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HUNLEY DECODED

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**O**N FEBRUARY 17, 1864, the Confederate submarine *Hunley* attacked the Union sloop of war USS *Housatonic* in Charleston Harbor. *Hunley*'s eight-person crew became the first submariners to sink another vessel, but they were never heard from again. What happened to them remained a mystery, even after the rediscovery of the sub in 1995. *Hunley* was finally raised from the seabed in 2000 and placed in a conservation tank, where it continued to guard its secrets. Archaeologists have studied the vessel for more than a decade, and now the recent find of traces of the weapon *Hunley* carried into battle has dramatically altered how we under-

spar, which archaeologists found still attached to the submarine, Jacobsen and her colleagues now know that scenario is wrong. The 16-foot-long pole—made of iron, not wood—was encased in a dense jacket of concretion, a hard mixture of rust, sand, and shell. After *Hunley* was raised, chief conservator Paul Mardikian placed the spar in a separate tank containing a preservative solution of sodium hydroxide. It lay there for more than a decade while the team excavated the silt-packed interior of *Hunley* itself.

Last year, Mardikian finally began removing the concretion. X-rays had shown it was covering something that looked like a bolt at the spar's tip, but the images weren't clear. "The object had been encrypted by the environment," says Mardikian. "My job

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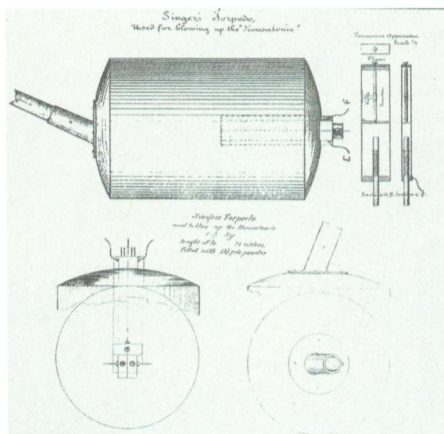
**The discovery of a simple piece of copper is changing how we understand the legendary vessel's last moments**

by ERIC A. POWELL

stand the submarine's final moments. "This changes everything," says Hunley Project senior archaeologist Maria Jacobsen.

Until now, the conventional narrative of *Hunley*'s attack was based on newspaper accounts dating to the turn of the last century. "The idea has been that *Hunley* rammed a wooden spar with a torpedo at the tip into *Housatonic*'s hull and somehow implanted the torpedo in the enemy vessel," says Jacobsen. *Hunley* was then supposed to have pulled away, unspooling a long rope, or lanyard, attached to the torpedo's trigger mechanism. "Once *Hunley* was a safe distance away," says Jacobsen, "the notion was that they pulled the lanyard to ignite the weapon." *Housatonic* sank in five minutes, and *Hunley* disappeared. One theory about the crew's fate had them setting the hand-crank-powered submarine on the seabed for a rest and then succumbing to bad air.

But thanks to recent conservation work done on *Hunley*'s



**Technical drawings of the Singer torpedo *Hunley* used to sink USS *Housatonic* were found in the National Archives.**

in conserving it was essentially to decode the spar." Over several months, he used dental tools and a pneumatic chisel to "deconcrete" the artifact, eventually revealing a piece of deformed copper held in place by a rusted bolt. When he called Jacobsen to examine it, she was stunned. "As soon as I saw it," she recalls, "the hair stood up on my head. I knew immediately we were looking at the weapons system. That is something

I never thought we would have." Jacobsen soon found that the remains matched technical drawings of a torpedo designed by Confederate gunsmith Edgar Singer that held 135 pounds of gunpowder, twice as much as standard torpedoes of the time.

The discovery of traces of the Singer torpedo shows it was not detonated remotely, but was still attached to the spar, and thus to the submarine, at the instant it exploded. The find means *Hunley*'s mission was far riskier than anyone had guessed. It will also allow the team to accurately simulate the final desperate moments of the attack. "We knew soldiers on *Housatonic* were shooting at them," says Mardikian. "Now we can say that they also had 135 pounds of black powder going off just 16 feet away. The odds of surviving that are not good." Mardikian is now preparing to chisel away concretions covering *Hunley* itself, which could be concealing evidence of breaches in the hull caused by the explosion. That would be the final proof that *Hunley*'s own torpedo sent it to the bottom. ■



***Hunley* has been in a conservation tank (left) since it was raised in 2000. It carried a 16-foot-long spar attached to the bow. 3-D scans of the spar's tip show it before cleaning (above top) and after (above). The metal on the left end of the cleaned spar is a remnant of the sub's torpedo.**

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