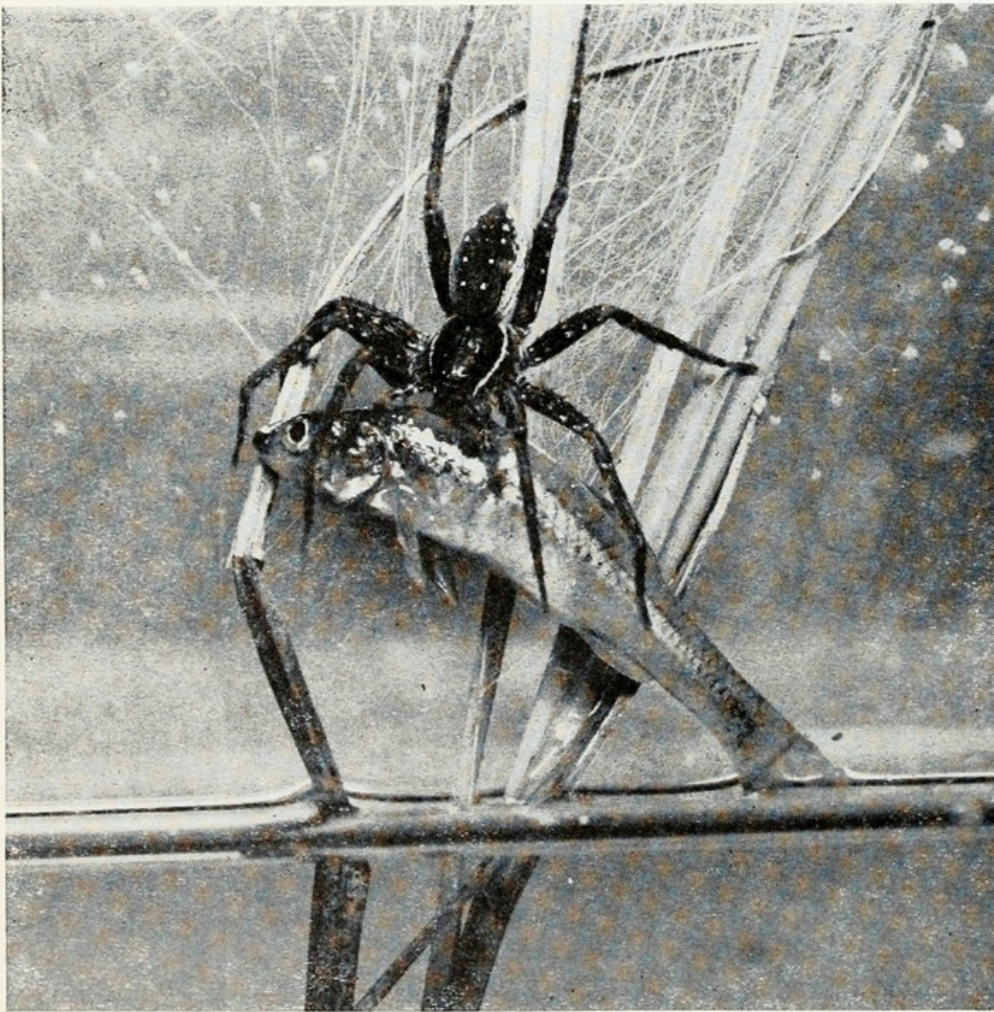


Spiders

the ingenious predators

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The fisher spider (*Dolomedes*), shown about twice natural size, eats small fish as well as tadpoles and insects. About a dozen species are found in the United States and Canada. Photo courtesy of John H. Gerard.

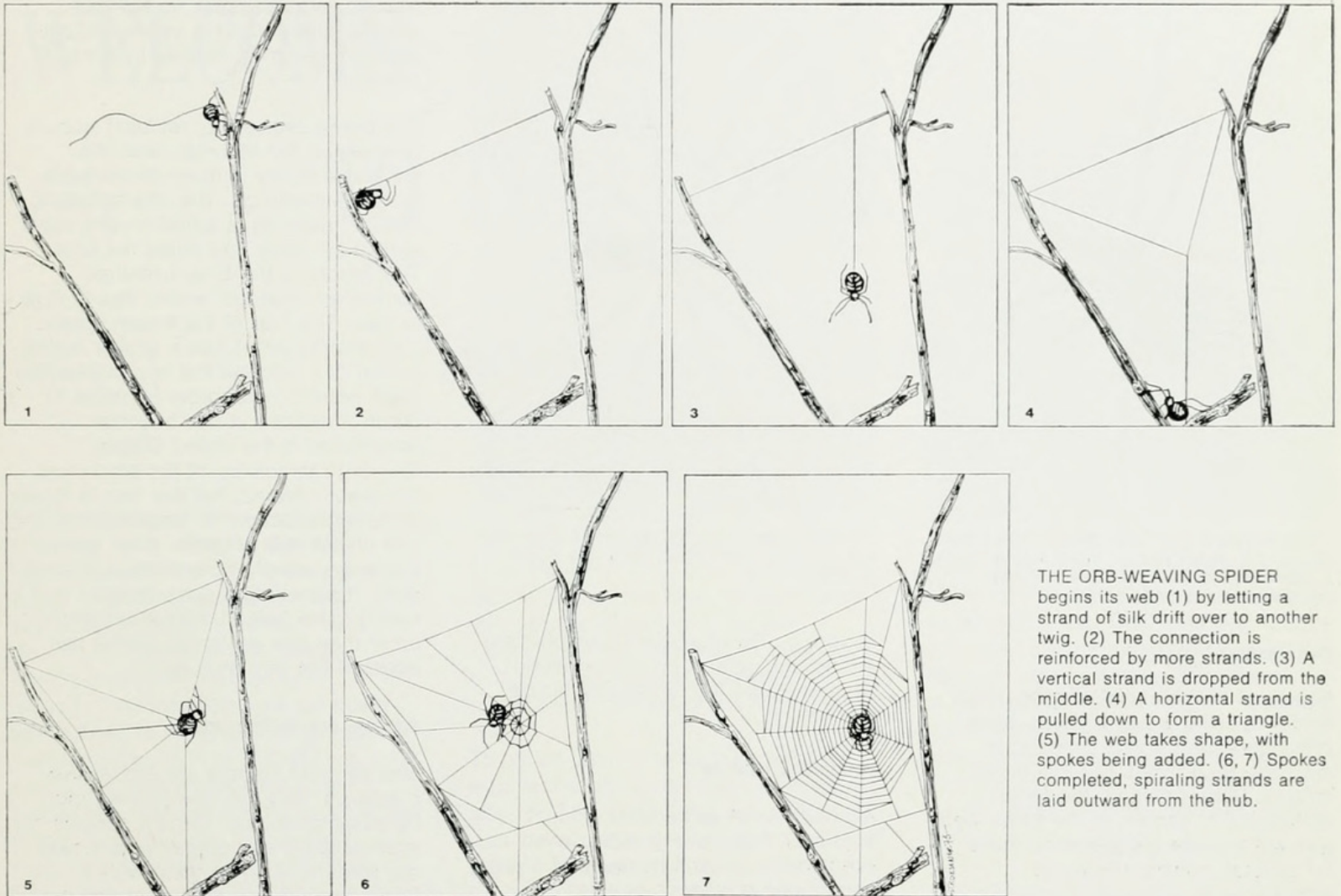
Although they are among the most bashful of creatures, spiders occupy an important place in man's ecological sphere. Compared to their close relatives the insects, spiders are relatively inactive and retiring; most are well camouflaged in dark or dull colors, thus they are seldom conspicuous in nature. It has been estimated, however, that in some grasslands the spider population may exceed 2.2 million per acre. Since all spiders are predators, such an abundance of them has a significant effect on other animals (and plants) in their communities.

As predators, many of the 30,000-odd known species of spiders depend in one way or another on their silk for capturing prey (all possess silk glands). Relatively few spin webs. The beautifully intricate, wheel-shaped webs of the orb-weaving spiders are familiar to everyone. Unlike many of its relatives, the orb-weaver has poor vision. It locates insects or other creatures that have become entrapped in the sticky web by means of vibrations imparted to the web by the struggling victim. The so-called ray-spider also spins an orb-shaped web. This spider lashes several "spokes" together with a central thread, then perches above the web on a twig, holding the central thread and pulling the web into a funnel-like shape. When an insect touches the web, the spider releases the thread and the web snaps free, ensnaring the victim.

Purseweb and pirate spiders

For many years spider experts could not determine how the purseweb spider captures her prey. This spider constructs a tubular web with the base sunken into the earth, about three inches of tube extending above ground. The mystery lay in the fact that the upper end of the tube was sealed and the spider was always found inside. Eventually it was observed that when an insect comes in contact with the tube, the spider strikes through the silken tube from the inside. The prey is then pulled through the wall of the tube. Before the spider eats her victim, however, she repairs the damage to the purseweb.

Pirate spiders of the family Mimetidae feed exclusively on other spiders. They



THE ORB-WEAVING SPIDER begins its web (1) by letting a strand of silk drift over to another twig. (2) The connection is reinforced by more strands. (3) A vertical strand is dropped from the middle. (4) A horizontal strand is pulled down to form a triangle. (5) The web takes shape, with spokes being added. (6, 7) Spokes completed, spiraling strands are laid outward from the hub.

do not make their own webs but invade the webs of orb-weavers and comb-footed spiders, killing the rightful owner.

Some pirate spiders of the genus *Ero* quietly enter the web of an intended victim, clear a space among the threads and then pull on the prey's web in the same manner as a courting male. The aroused occupant scurries out, hoping to encounter a new mate, only to become a meal for *Ero*!

Versatility of silk

In addition to making webs, spiders use silk in a variety of other ways. Once a victim is ensnared in a web, the spider may completely wrap it with silk and save it to be eaten later. Males make silken packets in which they transfer sperm to the female.

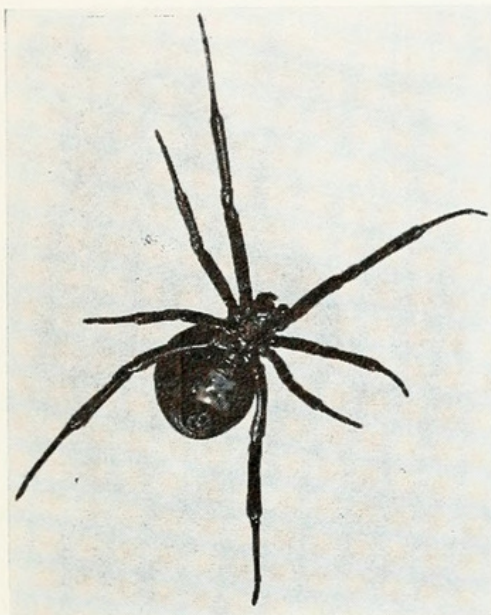
Eggs are often protected by special sacs constructed of silk. Some young spiders use a strand of silk as a "sail." They crawl to the top of a leaf or twig, spin a trail of silk, then are blown aloft. When the wind catches the thread, the spider may be carried for hundreds of miles on wind currents. This is one of nature's unique ways of species dispersal.

Jumping spiders of the family Salticidae do not make webs but search for prey on the ground or in vegetation. When a jumping spider is above ground and spies an insect below, she first secures a drag line to the twig and then jumps. If she misses her prey, the drag line stops her fall, and she scampers back up the line to try another time. Stories of such persistence, patience, and industry

among spiders are legion. Scottish hero Robert "the Bruce" (1274-1329) allegedly was inspired to renew his struggles against the English by watching a persevering spider.

Spitting spiders of the family Scytodidae capture their prey in a more sedate manner. When a potential victim is about half an inch away, the spider shoots a blob of sticky silk onto the prey, pinning it to the surface. She then leisurely strolls over to her meal.

Some of the cribellate spiders actually carry their webs to the victim (usually a moth). The spider constructs a small rectangular web and attaches the corners to her four front legs. When an insect lands nearby, the spider leaps on the victim and covers it with the net.



The notorious black widow has a painful bite, but victims usually recover within several hours. Actual body size is about ½ inch. Photo courtesy of John H. Gerard.

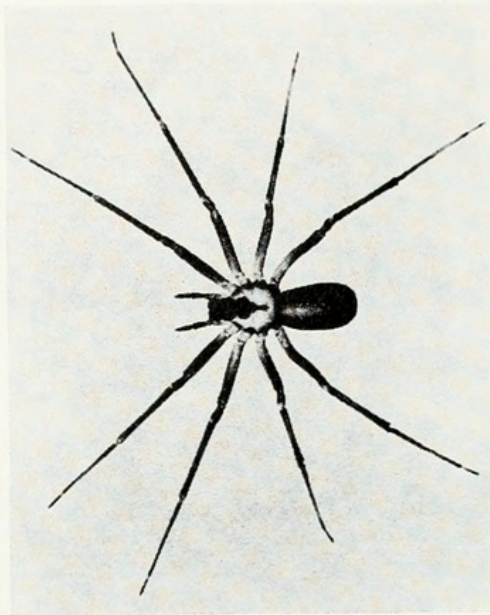
Cannibalism

Nearly all of the social or gregarious spider species are cribellates. Male cribellates have a less precarious marriage than males of most other groups. During mating, the female allows him to remain in the same web, and will tolerate his presence there for several months afterward.

The killing and eating of the male by the female spider after mating is one of the common misconceptions about spiders. Actually, the fate of the male depends upon a great many highly variable conditions. If the female has recently eaten, or if the male gives the proper identifying cues, he stands a very good chance of escaping after mating.

Giants and midgets

One of the largest spiders found in the United States is a species of tarantula, or hairy mygalomorph, *Dugesia hentzi*, common to the southwest. It easily covers the palm of the hand with its outstretched legs. The tarantula also holds the record for longevity among spiders. Some captive females have lived almost 30 years. Most true spiders, however, live only 12 to 18 months, producing one or two batches



The bite of the brown recluse spider ulcerates and is slow to heal. Actual body size is about ½ inch.

of young. Dwarf spiders (Linyphiidae) are the midgets of the spider world. Several would fit comfortably inside this letter o.

Venomous spiders

Although most spiders are quite harmless, the entire group is often eyed with suspicion because of a few notoriously poisonous species. In the United States there are two groups of species that one should learn to recognize and regard with caution: the widows, or hourglass spiders (*Latrodectus*, especially *L. mactans*), and the brown spiders (*Loxosceles*, especially *L. reclusa* and *L. laeta*). *Latrodectus mactans* occurs virtually throughout the United States, with the exception of Hawaii and Alaska. Relatively uncommon in nature, it is most frequently discovered in trash piles, under boards, and in outbuildings. The body and legs of the adult female are shiny black and there is a characteristic red hourglass on the lower abdomen; the total leg span is about 1½ inches. The male—a fraction the size of the female—does not bite. The female is actually not very aggressive and must be provoked before she will bite. She is most apt to bite when guarding an egg sac. The venom of the black widow is a

nerve poison, causing severe pain, nausea, and muscular weakness, but recovery generally follows in a matter of hours.

The brown recluse (*L. reclusa*) occurs primarily in the Midwest, and like the black widow is quite comfortable in man's dwellings. The characteristic "fiddle" marking is found on the upper part of the body that bears the legs. The venom of the brown recluse causes an ulcerous wound that is slow to heal. The bite of the brown spider (*Loxosceles laeta*) has a similar action to that of *L. reclusa* but is considerably more potent. This spider is native to South America but has become established in the United States. The large tarantulas of the southwest are greatly feared, but this fear is totally without foundation. A tarantula will not bite unless it is abused. Even then, the fangs usually do not penetrate the skin. If penetration does occur it is hardly more painful than a pin prick; other than this slight discomfort the effect of the venom is nil.

Spiders are victims, too

Just as most spiders are aggressive predators, they too, are preyed upon by other creatures. Certain species of mud-daubers and digger wasps seek out spiders, stinging them with a paralyzing venom, then dragging the stunned spider off to their nests to provide food for their own growing young. A notable example of such a predator is the tarantula hawk, *Pepsis*, that searches for female tarantulas. Rarely does this giant spider win battle with the intrepid wasp. Many insects are parasites of spider egg sacs. The larvae of mantid flies are known to develop only in the egg sacs of ground spiders. The larvae of small-headed flies of the family Acroceridae are internal parasites of adult spiders. The most common enemies of spiders, however, are birds and other spiders.

Between its alternate roles as predator and victim the spider manages to hold on to its own delicate foothold in the ecological scheme of things. Like man, the spider has so far been "successful."

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