

## 106 Years, 4 Weeks, 1 Wreck: How Shackleton's Ship Was Found

"Gents, I want to introduce you to the Endurance." More than a century after sinking in Antarctic waters, the legendary ship was found with just days to spare.

By Henry Fountain

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When perhaps the most celebrated shipwreck in Mensun Bound's long career as a marine archaeologist was discovered, he was off viewing some penguins a mile away.

It was the afternoon of March 5. Mr. Bound was traveling aboard an icebreaker in the Weddell Sea in Antarctica with the Endurance22 expedition, which was hunting for the century-old remains of Ernest Shackleton's ship Endurance.

Technicians had been running an undersea drone day and night for two weeks, scanning the seafloor with sonar looking for the 144-foot wooden ship, which was crushed in the Weddell's treacherous pack ice and sank in 1915 during Shackleton's ill-fated attempt to be the first to cross Antarctica.

So far there had been no sign of Endurance below the ice-covered waters, and there were only four days left before the icebreaker would have to return to port in Cape Town. Mr. Bound, the exploration director who had previously described Endurance as "the most unreachable wreck ever" because of its location in one of the most remote and iciest seas in the world, and John Shears, the expedition leader, needed a break.

"We'd been talking how we need to get off the ship to stretch our legs," Mr. Bound said in an interview later with Reach the World, a nonprofit educational group that produced streaming videos from the ship for classrooms. "And we decided today was the day."

At 4 p.m. they trekked to an iceberg embedded in the pack ice about a mile away. The views were stunning and there were even a few Adélie penguins nearby to keep them company.

When they arrived back at the ship they were summoned to the bridge, where they encountered Nicolas Vincent, who managed the underwater elements of the expedition. He was holding up his phone so they could see a photograph on it, Mr. Bound recalled in the interview. "And he said 'Gents, I want to introduce you to the Endurance.'"

"It was the first beautiful picture of it," Mr. Bound said. "I mean, it was incredible."

Mensun Bound, left, director of exploration, and John Shears, the expedition leader. Esther Horvath

An undersea drone returned to Agulhas II after a final dive to take photos and video of Endurance. Esther Horvath

While he and Mr. Shears had been off the ship, the drone had sent back some intriguing sonar images. Unlike some previous false alarms, on closer inspection it was obvious that these were of a ship, lying more or less upright on the seafloor. It could only be Endurance.

The image Mr. Vincent had on his phone was the first of the ship since the famous photographs taken by Shackleton's photographer, Frank Hurley, while Endurance was being ravaged by the ice.

Four days later the discovery was announced to the world, accompanied by the release of a few photographs and a short video. Endurance, whose sinking led to one of the greatest tales of leadership and survival in exploration history, with Shackleton and his 27 men all reaching safety, was in relatively pristine condition, its name still emblazoned on the stern, glass still intact in the portholes, caulking still visible between the planks of the hull.

Mr. Bound, whose archaeological credits include excavating a 2,600-year-old Etruscan ship in Italy, described the remains of Endurance as "the finest wooden shipwreck I have ever seen — by far."

The expedition, financed by more than \$10 million from an anonymous donor, had left South Africa aboard the icebreaker Agulhas II in early February. It arrived on Feb. 16 at the search site, a 150-square mile zone that had been chosen based on Endurance's last known position, which had been determined by Shackleton's captain and navigator, Frank Worsley.

A previous expedition three years before had ended in failure when technicians lost contact with the undersea drone and it was not recovered.

This time the expedition had two newer drones, a primary and a backup, that were flat torpedo-like pieces of equipment about 13 feet long and 5 feet wide with thrusters that enabled them to move in all directions.

Like those on the previous expedition, these drones could operate independently, programmed in advance with coordinates and a search pattern. But unlike the earlier equipment, these were tethered to the ship by a thin, miles-long fiber optic cable that could be unspooled as the drone traveled to the seafloor. The cable transmitted images to the ship in real time, but could also be used to send new instructions to the drone to alter its course if necessary.

Endurance spent more than a year stuck in the ice before it sank. Frank Hurley/Scott Polar Research Institute, University of Cambridge, via Getty Images

A dog team from Endurance in 1915. Frank Hurley/Scott Polar Research Institute, University of Cambridge, via Getty Images

Chad Bonin, who supervised the operation of the drones, said in the same interview that by March 5, the primary drone — named Ellie, for Elephant Island, where Shackleton and his crew first sailed to safety after Endurance sank — had done about 30 dives.

There had been a few early glitches, Mr. Bonin said. The fiber optic cable broke during one dive and had to be respliced. The cold water and high pressure 10,000 feet down caused problems with one of the thrusters. There were also issues with the winch used to lift the drone, which weighed more than 3,000 pounds, into the water.

“Once we ironed out the kinks and everything else it was great after that,” Mr. Bonin told Reach the World. “From that point it was just dive after dive,” he added. Each dive lasted between four and eight hours, with several hours between to recharge the drone’s batteries.

The drone carried radar equipment on either side, which scanned a mile-wide swath of the seafloor while traveling about 225 feet above it. Mr. Bonin and others monitored the images, staring at computer screens in a cramped operations center in the ship’s hold.

“The seabed on the Weddell Sea is pretty much flat,” he said. “So anything out of the ordinary would pop up like a red flag.”

Over two weeks, the team saw some interesting things, but after closer inspection all of the images turned out to be natural features or were otherwise ruled out as not being Endurance.

Even as the deadline for leaving the search site approached, though, Mr. Bonin remained optimistic.

“Every day I would walk on deck and say, ‘Today’s the day,’” he recalled.

The control center for the undersea drone hunting for Endurance from the icebreaker Alguhas II. Esther Horvath

The ship was in good condition thanks to the cold water and lack of wood-eating parasitic worms that

destroy shipwrecks elsewhere. Falklands Maritime Heritage Trust

When he first saw the image on March 5, he was excited but cautious. “My first reaction was — Hah! We found it. But we have to verify.” It didn’t take long to be persuaded.

The drone returned to the ship and technicians swapped out the sonar equipment for a high-resolution camera and a laser-surveying device to make highly detailed scans of the site.

Mr. Bound had expected the wreck to be well preserved, given the cold water and the lack of parasitic worms that consume wood and have wreaked havoc on shipwrecks elsewhere.

Combined with the clarity of the water, the drone’s camera revealed remarkable details. A crewman’s boot was seen in one spot. Elsewhere the images clearly showed where some of the ship’s timbers had been sawed off for use on the ice. The camera was even able to peer through portholes into some of the cabins.

The images and scans will be used for educational materials and exhibits.

“We came, we saw, we measured in detail,” Mr. Bound said. Then they left without touching anything because the wreck is protected under the 60-year-old Antarctic Treaty.

Before leaving the Weddell Sea, the expedition team and the ship’s crew celebrated with a party on the ice, setting up a large tent with food, drink and music.

The icebreaker is now sailing toward Cape Town and is expected there in about a week.

Ernest Shackleton, right, with his photographer, Frank Hurley, on the ice after the ship sank. Hulton-Deutsch Collection/Corbis, via Getty Images

A memorial to Shackleton at Grytviken on South Georgia in 1922. His grave is in a whaler’s cemetery on the island. Hulton-Deutsch Collection/Corbis, via Getty Images

On Friday the ship stopped at Grytviken, a former whaling station on the island of South Georgia. Shackleton and five of his crew had reached the island in May 1916 after a 16-day, 800-mile journey across the Southern Ocean in an open lifeboat.

After arranging the rescue of the remaining crew from Elephant Island, Shackleton had returned to Britain to a hero's welcome. He then organized another Antarctic expedition and returned to South Georgia in 1921 where he died of a heart attack at age 47.

He is buried there, and members of the expedition team visited his grave, leaving new images of his ship against the granite headstone.

Stefanie Arndt, a scientist from the Alfred Wegener Institute in Germany who was on board the ship studying how the Weddell Sea ice may be changing as the world warms, described the visit on Twitter.

"We ended this historic expedition yesterday with a visit to South Georgia," Dr. Arndt wrote. "Here we visited Sir Ernest Shackleton's grave — and brought his ship back to him by pictures.

"An emotional end to a long story."