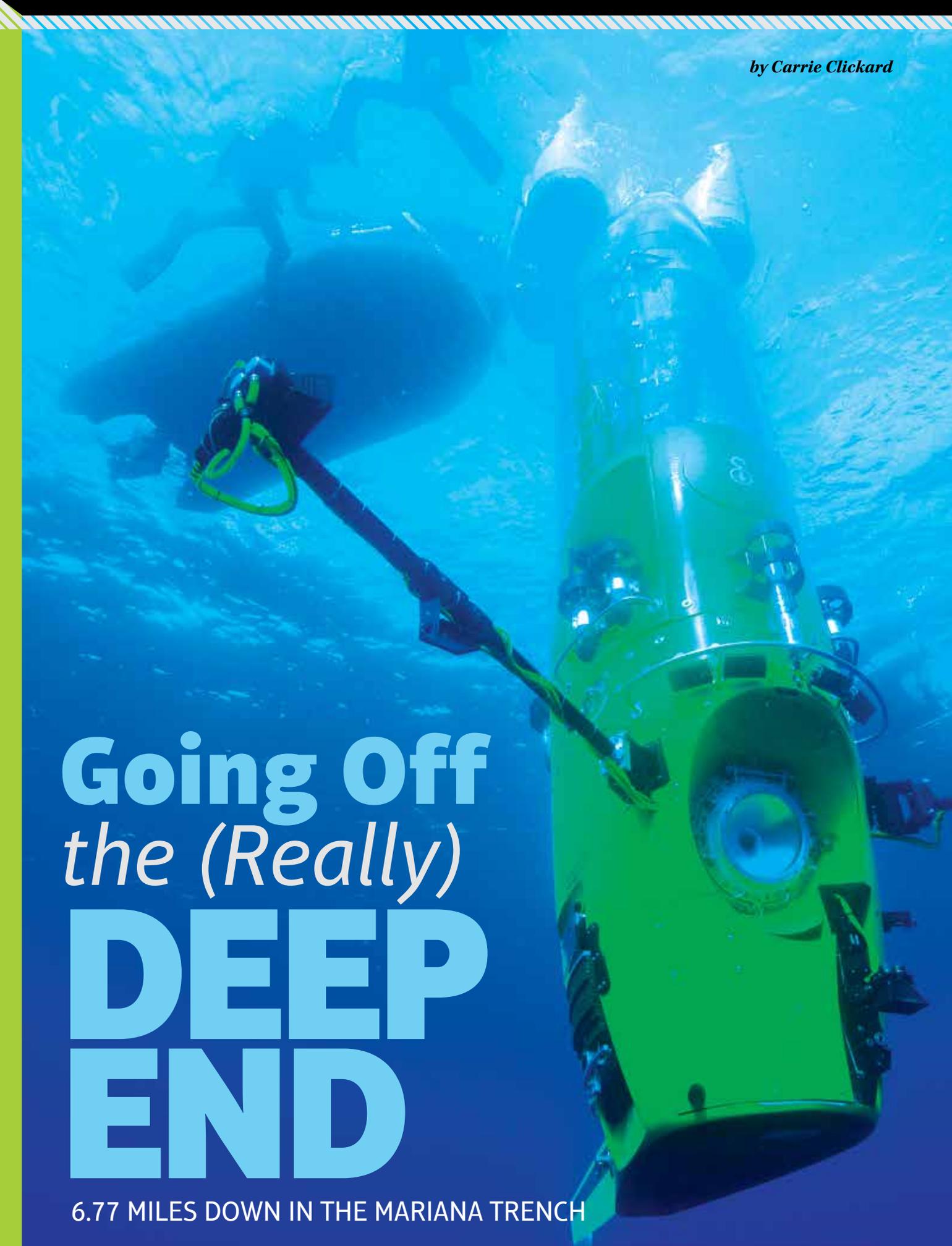


by Carrie Clickard

A photograph showing a large, cylindrical, silver-colored deep-sea submersible being lowered into the water by a crane. The submersible is suspended by a thick cable and has a large circular porthole. The water is a deep blue, and the scene is captured from an underwater perspective. The submersible is positioned vertically, with its top end towards the surface. The crane's arm and hook are visible at the top of the frame. The overall atmosphere is one of a significant deep-sea exploration mission.

# Going Off *the (Really)* DEEP END

6.77 MILES DOWN IN THE MARIANA TRENCH

# Help Wanted:

Expedition seeks explorers brave enough to face bizarre, glow-in-the-dark creatures. Must be able to navigate safely past vents spewing liquid carbon dioxide, erupting mud volcanoes, and a treacherous lake of molten sulfur.

What strange corner of the universe is this expedition headed for? It's a cozy little planet called Earth and a spot miles under the surface of the Pacific Ocean called the Mariana Trench.



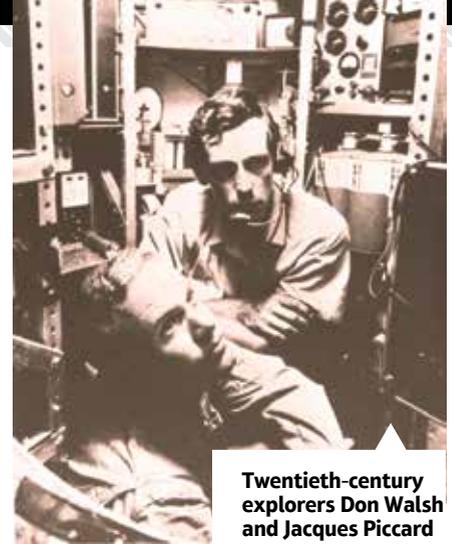
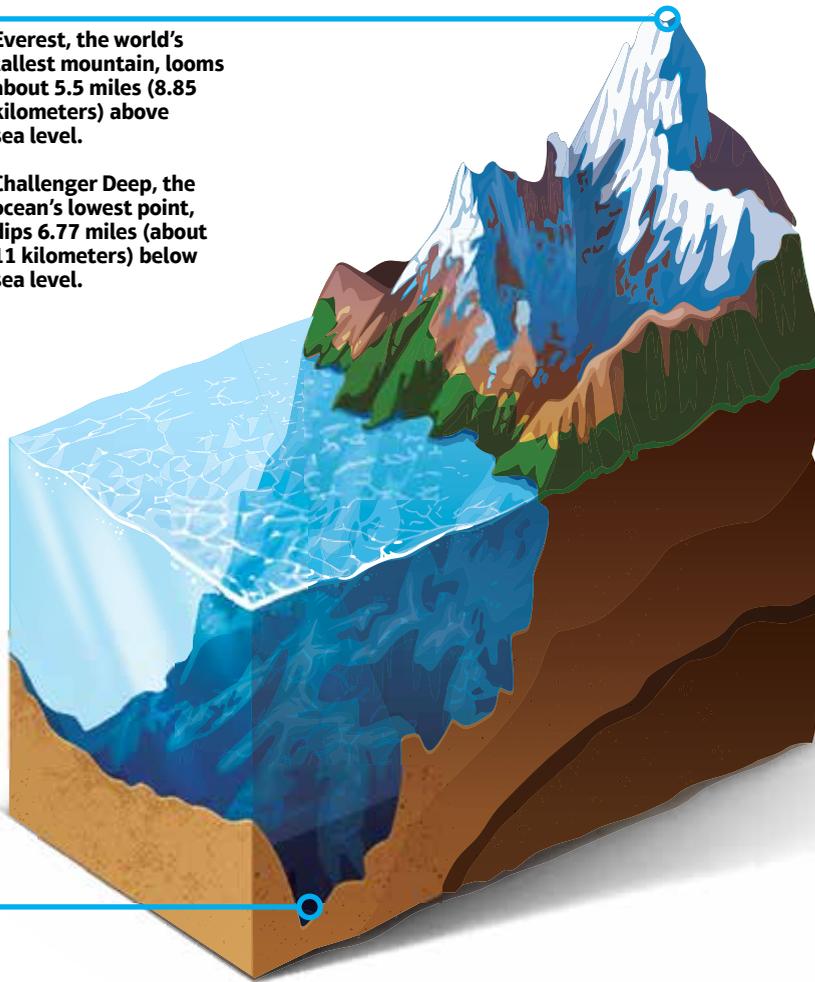
The sub *DeepSea Challenger* descends 5 miles (8,000 meters) in a test dive.



*Jason*, a remote-operated vehicle (ROV), takes samples at an underwater volcano near the Mariana Trench.

Everest, the world's tallest mountain, looms about 5.5 miles (8.85 kilometers) above sea level.

Challenger Deep, the ocean's lowest point, dips 6.77 miles (about 11 kilometers) below sea level.



Twentieth-century explorers Don Walsh and Jacques Piccard

## BRAVING THE DEPTHS

It wasn't until the 1950s that we knew just how big *Challenger's* discovery was. Using sonar (an instrument that sends out sound waves and measures how long it takes them to come back), scientists discovered that the hole is actually a trench. It is twice as long as the state of California and 43 miles (69 kilometers) wide. Parts of the trench are only five miles deep, but at its southern end, the trench drops to almost seven miles. That means if you planted Mount Everest on the bottom and stacked three Empire State buildings on top, you still wouldn't reach the surface of the ocean.

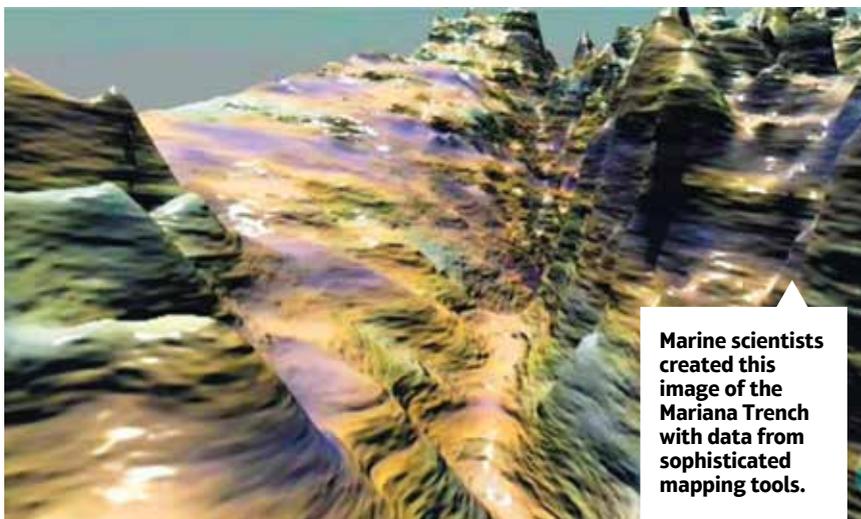
In 1960, two brave explorers, Jacques Piccard and Lt. Don Walsh, became the first human beings to see the trench with their own eyes. It took years to design and test a submersible ship strong enough to survive the immense water pressure in the trench. Called the *Trieste*, their ship weighed 150 tons, including fuel, and was almost 60 feet (18 meters) long. But for all its size, the two hydronauts would spend their journey in a round capsule only six feet in diameter. That's about the same amount of room per person that you'd find inside a refrigerator.

Crammed into that small space, at temperatures not much warmer than those in a fridge, it took the two explorers four hours and forty-eight minutes to descend the 6.77 miles (11 kilometers) into Challenger Deep—the deepest spot in the Mariana Trench. Unfortunately, during the 20 minutes

## A HOLE IN THE OCEAN FLOOR

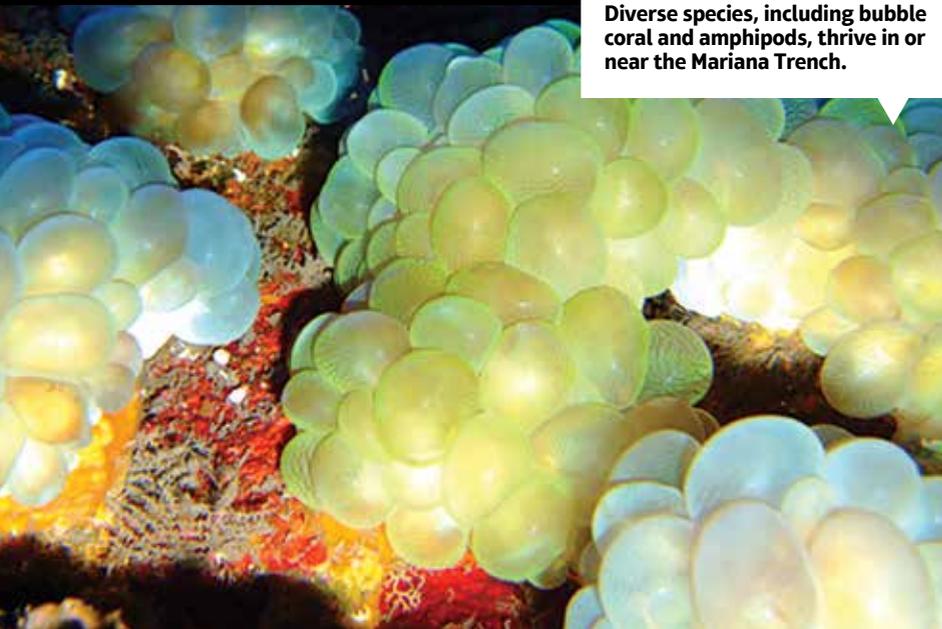
In 1872, the HMS *Challenger* expedition set out to map the ocean floor. The explorers spent four years crisscrossing the globe, sailing 70,000 miles (112,654 kilometers)—one-third of the distance to the moon. It was backbreaking, boring work. Sail about 200 miles (322 kilometers), drop a weighted rope into the water.

Measure how much rope it took to hit bottom. Sail another 200 miles and do it again. And again. This expedition was a total snooze fest, until a day in 1875 about 200 miles off the coast of Guam. That morning, when the rope was dropped, the ocean swallowed up *miles* of it—five miles to be exact. The *Challenger's* crew had discovered a “hole” in the ocean floor.



Marine scientists created this image of the Mariana Trench with data from sophisticated mapping tools.

Diverse species, including bubble coral and amphipods, thrive in or near the Mariana Trench.



they spent at the ocean bottom, the two hydronauts couldn't see much. The engines on the *Trieste* stirred up silt from the ocean floor and turned the water into what they described as swirling milk. But even though the *Trieste* didn't have the ability to take pictures outside the cabin, Piccard and Walsh got a chance to take the first deep-sea selfie.

## THERE AND BACK AGAIN

In 2012, film director and explorer James Cameron led the second human expedition (and the first solo dive) into the Challenger Deep. It took him half the time to reach the bottom, two-and-a-half hours, and he did it in a ship that weighed less than one-tenth what the *Trieste* did. Surrounded by water pressure 1,000 times greater than at the ocean surface, he spent three hours filming and taking scientific samples.

With six high-definition cameras, Cameron and his team filmed some of the deepest-dwelling creatures in existence, including a giant amoeba-like xenophyophore four inches (10 centimeters) wide and a unique sea cucumber.

And since the *Trieste* explorers had already taken the first undersea selfie, Cameron's Twitter feed captured the moment he touched the ocean floor: "Hitting bottom never felt so good."



## READY TO SIGN UP?

It will take a while before the next manned expedition heads to the trench. There are only a few vehicles in the world that can dive to those depths and even fewer that can protect humans at the same time. Woods Hole Oceanographic Institute lost its unmanned submersible vehicle, the *Nereus*, in May of 2014. The *Falkor*, a new UROV (underwater remote-operated vehicle) run by the Schmidt Ocean Institute, visited the trench in November and December 2014. But, as of late 2015, no one has plans to send another hydronaut into the trench.

Will you be the next one to dare?

**Carrie Clickard** is a museum addict, scuba diver, and amateur explorer who plans to see the Mariana Trench for herself just as soon as pizza delivery goes that far underwater. When she's not feeding her curiosity in some strange corner of the world, she writes books and poetry.

## 4 FREAKY SIGHTS IN THE MARIANA TRENCH

### 1. Lake of molten sulfur

Just a quarter of a mile down into the trench, you'll find one of the rarest sights on Earth: a bubbling lake of molten sulfur. Located on the slopes of the Daikoku underwater volcano, this pit of bubbling black goo, nicknamed The Cauldron, burns at a sweltering 369°F/187°C. If you miss this molten sulfur lake, you'll have to travel to Io, one of Jupiter's moons, to find another.



### 2. Giant amoebas

No need to pack a microscope to see these bad boys. In the Mariana Trench, one-celled creatures called xenophyophores can grow up to four inches (10 centimeters) wide—about as wide as an adult human hand. Imagine seeing a swarm of those outside your window. One person's cool adventure is another person's nightmare.



### 3. See-through ghost fish

When you reach five miles (eight kilometers) below sea level, keep your eyes peeled for the bizarre "ghost fish." It's a newly discovered species with wide, wing-like fins, an eel-like tail, and "a head resembling a cartoon dog," says Alan Jamieson of the University of Aberdeen. And if that's not strange enough, the ghost fish has skin so translucent you can see its internal organs.



### 4. Blistering hot "black smokers"

If jumping from a snowbank into a hot tub is your idea of bliss, this is the spot for you. Water temperatures in the trench hover around 34°F/1°C—just two degrees shy of becoming ice. Right in the middle of this frosty fluid sit the chimney-like "black smokers." That's the nickname for hydrothermal vents that spew swirling black water as hot as 700°F/450°C. But don't think those temperatures mean you'll be alone. If you decide to visit this sizzling spa, you'll have to share the water with vent crabs, tube worms, and foot-long amphipods.

