This year, a 58-year-old special education teacher made a bee-line to Louis Sorkin at the invertebrate zoology booth. The teacher, who refused to share his name, had spent a rough night at a nearby hotel and proceeded to pull up his knit green shirt to reveal a constellation of several hundred swellings on his back. Sorkin nodded and said the bites were indeed the work of bedbugs, *Cimex lectularius*, but he expressed little sympathy for the man's complaints. The museum entomologist had brought in his own bedbug colony – originally collected from Fort Dix in 1971 – and for 10 minutes every half hour, Sorkin offered the bloodsuckers his left arm to "keep them active" for visitors watching the magnified bugs on a television screen.

It was also a big day for Andrew Roberts, a computer programmer for the pharmaceutical company Merck, who handed Njoki Gitahi, a geology collections manager, a quarter-sized brownish piece of something or other that he found on a sidewalk in Kalamazoo in the 1970s and kept tucked away with his other "weird heirlooms" for the last 30 years. "It was in a plastic bag in a cardboard box with some old magazines," he said.

Gitahi brushed back her long black braids, pulled out her loupe, and brought the object under the lamplight to assess its luster. Then, she applied a drop of hydrochloric acid, looking for the telltale fizz that would indicate the presence of calcium carbonate, a shell-derived mineral. No fizz. Finally, she scratched the object with a steel nail to see where it fell on the Mohs hardness scale that stretches from talc (1) to diamond (10). "It's not actually a rock," she concluded, positing that it was a piece of asphalt. "I wish I could tell you more."

Roberts stuffed the mystery object back in his pocket. "I don't have it on display or anything," he said before shuffling away.

Meanwhile, Russo, the man with the discredited giraffe bones, was recovering at a bench by the museum's walrus display. "I'm not angry, I'm just disappointed," he said. "If I knew it was going to be like this I would have gone to Washington, DC, to the Smithsonian." **—Brendan Borrell**

COURTESY OF JOHN LUNDBERG

Whence this fish?

In February 2005, John Lundberg, an evolutionary biologist at the Academy of Natural Sciences in Philadelphia, obtained molecular data from a tissue sample that he just couldn't believe. The sample came from a bizarre species of Mexican catfish that no one could identify. But the data said the fish was from Africa. He thought, "Wait, maybe someone switched the jars." To be sure of the findings, he wanted a second tissue sample. So, in May 2005, Lundberg headed approximately 2000 km south to the Lacantún River along the Mexico–Guatemala border. There, he found another fish, which confirmed the original conclusion: This catfish was, indeed, of African descent. So how on earth did it end up in Mexico?

The Chiapas catfish's chocolate-brown color and white chin barbels are truly enigmatic.

The story began nine years earlier, when Rocío Rodiles-Hernández, a Mexican ichthyologist, was surveying the Lacantún River's aquatic fauna. Her fishhook pulled up a large mysterious catfish that wasn't in any of her taxonomic guidebooks. To help identify the fish, Rodiles-Hernández, now at the College of the Southern Frontier in San Cristóbal de las Casas, Mexico, sent a preserved specimen to Lundberg and his colleague Dean Hendrickson at the University of Texas at Austin. Right away, the two catfish experts were taken aback. "Just looking at it from across the room I knew that we had something special," says Lundberg.

The fish's chocolate brown body and bright white chin barbells made it stand out to the naked eye, says Lundberg, but what really set it apart from all other catfish were its distinctive gill arches, unusually shaped swim bladder, and two unique bones in its head. "It was really an enigma." Perplexed, the researchers assigned the fish to a new family and gave it the name *Lacantunia enigmatica*, or simply "Chiapas catfish," after the southern Mexican state where the fish was found (*Zootaxa*, 1000:1–24, 2005).

Lundberg then enlisted the help of his postdoc, John Sullivan, who was already carrying out a phylogenetic analysis of all the major catfish lineages based on a 3.6 kb stretch of nuclear DNA spanning the *rag1* and *rag2* genes, involved in immune cell maturation. Sullivan tossed the Chiapas catfish sequence into the mix, and ran the analysis again.

"I can still recall with that first sequence when I put it in and got the result after doing the Bayesian analysis," says Sullivan. "I was quite surprised." The analysis showed almost unequivocally that the Chiapas catfish was nested in among the African species, not the North or South American species as the researchers had anticipated. Through fossil-calibrated molecular clock dating, ▶

the researchers concluded that the Chiapas catfish branched off from its African relatives between 75 and 94 million years ago (*Proc Acad Nat Sci Phila*, 156:39–53, 2007).

After the findings were confirmed, the researchers set about determining how the fish had traveled from Africa to Mexico. Nearly all catfishes are freshwater species, so a marine route was highly improbable. The simplest solution would be for the Chiapas catfish to diverge from the African catfishes when South America and Africa separated. But the last time the two landmasses were combined was in the southern supercontinent of Gondwana, which broke apart an estimated 100 million years ago, before the split of the Chiapas catfish.

According to the researchers, that leaves only two scenarios where the geological record provides evidence for a plausible land-locked freshwater connection: Either the Chiapas catfish traveled through Asia, across the Bering Strait, down through North America, and into southern Mexico; or, it traversed Europe, journeyed along an ancient North Atlantic land bridge, through Eastern Canada, and further on to Mexico. "Any of these scenarios seem somewhat outlandish, and it's a matter of choosing between hypotheses," says Sullivan.

How did this freshwater fish get from Africa to Mexico?

Joseph Nelson, a fish systematist at the University of Alberta in Edmonton, Canada, thinks the North Atlantic land bridge explanation is more likely. "To me, it's the simplest, the most direct, and the shortest, so I would tend to favor it – but you never know," he says. With no living relatives or fossil remains, there's no way to say one way or the other, he admits. "The most direct way of solving it will be to find fossils."

Sullivan optimistically thinks that's a real possibility. "The discovery of *Lacantunia* in the first place was a huge surprise, and there could be other surprises in the future." —Elie Dolgin

Maggot sleuthing

Two years ago, entomologist Richard Merritt from Michigan State University pulled an all-nighter in a Toronto hotel room to prepare for seven hours of testimony about a court case so controversial it precipitated the abolition of Canada's death penalty. As part of his testimony, Merritt had to review the size, age, and species of a handful of maggots photographed and described from a crime scene 47 years earlier; his conclusions could redeem the reputation of a man who has contested the guilty verdict ever since. "I've testified in about 25 trials," says Merritt, "and this was the most intense."

Last year, Merritt's testimony helped overturn the guilty verdict for Stephen Truscott, convicted in September 1959, at age 14, of murdering his 12-year old classmate, Lynne Harper, and sentenced to hang.

Truscott was a popular boy in Clinton, Ontario, and, by all counts, Harper was fond of him: She was last seen hanging onto his bicycle as they pedaled along a country road in the early evening of June 9, 1959. Two days later, searchers found her corpse in the brush. She had been raped and strangled with her own blouse.

Many felt authorities botched the murder investigation, and after a public outcry, Truscott's death sentence was commuted to life imprisonment. Authorities released Truscott after 10 years for good behavior. He changed his name, married, raised a family, and has maintained his innocence. In 2000, the Toronto-based Association in Defense of the Wrongfully Convicted agreed to take Truscott's case back into the courtroom, and they brought with them half a century's worth of advances in forensic science.

The new trial hinged on estimating Harper's time of death: Did she die on June 9 when Truscott could have done it, or was she killed the following day, when Truscott had a solid alibi? Early investigators believed that the position of digested food in her gut indicated that she must have died on the 9th, but that method has long since been discredited. At the time, a


Richard Merritt

PHOTO BY G.L. KOHUTH / MICHIGAN STATE UNIVERSITY

fastidious government entomologist named Elgin Brown also reared insect larvae collected from Harper's body and identified the adults, but that information was not included in time-of-death estimates.

When the case re-opened, Truscott's lawyers contacted Merritt, a fly specialist, to review the original forensic evidence, along with specimens collected from three pig corpses placed at the crime scene in 2006 by another expert, Sherah VanLaerhoven of the University of Windsor.

Merritt, the 63-year old former president of the American Board of Forensic Entomology, discovered his first maggots as a San Jose State University undergraduate in the 1960s. He worked a night shift as an ambulance driver, where he got exposure to hangings, stabbings, and horrific car accidents. One night, a San Jose resident reported a putrid smell in a downtown neighborhood, and Merritt responded to the call. He held his nose and stepped into the decrepit home, where he discovered an elderly woman, alive but comatose, her lower leg covered with thousands of maggots consuming the flesh – a condition known as myiasis. The woman died in the hospital a day later, but Merritt's scientific curiosity brought him ▶