

SPIDER WOMAN

Hunting venomous species in the basements of Los Angeles.

BY BURKHARD BILGER

Early one morning last year, when the streets of downtown Los Angeles were still mostly deserted, a strange figure appeared in the Goodwill store at 235 South Broadway, next door to the Guadalupe Wedding Chapel. She had on tennis shoes, dungarees, and a faded blue T-shirt, and was outfitted as if for a safari or a spelunking expedition. A khaki vest was stuffed with empty plastic vials; a black duffelbag across her shoulders held a pair of high-tech headlamps, a digital camera, and a venom extractor. She made her way to the front desk, past a rack of summer dresses on sale for six dollars and ninety-nine cents. Then she introduced herself to the store manager, Gina Torres, a statuesque woman with silver-blond hair and thickly drawn eyeliner. She said that her name was Greta Binford and she wanted to hunt spiders in the basement.

Torres stared at her. Binford is small and keen-eyed, with a dark-brown bob and a scattering of freckles across her nose. Her voice has a quick, clear, almost chirping quality, and at forty-one she carries herself with the springy assurance of a high-school cheerleader. She didn't look like a crackpot to Torres. Then again, she didn't look like a spider hunter, either. Perhaps she was a health inspector. "I've never heard anything about you," Torres said, her eyes narrowing. "I've been here two years, and I've never seen you before."

Binford explained to Torres that she was a professor of biology at Lewis & Clark College, in Portland, Oregon. She specialized in arachnology and was on a weeklong spider-hunting trip through the Southwest. She'd been to this store before, years ago, to collect an interesting species that lived in the basement. "I just need an hour or so to get a few more specimens," Binford said. What she didn't say was that they were among the deadliest spiders in the world.

They belonged to a South American species called *Loxosceles laeta*—a cousin

of the brown recluse, but larger and more venomous. Sometime in the late nineteen-sixties, apparently, their ancestors had ridden to California in costume crates owned by a troupe of Shakespearean actors from Brazil. A year or two later, they were discovered at a theatre in the L.A. suburb of Sierra Madre and promptly triggered a citywide panic. "50 DEADLY SPIDERS FOUND," a front-page headline in the Los Angeles *Times* announced on June 7, 1969. "VENOM LIKE RATTLESNAKES." In Sierra Madre, spider suspects were rushed to the police in jam jars, ice-cream boxes, and Styrofoam cups. "Some have shown up around 3 A.M. in the trembling hands of frantic householders," the *Times* reported. By August of that year, more than two hundred *laeta*—as well as a thousand of their molted skins—had been found across Los Angeles. One family of eight abandoned their home at the sight of a single spider.

The Great Spider Hunt of 1969 ended as such scares usually do: attics were cleared, toolsheds swept clean, buildings fumigated and declared safe. Yet the spiders remained. Buildings like the Goodwill store had basements and sub-basements so deep and interconnected that no pesticide could reach into every hiding place. "I showed one of the spiders to an employee the last time I was here," Binford told me. "And she said, 'Yeah, I see those in the bathroom all the time.'" No bites had been reported, but word seemed to have got out that something was not quite right in the basement. Torres told Binford that no one was allowed downstairs, for reasons of liability. "You have to understand," she said. "I have to protect myself."

Binford spent the next hour on her cell phone, pleading her case with Goodwill executives. She was thumbing through a rack of used Hawaiian shirts, awaiting the management's verdict, when an irritated voice blared over the intercom, "Spider

lady! Spider lady! Come to the front!" Torres was standing by the cash register, her hands on her hips. She made Binford scrawl out a waiver on a legal pad, then led her down a long, dingy hallway to the basement door. "It's your own risk," she said, pointing down the stairwell. "If I don't hear from you in two days, I call the authorities."

Spiders have a bad reputation, largely undeserved. The great majority aren't venomous enough to harm us, or their fangs are too small, or their jaw muscles are too puny, or they simply see no profit in attacking large, indigestible creatures that can crush them with their toes. Unlike snake venom, which is designed to kill vertebrates, spider venom is almost always meant for insects. Its toxins can stop a hornet in mid-flight, but they lack proper targets in the human nervous system. "If we were wired for spider venoms the way insects are, we would be screwed," Binford says.

Still, some spiders can kill you, and they're the ones that interest Binford. She has spent the past ten years collecting venomous species worldwide, raising them in her lab, and patiently milking their fangs. A single spider can inject its victims with as many as two hundred compounds: proteases that dissolve flesh, gelatinases that dissolve connective tissues, neurotoxins that short-circuit nerves, slow the heart, and freeze the limbs. A spider's venom offers a window onto its evolution, Binford says—a chemical record of its most successful experiments at killing prey. It's also a storehouse of potential pharmaceuticals, one that remains virtually untapped. "There aren't any spiders for which we know all the chemicals in their venom," she says. "None."

In the United States, two groups of spiders are widely considered dangerous: black widows and brown recluses, along with their close relatives. Widows are small creatures, potbellied and delicately



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articulated, often with a red or yellow hourglass on the abdomen. They can be found in cellars, garages, and woodpiles in every state, and seem to be fond of filth. (They're notorious for biting the pendulous parts of outhouse visitors.) The recluse and other *Loxosceles* species prefer warm, dry country. They're common in the Southwest and the Midwest but can range as far east as Georgia. In Oklahoma, where I grew up, my mother sometimes found them in our bedsheets—their legs long and nearly translucent, their bodies a pale umber, with a violin-shaped mark on the head. We called them fiddlebacks.

I was never bitten by a fiddleback, but a friend of mine named Jeanne Devlin swallowed a black widow one spring, when it crawled into her juice glass on a Girl Scout trip. It felt like a cocklebur in her throat, she told me recently, and bit her at least once before she coughed it up. Black-widow venom is a cocktail of neurotoxins. It targets the muscles and nerves, causing cramps and spasms, fever, nausea, and wracking pains. One or two people may die from it every few years, most of them elderly or very young, but an antivenom has been available since the nineteen-thirties. Devlin's mother drove her to a local doctor for the injection. The other girls were crying hysterically, convinced that she was going to die, but she went home that night with nothing more than a terrible sore throat.

No one knows how many people in the United States are killed by *Loxosceles* bites—estimates vary from fewer than one a year to as many as ten. The venom triggers an immune reaction that can be

hard to distinguish from herpes, cellulitis, flesh-eating staph, and half a dozen other severe infections. (In 2001, two cases of anthrax poisoning in New York were initially blamed on recluses.) Perhaps to keep the toxins from spreading, the body walls off the arteries and veins around the bite. The skin, starved of blood, begins to die, turning black and sloughing off, leaving an open wound that can take months to heal. Bite victims sometimes look as if they've had serious burns. Some go into shock. A rare few suffer hemolysis: their red blood cells begin to burst, poisoning the kidneys and slowly depriving the body of oxygen. Although an antivenom for recluse bites has recently been developed, with Binford's help, it has yet to be approved in the United States.

I first met Binford at the American Museum of Natural History, in New York. She was planning her trip through the Southwest to gather fresh venom for her research, and she wanted to spend time in the museum first, studying the species that she hoped to find in the field.

The spiders were kept in slender vials of ethyl alcohol, and arranged in cabinets in a vast, deserted hall. Each vial held one or more specimens and was marked with a typewritten label. One of the spiders, a *Loxosceles rufescens* native to the Mediterranean, had been found in New York in 1992. "116 W. 71st, Apt #3," the label read. "Cynthia Dansby. Put on sweatpants. Bit on thigh."

Binford peered at the specimens through a microscope, focussing on their genitals. (The shape of a spider's sex or-

gans—bulbous or bifurcated, barbed or smooth—is sometimes the only clue to its species.) Then she went to find Louis Sorkin, the assistant to the curator of spiders. Sorkin is usually called in to investigate the city's infestations, and Binford suspected that the museum might have a few trespassers of its own. Spiders often crawl into crates and cabinets and get sent around the world with travelling exhibits, she said. Over the years, she had found *Loxosceles* in the basements of the Argentine Museum of Natural Sciences and the Indiana Statehouse.

Sorkin, a short bald man with bushy eyebrows and a rolling, stumpy gait, handed us a pair of flashlights and took us down a service staircase. As we walked, he told us about the bedbug colony that he was raising in his office, mostly on his own blood—"I like to put them on me and watch them feed"—and about a dinner hosted by the local Explorers Club. The menu included tempura-battered tarantulas, he said, but the cooks had neglected to clean them properly. The spiders' barbed hairs got stuck in some diners' throats, and they had to be taken to the emergency room.

We spent the next hour or so crawling around in the sub-basement, shining our beams among the steam pipes and elevator crankshafts. Sorkin spotted a few cockroaches and recalled a museum scientist who used to capture and tag them, then track their movements around the building. But the most exotic spider we found was a European house spider, *Tege-naria domestica*. We'd have better luck at the Goodwill store in Los Angeles, Binford assured me. "You'll see," she said. "It's just like getting candy in a candy store."

Spiders tend to be solitary hunters, and they demand the same single-mindedness from scientists. The French entomologist Jean-Henri Fabre set the pattern in the late eighteen-hundreds, when he retired to Provence after a career in chemistry and physics, and spent the rest of his life studying the bugs in his garden. "When we lack the society of our fellow-men," he wrote, "we take refuge in that of animals, without always losing by the change."

Fabre delighted in what he called "experimental villainies." He might catch a bumblebee in a bottle and send it buzzing down a tarantula's den, or steal a fe-



"Nice, but we'll need an environmental-impact study, a warranty, recall bulletins, recycling facilities, and twenty-four-hour customer support."

male spider's egg sac and replace it with a ball of cork. (She couldn't tell the difference, he found.) He once took two tarantulas, each with a brood of spiderlings on her back, and put them in the same cage to test their territoriality. "One morning, I catch the two harridans fighting out their quarrel on the floor," he later wrote:

The stronger of the two, the one on top, closes her lethal engine and grinds the head of the prostrate foe. Then she calmly devours the deceased by small mouthfuls.

Now what do the youngsters do, while their mother is being eaten? Easily consoled, heedless of the atrocious scene, they climb on the conqueror's back and quietly take their places among the lawful family. The ogress raises no objection, accepts them as her own. She makes a meal of the mother and adopts the orphans.

Fabre's successors often shared his ghoulish enthusiasms, if not always his scientific rigor. John Crompton was a former mounted policeman in colonial Africa; W. S. Bristowe was an executive in the British chemical industry. Their books, published in the nineteen-forties and fifties, are full of entomological detail but sometimes read like the diaries of ten-year-old boys. Bristowe once ate a spider on a bus to shock his fellow-passengers. He was fascinated by the grim mechanics of spider sex and held gladiatorial combats between species. (His undisputed champion was a small but feisty female ground spider, *Drassodes lapidosus*, which killed fifteen larger opponents in two days.) Crompton licked webs to see how they tasted and daydreamed about which species he would like to be. He envied the crab spider, "whose life consists of immobility interspersed with succulent meals," but settled on a male labyrinth spider, whose mate treats it kindly after copulation. For most species, Crompton noted, a husband's place is "in the digestive tract of his wife."

Time spent in the company of spiders can cure anyone of his sentimentality about nature. In these books, the coöperative ant and the hardworking bee give way to much darker figures: mothers who eat their children, neighbors who prey on neighbors, predators who keep their victims bound and sedated, then slowly drain their body fluids. "Under the tyranny of the stomach, we are all of us, beasts and men alike, ogres," Fabre wrote. "The dignity of labor, the joy of life, maternal affection, the terrors of

death: all these do not count, in others; the main point is that the morsel be tender and savory."

Binford came late to the study of spiders, and without morbid predilections. She grew up on a small corn-and-soybean farm in west-central Indiana—"dull spider country," she calls it. Her parents had met at a family reunion, and had local roots so deep and intertwined that Binford jokingly uses herself as an example of inbreeding when she teaches evolutionary biology classes. At her parents' house, though, evolution was never discussed. The Binfords were creationists, and Greta was born again in high school.

As an undergraduate at Purdue, Binford studied veterinary medicine, then switched to psychology after she nearly fainted while watching a dog get an injection. During her sophomore year, she joined a small, charismatic church called Calvary Chapel and soon fell in love with one of its members. When he graduated and took a job near Cincinnati, she spent a summer commuting there on weekends—rolling her hair into the car window so that it would yank her awake if she fell asleep. By that fall, they were married.

Binford played the role of a "Christian conservative housewife" for a couple of years—"I did a lot of cross-stitching. I did a lot of crafts." But she grew restless. In 1987, she enrolled at a branch of Miami University, hoping to become a high-school science teacher. "She didn't have her sights set very high," Ann Rypstra, her genetics professor at the time, told me. "But some students are capable of great things if you nudge them a little, and Greta was nudgeable." One day after class, Rypstra made Binford an offer. She had a grant to study spiders in the Amazon basin of Peru, she said, and wanted Binford to join her as an assistant that summer. Binford dismissed the idea at first, but her husband encouraged her to apply.

The spiders were of a rare, social kind. They gathered in the rain forest by the hundreds of thousands and constructed communal webs, some of which were the length of a tractor-trailer. By describing how the spiders lived and worked together, Rypstra hoped to uncover the roots of all social behavior.

Binford's job was to sit and watch. Every morning, she'd carry a camp stool to the edge of a web and spend the next three hours taking notes. "It was still, still, still," Binford recalls. A troop of monkeys might wander by, or an anteater snuffing for food. There were sloths in the trees, their fur overgrown with emerald moss, and jaguar tracks in the underbrush. Yet the spiders held her attention. Less than half a centimetre long, they worked together like bands of Lilliputians, wrapping up locusts many times their size, patching the web, and caring for one another's children. "Most of what I'd heard about spiders was nasty, evil stuff, and all I saw was really beautiful," Binford says. At the end of the summer, when Binford handed in her notes, Rypstra told her that she was now the world's expert on that species.

"The night I got home, I was just bubbling over," Binford says. "I told my husband that I wanted to change my major, that this stuff was wonderful." But her husband seemed distracted. Later that night, he confessed that he'd fallen in love with another woman. "I kind of got used to you being gone," he said.

When Binford told me this story, at a café across from the Museum of Natural History, she didn't try to blame the disaster on destiny or Providence—she had lost her religious faith in the years following that summer. "My whole platform crumbled," she said. "Until that moment, I'd been on a track of what's expected of a woman in rural Indiana, and it just shattered those expectations." Then she smiled. "It was really the best thing that could have happened to me," she said.

Early in her career, when she was in graduate school at the University of Utah, Binford tried focussing on the milder side of entomology. She had become fascinated with evolution after leaving the Church, and wanted to understand what gave rise to the biodiversity she'd seen in the rain forest. Spider evolution, though, has mostly murderous ends. The forty thousand species identified so far make their homes from the slopes of Mt. Everest to the islands off Antarctica, and nearly everything they do is in quest of fresh meat. Just as birds can be identified by their singing, so spiders can be sorted by their methods of killing.

Spiders begin their hunting with a few

handicaps. They're often smaller and weaker than their prey, and they have no wings to give chase in the air. Some species extend their legs by hydraulic pressure, using the same liquid that carries oxygen from their lungs, so they have a hard time running and breathing at the same time. Even their poison may be no match for their victim's: a crab spider's bite is to a honeybee's sting as "an air-gun compared with an elephant rifle," John Crompton wrote. Yet spiders kill at an astonishing pace. One Dutch researcher estimates that there are some five trillion spiders in the Netherlands alone, each of which consumes about a tenth of a gram of meat a day. Were their victims people instead of insects, they would need only three days to eat all sixteen and a half million Dutchmen.

To compensate for their weaknesses, spiders have evolved an array of weapons, tactics, and freakish mutations that bring to mind a tiny band of supervillains: the X-Men of the animal world. Jumping spiders can leap up to fifty times their own body length; spitting spiders shoot streams of glue to ensnare their prey; orb weavers can spin a silk as strong as steel and a thousand times as elastic. (In 1710, a Frenchman named Bon raised enough spiders to make mittens from their silk; he had to give up the enterprise, though, when all of his workers ate one another.) Some spiders are shape-shifters, camouflaging themselves as dead leaves or bird droppings; others change colors to match the flowers where they're hiding. A spider discovered in the nineteen-eighties, tentatively named *Theridiosoma schwarzeneggeri*, uses its brawny forelegs to stretch its web as taut as a slingshot. When an insect happens by, the spider lets go, and the web snaps forward to capture the victim.

"The thing moves, therefore it is worth catching," Fabre wrote. "This formula seems to sum up the spider's wisdom." Yet the instincts of some species are so elaborately programmed that they can almost pass for intellect. The portia spider hunts other spiders by sneaking onto a high branch and dangling down on them, or pretending to be an insect caught in the web. The bolas spider emits moth pheromones to lure its prey, then whips a line of silk around like a lasso to snag it. The most impressive, though, may be the water spider. It builds a web beneath the waves, anchored to a plant, and fills it with

bubbles that it collects on the surface. The bubbles coalesce into an airy chamber where the spider can sit, safe from predators. When hunger strikes, the water spider waits for a shrimp or a tadpole to swim by, then it pounces.

Venom is a spider's oldest weapon, and its most mysterious. Like silk, it can be found in almost every species and was probably present in their earliest ancestors: the first spiders already had fangs. Until recently, though, it was impossible to say how venoms differed. Pure samples were hard to obtain; chemists didn't know how to isolate their components, and medical reports were contradictory. "Thus we read of a man bitten by a spider without any effect," Crompton wrote, "whilst his sister bitten by the same spider had a painful swelling that lasted several hours."

The most notorious spider in Europe in Fabre's time was the Italian tarantula, *Lycosa tarantula*. Named for the town of

PHONE BOOTH

There should be more nouns
 For objects put to sleep
 Against their will
 The "booth" for instance
 With coiled hidden wires
 Lidded chrome drawers
 Tipping up like lizards' eyes
 We looked out into rhymed rain
 We heard varying vowels
 Rimbaud's vowels with colors
 Orange or blue beeps
 Types of ancient punctuation
 The interpunct between words
 A call became twenty-five cents
 Times in a marriage we went there
 To complain or flirt
 A few decades and we wised up
 Got used to the shadow
 The phone booth as reliquary
 An arm could rest
 On the triangular shelf
 A briefcase between the feet
 A pen poked into acoustic holes
 While we gathered our actions/wits
 For magic and pain
 The destiny twins
 Some of us scratched pale glyphs
 Onto the glass door while talking

Taranto, on the southern coast, this was a large, fearsome-looking wolf spider—no relation to American tarantulas—whose bite was said to cause madness, melancholy, and death. A victim's only hope was to dance furiously for days on end, often accompanied by fiddles and pipes, until his body gave out and the venom wore off. Liszt, Chopin, and Mendelssohn later wrote music for stylized versions of these dances, which came to be known as tarantellas.

"Must we take these queer things seriously or laugh at them?" Fabre wondered. The answer could be gleaned only from a living subject. So Fabre took a blackbellied tarantula—a cousin of the Italian kind—and had it bite the leg of a young sparrow. Then he took notes:

A drop of blood flows; the wounded spot is surrounded by a reddish circle, changing to purple. The bird almost immediately loses the use of its leg, which drags, with the toes doubled in; it hops upon the other. Apart from this, the patient does not seem to trouble much about his hurt; his appetite is good. My daugh-

One day we started to race past
 And others started racing
 Holding phones to their ears
 Holding a personal string
 To their lips
 If there are overages
 There might be nouns for
 The clotting of numbers in the sky
 So thick the stars can't shine through
 A word for backing away
 From those who shout to their strings
 In the airport while eating
 We loved the half-booths
 Could cup one hand on the mouthpiece
 Lean two-thirds out to talk to a friend
 Sitting in the lobby
 The universe grows
 We are dizzy as mercury
 We are solitudes aided by awe
 Let us mourn secrets told to
 Fake wood and the trapezoidal seat
 Perfume in the mouthpiece
 Like a little Grecian sash
 Why did we live so fast
 The booth hid our ankles
 We twisted the rigid cord
 As we spoke
 It made a kind of whorl

—Brenda Hillman

ters feed him on flies, breadcrumbs, apricot pulp. He is sure to get well, he will recover his strength; the poor victim of the curiosity of science will be restored to liberty. . . . Twelve hours later, the hope of a cure increases; the invalid takes nourishment readily; he clamors for it, if we keep him waiting. But the leg still drags. I set this down to a temporary paralysis which will soon disappear. Two days after, he refuses his food. Wrapping himself in his sticism and his rumpled feathers, the sparrow hunches into a ball, now motionless, now twitching. My girls take him in the hollow of their hands and warm him with their breath. The spasms become more frequent. A gasp proclaims that all is over. The bird is dead.

The night of the sparrow's death, there was "a certain coolness" among his family at the dinner table, Fabre noted, and an "unspoken accusation of cruelty" in their faces. Nevertheless, he added, "I had the courage to start afresh, this time on a mole." Thirty-six hours later, it, too, lay dead. "It appears to me that the bite of this spider is not an accident which man can afford to treat lightly," Fabre concluded. "This is all that I have to say to the doctors."

And yet, in hindsight, Fabre didn't go far enough. Just because a spider's bite can harm a mole doesn't mean that it will harm a human. Recluse venom can kill rabbits, for instance, but it has no effect on rats. To truly settle the toxicity debate, researchers needed human subjects. And who better than themselves?

Entomologists are somewhat accustomed to being research subjects. Justin Schmidt, a scientist in Tucson, has been attacked by more than seventy-five species of ants and bees, and has put together an index to rank the pain. It runs from sweat bees ("1.0. A tiny spark has singed a single hair on your arm") to bullhorn



acacia ants ("1.8. Someone has fired a staple into your cheek") to bullet ants ("4.0+. Like walking over flaming charcoal with a three-inch nail in your heel"). Spiders, though, are less willing collaborators. "One can ill-treat and tease them for hours on end," Crompton grumbled. "But the peevish creatures will *not* bite." Some researchers have removed venom glands and injected themselves with the contents; others have swallowed venom-filled sugar pills. A few, like the Smithsonian's curator of arachnids, Jonathan Coddington, have managed to provoke spiders to bite them, but the results have almost always been anticlimactic. "It feels like picking up a pin, dipping it in vinegar, and then whirling it around in an open cut," Coddington told me. "It's no big deal." The Italian tarantula is no exception: its venom leaves a touch of swelling which fades within a day or two. No frenzied dancing required.

By the beginning of the last century, most arachnologists agreed that there were no truly dangerous spiders in the United States. Then, in 1922, William Baerg, an entomologist at the University of Arkansas, coaxed a black widow to bite him on the finger. Baerg let the spider sink its fangs in for a full five seconds, then kept a diary of his reactions:

July 10, 8:25 AM: When spider is removed, the pain keeps on growing, a sharp piercing sensation.

12:20 PM: Pain in hips rather severe. Chest feels cramped, breathing and speech are spasmodic.

4:30: Nervous tremor, present since noon, is more noticeable now.

5:15: Arrived at the hospital.

July 11, 6:00 AM: Pain in legs and hips very severe.

July 12, 5:50 AM: Slept for short periods, much troubled with delirium. As soon as I fell asleep, I would be frantically and in an utterly aimless fashion working with spiders.

Altogether, Baerg spent three days in the hospital, and needed a week to recover fully. As proof of the spider's toxicity, he later wrote in *The Journal of Parasitology*, the results were "all that could be desired."

Baerg's experiment was much on my mind that morning at the Goodwill store. The *Loxosceles laeta* in the basement weren't recognized as dangerous until 1937, and recluses were considered harmless until the late nineteen-fifties. These days, though, pictures of horrific

Loxosceles bites are easy to find: ulcerating ankles; forearms stripped of flesh; pale, ragged wounds ringed with blackened cells. Binford had never been bitten by a *Loxosceles*, but she didn't take any chances: she wore gloves when collecting and watched where she put her hands. "This is where we most need headlamps," she said, strapping hers on. Then she scurried downstairs, looking for a second as if she had multiple eyes.

The key to good hunting, Binford said, was to have a "search image" in mind. Wolf spiders, for instance, can be found by their eye shine. When you train a flashlight beam over your back yard at night and see a faint glimmering in the grass, those might be spiders gazing back at you. *Loxosceles* tend to splay their legs like asterisks, and to gather in pockets of dampness—anything from the bottoms of rotting logs to the spaces behind steam pipes. "It reminds me of hunting for morrels as a kid," Binford said. "There's a kind of Zen moment where everything falls away and there's just you and the spider."

The stairs led down to a long, open space, with pipes and wires hung low from the ceiling. Bits of graffiti flared into view, as our headlamps swung past, and strands of webbing caught at our faces. Most of it belonged to pholcids, or daddy longlegs, Binford assured me. Their venom is strong enough to kill a mouse, and they prey on other spiders, but their fangs are too small to hurt us. She played her beam along the bottom of a wall and held it on a *Steatoda*, a bulbous relative of the black widow, famous among arachnologists for turning radioactive and biting Peter Parker in the recent Spider-Man film. Then she stopped and scanned the room from end to end. "It's like an Easter-egg hunt," she said. The spiders were hiding in plain view.

There, on the wall: two *Loxosceles laeta* scuttling out of the light. And there, on the staircase: a fat female surrounded by four of her moltings. And there, beside an empty whiskey bottle: an adolescent male in its web. Suddenly, spiders seemed to be everywhere—crawling on walls and clinging to the ceiling, suspended from pipes and crouched behind beams. I lost Binford at one point and called out her name in the dark, my voice as warbly as a

ghost's. When I found her again, she was corralling a female *laeta* into a vial, along with its cottony egg sac. The spider looked twice as large as the recluses I remembered, but with the same sandy coloring. "It's just too easy," Binford said, snapping the lid shut.

Back at her lab, Binford could tease apart the spiders' toxins, using a host of chemical techniques developed in the past few decades, then sequence the genes for the most harmful compounds. By comparing sequences among species, she could piece together a *Loxosceles* family tree and so lay the groundwork for future treatments. "If you're camping in Peru and you're bitten by something and you have a little antivenom in your pocket, will it work?" she said. "It's fundamentally an evolutionary question." She crouched down and plucked another pregnant female from its web. "It's surprising to me how few of us study spider venom," she said. "It's just so cool."

Half an hour later, Binford had thirty live spiders in her vest. She had wondered, earlier that morning, if the Goodwill store's *Loxosceles* might be gone—if the city exterminators had finally done their jobs. Now she worried that the spider population might be a little too healthy. She pointed to a patch of rubble with a glimmer of daylight coming through it—we could hear the low rumbling of trucks outside—then to cracks and gaps in the other walls. "All these buildings are connected," she said. "And, meanwhile, there are piles of clothes being sorted upstairs that go out all over the city. This could be the beachhead of *Loxosceles laeta* in Los Angeles."



When Binford milks *laeta* in her lab, their fangs yield about ten times as much venom as other *Loxosceles*'s, and medical records suggest that their bites leave larger lesions. Yet, even if the Goodwill's population spread across Los Angeles, it isn't clear how much of a threat these spiders would pose. *Laeta* are easily as reclusive as their North American cousins. They keep to dark, quiet areas and shrink from human contact. When they do bite, the venom doesn't always have an effect: some people's immune systems aren't sen-

sitive to *Loxosceles* toxins. Five years ago in Lenexa, Kansas, a family of four trapped and killed more than two thousand recluses in their nineteenth-century farmhouse. Yet no one in the family suffered from a bite.

Venom experts get uneasy when asked about the risk of *Loxosceles* bites. The statistics are suspect, they say. "We have several thousand bites a year coded in our database," Leslie Boyer, the medical director of the Arizona Poison Center, in Tucson—perhaps the spider-bite capital of the United States—told me. "I don't know which is the bigger number: those that are coded as bites but aren't, or those that aren't but are."

In Los Angeles, officially speaking, there have been no *Loxosceles laeta* bites in fifty years. But when I talked to Sean Bush, a professor of emergency medicine at Loma Linda University Medical Center (one of the area's leading venom centers), he told me that people come in complaining of spider bites almost every day. Many have necrotic lesions, and the number of lesions has been rising. "They really do look like spider bites," Bush said, but he thought that most were probably caused by antibiotic-resistant staph. The danger of *Loxosceles* bites is "grossly overrated," he said. In any case, he added, as long as no antivenom is available, the diagnosis is moot. "What we do is treat the wounds."

For the past four years, a Mexican company called Bioclon has been working on an antivenom based partly on Binford's research. Of the eighty-odd *Loxosceles* species in the Americas, all those which have been tested cause lesions with a single type of toxin, called sphingomyelinase D. The toxin varies slightly from species to species, Binford has found, but the same few antibodies ought to be able to neutralize any bite. To produce them, Bioclon has cloned four versions of the toxin, immunized horses with them, then harvested the antibodies from the horses' blood. Last fall, the company began testing its antivenom in a hospital in Mexico City. In most cases, Jorge Paniagua-Solís, Bioclon's research director, told me, the pain fades immediately and the lesions begin to heal within a day.

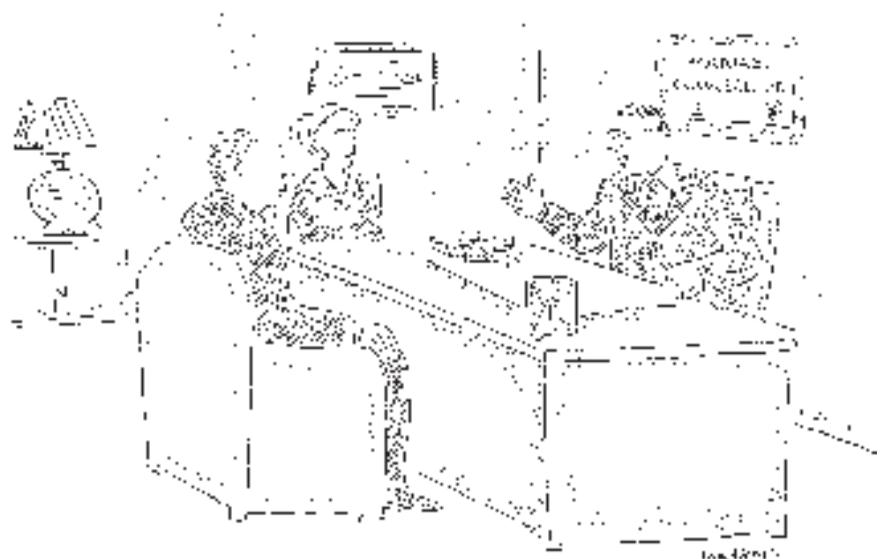
Even so, the antivenom may not be approved in the United States for several years: the demand is too low, and the cost of clinical trials too high. In the mean-

time, the best remedy for an infestation is still an exterminator. Spiders have many fine qualities, not the least of which is an ability to hold their venom in abeyance. Their bites are almost never meant for us, but it's best not to tempt them. "If you ask me," the Smithsonian's Jonathan Coddington said, "I'd nuke that Goodwill building."

Late one night, toward the end of our trip, Binford and I pulled into Yarnell, Arizona, a former mining town in the high country northwest of Phoenix. Binford had a friend and mentor there named Chuck Kristensen, who had taught her how to milk venom years ago. He lived in a pink stucco house near the center of town, with his wife and their teen-age daughter, two curly-haired mutts, and fifty thousand spiders, half of them black widows. He called the place the Spider Pharm.

The Pharm was a final twist on humanity's old ambivalence toward spiders—an attempt to find the virtues in venom. Kristensen had come up with the idea in the late nineteen-seventies, while studying for his master's degree in chemistry at California State University at Long Beach. Drug companies had a long history of prospecting for chemicals in the rain forest, but venom struck Kristensen as a more promising source. Its toxins were already targeted at cells and nerve receptors, and prepackaged for injection with stabilizers and emulsifiers. The problem was getting a sufficient supply. Sitting in a Big Boy restaurant one morning, Kristensen sketched a design for a spider-milking machine—the first of its kind—then began to collect and breed dozens of species for their venom. "I didn't give a shit if they were killing people," he told me. "All I cared about was what was in them."

Kristensen is fifty-six years old now, small and rangy, with scraggly sideburns and dishevelled gray hair. While his wife, Anita—a handsome Czech woman with auburn hair—made coffee and sliced up some oranges, he showed us around the house. This was the Pharm's seventh location, he said. At the last place, in Feasterville, Pennsylvania, the township manager had shown up with a policeman one day and given them ten days to "vacate the spiders." Kristensen kept the smaller species in plastic cups covered in



"True, you have irreconcilable differences, but they're mainly about flossing."

chiffon and stacked in six-foot metal racks. The tarantulas were in larger containers and had their own, steamier room. A few spiders escaped every so often, he said, but most of them were eaten by the daddy longlegs that patrolled the halls.

After the tour, Kristensen brought in a tub of homegrown maggots for the spiders—the babies had to be fed every day, the adults once a week—and Anita milked a few recluses. First, she tranquilized the spiders with carbon-dioxide gas (it lowered their oxygen levels until they passed out), then she grasped one with a pair of tweezers, held it under a microscope, and stepped on a foot switch. The tweezers were wired to an electrical stimulator. When Anita's foot hit the switch, the spider received a small shock, which made its venom gland contract. This forced a droplet through the fangs, where Anita caught it in a thin glass tube.

"I never touched a spider in my life before I met Chuck," she said, as a pair of fangs ballooned into view under the microscope. "But I liked it right away. It never gets boring." On a good day, Anita might milk a thousand spiders and get less than a thimbleful of venom. Yet medical biologists had found a remarkable range of compounds in it over the years—from a Chilean-tarantula toxin that stops heart fibrillations to a Chinese-tarantula toxin that prompts insulin secretions. None had yet been turned into a drug, but a painkiller based on cone-snail venom

has been on the market since 2004. Known as Prialt, it's considerably more powerful than morphine.

Binford looked around, grinning, entirely at home. Then she ran out to the car to get the cooler full of spiders that she'd collected. She seemed proud and a little nervous showing them off, like a kid with some brand-new Hot Wheels. She was especially excited about those she'd found earlier that day, in a desert reserve outside Palm Springs. They looked like *Loxosceles martha*, she said, the last of the North American species she had left to find. Kristensen held one up to the light. He peered at its appendages and noted its fine orange color, and soon they were chatting companionably about genitalia.

It was well past midnight before we left. Chuck packed up a few spiders for Binford to take home, and Anita found some keepsakes for my children: a brown recluse and a pair of black-widow venom glands, preserved in gel. They'd been handing them out at local schools, she said, but some people just have a thing against spiders. As we drove off, I looked back at the two of them, waving goodbye under the porch light, and thought of Jean-Henri Fabre in his meadow. "To appoint oneself, in this way, an inspector of spiders' webs for many years in succession, and for long seasons, means joining a not overcrowded profession," he wrote. "No matter: the meditative mind returns from that school fully satisfied." ♦