

# One GIGANTIC Mystery

LIFE MOLLUSKS



Scientists use clues to reveal the secretive life of the giant squid

BY PATRICIA JANES

Last fall, word spread around the globe at lightning speed: Japanese scientists had snapped photos of the elusive giant squid swimming deep in the Pacific Ocean. "Until then, no one had ever seen the creature alive," says Neil Landman, a paleontologist at the American Museum of Natural History (AMNH) in New York.

Although the scientist spends most of his time analyzing fossils, or traces of ancient marine organisms, Landman studies the giant squid too. His goal: to unravel some of the animal's mystery and hopefully apply that knowledge to his studies of long-extinct sea creatures. "I used to say that it would be a quantum leap in our understanding of the giant squid if anyone were to capture one on film. Now they have," he says.

The giant squid, or *Architeuthis dux* (ar-keh-TOOTH-us duks), owes its nickname to its jumbo size—females can measure 18 meters (60 feet). The colossal creature has long

been considered one of the great unsolved mysteries of science. That's because no one really knows where or how this elusive animal lives. "All of our best preserved specimens have been hauled up accidentally by fishermen," says Landman. When fishermen in search of deep-sea fish retrieve their nets, sometimes they inadvertently scoop up the remains of a giant squid too. "As many as 300 giant squids have been hauled up in the last 15 years," he says.

With the proper training, you can gather a surprising number of clues from a dead specimen. That's where Landman's paleontology background comes in. "As I study fossils, I'm constantly piecing together the puzzle of how a certain animal once lived," he says. "That training is useful when you're looking at animals as remote and elusive as the giant squid."

So what have scientists deduced about *Architeuthis dux*? Landman speaks with *Science World* about the creature and comments on the significance of the recent giant squid photos.

**Why are you, a paleontologist, interested in studying the giant squid?**

Being a paleontologist, my chief focus is on fossils—mainly the fossils of mollusks (see *Nuts & Bolts*, p. 11). But if I am to understand the body structure and behavior of an ancient mollusk, I have to look at modern forms—including the giant squid.



**SQUID SLEUTH:** Neil Landman, a paleontologist at the American Museum of Natural History.

ILLUSTRATION: TIM GOLDMAN; LANDMAN: PHOTO BY DENIS FINNIK. COPYRIGHT AMERICAN MUSEUM OF NATURAL HISTORY.





**BEHIND THE SCENES:** AMNH scientists preserve a giant squid specimen inside a chemical-filled tank.

That's because older life forms are also a part of the diversity of life on Earth. There is no real dividing line between living and extinct organisms.

### What do scientists know—or think they know—about the giant squid?

Unfortunately, there are many more unknowns than knowns. However, we do know that the giant squid falls within the group of mollusks called *cephalopods* (SEH-fuh-luh-podz). The amazing thing about giant squids and many other cephalopods is that their mouths are surrounded by eight arms and two tentacles. They use these muscular tentacles, which are lined with circular suckers, to capture food. Scientists also know that cephalopods are the most sophisticated of the *invertebrates* (animals without a backbone); they are very intelligent.

Additionally, we know that giant squids have the

biggest eyes of any known animal; they can be as big as a soccer ball.

### Why such big eyes?

That's one of the many questions we don't know the answer to. The giant squid that the Japanese scientists photographed was hunting prey in very deep waters—roughly 900 meters (2,950 feet). There isn't any light there. So why would the squid need such big eyes? There are some theories: For instance, although the giant squid is believed to live well below the area of the ocean where light penetrates, they may use their large eyes to spot animals that *phosphoresce*, or chemically produce their own light.



**ALIVE!** The first photo of a live giant squid.

### Why did it take scientists so long to spot a giant squid alive?

One challenge was figuring out at what depths

to search. There are probably thousands of giant squids in the oceans, but if scientists weren't searching in their main habitat, it was unlikely that they would find one alive.

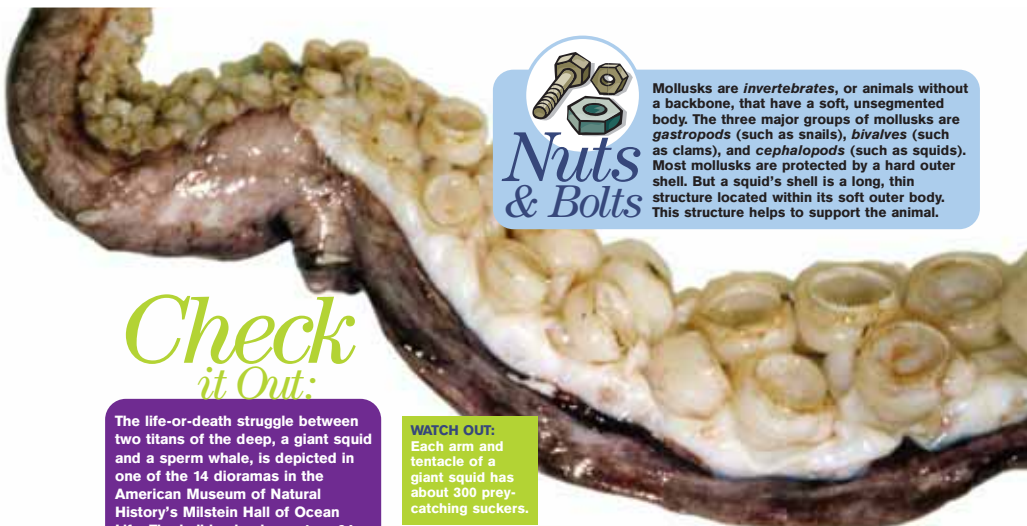
### What clues have scientists used when deciding what depths to search?

There was always this notion to look around 1,000 m (3,280 ft). Researchers came up with that depth because people never see giant squids in shallow waters. Plus, sperm whales live at that depth—and sperm whales prey upon giant squids.

But my colleagues and I wanted to see if we could infer the giant squid's habitat depth by studying its *statolith* (STAH-toh-lith). This tiny structure is similar to an inner ear bone and helps the animal maintain its sense of balance. A *statolith* contains a sort of record of the surrounding conditions at the time it formed. It does this by locking in

### WEB EXTRA

Visit Scholastic's interactive site to experience how scientists study the giant squid. Then, participate in a live online interview with an American Museum of Natural History scientist. [www.scholastic.com/squid](http://www.scholastic.com/squid)



Mollusks are *invertebrates*, or animals without a backbone, that have a soft, unsegmented body. The three major groups of mollusks are *gastropods* (such as snails), *bivalves* (such as clams), and *cephalopods* (such as squids). Most mollusks are protected by a hard outer shell. But a squid's shell is a long, thin structure located within its soft outer body. This structure helps to support the animal.

## Check it Out:

The life-or-death struggle between two titans of the deep, a giant squid and a sperm whale, is depicted in one of the 14 dioramas in the American Museum of Natural History's Milstein Hall of Ocean Life. The hall is also home to a 94-foot-long model of a blue whale. The Museum has been researching and celebrating the natural world for more than 135 years and has more than 30 million objects in its extensive research collection. The Museum's 200 scientists travel around the world on 100 field expeditions each year, studying everything from fossilized insects to bioluminescent fish and the universe.

To learn more, ask your teacher, or visit [www.amnh.org](http://www.amnh.org).

**WATCH OUT:** Each arm and tentacle of a giant squid has about 300 prey-catching suckers.

*oxygen isotopes* (the three different types of oxygen atoms that have the same number of *protons*, or positively charged particles, but a different number of *neutrons*, or electrically neutral particles). By studying the ratio of these isotopes, we were able to tell what the temperature of the ocean water was when the *statolith* formed over the lifetime of the animal.

Then we compared the temperature information with ocean-depth data. For instance, deep water is colder than shallower water that's warmed by sunshine. So we deduced that giant squids live at an average depth of about 300 m (984 ft).

### But the squid that was recently photographed was in much deeper waters. Why is that?

Since sperm whales feed on giant squids, the scientists followed these large whales. Then, they lowered a baited line to attract the squid. There's always a bit of bias when you put out bait because the animals will come to it. Also, my estimates were averaged over the animal's lifetime. That means that over the course of its life, the giant squid may migrate up and down

in the water column, living in different areas at various life stages.

### What was your biggest question about the giant squid before the Japanese scientists captured it on film?

I've always wondered if the giant squid just waits for a meal with its arms extended, or if it is a predatory monster that hunts down and devours its prey. The recent photos show the squid enveloping the bait in a ball-like mass of tentacles. So for the first time, the balance is tipping in the direction of it being a voracious, active predator. That said, it is tricky to judge an animal that has been lured by bait, because the animal has been placed in an artificial situation.

### Do the latest photos take any of the mystery out of studying the giant squid?

Not at all. It actually whets the appetite, raising more questions about the animal's behavior: What is its life cycle; how long does it live; is it the fastest growing animal in the world? The next step will be trying to capture a giant squid on video. ❁

BOTTOM LEFT: NATIONAL SCIENCE MUSEUM/NOVA; WIDE WORLD; ALL OTHER PHOTOS: PETER ROLLINS/CORBIS/AMERICAN MUSEUM OF NATURAL HISTORY (2)



**GET SET:** Scientists at AMNH prepare a giant squid specimen for study in the lab.