A GIANT MYSTERY

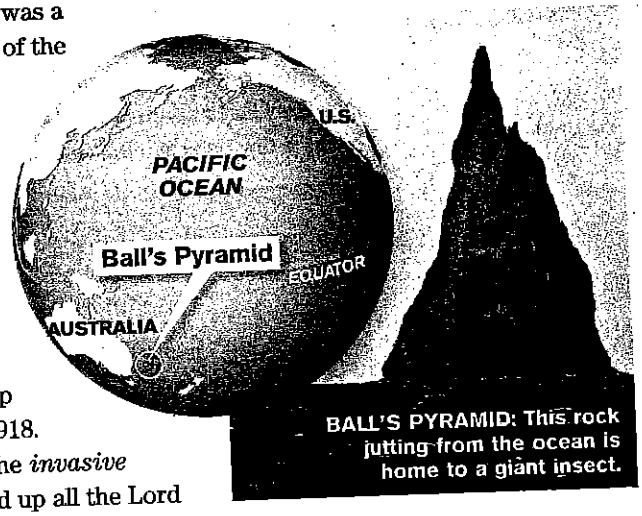
Scientists find a missing insect—and plan to reintroduce it to its former home

Off the eastern coast of Australia, a jagged rock called Ball's Pyramid juts from the sea, 562 meters (1,844 feet) into the air. For more than 50 years, this remnant of an ancient volcano was the site of an unsolved mystery.

The story started 23 kilometers (14 miles) away on Lord Howe Island, where a giant insect made its home. The insect was a *phasmid*, a member of the group that includes stick insects and leaf insects. It was as long as a human hand and thrived in the lush rainforests of the small island—that is, until black rats from a wrecked ship swam to shore in 1918. Within two years, the *invasive species* had gobbled up all the Lord Howe Island stick insects, and the phasmid went extinct.

Or did it? In the 1960s, climbers on Ball's Pyramid spotted the empty *exoskeletons*—hard outer shells—of giant stick insects. But later expeditions found no sign of the phasmid.

Had the humidity-loving insects found a way to survive on the dry cliffs of the pyramid, or was the whole thing a hoax? Rumors circulated for decades, until a team of scientists set out to solve the mystery.



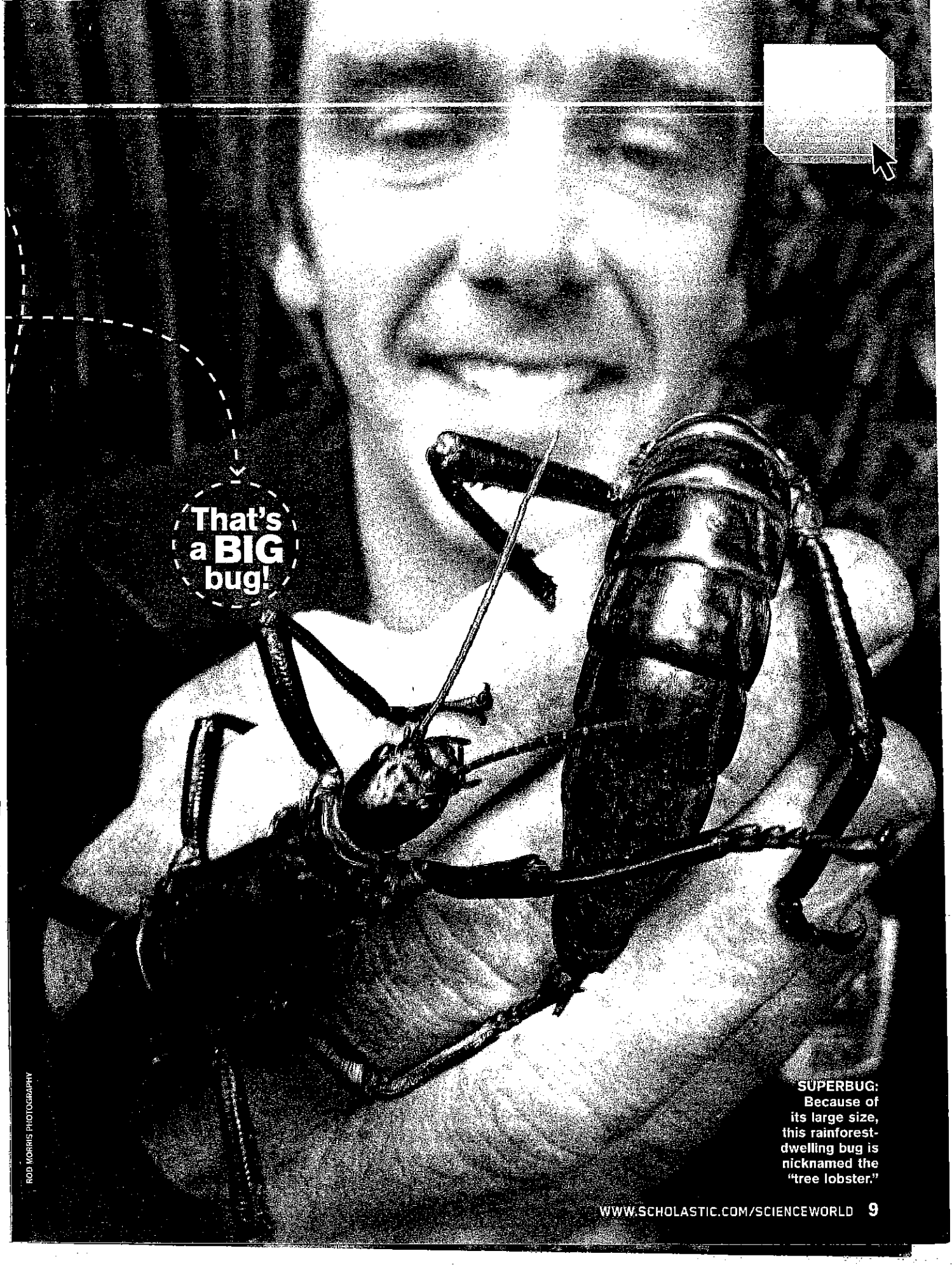
BALL'S PYRAMID: This rock jutting from the ocean is home to a giant insect.

CLIMBING FOR CLUES

For safety reasons, the Australian government restricted access to Ball's Pyramid in 1986. Anyone who wants to visit has to get permission first, and scientists are some of the few people who are granted access.

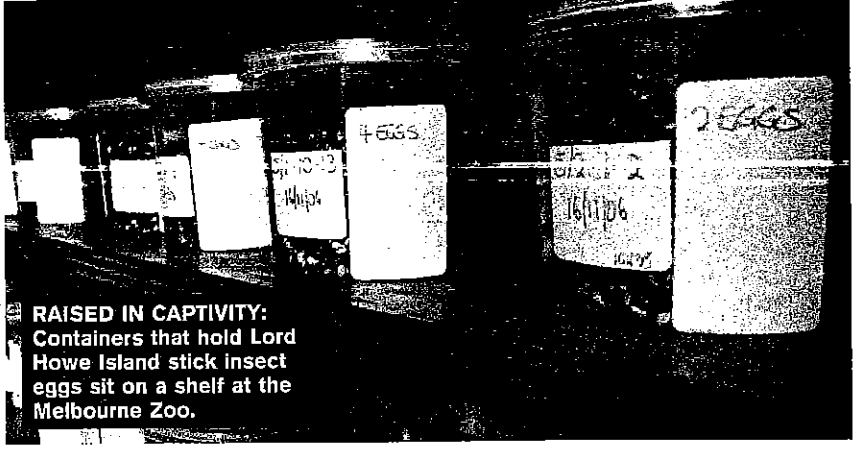
Nicholas Carlile, an ecologist at the New South Wales Office of Environment and Heritage in Australia, has the job of reviewing applications from people wanting to visit Ball's Pyramid. Many applicants claimed they wanted to go there to search for the phasmid, but Carlile suspected they were just looking for an excuse to climb the landform, which is the world's tallest *sea stack*—a steep, vertical column of rock in the ocean.

"The only way we were going to solve this," he says, "was to mount a credible expedition to Ball's Pyramid



ROD MORRIS PHOTOGRAPHY

SUPERBUG: Because of its large size, this rainforest-dwelling bug is nicknamed the "tree lobster."



RAISED IN CAPTIVITY: Containers that hold Lord Howe Island stick insect eggs sit on a shelf at the Melbourne Zoo.

to prove once and for all that the phasmid wasn't there."

In 2001, Carlile and a team of scientists leaped from a small, rocking boat onto Ball's Pyramid. With bad weather on the way, they'd have only 24 hours to tackle the case. Because the *nocturnal* insects wouldn't appear in the daytime, the scientists looked for evidence of them—shed exoskeletons, eggs, and *frass*, or insect droppings.

After climbing all day in the hot sun without finding anything, the exhausted team turned back. But on the way down, Carlile spotted a large amount of frass under a bush. Could the rumors that the phasmid lived on Ball's Pyramid be true? The only way to find out would be a dangerous nighttime climb.

Carlile set out after dark wearing a head lamp. He felt for handholds and footholds that he could barely see. Finally he neared the bush. On it sat a Lord Howe Island stick insect! Several of the phasmids scurried beneath the bush, where moisture seeping from the cliff had allowed a layer of humid plant debris to accumulate.

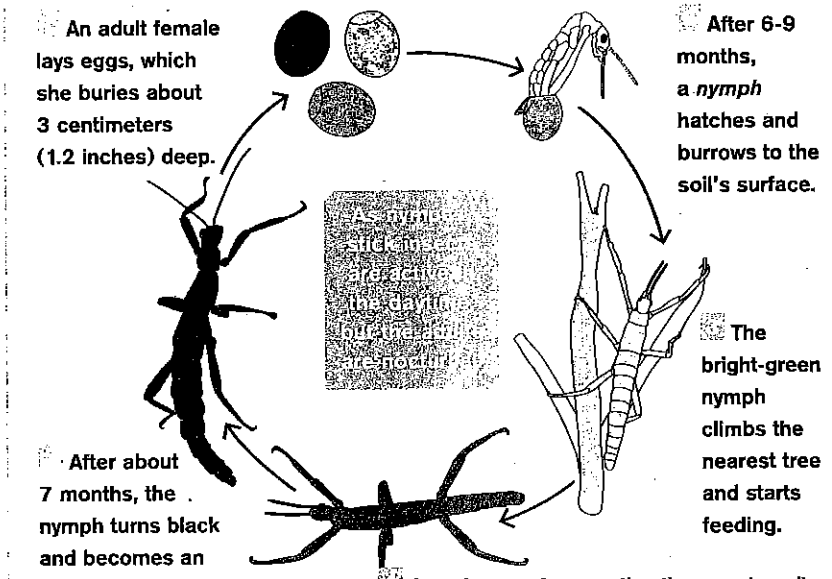
"That one bush was the only place [on the island] where they could feed and lay their eggs," says Carlile. "So it was basically the rarest *invertebrate* [animal without a backbone] in the world, limited to one bush."

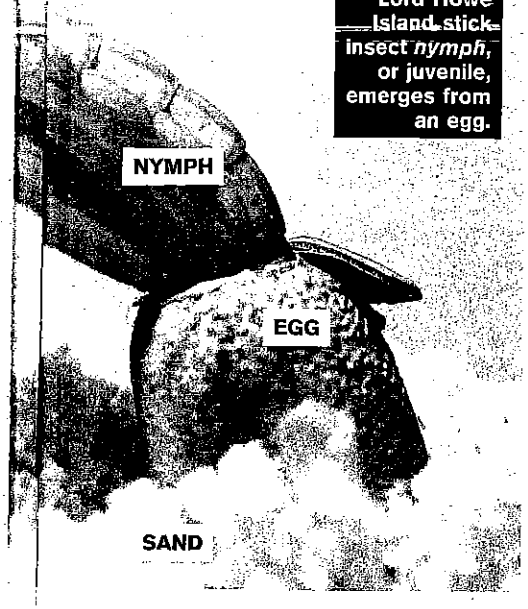
No one knows how the phasmids ended up on the sea stack, but since they're only known to exist in that one spot in the wild, the species was in grave danger.

Experts wanted to breed the phasmid in captivity, but the biology and behavior of the long-lost insect was a mystery. Patrick Honan, an entomologist who would later care for the bugs at the Melbourne Zoo, explored their original habitat on Lord Howe Island for clues about their diet. He also studied other phasmid species, but none were closely related to this one. "We had to start from scratch," he says.

Honan had only one chance to get it right, because officials allowed climbers to remove only four of the

Lord Howe Island stick insects undergo *metamorphosis*, or change in body form, as they grow from egg to adult.





TIME TO HATCH: A Lord Howe Island stick insect *nymph*, or juvenile, emerges from an egg.

rare insects from Ball's Pyramid. One pair went to a private breeder—and soon died. Honan got the other two, dubbed Adam and Eve. Every night, he watched the nocturnal insects in their greenhouse, while a steaming teapot kept the environment humid.

After two weeks, Eve stopped eating. Honan called experts around the world, but no one knew what to do. Five days later, as the sick insect lay motionless in his hand, he took his best guess and mixed a concoction that included leaves from the same type of bush where the insects lived on Ball's Pyramid. He placed the liquid, one drop at a time, on Eve's mouthparts. "After a few hours," he says, "she started moving again, and by morning she was up and walking around as if nothing had happened."

Today, about a thousand of Eve's descendants live in captivity. Scientists plan to reintroduce some of them to Lord Howe Island, but first they have to get rid of the rats. An island-wide rodent-eradication program is scheduled for 2015, but some of the island's residents are concerned about the use of poisons. Others aren't crazy about sharing an island with giant insects!

Honan points out that the rats wiped out other animals too, such as several bird species that now survive only on a few parts of other islands. "When they get rid of the rats it's not just the stick insect that will be coming back," he says, "it's a lot of other animals as well."

Carlile thinks the phasmid will also give native plants a boost as it breaks down the vegetation it eats and cycles the nutrients back into the soil.

"The only reason the phasmids are restricted to Ball's Pyramid now is because rats were [accidentally] introduced by humans," he says. "So we're righting a wrong from almost a hundred years ago." ❀

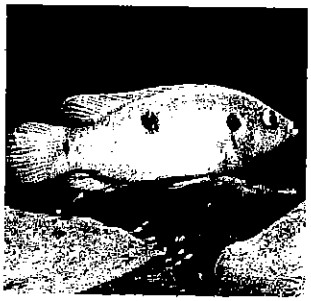
—Jacqueline Adams

WHAT DO YOU THINK?

If you lived on Lord Howe Island, would you want scientists to reintroduce the stick insects there? Why or why not?

MORE VICTIMS OF INVASIVE SPECIES

Invasive species have caused or contributed to the disappearance of hundreds of animals worldwide. Here are a few animals that are in danger.



VICTIMS: 350 SPECIES OF SMALL FISH CALLED CICHLIDS

LOCATION: Lake Victoria, Africa

INVASIVE SPECIES: Nile perch introduced for fishing ate the cichlids.

STATUS: More than half of the lake's cichlid species are believed to be extinct or near extinction.

VICTIMS: PARTULA SNAILS

LOCATION: South Pacific islands

INVASIVE SPECIES: Rosy wolfsnails—brought in to control another invasive snail—ate native Partula snails instead.

STATUS: 50 species of Partula snails are extinct, with another 24 species surviving only in captivity.

VICTIMS: LORD HOWE ISLAND WOODHENS

LOCATION: Lord Howe Island

INVASIVE SPECIES: Owls, feral cats, and rats preyed on woodhens. Pigs and goats competed with woodhens for food.

STATUS: The population has rebounded from 20 to 200 because of a breeding program and the removal of feral cats and pigs.

LEFT: JAMES D. MORGAN / REX USA; RIGHT: ROHAN CLEAVE, MELBOURNE ZOO; DIAGRAM: MARYBETH BUTLER

TOP TO BOTTOM: JANE BURTON / NATUREPL.COM/ NATUREPL; ROD WILLIAMS / NATUREPL.COM/ NATUREPL; DAVID DOUBILET/NATIONAL GEOGRAPHIC STOCK