

Barbara Moe, Curator
Naval Undersea Museum
Naval Undersea Warfare Center, Division Keyport
610 Dowell Street
Keyport, Washington 98345, USA
Bmoe@kpt.nuwc.navy.mil

The Impact of the Invention of the Torpedo on the U.S. Navy

I. Introduction

The effect on the navies of the world by the invention of the torpedo is quite remarkable for one small weapon. The evolution of the torpedo from an explosive device held on the end of a long stick to an “automobile” torpedo, able to move through the water on its own, impacted not only battle strategies but also the invention of new naval vessels to deliver this weapon to the enemy’s doorstep. This paper discusses the first 50 years.



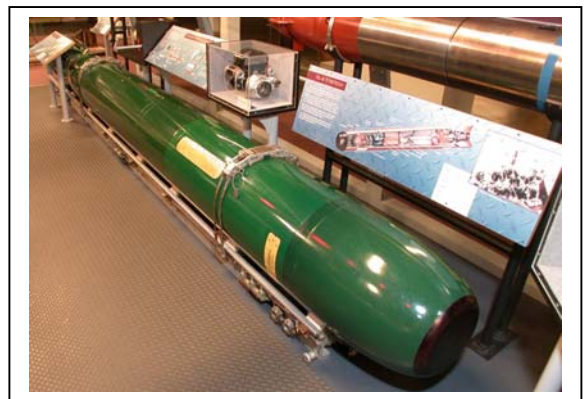
The Spar Torpedo



The Howell Torpedo.



The Mark 50 Torpedo



The Mark 48 Torpedo

These Torpedoes are from the collection of the Naval Undersea Museum, Keyport, Washington.

A. The Frame torpedo.

The order, “Damn the Torpedoes, Drayton, full speed ahead” made famous by Rear Admiral David G. Farragut, should actually be “Damn the Mines, Drayton, full speed ahead.” This frame torpedo used in 1864 at the Battle of Mobile Bay was actually a mine—a weapon waiting for its target.



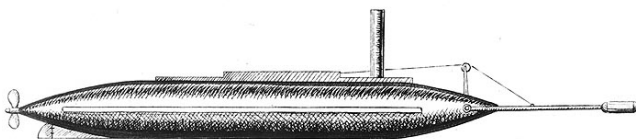
II. Background

Although there is some evidence of experimentation with spar torpedoes during the War of 1812, the American Civil War provided the impetus for its development. Generally, the spar torpedo consisted of a buoyant casing loaded with 40 to 100 pounds of gunpowder attached to a long pole or spar. This device was exploded by pulling a lanyard from the attacking vessel or by a percussion-firing device upon contact with the target when the torpedo was rammed below the waterline—oftentimes amid a retaliatory firestorm of bullets. The towed torpedo was also a mine or series of mines towed behind a vessel.

A. Historical Beginnings

In October 1862, the Confederacy set up a Torpedo Bureau at Richmond, Virginia, to control the manufacture and use of underwater weapons. The bureau was primarily interested in torpedoes, or *mines*, to protect the southern coastline.

Photo # NH 95242 Drawing of a Confederate "David" torpedo boat with spar torpedo deployed



CONFEDERATE **DAVID**
Civil War Torpedo Boat

Boats, commonly called *Davids* , carried a 60-lb charge of grain gunpowder at the end of a 25-ft. spar, striking the target

ship below the armored area of the vessel at about six feet beneath the waterline. *Divers*, which were submersible, human-powered boats, also served as *Davids*; most notable was the American Diver, *H.L. Hunley* which sank the Union frigate USS *Housatonic* in 1864. That same year the spar torpedo was employed when Cushing forced his vessel over the floating log barrier to attack and sink the *Albatross*. Only he and one of his 15-man crew survived. Vessels were protected from spar torpedo attacks by employing torpedo nets.

During this experimental time, a wide range of vessels employed the spar and the towed torpedo: tugs, monitors, steam launches, submarines and even ships. However, the first boat built expressly for the delivery of the spar torpedo was the Norwegian *Rap*, built in 1873 by an English boat-builder. The *Rap* was the first of many torpedo boats to be built for both the Royal Navy and for export, primarily to Japan where torpedo boats played a significant part in the Russo-Japanese War of 1904. The goal was to build an inexpensive, small, fast boat that could deliver the weapon and get away quickly.

The first modern torpedo boat was the *Lightning*, built for the British navy in 1877. The *Lightning* was an armored spar torpedo boat designed for swift attacks in littoral or coastal waters, not the open sea. It frequently had to be refueled and was too fragile for direct head-to-head combat with larger vessels. Around the same time, the United States Bureau of Ordnance ordered

the torpedo boat *Lightning* to be built by Herreshoff Manufacturing Company, Bristol, Rhode Island.

Trying to control a 20-foot or longer pole with an explosive on the end provided some challenges. The speed of the vessel plus the action of the waves sometimes made control unmanageable. Trying to solve this problem led to the next step in the evolution of torpedo delivery. “When attacking vessels steamed at high speeds the spars would sometimes carry away when lowered into the water.” This led to their being rigged to be run out through the side, under water. This method was the forerunner of the submerged torpedo tube of today.

By the late 1800's, there were many voices advocating advanced torpedo technology:

“The spar torpedo has been perfected...but we want something better; something that can be thrown at the enemy when he is beyond the reach of a club...” Lieutenant Commander F. M. Barber, U.S.N., 1885.

III. Delivery of the Automobile Torpedo

The term *torpedo* did not change until it was further defined as *automobile* or *fish torpedo*, meaning an explosive device that moved on its own. The Navy established the Naval Torpedo Station, Newport, Rhode Island, in 1869 for torpedo development and experimentation. Two years later, in 1871 the Torpedo Station had developed a fish torpedo; it was not successful.

By 1880, Robert Whitehead had manufactured about 1,500 torpedoes and was selling his torpedo to 14 countries in Europe and South America. The Whitehead torpedo feature “*The Secret*” was a pendulum and balance chamber. The secret was to prove a direction-keeping problem for torpedoes and was eventually replaced by a gyroscope.



The Whitehead Torpedo

Using the definition of a torpedo as, *An engine or machine invented for the purpose of destroying ships by blowing them up*, in 1883, the Navy Department issued a circular to prominent inventors and torpedo manufacturers informing them that Congress had authorized the purchase of torpedoes adapted to naval warfare. Those responding were Asa Weeks; American Torpedo Company; Sims Electric Fish Torpedo Company; and Commander J.A. Howell, USN. The European inventors chose not to participate.

The first real sinking of a vessel by a torpedo occurred in 1891 during a Chilean civil war when two torpedo boat destroyers attacked an ironclad anchored in Caldera Bay. The first torpedo boat fired three torpedoes but the torpedoes swerved off course. The second torpedo boat fired its torpedoes. The bow torpedo missed but the boat came in closer and the two beam shots found their target. In less than ten minutes the Chilean battleship had disappeared along with all hands. This new devil's device had proved its worth.

IV. The Torpedo Boat Evolution

“The fish torpedo is practically a projectile, and the torpedo boat may be called the gun which fires it.” Trying to document the evolution of delivery platforms for a torpedo—identifying what happened when—becomes difficult because the use and development of the spar torpedo and

the experimental development of the automobile torpedo overlapped. Both types of explosives influenced the building of watercraft to deliver the weapons. Following are a series of photographs illustrating the evolution of the first torpedo boat, the USS *Stiletto*.

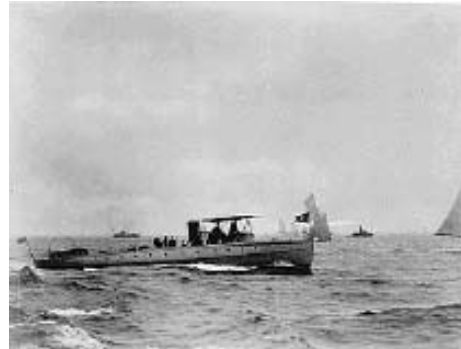


The USS *Stiletto*, shown here prior to purchase by the U.S. Navy, was launched in 1885 as a high-speed steam yacht. The *Stiletto* began its career as a sleek craft from the workshops of Herreshoff Manufacturing Co., Bristol, Rhode Island. She entered service in 1888. *Stiletto* became an experimental torpedo boat assigned to the Naval Torpedo Station on Goat Island in Newport Harbor, Rhode Island.

This drawing illustrates the *Stiletto* in 1889, reconstructed as *Wooden Torpedo Boat No. 1*, running at full speed--26 miles per hour.

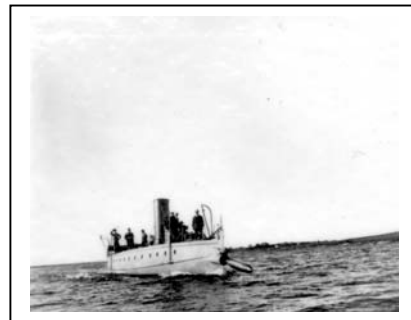


Initial plans were to use the *Stiletto* for testing spar torpedoes but with the continued development of the Howell and Whitehead torpedoes, it was converted to fire automobile torpedoes



Stiletto in 1891, Starboard Side.

Torpedo tube was built into her bow in 1892. This 1900 photograph shows the *Stiletto* firing a Howell torpedo.

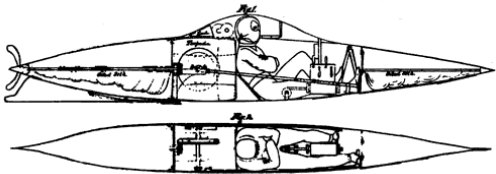


V. Submarine Torpedo Boats

"When the first submarine torpedo-boat goes into action, she will bring us face to face with the most puzzling problem ever met in warfare."

John P. Holland

John Phillip Holland, a New Jersey schoolteacher, invented his first submarine in 1874.

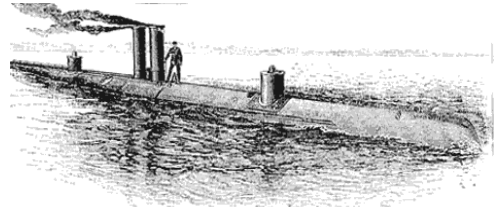


Holland's first submarine, 1874

This submarine was 15-½ foot long, a one-man human-powered vessel with a foot-treadle propelling it through the water. Primitive as it might seem, it was successful enough to encourage him to refine his design into the "*Holland No. 1*." The sea-trial of the *No. 1* in 1878, incorporating a gasoline engine, ended up being one more step forward toward a usable undersea vessel.

A contemporary of Holland was Reverend George William Garret, England. In 1885, Garret worked with a third inventor, Thorsten Nordenfeldt of Sweden, a well-known munitions dealer, to produce the *Nordenfeldt I*. As a munitions dealer, Nordenfeldt was also familiar with undersea weaponry. He thought the torpedo not only needed a safer delivery platform but the submarine needed a weapon. He believed the spar torpedo and mines were far too dangerous for use on a submarine. With the stealth provided by the submarines, the danger experienced by the early (surface) torpedo boats being counter-attacked while on a nighttime raid, would be minimized. The *Nordenfeldt I* was subsequently modified to carry a Whitehead locomotive torpedo in an outside tube near the bow.

These first Nordenfeldt submarine ventures were not all successful; when it fired a torpedo, the recoil caused the boat to tip backwards and sink, stern first, to the bottom. Nordenfeldt was the first, however, to combine the submarine and the torpedo.



Nordenfeldt III, 1807

It was in this milieu that the United States began to take notice of the submarine inventions, and the U.S. Navy announced an open competition for a submarine torpedo boat, with a two million-dollar incentive.

Through a series of false starts, John Holland's design won out over the other contenders, including Nordenfeldt. Holland's 1893 design, *Plunger*, was not a success and did not complete sea-trials. However, he didn't give up. Building on his previous designs, the successful *Holland VI* was launched in 1897. The submarine was sold to the U.S. Navy three years later in 1900, commissioned as the *Holland* and later designated "SS-1." The submarine has one torpedo tube forward and carried three torpedoes. The submarine torpedo boat, built on years of success and failure, finally delivered the weapon it was invented for—the automobile torpedo.

VI. The Torpedo Boat Destroy: The Greyhounds of the Sea or *Tin Cans*

The torpedo-boat USS *Cushing*—a forerunner of the Torpedo-Boat Destroyer—was commissioned in 1890. The *Cushing* was 140 feet long and had three torpedo tubes. These craft were built to a variety of designs by several shipyards.

The same Act of Congress in May 1898 that authorized construction of the last 12 torpedo boats, authorized construction of 16 torpedo boat destroyers. These destroyers evolved in response to the swift, small torpedo boats, like the *Cushing*, that could attack larger ships, fire their torpedoes, and then speed away but needed to be more substantial. There was a need for a ship able to defend against an enemy force of torpedo boats using wolf pack strategy. Also, the U.S. Navy's torpedo boats—used primarily for coastal protection—lacked the size, speed, fire-power, and seakeeping needed to accompany the battle fleet away from U.S. coastal waters.

The destroyer, originally called the torpedo boat destroyer, clearly defined its mission by its name. The Torpedo-Boat Destroyer was bigger, swifter and more deadly than the torpedo boat. It was armed with deck guns and torpedoes. These larger Destroyers that were capable of seakeeping and able to travel with the battlegroup signified a change in military strategy as well.



Destroyer leading Torpedo Boats during maneuvers, circa 1903. The destroyer is either Dale (Destroyer # 4) or Decatur

(Destroyer # 5). The three torpedo boats in left center are of the Blakely class (Torpedo Boat #s 27 through 35)

The first destroyers flotilla's 18,000-mile journey to the Philippine Islands proved beyond any doubt the reliability of the Destroyer as a seagoing vessel. This group set the pattern, which emphasized seakeeping and endurance as opposed to very high speed required of the earlier and smaller torpedo boats.

Threats occurring during World War I resulted in building newer classes of destroyers with even greater size and firepower. This larger, more substantial Destroyer was part of the battle group, charged with protecting the large battleships from enemy torpedo attack and firing torpedoes at the enemy.

VII. Conclusion

This paper covers only the 50-year period of invention of the torpedo, beginning in 1860s up to the early 1900s. It was during these years, the torpedo was essentially invented, evolved, and proved in battle. From a simple wad of explosive on the end of a stick to a self-propelled weapon, the torpedo influenced not only the US Navy, but also the navies of the world. Vessels have been built to deliver this weapon. Vessels have been built to counteract these vessels, and warfare was redefined to include offensive as well as defensive strategies. Now, instead of a coastal defense system, the defense of the ocean as a battlefield became the navy's vision.

References

- [1] Barber, F. M. Lieutenant Commander, U.S.N., "Torpedo-Board Coast Defense" to the Naval Advisory Board, October 1885.
- [2] Bradford, R. B., Lieutenant Commander, U.S. Navy, "Notes on the Spar Torpedo," Torpedo Station, Newport, Rhode Island, March 1882.
- [3] Bureau of Ordnance Navy Department, Washington City, December 3, 1883
- [4] Everett, Marshall, "Exciting Experiences in the Japanese-Russian War", 1904.
- [5] Nordenfel, T., "Submarine Boats," United Service Gazette, pg. 440.
- [6] Schofield, William G. Schofield, Captain, USNR, "Destroyers—60 years", 1962
- [7] U.S. Naval Institute Proceedings, 1888. Vol XIV
- [8] U.S. Naval Underwater Weapons Systems Engineering Center, "A History of the Development of the Torpedo," Newport, Rhode Island.