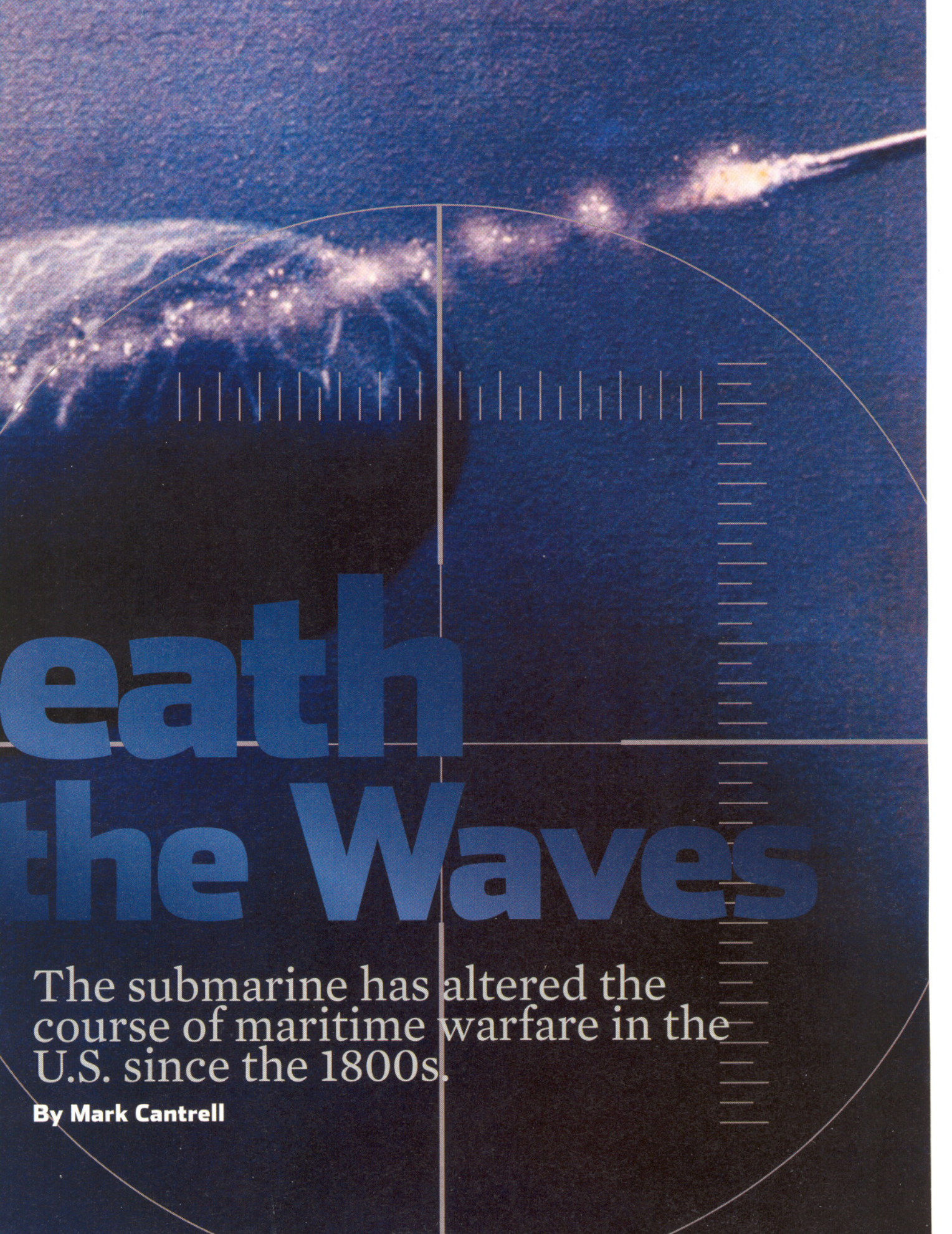




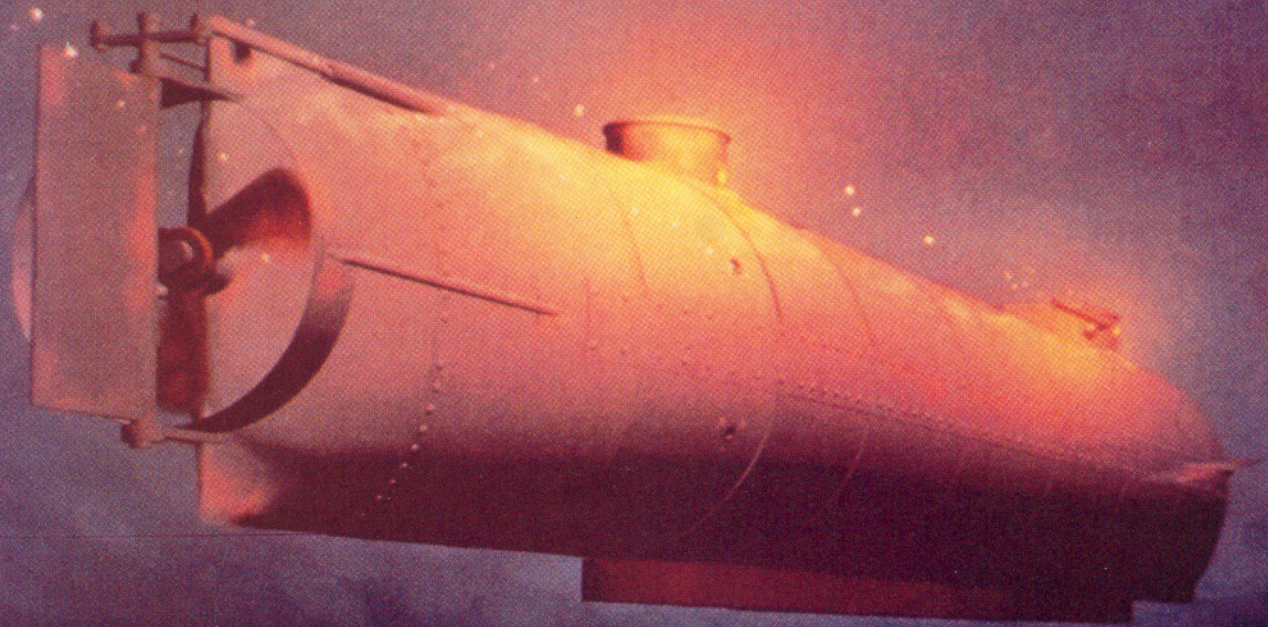
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Death the Waves

The submarine has altered the course of maritime warfare in the U.S. since the 1800s.

By Mark Cantrell



An artist's rendition (above) shows what the *CSS H.L. Hunley* might have looked like in 1864. A Seawolf-class sub (previous spread) fires a torpedo.

THE NIGHT OF FEB. 17, 1864,

a shadowy vessel riding low in the water slipped its moorings and quietly made its way through Charleston Harbor in South Carolina. In her cramped interior sat eight strong men, cranking a long driveshaft connected to a single propeller. Her only weapon was an explosive package mounted on a forward spar, but it was enough.

That night, the Federal sloop-of-war *USS Housatonic* was sent to the harbor bottom, and the Confederate ship *CSS H.L. Hunley* passed into history as the first submarine to sink another vessel.

But it was a Pyrrhic victory: The *Hunley*, too, was lost that night, with all hands aboard.

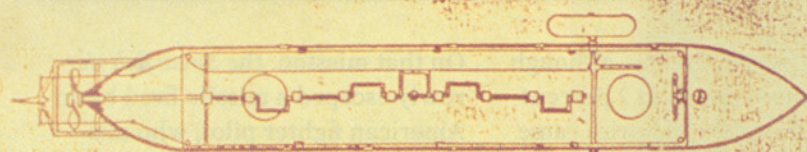
The *Hunley* was by no means the first submarine — or even the first sub-

mersible warship. In the book *Jane's Submarines: War Beneath the Waves from 1776 to the Present Day* (HarperCollins, 2005), Robert Hutchinson notes submarines were being designed as far back as the 1500s. The first true submarine wasn't built until the 1620s, by Cornelius Drebbel. It was followed by the *Turtle* in 1776 as well as several other ill-fated experiments by France and Germany in the 1800s.

The idea of a ship that sank on purpose must have seemed ludicrous to mariners of the time, and the fate of the *Hunley* and other early designs was a stark reminder of how many challenges lay ahead for this new kind of warship. But the evolution of the submarine had begun, and from those first humble submersibles came the warships that played a vital role in the history of maritime combat.



John P. Holland (above) stands in his submarine, the *Holland VI*, in 1898. It later became the first submarine purchased by the U.S. Navy. A computer image (above left) shows the sinking *USS Housatonic* and the *H.L. Hunley*. Drawings of the *H.L. Hunley* (left) were based on descriptions by a survivor of the sinking. The "American Turtle" (bottom left) was designed and built to carry gunpowder underwater.

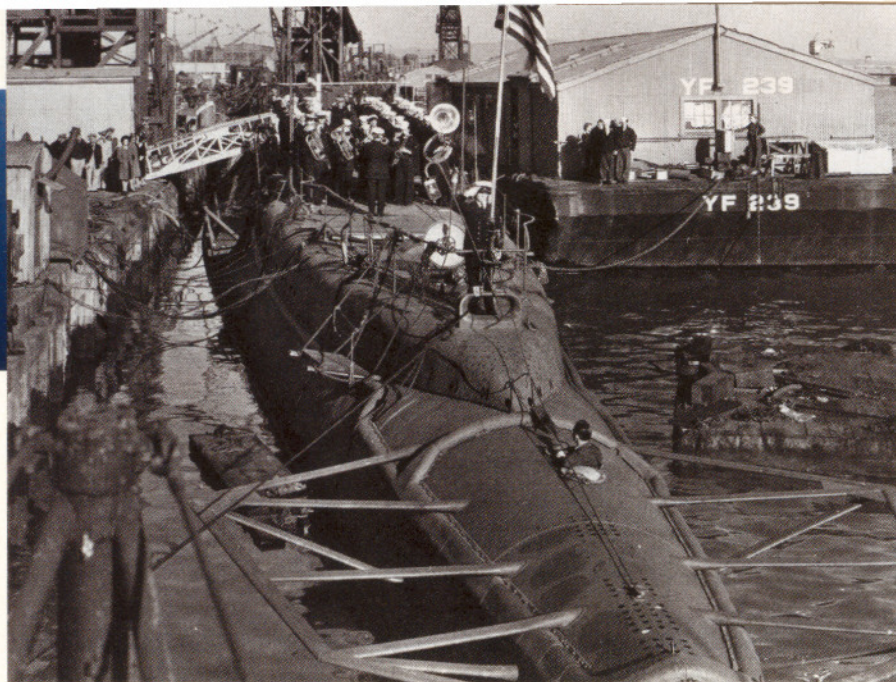


WORLD WARS BENEATH THE WAVES

The pace of advancement in submarine technology was incremental until the start of World War I, when it shifted into high gear. The submarines that emerged from the conflict were propelled by diesel engines while on the surface and electric motors when submerged. Torpedoes and deck guns became the mainstay of submarine armament.

Between the wars, Germany continued to upgrade and improve its submarine fleet. When World War II broke out, America found itself lagging woefully behind. To answer the threat looming in Europe, the country's war production machine swung into action, producing the Gato class of submarines that would become the linchpin of America's underseas force. The Gato boats,

The ill-fated *Tullibee* (SS-284) joins the ranks of the U.S. Navy (right) during the conclusion of commissioning ceremonies at Mare Island Navy Yard in California Feb. 15, 1943. Submarines of the 1960s are showcased (below).



which sent 1.7 million tons of Japanese shipping to the ocean bottom during the war, later were joined by the Balao class of submarines, which featured a fortified pressure hull for deeper diving and a larger fuel capacity for longer patrols.

MAKING PROGRESS

The success of World War II subs especially is impressive because many of their early standard-issue Mark XIV torpedoes either ran too deep, failed to detonate, exploded prematurely — or worse. In March 1944, a torpedo launched by the *USS Tullibee* ran a circular course and returned to destroy the Gato-class boat.

In all, U.S. submarines sank 4.9 million tons of shipping and 700,000 tons of naval ships during the war — about 60 percent and 30 percent

of the total, respectively — although subs comprised less than 2 percent of the U.S. fleet. The victories came at a high cost, however. Of the 288 submarines that went into battle, 52 of them — with a total of 3,506 men aboard — never returned.

Jack Smalling is one of the lucky ones. Assigned to the *USS Spearfish*, he participated in a reconnaissance mission to Iwo Jima, Japan. “When you looked through the periscope, you felt like you were right next to the island,” Smalling remembers.

On that mission, the *Spearfish* narrowly escaped a missile fired by an American fighter pilot, who mistook the sub for a Japanese boat.

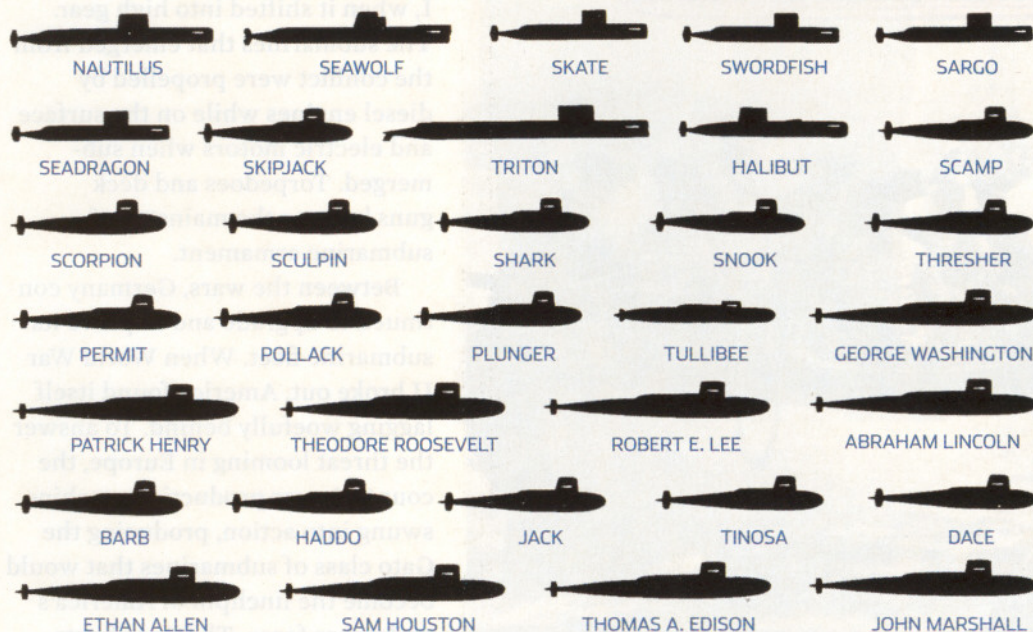
Smalling later was assigned to the *USS Hackleback*, a brand-new sub that shadowed the giant Japanese battleship *Yamato* as it made its way to Okinawa, Japan, to intercept the Allied invasion fleet.

“We were within 4,000 yards but had orders not to attack,” he recalls. “Here you’ve been at war for several years, looking at the

biggest target there is, and all you can do is notify [commanders] that it’s coming.”

Less than a decade after the end of World War II came a quantum leap in submarine propulsion, when the first boat with an atomic power plant — the *USS Nautilus* — set sail on her maiden voyage. Although capable of combat, the *Nautilus* served mostly as a research platform.

The advent of nuclear engines meant subs no longer had to surface to recharge their



batteries, thereby risking exposure to enemy attack. Their operational range greatly expanded as well — if necessary, they could stay submerged for months.

As the Cold War set in and Russia began its military buildup, two major categories of submarines emerged in the U.S.: fast-attack boats,

The *USS Nautilus* (SSN-571)

(below) returned to New York Harbor in 1958 after Operation Sunshine, the first transpolar voyage under the Arctic ice. The *USS Providence* (bottom) was at the North Pole in July 2008 to commemorate the 50th anniversary of the *Nautilus'* pioneering polar transit. The *USS Norfolk* heads to sea after a routine port visit (right).

also known as hunter/killers, and strategic ballistic missile subs, or boomers. Hunter/killers, or SSNs, as their name implies, were tasked with tracking Soviet submarines and destroying them before they could launch their ballistic missiles should war break out. The George Washington-class submarines were the first ballistic missile subs, or SSBNs, deployed during the Cold War. The Ethan Allen class followed, succeeded by the Lafayette/Franklin boats in the 1960s. The trend toward larger submarines peaked in the early 1980s when the Ohio-class boats took to the seas. At 560 feet long and 42 feet wide, they were the largest American subs ever built — so big that two *Hunleys* could fit side by side in each Ohio missile tube.



most numerous type of submarine in the world. Navy retiree Michael Lane served as a lieutenant on the *USS Chicago*, a Los Angeles-class fast-attack boat, from 1993-97, at a time when the submarine's role was changing because of the Soviet Union's collapse.

AN EVOLVING ROLE

SSNs were evolving as well, culminating in the Los Angeles class. First launched in 1976, the Los Angeles class now is the

“When I was at the [U.S.] Naval Academy [in Annapolis, Md.], we were very focused on a conventional adversary,” Lane says. “When the Cold War ended while I was serving in the fleet, our role changed to a more low-intensity conflict against a nonconventional adversary. We were doing a lot more support of special forces, [including] more strike missions and reconnaissance and a lot less hunting other subs and large surface ships.”

The end of the Cold War meant fewer SSBNs were needed. Some were refitted to adapt to the current asymmetric warfare model, including the Ohio-class *USS Florida*, now designated a guided missile submarine (SSGN). “We’ll be operating up close to shore in littoral waters with the ability to do a conventional missile strike and to launch SEALs or other special ops forces,” says the *Florida's* Capt. William Traub, USN. “We can carry 154 Tomahawk missiles in a full-up strike-loaded configuration. Fourteen different



Current U.S. Submarine Classes

Class	Type	Year Deployed	Length	Beam	Displacement	Crew	Armament
Los Angeles	SSN	1976	360 feet	33 feet	6,900 tons	13 officers; 121 enlisted	Tomahawk missiles, VLS (SSN 719 and later), MK-47 torpedoes, four torpedo tubes
Ohio	SSBN SSGN	1981	560 feet	42 feet	16,760 tons	15 officers; 140 enlisted	SSBN: 24 tubes for Trident I and II, MK-48 torpedoes, four torpedo tubes. SSGN: up to 154 Tomahawk missiles, MK-48 torpedoes
Seawolf	SSN	1997	453 feet	40 feet	12,158 tons	14 officers; 126 enlisted	Tomahawk missiles, MK-47 torpedoes; eight torpedo tubes
Virginia	SSN	2004	377 feet	34 feet	7,800 tons	14 officers; 120 enlisted	Tomahawk missiles, 12 VLS tubes, MK-47 ADCAP torpedoes, four torpedo tubes

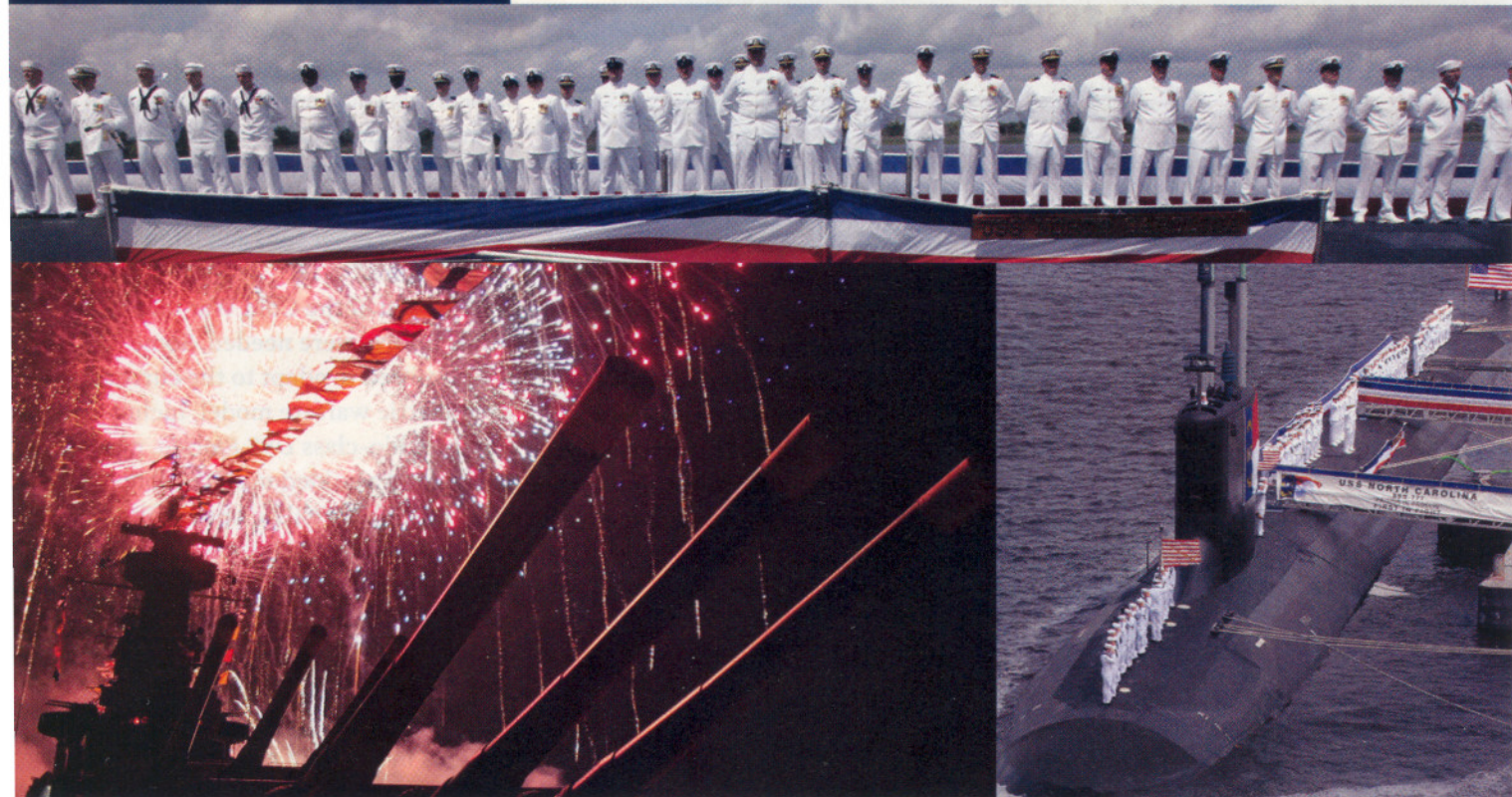
Sailors “man the ship” of the newest Virginia-class nuclear attack submarine, the *USS North Carolina*, in May 2008 (below). Fireworks cap off the celebration for the commissioning of the *North Carolina* (left). The *North Carolina* officially is brought to life during her commissioning ceremony (right).

submarines shot missiles into Iraq during Operation Iraqi Freedom. All those missiles could be fired today with just two SSGNs.”

The newest submarines to join the Navy’s undersea flotilla are the Virginia-class boats, which eventually will replace the Los Angeles class. The first sub without a periscope, the Virginia boats instead

sport a “photonic mast” with cameras that transmit images to command stations. The hull contains a chamber that can deploy special ops forces and even a mini-submarine.

The latest in the Virginia series, the *USS North Carolina* (SSN-777), was commissioned in Wilmington, N.C., May 3. The fourth Navy ship to bear the state’s name, the submarine





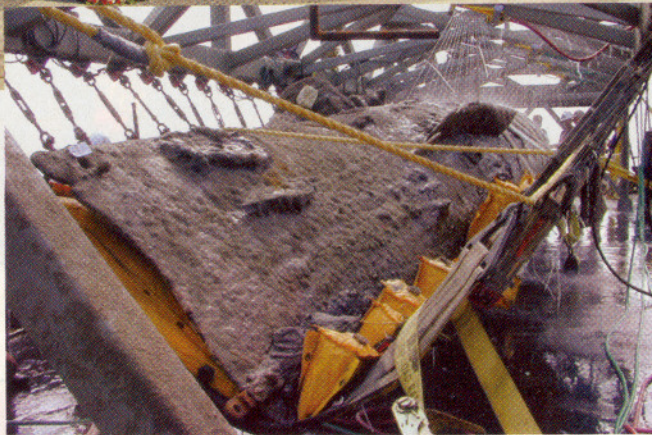
will join the fleet based at Pearl Harbor, Hawaii.

ETERNAL PATROL

But no matter how technologically advanced submarines become, they all owe their existence to

the *H.L. Hunley* and its contemporaries. Today that storied vessel lies on its side, submerged in a tank of water in a warehouse that once was part of the Charleston Navy Yard in South Carolina. The details of its fate still a mystery, researchers continue to pore carefully over each rivet and seam, removing the concretions that have built up over time.

When the silt that filled the submarine was removed, the remains of its eight crewmembers were found,



still at their posts. On April 17, 2004, they were buried with full military honors at Magnolia Cemetery in Charleston.

As you stand at the railing, gazing down at the *Hunley* in its tank, the bravery of those eight men suddenly hits home. They would tell you they simply were doing their jobs, but it takes a special kind of fortitude to voluntarily go in harm's way in an underwater tube — and all submariners are volunteers.

From time to time, veterans wearing the dolphin insignia of submariners appear at the railing, observing the old boat as it undergoes restoration. “We had a network crew from CBS here a few years



back, filming a tour group of World War II veterans,” says Kellen Correia, a spokesperson for the *Hunley* project. “One of the men began to weep a little, and it broke the camera guy up as well. After all, this is where it all started.” MO

(clockwise from above) The *Hunley* rests on the recovery barge after being brought up from the ocean floor. A funeral for the *Hunley* crew was held at the Confederate Monument in Charleston, S.C., in April 2004. Researchers created facial reconstructions of the eight sailors who died on the *Hunley*. An officer's badge bears the submarine warfare insignia.

