

TARANTULA: This Mexican Red Knee can grow to be six inches across, but the Goliath birdeater can be twice as big.



E.S. ROSS

Super-powered spiders

**kid
Space**

Web-slinging and wall-crawling come naturally to these bug hunters

DARRELL UBICK bends over a square of canvas, picking carefully through oak leaves, dried moss, and bark pieces. An itchy-bitsy spider tries to sneak away, but Mr. Ubick spots its tiny, ghostly-green body. This particular spider is found only in oak trees along the California coast.

"As a kid," says Mr. Ubick, "I always liked spiders and insects." By sucking on one end of a tube draped around his neck, he plucks the miniature spider off the canvas. "There is a mesh inside the tube," he explains, "so I never get a spider down my throat. He gently blows the spider into a glass vial.

Creeping, crawling carnivores

The first thing to know about spiders is that they are not insects. Insects have six legs, spiders have eight. Unlike most insects, spiders don't have wings or antennae. Like scorpions, mites, and ticks, spiders are "arachnids" (uh-RAK-nids). This group of creatures gets its name from Arachne (uh-RAK-nee), a beautiful Greek maiden. According to legend, Arachne made the mistake of beating the goddess Minerva in a weaving competition. In revenge, Minerva turned Arachne into a web-weaving spider.

Scientists have named 40,000 kinds of spiders. (There are only about 4,000 kinds of mammals.) At the California Academy of Sciences in San Francisco, where Darrell Ubick works, 9 million insects and spiders are preserved in trays and glass vials.

"Scientists would love to identify all the different



PAMELA S. TURNER

REAL SPIDER MAN: Researcher Darrell Ubick finds spiders by shaking branches over a canvas square.

types of spiders," Ubick says. He has discovered about 30 new spider species himself. "But it will take a long time. We probably only know about half of all species, and even California has many spiders we don't know much about."

Spiders are nature's bug hunters. "Carnivore" makes us think of wolves and tigers, but spiders are probably the most common carnivores on land.

Just as lions and eagles hunt in different ways, so do different types of spiders. Crab spiders lie in wait, ambushing their prey with a lightning-fast strike. Jumping spiders stalk their prey like a cat. They can jump 20 times their body length to pounce on an insect. Sometimes a jumping spider will anchor itself by a strand of silk, and launch itself into space after a flying insect – just like a bungee-jumper. The spitting spider stuns its prey by shooting it with a nasty glob of venom and silk.

Although most spiders hunt insects, a few spiders, such as tarantulas, are big enough to eat frogs, lizards, and even small birds. A few diving spiders capture tiny fish.

Spiders kill their victims with venom (poison). Then the spider pumps special juices inside, turning its prey to liquid. "They suck up their prey like a milkshake," Darrell says. "Have you ever taken an orange, rolled it around, mashed it up, then stuck a straw in to get the juice? That's how a spider eats."

Many spiders spin webs to snare their meals. Different spider species make many kinds of webs – round "orb" webs, funnel-shaped webs, sheet webs, and even underwater webs. The teeny-tiny green spider that Ubick collected spins a small, flat web on an oak leaf.

Silk that's stronger than steel

All spiders spin silk, though not all spiders make webs. Spiders that don't make webs use their silk to line their nests and cover their egg sacs.

Spiders spin silk from special "spinnerets" on their tail end. A spider has many different "faucets" on each spinneret, to spin different kinds of silk. Have you ever wondered how a spider keeps from being stuck in its own web? A spider can spin both sticky and nonsticky silk. When it walks on its own web, it walks on the nonsticky strands. Even if a spider becomes stuck, it can eat its own silk. After a spider climbs up a line of silk, it may pull it up and snack on it!

Spider silk can also carry special "perfume." "Female spiders release chemicals with their silk," Ubick says. "If a male spider touches the silk, he knows it's a female of his species. So he follows the silken strand." Courtship is tricky among bug hunters, however. Female spiders are often bigger and stronger than males. In many spider species, males have special hooks on their legs to push the female spider's fangs back, just in case she is thinking of dinner instead of love.

Spiders don't have wings, but their silk helps many spiders become frequent fliers. "They release a line of silk," Ubick says, "and it can be picked up by the wind like a kite. Lots of smaller spiders can take advantage of air currents and be transported hundreds or thousands of miles." (Don't worry about flying tarantulas, though. They're too heavy.)

The tiny green spider that Ubick studies has relatives in Europe and Asia. Could its distant ancestors have flown to California from far away?

Modern chemists and engineers haven't invented anything to equal spider silk. Pound for pound, spider silk is stronger than steel, more elastic than nylon, and harder to break than rubber.

Spider silk also lasts a long time. Only harsh acids can break it down. That's why you find so

Continued on next page



US FISH & WILDLIFE SERVICE

LOVELY PREDATOR: A green lynx spider lies in wait for a meal. When these quick spiders spot an unsuspecting insect, they pounce on it like a cat – hence the name. Their green coloring helps to camouflage them.

Continued from previous page

many abandoned webs in dark, forgotten places.

Spiders aren't the only creatures that use spider silk. Many birds use it in making nests. People in New Guinea once encouraged large spiders to spin webs in hoops made of bamboo. When the spider was done, the spider web was used as a fishing net!

Spider senses tingle

Most spiders have eight eyes as well as eight legs. Even with all those eyes, most spiders don't see very well. Instead, they use their legs the way we use our tongue, ears, and fingertips. Spiders have special hairs on their legs that let them "taste" their food. Other hairs let them "hear" tiny movements in the air or feel small movements on their webs.

How do spiders crawl up walls? They have two or three claws and dozens of little hairs on each foot. The hairs are wet, but not sticky. "Just like a little scrap of paper will stick to a wet fingertip," Ubick says, "the spider can stick to a wall with these moist hairs."

But even to a spider scientist like Ubick, spiders are still a mystery. How are spider species related to each other? How many kinds are there? How do they "see" the world? How might we adapt spider silk for human uses?

Spiders may give some people the creeps, but nature has given them a special talent. Charlotte, an orb-weaving spider in E.B. White's "Charlotte's Web" (1952), said it best: "I don't know how the first spider in the early days of the world happened to think up this fancy idea of spinning a web, but she did, and it was clever of her, too. And since then, all of us spiders have had to work the same trick. It's not a bad pitch, on the whole."

Pamela S. Turner

Is 'Spidey' spiderlike?

In the 'Spider-Man' movie, the Peter Parker character uses some real spider tricks:

- Like a real-life spitting spider, Spider-Man shoots a glob of icky goo on his adversaries.
- In the scene where Spider-Man starts to crawl up the side of a building, a close-up shows spiky hairs shooting out of his fingers. Real spiders have these hairs, which help them climb walls.
- Spider-Man uses his spider webbing as a safety line, a trapeze, and a way to wrap up the bad guys (his "prey"). Real spiders use silk this way, too!
- Spider-Man supposedly gets his talents from a "mutant" spider that combines the genes of three spider species. No single spider has all of "Spidey's" talents – web-spinning, jumping, and spitting.
- In the movie, we never see what happens to all the webbing Spider-Man uses. A real spider would eat most of it.
- And finally: In the movie, Spider-Man's webs shoot out of his wrists. If he were a real spider the webbing would shoot out of a spinneret on his behind.

P.S.T.



PHOTOS BY E.S. ROSS

SPINNERS, JUMPERS: Female orb-weaver spiders (top; this one is from Ecuador) always rest head-down in their webs. A jumping spider (right; from California) is free-roaming and doesn't spin a web. Note its huge front eyes.



▶ TODAY'S ARTICLE ON CHRISTIAN SCIENCE ◀

Bringing a spiritual perspective to daily life

An end to bullying

IT MAY SEEM LIKE an obvious point, but it needs to be stated up front: bullying hurts, whether it's by poisoning a family atmosphere, making a person feel inferior and alienated, or causing a young person to go to school dreading another hallway or schoolyard encounter. Bullying or being bullied is not a natural, normal part of growing up. It is damaging, disparaging, and unacceptable.

With the deaths of several Canadian children due to bullying, as well as at least one suicide linked to bullying, the problem has moved to the top of the public agenda. The Minister of Justice was the first speaker at a national conference on the subject in Ottawa last week.

How do we help children treat one another with respect, whether it's quieting insults being exchanged by our children two rows back in the minivan or preventing youths from picking on their peers, physically or in other ways?

We can stop bullying. I remember a time when I was being picked on by a bigger boy in my first year of high school. It happened during physical education period and sometimes in the hallway between classes. But a wonderful, encouraging thing also happened.

A very large boy who was also in grade nine, but who already played on the football team and to whom I had talked a bit at the start of the school year, told me that if I was ever picked on again by the other boy, I should tell him and he would take care of it.

My big friend never had occasion to help me, and I would never have asked him to beat up anyone for me or anyone else. But his comments caused me to feel that someone was aware of what was happening to me and cared.

But what can a parent, teacher, or administrator do to prevent bullying? Some schools have developed zero-tolerance programs or other successful approaches. Certainly you can help by taking bullying seriously and standing ready to intervene if necessary.

One website emphasizes these points to a young person being bullied: 1) you're not alone; 2) you're not the reason why you're being bullied; and 3) you can do something to stop it, so

you're not powerless (see www.bullying.org).

Recently, comments made by a youth police officer with 26 years of experience helped me think more spiritually about youths and parents. She said that the parents of the children involved in wrong activity are often good parents. But they don't realize their children are involved in such activity or don't know how to help them. She also said that the young people themselves are good, but they're making terrible decisions.

Jesus reformed a bully by seeing that his true nature was to reflect goodness. Zacchaeus was a tax collector who bullied the people from whom he collected taxes into paying more than they should. But when Jesus stopped to talk to him on the road into Jericho and then went to his house, Zacchaeus repented of the harm he was doing to others. At his own initiative, he committed to making

amends. (See Luke 19:1-10.)

To cause such a radical change of character, Jesus must have been seeing beyond Zacchaeus as a bully to his

true nature as the reflection of God. What he did relates to this passage from a book by the founder of this newspaper, Mary Baker Eddy: "Jesus beheld in Science the perfect man, who appeared to him where sinning mortal man appears to mortals. In this perfect man the Saviour saw God's own likeness, and this correct view of man healed the sick" ("Science and Health with Key to the Scriptures," pgs. 476-477).

Such thinking about bullies helps us deal with the issue in ways that are practical, wise, and compassionate. It helps us communicate courage to our children and prevents us from getting dragged into condemning another child. It makes us receptive to helpful ideas and aids us in putting those inspired ideas into practice in our family, classroom, school, and school system.

Through prayer and other ways, we can end bullying.

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it's not a natural,
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