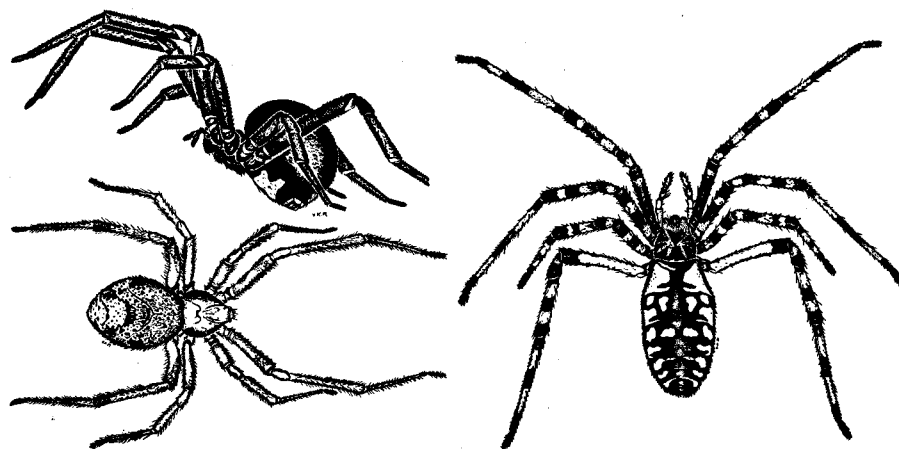


This is the twenty-second in Nature Magazine's series of educational inserts

BLACK WIDOW SPIDER (ABOVE), HOUSE SPIDER (BELOW) AND THE GARDEN SPIDER



Along Came a Spider

By E. LAURENCE PALMER

Illustrations by Velma Knox and MacGeyger

MRS. MUFFET made a great mistake when she let her daughter be frightened by the spider that came to sit beside her. Mrs. John Citizen compounds the mistake when she repeats the nursery jingle which has prejudiced so many against some of the most interesting and usually harmless creatures in our neighborhoods. Of course, the black widow spider is dangerous, but it is not aggressive; and, of course, some of the related animals like the mites and the chiggers are offensive neighbors. But the mill-run of spiders that run about our homes, swing from our trees, sail through the air, dive through the water or hide in holes in the ground, are harmless and often valuable members of the fauna of our back yards and gardens.

When Liberty Hyde Bailey was asked what should be done about dandelions, he is reported to have said that we should learn to love them. Similar advice might bear on our attitude towards spiders, because there is little doubt that we will have to live with them indefinitely. Their oldest ancestors were probably marine, but ever since Silurian, or late Ordovician times there have been spiders running around on dry ground, or at least their ancestors have been doing this. The earliest true spider fossils are found in the Carboniferous Age, as is also the case with the earliest of the closely related daddy-longlegs.

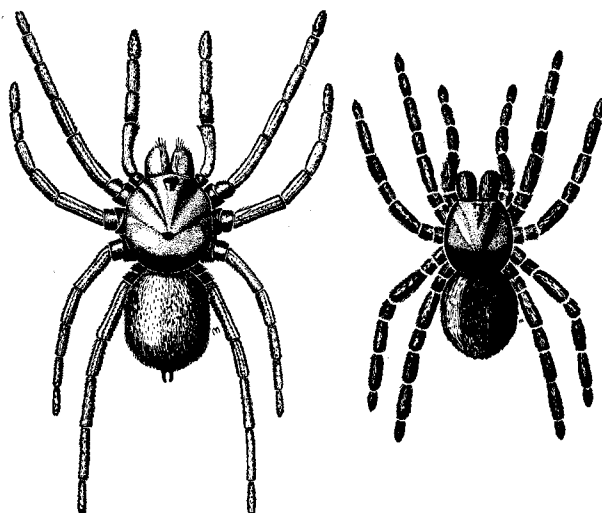
I have lived or spent substantial periods of time in homes in the four corners of the United States.

In each place, I have found spiders similar to those that haunt my permanent home. In fact, the common house spider is one of the most widely distributed of the spiders, apparently able to adjust itself to highly varied conditions. If you look in your attic or cellar you will probably find one on its web protecting one or more of its egg cocoons. While looking for a house spider, you may find a loose web with a slender-bodied spider which jumps about on the web at times as though it were an insane acrobat. This squint-eye spider might be mistaken for a daddy-longlegs if we did not know that the latter does not build or live on a web.

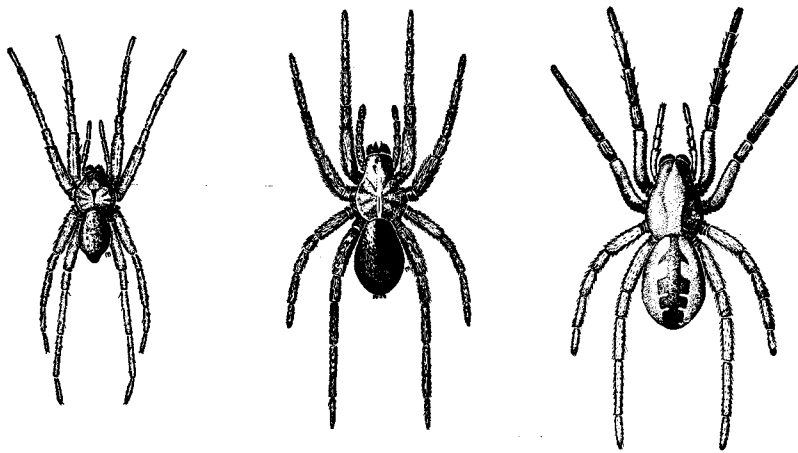
It is fun to explore your own home for spiders. We have a colony of mud-dauber wasps at one end of our home. Occasionally, the wasps get in our sleeping porch to the distress of the family. But I enjoy watching the wasps and my spiders. We might assume that, in a contest between a wasp and a spider, the spider always loses.

We are told how the wasp paralyzes the spider and stores it away in its nest as food for the wasp grub. In my attic, below a maze of spider webs, the remains of plenty of wasps are scattered on the floor.

It is difficult to know how to feel about these contests. Most of the family do not like the spider webs, and so do not like the spiders. But people who do not like spiders also despise flies, mosquitoes and moths. Although you can show the spider webs strewn with the remains of



TRAP-DOOR SPIDER AND TARANTULA



WATER SPIDER, WOLF SPIDER, TURRET SPIDER

these insects, the spiders are not popular. And so when a wasp comes along and steals a spider from my attic how should I feel about it?

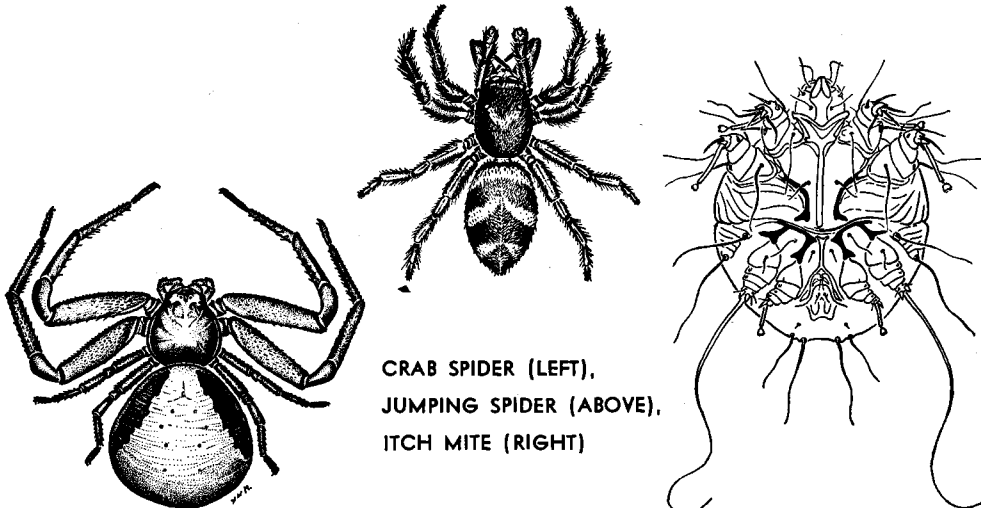
One of the things that annoy our household is the presence of slender threads of cobweb that hang vertically from the ceiling or from the lighting fixtures. Sometimes, these are draped gracefully across corners and sometimes they get well covered with dust before they are discovered. Rarely, if ever, are there any spiders on these webs, and the question has been raised as to how the webs got there and what made them.

Of course, it is not safe to say that all webs that hang

leisure. The silk, being of no more use, continues to hang from the ceiling gathering dust until it is discovered by some irate housewife.

All the interesting spiders on my home lot are not found in the house. My garden, my lawn, the woods, the pool and even the driveway have spiders of their own. Probably the most beautiful of these is the orange garden spider, which builds large webs in a vertical plane between some of the plants of my garden, or even at the edge of the woods in the trees. I like to follow this spider and its behavior through the year. There is a little clump of weeds that I have saved in my back yard. Each year I

can find in it a few silken cocoons about the size of a hickory nut. In these cocoons, the young spiders hatch in the middle of the winter and remain within the cocoon, living by eating each other and gradually growing until such a time as they are ready to free themselves. These spiders are likely to build new webs frequently. So large and elaborate are some of



CRAB SPIDER (LEFT),
JUMPING SPIDER (ABOVE),
ITCH MITE (RIGHT)

from a ceiling are made by one kind of spider, because they are not. Some of them, however, are made by little spiders that I have known and recognized since I was a youngster and before I had any formal training in Nature. I believe the first one I ever remember seeing was on the porch rail at my grandfather's home. I remember seeing this little gray spider run erratically on the sunny side of the rail. I remember trying to crush it with my finger and failing because the spider suddenly jumped to a new position. When I tried again, the spider again escaped by jumping. This provided me with so much fun that I devoted some time not to trying to kill the spiders

these that we are likely to wonder how they are able to produce enough silk to do the job.

What makes me marvel at these spiders is how they escape capture when they rest exposed in the open air so far from any shelter. They have the ability to drop to the ground suddenly in case of real danger, but this must expose them to other enemies on the ground. The webs are particularly interesting. I can hardly resist poking each one I see with a blade of grass to see what happens. The lines that extend like spokes of a wheel are not sticky and I can easily draw the grass away from them after they have been touched. The lines that make up the spiral *are*

sticky. Once they have been touched, I have difficulty in drawing the grass blade away without destroying the web. It is easy enough to draw conclusions as to why these two kinds of silk are used in the web. This becomes more significant when we notice that the spider runs about the web on the spoke threads rather than on the spirals. I also like the little stabilizer ladders that are so often to be found on these webs. They look much like a shoelace and are used to tighten up the web or release the strain, depending on weather and other conditions that might destroy the web if provision

was not made for them. Nature anticipates many needs.

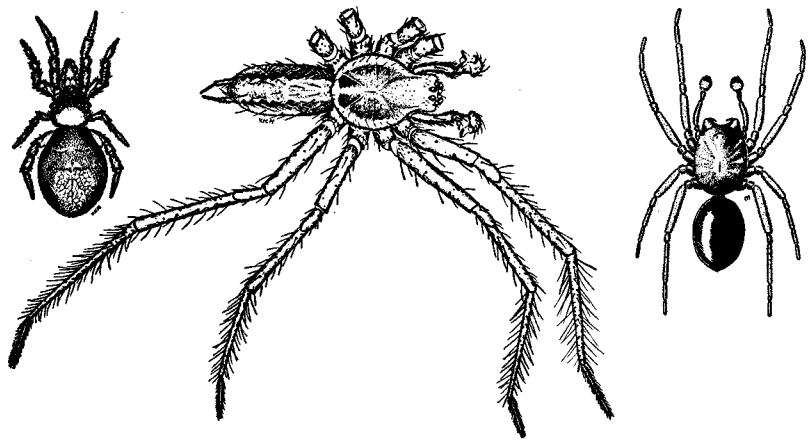
So strong are the webs of these garden spiders that they are able to catch and hold a large grasshopper that may spring into it with considerable force. Of course, the webs may break and be repaired but it is remarkable that they withstand as much as they do.

Another favorite spider of mine is the funnel-web spider whose webs I find in the grass at the edges of my lawn. As the season advances, these webs grow larger and larger, as does the spider builder. These webs are much more permanent than those of the garden spider, which commonly builds a new web each night.

The funnel webs are often overlooked unless they get covered with dust or dew, when they stand out as gray patches in the green. Usually they are supported at the corners by more substantial grass blades, the tops of which may be high above the ground. Between the tops, one or more "trip threads" are frequently found. These serve to upset an insect flying above the web beneath. By the time the insects have regained their equilibrium, they may have fallen to the web below. What happens to them there is the business of the spider.

The male funnel-web spider rarely builds a web as large as those of a female; in fact, he rarely stays at home long enough to build a big web. He is off on courting expeditions, visiting the webs of females who are just as likely to eat him for a meal as to accept him as a suitor. Unless she is disturbed, the female may spend her entire adult life on the one web on which she lives. These spiders are unique among many of the commoner spiders in that they run about on top of their webs instead of suspending themselves from beneath them.

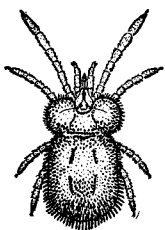
Down among the grasses and out on my bare driveway run a host of long-legged active spiders. Frequently, they go dashing across a bare concrete sidewalk. I once watched one of these spiders stage a fight on a sidewalk



TRIANGLE SPIDER, GRASS SPIDER, BALLOON SPIDER

with a large wasp. The contest lasted for fully a quarter of an hour, with the wasp keeping the spider from getting to the border cover and yet hesitating to break through the threatening guard the spider was putting up. A number of times they went into a rough and tumble clinch only to break loose and back off for another try. Finally, the spider collapsed, and after I had chased the wasp away I found the wasp egg laid on the spider.

These spiders which are so common on the ground in my yard are for the most part wolf spiders. They build no web; few if any dig any burrows. Instead they seek shelter in the vegetation or under rubbish. In such a hiding place, they lie in wait for a lunch that may pass by. When the

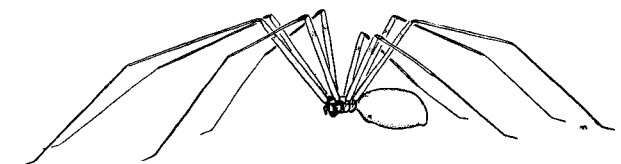


CHIGGER

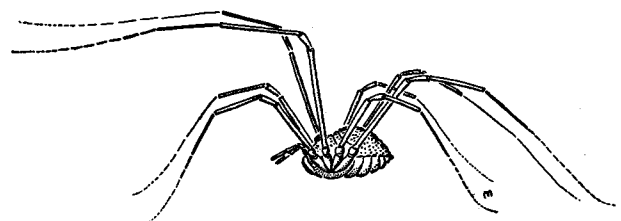
covered with dust or dew, when they stand out as gray patches in the green. Usually they are supported at the corners by more substantial grass blades, the tops of which may be high above the ground. Between the tops, one or more "trip threads" are frequently found. These serve to upset an insect flying above the web beneath.



CHICKEN MITE



PHOLCUS, THE SQUINT-EYE SPIDER, AND, BELOW, DADDY-LONGLEGS



time is ripe, they dash out and catch their meal and that is about all there is to it. They waste no time in making elaborate webs or digging underground shelters. They see what they want and they get it. Their abundance and wide distribution indicate that there is merit in their technique for living.

The flowers of my garden serve as hosts for one group of spiders that always delight me. I remember the first one I ever saw. It was in the throat of a white trillium flower that I had plucked to lay on top of a basketful of brook trout I was taking home to my mother. I thought that the flower looked peculiar but I was not prepared to see a pink and white crab spider (Continued on page 536)

COMMON NAME SCIENTIFIC NAME ORDER FAMILY	HOUSE SPIDER <i>Theiridion tepidariorum</i> Araneae Theridiidae	SQUINT-EYED SPIDER <i>Pholcus phalangioides</i> Araneae Pholcidae	GRASS SPIDER <i>Agelena naevia</i> Araneae Agelenidae	ORANGE GARDEN SPIDER <i>Argiope aurantia</i> Araneae Argiopidae
DESCRIPTION	Female, with body 1/4 inch long; male, with more slender, 1/8 inch body. Legs, nearly 3 times the length of the body in front. Exceedingly variable, but bearing several dark chevrons above the end of the abdomen and on the under side. General appearance, dirty and dusty.	Body, about 1/4 inch long, and longest legs just over 2 inches long. Body, conspicuously long, slender, pale brown in color for a spider. Might easily be confused with Daddy-long-legs, but for presence of a web and the general body characters that make it a true spider.	Medium-sized spider, varying in size and color, but with 2 longitudinal black lines bordering gray lines on the back. Male, 1/2 inch or less long; female, up to 3/4 inch long. Legs do not vary greatly in length. Median gray band down the back serves as quick, rough identification character.	Large black and yellow spider. Male, about 1/4 inch long; female, about an inch long, with front legs as long as the body. Colored conspicuously, with the rear of the body black, with bright orange or yellow spots that make a band along the sides.
RANGE AND HABITAT	Over 300 species of the genus have been described, about 40 of which are found in North America. <i>T. tepidariorum</i> is the most common of the species. Commonly found in and about houses, particularly in dark, unused places, as under porches, in attics, and the like.	Closely related to house spider though not in same family. American species of genus, 2; related American genera, 6. Common in cellars, under porches, in houses, both in Europe and in America. Closely related species found limited for most part to Florida region. Favors dark, warm places.	Four species of the genus found in the United States, the genus also being represented elsewhere in world. Commonly found on or near their webs in grass, on lawns or in meadows, and most conspicuous when webs are covered with dust or dew. Probably one of most universally common spiders.	Rather closely related to the Silk Spiders, from whose silk cloth has been made. Appears in literature as <i>Miranda</i> frequently. About 120 American species known. Favors marshes, gardens or among tall plants protected from the wind. Webs sometimes found on shrubs.
REPRODUCTION	Male courts female; may be eaten if unwelcome or after mating. Eggs, 50 to 200, laid in spherical cocoons hung in webs 6 to 8 weeks after mating, hatch in 1 week. In next 8 weeks, young pass through 5 moults, feeding on each other; leave cocoon in second stage and web of parent in third. Nine cocoons may be made in one season.	Eggs, laid in inconspicuous egg-sac which the female carries about with her rather than leave it hanging in web, as is case with house spider. Egg-sac, thin, seen only when it is looked for carefully. Young develop in egg-sac and when released live for a while on mother's web.	Lives but one year, winter being spent in egg stage. Adults die soon after eggs are laid. Eggs in irregularly shaped, flat sacs, under rubbish and usually protected by female until her death. Male wanders in late summer visiting webs of females, seeking mating, but may be eaten for his trouble.	Male and female build similar nests but male visits female's nest in fall. After mating, female lays eggs in cocoon size of hickory nut which is firmly fastened to vegetation. Eggs hatch in mid-winter but young remain in cocoon until May. Mature by midsummer and disappear by October.
HABITS AND FOOD	One mating fertilizes eggs for many cocoons. At first, young feed on each other, then on scraps in mother's web. Finally, leave to make own webs. Webs, irregular. Adults may or may not have place in which to hide and await prey. Fourth pair of legs has a comb of fine teeth which help fling silk on prey.	Builds a large, irregular web which is loose and open. On the web, spider hangs head down, except when alarmed. When prey enters the web, spider jumps around on web shaking it violently and entangling victim which is then killed. Food, almost exclusively small insects caught on the web.	May stay on one web all summer if undisturbed, the web being enlarged with the season. Trip thread common between supports above the web. Spider runs on top of web, unlike most species and hides in funnel, which has a rear entrance for escape or for pouncing on prey. Webs of young plain by May.	Remarkable web, sometimes 10 feet across, with ladder-like structure near center, and shelter web where adult hides. May add secondary web near center. Can kill large grasshoppers that land in web by enmeshing in silk and then biting. If frightened, drops to ground and hides in vegetation. Web remarkably strong.
RELATION TO MAN	Ability to adapt itself to varied climates has made species almost world wide. Useful as destroyer of house insects such as flies, moths, mosquitoes. Webs collect dust. Should be studied living in every biology class in preference to so much book teaching.	Useful as a destroyer of insects and interesting because of its behavior on loosely hung web. Of course, it clutters up neglected places with its webs, but this does no great harm, and insects captured can not do harm they might do otherwise. Lives comfortably in a dark box if fed.	Useful as destroyer of insects that may be injurious to crops. A most excellent subject for study in fall biology because of abundance, food-getting habits, the physics of the nest, sensitivity, locomotion, and protection. May be attacked by parasitic wasps. Webs used by some birds in nest making.	Probably useful as insect destroyer. The physics of the web is worth studying. New web usually made each night. Not all portions of the web are sticky as may be discovered easily. Spider commonly parasitized by ichneumon flies which may themselves be parasitized.

WOLF SPIDER <i>Lycosa helluo</i> Araneae Lycosidae	TURRET SPIDER <i>Geolycosa arenicola</i> Araneae Lycosidae	WATER SPIDER <i>Dolomedes urinator</i> Araneae Pisauridae	CRAB SPIDER <i>Misumenia vatia</i> Araneae Thomisiidae	JUMPING SPIDER <i>Salticus scenicus</i> Araneae Salticidae
<p>Medium-sized spiders. Male, about 1/2 inch long; female, 3/4 inch long. Color, gray, yellow, grayish brown or brown, with a yellow, narrow middle stripe down the back. Legs, shorter and stouter than those of the water spider. <i>Dolomedes</i>, although some species of <i>Lycosa</i> have relatively slender legs.</p>	<p>About 7/8 inch long, with stout body and strong legs. Male, more slender than the female. Color, reddish brown, obscured by gray hairs, with a broad light band down the back which becomes narrower towards the abdomen. The body is hung low and the female's abdomen is conspicuously larger than that of the male.</p>	<p>Large, long-legged spider, the sexes differing so greatly that they have been described as separate species. Male, with conspicuous, yellow band around forepart of body; female, with large abdomen bearing median, yellow band, with 3 to 6 pairs of small yellow or white spots. Relatively active, with remarkable locomotion abilities.</p>	<p>Medium sized spider, with front legs spreading 3 times the body length. Male, 1/8 to 1/6 inch long; female, 1/3 to 1/2 inch long. Color, yellow or white depending upon the flower on which it lives, usually with pink markings or red markings. Male, usually darker, particularly on sides.</p>	<p>Relatively small spider. Female, slightly larger than male, reaching length of 1/4 inch. Male, conspicuous, even to naked eye, because of larger mandibles of jaws which hold the female in the mating. Gray, mottled, hairy, with numerous white bands and spots. General appearance, flat or low. Front eyes touch each other.</p>
<p>In same general group with water spiders and turret spiders, a group that includes a majority of the larger spiders which run on the ground without making nests. Commonly found on or under stones or in holes underground, and when pursued, runs rapidly, even going upon or under water to escape many enemies.</p>	<p>In the same general group with the wolf spider, which it resembles slightly. There are roughly 114 species in America in the family Lycosidae, all of which live on or near the ground. This species digs burrows underground, the entrance being marked by little turrets of sand.</p>	<p>One of a rather large family of nursery-web spiders. By some, they are grouped with the wolf spiders, the Lycosidae, but in <i>Dolomedes</i> the upper row of eyes is less curved and is smaller. <i>Dolomedes</i> is commonly found on, under, or near water, and because of skill in diving, is sometimes called the Diving <i>Dolomedes</i>.</p>	<p>A dozen species are distributed through United States, a number being from far West. Commonly found on flowers or resting in throat of some bell-shaped flower. In spring, seems to favor white flowers; in the fall, yellow; may change from white to yellow in 10 or 11 days. Not common in winter.</p>	<p>Only common species in the United States but this one widely distributed even into Europe. Three species not so common. Found on walls of rooms, on window casings, on fences, barns, wooden houses commonly where it is sunny or where wood has been weathered. Not offensive in spite of its abundance.</p>
<p>Eggs laid in spherical sacs, each consisting of 2 pieces. Sacs carried by female to rear of body. Female frees young from sac and they may crawl over her body taking a ride with her wherever she goes. The young soon leave the parent and shift for themselves. The female builds a silk-lined nest for shelter in early summer.</p>	<p>In late May, male courts female; is eaten by her usually, after mating. In June, female retires to burrow, closes it, spins and protects cherry-pit sized cocoon containing eggs. Young emerge from cocoon in July, live on mother's back, moult twice by August, leave to dig own burrow. Mature size, third fall; sexually mature next spring.</p>	<p>Eggs laid in an egg-sac almost equal in size to that of the abdomen of the female, may number to 300. Young freed by mother when sac becomes mottled; may be guarded in web nursery, or in web under stones. Young feed on each other at first; not fed by mother. Web made just as young are freed from sac.</p>	<p>Eggs are placed by female in flattened silken sac which is composed of 2 equal parts. Female protects sac and young, the sac being usually fastened to some leaf or other plant part, and hidden on some incurled surface. Young feed on each other until they leave the sac to shift for selves.</p>	<p>Male courts female by dancing before her, spreading his legs out at the sides and up over his back and head. Eggs, laid in cocoons, often several in a single nest; laid early in season, hatch early. Young guarded by mother until able to be independent, or well through summer, when young leave mother's nest for independence.</p>
<p>Food, small animals, mostly insects caught by pursuit. May be active during the day, but most active at night when its food is more active and its enemies, such as many wasps, are less active. A fight between a wolf spider and a wasp, which uses the spider as a food supply for its young, is well worth watching.</p>	<p>Preys on small animals caught by pursuit. First year, burrows few inches deep; second year, 10 inches or more; mature spider burrows to 18 inches, often ending in enlarged cell in which winter is spent. Entrance turret may be reinforced with plant material. May go months without food, without ill effects.</p>	<p>Feeds on water insects and other small animals caught largely by pursuit. Normally wary; hides under water or vegetation skillfully. Webs built apparently only for protection of young. A 3/4 inch spider has been known to capture and drag from the water a fish 3 1/2 inches long weighing 4 times as much as the spider.</p>	<p>Makes no web but lies in wait usually in throat of flower to capture insect visitor, then hangs on with hind legs while the forelegs are used in capturing the prey even though this means a struggle, when the prey is larger than the spider itself. Most active in warmer, sunny seasons.</p>	<p>Although this spider spins silk, it makes no web for capturing prey. It moves rapidly, in any direction and when necessary, leaps into the air to capture its prey, "letting out a line" of silk until it is ready to stop, then climbs back up the silk to the place left. Hides in silken nests in winter.</p>
<p>Probably of considerable importance in controlling insect enemies of plants of fields and gardens and most difficult to conceive of as harmful to man's interests. Makes an excellent and interesting terrarium pet for home, camp or school, and should be better known than it is.</p>	<p>Useful enemy of insects that may injure plants. Worth studying because of great sensitivity to jar, light, odor, sound and moisture. Can be frightened by footsteps 12 feet from burrow entrance. Will come to entrance if beam of light is centered on the entrance. Rushes to entrance of burrow at slightest disturbance.</p>	<p>Possibly serves some role in maintaining a balance among small animals of waterways. Most interesting because of ability to swim under water, to build and use rafts from which to dash after prey, and because of webs which so obviously serve as a nursery. Harmless and should be studied more.</p>	<p>Possibly useful as insect destroyer but always interesting as garden or terrarium pet. May wander from flower to flower but if hiding places are limited, the spider may usually be found easily. One may stay for days in a single flower if undisturbed.</p>	<p>Amusing and harmless resident of the rooms in which most of us live. Obviously, it favors dryness, sunny spots and warmth, and is active in daytime rather than at night. Makes excellent subject for classroom study and should be better known than it is by all students and housewives. It makes common cobwebs which hang from ceilings.</p>

COMMON NAME SCIENTIFIC NAME ORDER FAMILY	BALLOON SPIDER <i>Erigone autumnalis</i> Araneae Micryphantidae	TRIANGLE SPIDER <i>Hyptiotes cavatus</i> Araneae Uloboridae	BLACK WIDOW <i>Latrodectus mactans</i> Araneae Theridiidae	TARANTULA <i>Eurypelma hentzi</i> Araneae Aviculariidae
DESCRIPTION	Body, about $\frac{1}{20}$ inch long, and easily recognized by generally light color, and the bright yellow head. Male has claspers used in holding female in mating. Related species are mostly larger and darker in color. Legs, moderately long, and movement, relatively slow. Does not frighten easily.	Male, $\frac{1}{12}$ inch long; female, $\frac{1}{8}$ inch long. Generally inconspicuous, but none the less interesting. Back of female, with 4 hair-bearing humps which in male are less conspicuous. At rest, spider closely resembles a tree bud, for which it is commonly mistaken until it moves on being disturbed.	Black spider, with body $\frac{1}{2}$ inch long; legs, slender; abdomen, large and almost spherical, with an hour-glass-shaped, red spot on under side. Front and hind legs, longer and more slender than the middle pair. Female, over twice size of the male, whose body is under $\frac{1}{4}$ inch long.	Largest of American spiders, some species measuring 2 inches in length of body alone, with legs correspondingly large. Body and legs, conspicuously velvety. Legs, stout, but able to carry spider rapidly. One South American tarantula has legs which spread over 7 inches; another has a body $3\frac{1}{2}$ inches long.
RANGE AND HABITAT	About 95 species of the family and 30 of the genus. There are 4 American genera. Found for the most part on the ground, in grass, among leaves, moss and other small plants, where they spin their small webs during the summer months. In the fall, they are found high on some post or exposed plant.	One species is best known in United States but there undoubtedly are others as yet undiscovered; possibly, present on west coast, in closely related form. Found on dead twigs commonly in gorges and similar places where air may be relatively quiet. Usually, on a twig next web.	From New Hampshire to Patagonia and West to the Pacific coast, but more common in southern and western United States. Favors damp, dark areas such as are found in cellars, under boards, in stone walls and frequently in outhouses. Closely related to harmless house spider.	Closely related to trap-door spiders; about 40 species in family but does not belong to the same family as the Italian spiders whose behavior gave the name "Tarantella" to a dance. Lives on or near the ground hiding in holes under stones and in logs and debris. Common in the southwestern United States.
REPRODUCTION	Little known of the life history. One member of the family builds a dome web about 3 inches across; others build small webs like plain sheets. Some favor houses; others fields, and others woodlands, but all are most commonly inconspicuous and the webs are usually noticed only when dew-covered.	Egg-sacs, not easily noticed as they are placed on twig and resemble bark or silk. They are oval and flat and have an outer covering over $\frac{1}{4}$ inch sac. Covering is gray like bark, or dirty white due to fact that portions are made of black silk mixed with white. Young hatch in brood sac.	In June or July, female makes 3 or 4 $\frac{1}{2}$ -inch cocoons, each of which may contain about 300 eggs. Young hatch, feed on each other. In a few weeks, survivors emerge from cocoons and begin eating spiders, insects and other small animals. May mature and breed by fall and females may live through winter.	Mates in fall. Following summer, a female puts 300 to 600 eggs in a thick-walled cocoon which she protects. Young grow slowly first half year, rapidly next 4 or 5 years, moulting about twice a year, and living sometimes as long as 16 years. Only 2 or 3 may mature out of an initial 5,000 young.
HABITS AND FOOD	About time first frosts appear, great numbers of erigonids climb to elevations. There they spin long streamers of web when air is rising, which serve as balloons with which they may journey great distances. Sometimes streamers cover a field causing the "gossamer", "flying summer" or "old woman's summer" effects.	Makes a triangular web of 4 threads with cross threads, one corner terminating in a single, long thread. Spider takes up slack on this long thread, and when prey enters web, releases it to snap the web and tangle prey in meshes. Spider rests feet uppermost beneath this trip-cord, slack lying loosely between front and hind feet.	Not ferocious, and normally must be forced to bite. Bite causes serious discomfort and while 10 percent of those bitten have been reported to die, there is no record of death occurring to a healthy adult human. Pain is general, not accompanied by great local swelling, causes slight temperature, lasts 3 days.	Not poisonous in spite of contrary convictions. Bites painful, but not serious because jaws suitable for crushing its food of insects. Some species can kill birds. When annoyed, assumes defense attitude. Can hear camera click. Bites only when forced to do so. Largely nocturnal. Common prey a wasp, tarantula hawk.
RELATION TO MAN	So conspicuous are the gossamer threads, when dew or frost covered, that everyone has noticed them in their season. The little spiders probably do some good in controlling small insects which might be enemies of useful plants.	May be kept in a small bottle where it may build its web, lay its eggs and if food is available live with reasonable comfort. Too small for general appreciation but included here because of unique method of capturing prey and because of remarkable resemblance to its immediate environment. Protective coloration almost perfect.	Entitled to worst reputation enjoyed by any spider. Use ligature, cut wound, apply weak ammonia and carbonate of potash. Since bite tends to paralyze bowels, cathartics are used also. Name "black widow" probably from habit of female eating the male but this is a common habit in other spiders.	Valuable as insect destroyer and of no serious injury to man's interests, so really worthy of protection. Relies on sense of touch. Probably, cannot see difference between light and darkness but seems to be "charmed" by bright light at night. Makes excellent terrarium pet and thrives if given reasonable care.

TRAP-DOOR SPIDER <i>Cteniza (Bothriocyrtum) californica</i> Araneae Ctenizinae	DADDY-LONGLEGS <i>Leiobunum vittatum</i> Opiliones Phalangidae	ITCH MITE <i>Sarcoptes scabiei</i> Acarina Sarcoptidae	CHICKEN MITE <i>Dermanyssus gallinae</i> Acarina Gamasidae	CHIGGER <i>Trombicula irritans</i> Acarina Trombididae
<p>Large spider. Body of adult female, 1 1/8 inches long. Legs, long and stout. Color, whole spider, rich, dark chocolate brown with legs slightly darker. Third claw better developed than in tarantulas, having rake for digging which is absent in web-building tarantulas and needed here for hole digging.</p>	<p>Spider-like, with body 1/2 inch long, and 8 legs varying in length from 1 to 2 inches; the second pair longest. Body, brown; legs, black. Male, smaller bodied and more brilliantly colored than the female. Abdomen, segmented unlike the spiders. Abdomen, with stink glands which are effective.</p>	<p>Almost too small to be seen by the naked eye. The mite is white. In the female, the first 2 pairs of legs end in stalked suckers; in the male, all 4 pairs have suckers. The fourth pair in the female is long-bristle tipped. Size of mite, about 1/50 inch long and 1/75 inch wide.</p>	<p>Flat, reddish, pear-shaped mite, about 1/35 inch long and slightly more than half as wide with hind legs not reaching to the rear end of the body. Female, with long piercing mouth parts; male, with pincer-like mouth parts. Body, not conspicuously constricted at any place. Young have 3 pairs of legs, as in insects.</p>	<p>Minute harvest mite that has a greater restriction forward of the middle of the body than most others of the group. Immature form has but 5 hairs on the dorsal plate. In the immature and pestiferous stage, it is small enough to make its way through the meshes in ordinary cloth used in clothing.</p>
<p>A half dozen American genera of trap-door spiders, some with several species and closely related to the tarantulas. Fairly common throughout the southern and western United States but more common farther south. Lives almost wholly on or under the ground, in burrows which may be six inches or more deep.</p>	<p>One of 16 American species; about 15 American genera, with 2 families, with about 60 American species in all. Found in fields and meadows, or sometimes crowded in considerable numbers in holes in logs or in brush piles, but usually close to ground and most commonly more or less solitary.</p>	<p>Closely related to organisms which cause such skin diseases as scab and mange. About 100 known species in group, of which 13 are American. This species, parasitic on man and hogs. Common where cleanliness is not observed, with the female laying her eggs under the skin of the host.</p>	<p>One American species of the genus, but 18 American genera in the family. This genus is found almost exclusively on birds, though this species may live at least temporarily on humans, dogs, cats, horses or other domestic animals. The relationship is of course parasite on a host.</p>	<p>Closely related to "red spiders." About 4 American genera and 30 species, in none of which are the adults parasitic. This species occurs from New York to Minnesota and Kansas and through the South, but close relatives extend the ranges, particularly westward in the South. Found on vegetation and then on animals.</p>
<p>Life history habits in general similar to those outlined for the tarantulas. Young remain in the nest burrow of the mother with her for about 8 months leaving the home burrow after the winter rains cease and establishing burrows of their own. New layer of web added to door each year. May live 7 years or more.</p>	<p>Eggs, laid in fall through a long ovipositor which is thrust underground or in debris; hatch in spring. Young, white, with black eyes at first but otherwise much like the adults whose color they soon develop. By fall, young have matured; then mate, lay eggs and most individuals die, wintering being as eggs.</p>	<p>Female makes irregular burrows under the skin, laying egg-shaped eggs singly in rows of about 22 to 24. Eggs hatch in about 7 days into little mites whose explorations cause further irritation. Time from eggs to egg, about 4 weeks, though cold weather may extend this period considerably. May live away from host.</p>	<p>Elliptical, pearly white eggs are laid from 3 to 7 at a time, with a total of 25 to 35 laid during eight periods. Eggs laid in cracks near roosts, or in nests, hatch in 2 days into small mites, which, after the third moult, become adult. Time from egg to egg may be 7 days; individuals may live 4 months.</p>	<p>In northern part of range, larvae appear in June and disappear by October. They attach themselves to animal hosts which brush against plants on which they lie in wait. They do not burrow under the skin, but attach themselves and cause intense itching and pink or red spots. Usually leave host in 1 to 7 days.</p>
<p>Food, largely insects and other small invertebrates that can be captured with quick forays from the nest. Life dominated by fear particularly of parasitic wasp enemies, of which there are many. Highly sensitive to jar and to light. Does not leave nest; can hold cover shut from beneath.</p>	<p>Food, small insects and other small animals as well as dead and decaying matter. More or less nocturnal, though active on bright, sunny days. Builds no web or nest. Moves about slowly, getting some protection from noxious odor. May shed legs to effect escape; these may serve as a poor barrier protecting body.</p>	<p>Position under the skin makes it practically impossible to remove pests mechanically, and attempts to do so only spread the infection. Others may be infected by contact with clothing, towels, bed clothing or anything handled by infected person. No significance in the "seven year itch" idea as infection need not be tolerated.</p>	<p>Crawls about roosts and birds sucking blood, most commonly at night and hides easily because of smallness, flatness and other qualities. In the family are some mites that live independent of hosts, some which are parasitic on insects, as well as on warm-blooded animals; and some that use insects primarily for transportation.</p>	<p>Known to live as parasites in larval stage on man, mice, rats, rabbits, prairie chickens, quail, toads, box turtles and snakes. Humans attacked severely may run a slight temperature, and develop certain nervous diseases due to inability to sleep. Japanese chigger causes Japanese river fever fatal to 33% of victims.</p>
<p>Useful as destroyer of insects and similar animals captured at burrow entrance while door is held open by abdomen of spider. Some tunnels have two doors; some, branched, but all, lined with water-proofed silk. Some are camouflaged at entrance. Excellent terrarium and garden pet which is harmless.</p>	<p>Interesting to children who have been told that if held they will point in the direction the crows are to be found. Since they point in all directions this is a reasonably safe generalization if one successful prediction is considered adequate. General role probably that of a scavenger, but of little economic importance.</p>	<p>Infected person should be bathed and rubbed thoroughly in hot water and green soap, followed by bath in hot water and by applications of sulphur ointments which should remain on body several hours. Infections should not be tolerated particularly where persons come in contact with others in schools, churches and buses.</p>	<p>May be kept in control by scrupulous cleaning of roosts and nests, by use of crude petroleum mixed with kerosene. If too abundant, may kill chickens or so weaken them as to injure their productivity. May kill young of wild birds that use same nest succeeding seasons.</p>	<p>Controlled by soaking garment in 1/4 pound of naphtha soap and 1/4 pound of powdered sulphur in a gallon of hot water. Garments should be tied to hinder entrance of the chiggers. Cure with sulphur or carbolic salve. A great pest, attacking man and beasts as do the chiggers of Europe.</p>

(Continued from page 531) resting where I had come to expect to see only stamens and pistils. These spiders, like the wolf spiders, make no webs. Unlike the wolf spiders, they do not go out and run down their prey. Instead, they rest in a likely place and catch it. Their fore-legs are modified so that they can catch an insect much as the jaws of a steel trap close on a victim. The rear of their bodies can be thrust into and held in the throat of the flower so that the struggling insect cannot drag the spider loose in its attempt to escape.

The most remarkable thing about these crab spiders is their ability to change color. At some times, they are white with pink spots; at other times, almost entirely yellow. When they are on a white flower, they are white; but when they rest on a flower like goldenrod, they so nearly match the color that even you are not likely to notice them.

The tree tops support a host of spiders, but my favorite is a little fellow that one finds in the gorges near my home. Usually, it is on the dead top of a hemlock, but this is not always the case. It looks so much like a bud on a twig that it would rarely be noticed were it not for its triangular web. This web is discussed in the chart section.

Few people who have haunted fresh-water brooks and pools have failed to see a rather husky spider that runs rapidly off over the top of the water or dives at will beneath the surface. Fewer may have noticed the nursery-like web which these spiders build in the top of some weeds near the water. This web is not used in capturing prey but solely as a protection for the young spiders as long as necessary. Like their relatives the wolf spiders, these water spiders get their prey by running it down. Their ability in getting a meal either in the open air, on the surface of the water, or under it is, of course, unique.

The spiders have plenty of kin with varying reputations. The daddy-longlegs are experimented with by most youngsters at about the time in life when attempts are made to make threadworms from horsehairs. It is strange that once having overcome one's aversion for spider-like things by handling daddy-longlegs more people do not get better acquainted with spiders.

If we consider the mites as kin of the spiders and think about chiggers, the itch mites and chicken mites, we realize that these are animals whose intimacies we do not welcome. Chiggers are troublesome enough in their season but they are not so persistent as the itch organisms once they have become established.

It is difficult to classify spiders and their kin in our minds. Zoologically it is simple. Emotionally we feel we should consider them ogres. Poetically we turn to the delicate tracery of the webs. Economically we are in a quandary. We may turn to good books for our answers. *The Spider Book* by Comstock is one of the best. James Emerton's *The Common Spiders of the United States* has helped me improve my appreciation of the spiders about my home.

It is, of course, ridiculous to let the appearance of some of these animals prejudice us. To a fly or a grasshopper, they may be ogres but why to us?

"Where webs are spread to more than common size,

And half-starved spiders fed on half-starved flies."

In these lines one poet uses size of the webs and the hunger of spider and fly to show that the place has long been free from the disturbances of a housewife.

Another writer must have watched his spiders, because when he wished to emphasize a delicate touch he wrote:

"The spider's touch, how exquisitely fine!

Feels at each thread and lives along the line."

Of course, Shakespeare provides a wealth of appropriate similes such as Queen Mab's coach, the wheels of which had "long spinners' legs" for spokes, while the traces that drew it were "of the smallest spider's web". This sentiment is much nicer than in the verse in which the spider asks the fly to walk into its parlor with inhospitable intent. Of course, we have been told that it is bad luck to kill a spider, but that seems to hold little force in face of the Miss Muffet experience.

There have been attempts to use spider silk commercially, and silk cloth has been made from the silk of certain spiders. The effort required to produce this silk was such that there is little likelihood that it will become the basis of a big industry. Rayon and other substitutes for silk have undoubtedly closed the door to seeking silk from spiders, except for delicate instruments.

The silk of spiders, however, is something that holds the interest of those who like to understand what is going on in Nature just for the knowing. Not all silk from spiders is alike, and some produce a number of kinds of silk in the construction of different parts of their webs. Spiders use silk in ballooning their way across country in the fall, resulting in the sheets of gossamer we see so frequently spread over the fields in fall. Once you have watched a spider produce one of these streamers you have had an experience that you like to share with others. It has no commercial value. It will not affect your health. But it is fun to know about it and that sort of thing is what is meat to the naturalist. For this reason, spiders merit study.

The psychologists have been interested in spiders to help them in the study of instinct and intelligence. They find that most if not all of the actions of spiders are orderly responses to definite stimuli. They find that some spiders act after a definite pattern when an insect gets into their webs. They may, like the house spider, follow a pattern where the procedure is something like the following. The spider dashes across the web to its prey. It reverses its position on the web when the prey is reached. It wraps a thread of silk about the prey and gives it a pull. If the web is again shaken by the struggling victim the procedure is repeated. It may or may not bite at the end of each trip, but this is the pattern that is followed whether the web is disturbed by a luscious fly or by the end of a wire in your hand. These orderly series of behaviors following stimuli which can be easily typed are just what the experimental psychologists like to work with. Fortunately the behaviors are not always orderly in all species so there is little likelihood that those who want to know what a spider will do under all circumstances will be able to find the answer in any book. This is one of the nicest things about spider study—about all Nature.