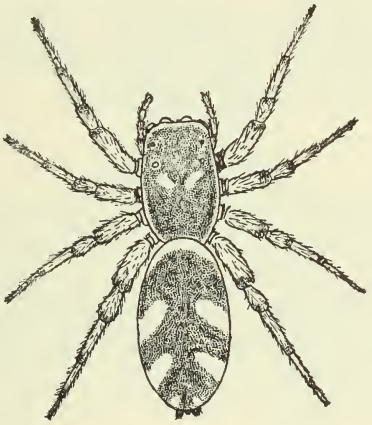
Geolycosa wrightii is the Lycosid that you are most likely to find inhabiting sandy areas, particularly along the shores of lakes.

Pardosa xerampelina is a rather slender, long-legged Lycosid commonly found in great numbers running over the dead grass in meadows. It is gray in colour with a distinct light-coloured marking on the cephalothorax and the abodmen.

The large gray spider so commonly seen running over the ground in marshy areas is *Lycosa helluo*. In addition to its large size it may be identified by the presence of a median light band, which is distinctly pointed at the front end, located on the cephalothorax. There is also a dark band on the front half of the abdomen.

Salticids

Of all the species of spiders none are more interesting to watch than are the acrobatic Salticids. Although they may be found running and jumping over the ground in woods, pasture fields and meadows, they are more commonly found inhabiting the brick walls and window ledges of your home.



This particular home-loving species is strikingly coloured with black and white stripes somewhat resembling the stripes on a zebra.

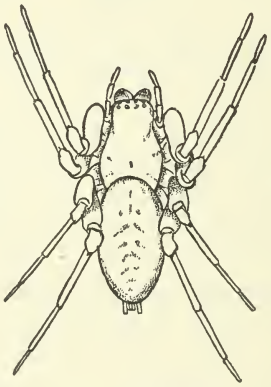
Although the Salticids do not construct a web, they do produce strands of silk by means of which they are able to drop from one place to another. At other times the silk is used as a sort of anchor rope so that when the Salticid leaps upon a fly and falls from the window ledge it remains swinging back and forth on the end of the anchor rope, the fly firmly held in its mandibles. When the fly has ceased struggling, the Salticid climbs back again to the window ledge, there to feed upon the body fluids of its victim. The fact that the Salticids do not spin webs but do prey upon houseflies and other insect pests should make them welcome visitors in our homes—that is if we are not upset by the presence of "crawly" things.

Salticus senicus is the small zebra-striped Salticid that is common about our homes.

Phidippus audax is commonly found running in a somewhat jerky fashion over the ground. It is black in colour with a distinct triangular white spot on the upper surface of the abdomen. The cephalothorax is metallic green. It possesses two large eyes, in addition to six smaller ones, that shine like miniature searchlights in the dark when a flashlight is directed on them. It is a rather robust and hairy spider, and is commonly preyed upon by certain species of wasps. If you happen to see a thin-waisted wasp with a metallic blue body and smoky wings dragging a small object over the ground, you will usually find that the object is a species of *Phidippus* and most likely *Phidippus audax*. The thread-waisted wasp deposits the spider, which she has paralyzed, in an underground tunnel and lays an egg upon it. The young grub-like wasp then feeds upon the body of the paralyzed spider.

Gnaphosids

The Gnaphosids live in the small cracks and crevices in the loose bark of trees and in decaying stumps and logs and other loose objects on the ground. For this reason they are dorso-ventrally flattened. They are usually brown or grayish brown in colour with a faint herring-bone pattern on the upper surface of the abdomen.

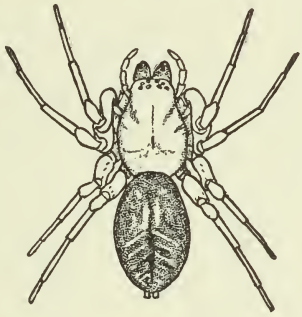


Drassodes neglectus is of common occurrence in most wooded areas. It is about three-eighths of an inch in length. The abdomen is elongated and has a faint herring-bone pat-

tern on the upper surface. The flat, white, circular structure, somewhat resembling a round piece of white parchment paper, so commonly found on the undersides of logs and stones, is the cocoon of one of the gnaphosids and, in most cases, that of *Drassodes neglectus*.

Clubionids

Perhaps you have had the experience of opening a group of leaves on some small bush or flowering plant to find that what you had considered the cocoon of an insect was actually the silk-lined home of a spider. Although not all Clubionids construct tubular nests among leaves, there are a great many



that do, and they always attract the attention of the amateur collector. Perhaps one of the most conspicuous of these leafy retreats is that found among the grasses and sedges in which a single blade is bent back in such a way that it forms a triangular envelope.

The Clubionids vary in size from approximately an eighth to a quarter of an inch in length. They are usually light brown or grayish-brown in colour. The ends of the tarsi bear clusters of hairs which give them a club-like appearance. This characteristic is most obvious in light-coloured species.

Clubiona riparia is the species that folds the leaves into a three-sided chamber, and they are most abundant in marshy areas. If you open the leafy chamber you will find the female spider and, in some cases, her egg sac.

How to Collect and Preserve Specimens of Spiders

Where to Look

Spiders may be found in almost every conceivable location. You will find them among the foliage of bushes, grasses and

trees. Many of them live among the dry and decaying leaves on the forest floor, while still others inhabit crevices in rocks, logs and the loose bark of trees.

How to Collect

There are three methods for collecting spiders, namely, *hunting*, *beating*, and *sifting*. The method of "hunting" for spiders is obvious. All you need is a "discerning eye" that will immediately identify a spider as such whether it is resting upon a dry leaf on the forest floor or is suspended from the underside of its gauzy web. "Beating" is a method widely used by collectors of both insects and spiders. You simply place a black cloth or an inverted umbrella beneath the branches of a tree or bush and then beat the branches, thus dislodging the specimens from their hidden retreat among the dense leaves. A somewhat similar method is that of "sweeping" in which a stout insect net is passed through the leaves of bushes and tall grasses. "Sifting" is a method used when you wish to collect small spiders that are concealed beneath leaves and other surface debris on the ground. The surface litter is placed on a coarse screen (one-quarter-inch mesh) and shaken over a piece of black cloth. The dislodged spiders may then be picked off the cloth.

If you are very careful, you can pick the spiders up with your fingers or with a pair of forceps. However, you should keep in mind that spiders are rather delicate creatures and that it does not take much pressure to squash them. Therefore, by far the best method of handling the specimens that you catch in your net, or on the beating cloth, is to use an "aspirator." This is simply a piece of glass tubing, about five or six inches in length, which is open at one end and attached to a rubber ball at the other. By squeezing the rubber ball the air is forced out of the glass tube. When you place the open mouth of the tube close to a spider and then release the rubber ball the air rushes back into the tube, carrying the spider with it. Of course, you will place a piece of cheese cloth over the end of the glass tube that fits into the rubber ball so that the spider will be held in the glass tube. Now, when you wish to transfer the spider to your collecting bottle, you simply squeeze the rubber ball which forces the spider out of the glass tube and into the bottle.

How to Preserve Specimens

All specimens should be stored in 75% grain(ethyl)alcohol. Before starting out on your collecting trip, fill a number of small bottles with alcohol. As you collect the specimens, either by picking them up with a pair of forceps or by means of an aspirator, drop them into the alcohol alive. Within a few minutes the alcohol will be absorbed by every part of the spider's body. Then, when you return home with your collection of spiders, transfer your specimens to vials containing fresh 75% alcohol. The reason for transferring them in this way is that the spiders' bodies contain a considerable amount of water which, when added to the alcohol, reduces the strength of the latter and thus weakens its preservative properties. When the specimens have been thus transferred, place a paper label, containing the following information clearly written in pencil or water-proof ink, in each vial: Locality (the nearest post office where the specimens were collected—e.g. Toronto, Hamilton, or London); date (the day, month, and year when the specimens were collected); your own name or the name of the person who collected the specimens. A sample data label contained within a vial of spider specimens should read as follows:

Centreville, Ont.
July 21, 1948
J. Smith

This label then tells you that the spiders contained in the vial were collected by J. Smith on the 21st day of July, 1948, in Centreville, Ontario.

Remember that *specimens of spiders are of very little use without detailed labels telling you where and when they were collected and who collected them.*

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