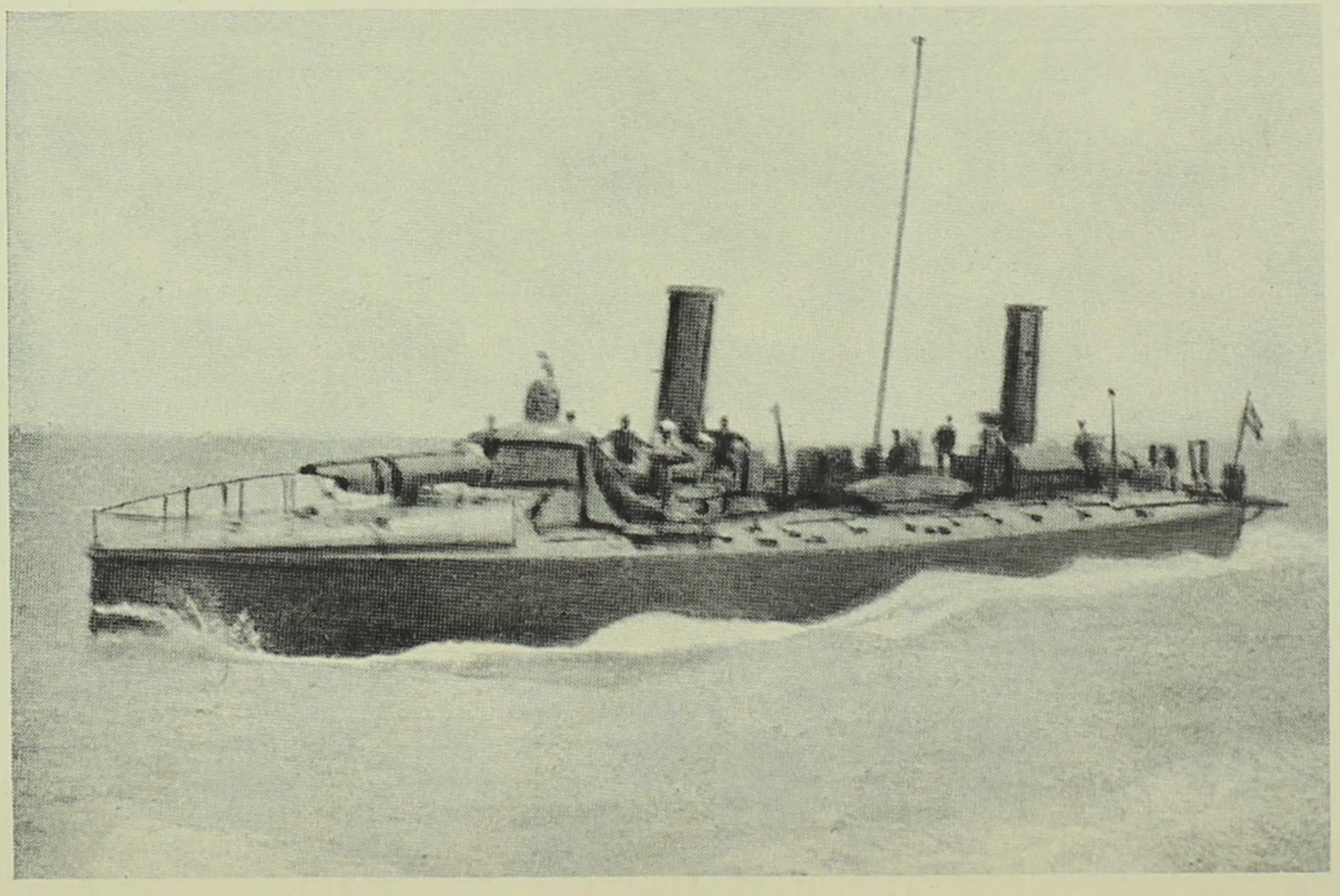

THE ERICSSON

THE PALIMPSEST

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VOL. XIV ISSUED IN MAY 1933 NO. 5

Conception and Design

Probably no American naval vessel was ever more intimately identified with Iowa than the torpedo-boat *Ericsson,* of the Spanish-American war period. Iowa built, upon the shore of the Mississippi River at Dubuque, Iowa launched, and christened by a native daughter of this State, the boat steamed away on a career of high adventure, never to return. Its sturdy construction and efficient performance won favorable comment, not only in America but also from naval authorities abroad.

The *Ericsson* sailed under the aegis of the illustrious name of Captain John Ericsson who designed and supervised the construction of the *Monitor,* thereby winning for the North one of the most decisive naval duels of modern times. Furthermore, to this Swedish-American genius must be given the credit of inventing the screw-

propeller, revolutionary achievement in the maritime world; the hot-air engine, being the immediate forebear of the present ubiquitous gas-engine; the solar engine; and the torpedo tube gun, making possible the torpedo-boat and modern submarine warfare. Certainly the *Ericsson* went to sea under favorable auspices.

The chief function of the torpedo-boat, as signified by its name, is to carry and discharge those dangerous and destructive engines of modern warfare known as torpedoes. This requires small, sturdy, light-armored vessels, capable of slipping swiftly toward slower, heavily armored battleships, and, under cover of darkness, releasing their missiles and then beating a hasty retreat. Being practically unarmed and therefore utterly incapable of defending themselves in case of discovery, they operate upon the theory that it is better to strike and run away, and "live to fight another day". They are most efficient in the comparatively quiet waters of harbors and therefore most useful in coastwise defense against enemy fleets. They are not designed to withstand the stress of heavy seas, their cruising range is restricted by their limited fuel capacity, they need the protection of cruisers, and they are not well adapted for messenger service or the maintenance of blockade.

The design of such vessels passed through successive stages of evolution, being perfected step by step until from a technical standpoint there was little left to be desired. England, France, Russia, and Italy had long experimented with and employed naval vessels of this type, but the earliest American attempt in this direction was the construction of United States Torpedo-boat No. 1, the *Cushing,* in the Herreshoff shipyards at Bristol, Rhode Island, in 1888–1890. It cost $82,750.

This boat, however, was said by competent authorities to have been greatly inferior in construction and in other important details to the *Ericsson,* United States Torpedo-boat No. 2, built in the yards of the Iowa Iron Works Company, at Dubuque, during the years 1891–1894. While the plans for the *Ericsson* included the most approved features as developed in other navies, she was strictly an American type of boat — the result of careful study by the Navy Department and designed by men who were specialists in that branch of naval construction. In spite of the fact that England and France had previously built about three hundred of these boats, they "had nothing superior," and it is doubtful if any they had produced were the equal of this unique craft.

The plans for the *Ericsson* called for a vessel 150 feet in length and 15½ feet beam in the

widest section. Her rated displacement was 120 tons and, like all boats of her class, she set low in the water, although when completely equipped and with full cargo she required only about five feet of water to navigate safely. Aft she resembled the "whale-back, with graceful lines drawn into the cigar shaped termination"; but fore, she held "her depth well, giving her smooth and unbroken lines from stem to stern, and so shapely drawn" as to meet the least possible resistance to the air while speeding swiftly through the water.

In order to give the vessel maximum strength and rigidity, the transverse system of construction was employed, uniting the outer keel plate firmly with the inner flat keelson, which greatly reduced the vibrations caused by the engines and prevented the tripping of the floors. Her frames were of steel and the plating of galvanized steel was from three-sixteenths to one-fourth of an inch in thickness. The interior of the vessel was divided into fifteen water-tight compartments, which provided rooms for boilers, engines, fuel, and supplies, as well as rooms and bunks for the crew of twenty-six or twenty-seven men, who were quartered in the space in the bow, 21 by 15 feet in dimensions. The captain's stateroom, and the engineer's, each 6 by 7 by 8 feet, were likewise divided by a water-tight bulkhead and opened aft

into a wardroom or officers' dining room 16 by 19 and 7 feet high. This room also provided sleeping quarters for twelve men, occupying sailors hammocks. In the stern were the lavatory, kitchen, and pantry. The interior was covered with cork paint, to absorb moisture and condensation, and the staterooms were wainscoted with three-ply veneer one-fourth inch in thickness.

The vessel contained many modern innovations, including a forced ventilating system, patent enunciators, and "an incandescent lighting system" consisting of a generator, twenty fixed bulbs, and four hand lamps. She was also provided with a steam steering gear which added greatly to her efficiency. The engine rooms were located amidship between the two boilers, which were in separate compartments, so arranged that in case one was disabled by shell-fire, the other might continue to function and enable the vessel to escape from the zone of action. The dimensions of both boiler and engine rooms were 10 by 21 feet, and the latter contained bunkers for thirty-five tons of hard coal and a reservoir for 360 gallons of distilled water. The four machinists were quartered in staterooms 5 by 8 feet on either side of the powder magazines.

It was said that no finer engines were ever built in America. There were two sets of "four cylin-

der, quadruple expansion engines of the vertical, inverted direct acting type, operating twin screws". At full speed, these propellers were theoretically estimated to turn at 412 revolutions per minute. The cylinder diameters were 11½, 16, 21½, and 30 inches, and the stroke of all the pistons was sixteen inches. In addition to the engines employed for propelling the vessel, powerful pumps, capable of pumping out the weight of the vessel in water every fifteen minutes, were installed in the engine-room, to insure reasonable security from serious accident.

On deck were rigging, hatch doors, skylights giving natural illumination to the quarters below, two rather slender smoke stacks, and two watertight canvas life-boats. Fore and aft were electric search lights having a "compass of one mile". Just ahead of the forward smokestack was a conical tower from which the commander operated and maneuvered the vessel. The proposed armament was to be three torpedo tubes for firing Whitehead torpedoes; one a fixed tube in the bow eighteen inches in diameter, and two on a revolving table, aft, each fourteen inches in diameter. In addition there were four long one-pounder rapid-fire guns for repelling boarders. The fixed tube was fired by compressed air at 60 pounds pressure from the commander's office by pressing an elec-

tric button. These Whitehead torpedoes varied in length from 12 to 19 feet, and had a range up to half a mile, being propelled beneath the water by means of compressed air. Each torpedo carried a sufficient charge of high explosive to destroy a battleship if it should strike below the armor line.

In action, the vessel was so maneuvered in approaching the enemy that the sights of the bow tube were directly in line with the target. When, in the judgment of the commanding officer, the boat had come near enough to register a hit or for her own safety, he fired the bow tube, which had the greatest range, and swung the vessel round sharply to make off quickly. It was then that the two tubes mounted aft came into action, these being aimed independently of the position of the vessel by means of the turning table. They are fired with black powder. After the *Ericsson* had turned, which operation could be performed in half her own length, and got under speed, it is said that no ironclad afloat was swift enough to overtake her and "none could land a shot on her except by accident". There was no storeroom for extra torpedoes and, therefore, when the three in the tubes were fired, the boat had to sail immediately for her base or supply-ship to replenish the supply.

Proposals for the construction of Torpedo-boat

No. 2 were invited in 1890, but the first bids were all rejected because the specifications submitted were unsatisfactory. Plans were therefore drafted in the Navy Department and advertisements for new bids were posted, calling for the completion of the entire vessel, with the exception of equipment and armament, within twelve months. When it was discovered that the Iowa Iron Works had filed the lowest bid, it is said that consternation, not unmingled with incredulity, was manifest upon the faces of certain government officials. That a shipyard so located should be able to undertake and execute such a project seemed almost unbelievable. Careful investigation, however, disclosed the fact that this was no incompetent, inexperienced company, but one which for twenty years had been building steel-hulled vessels for service not only upon the Mississippi and other inland streams, but upon the Great Lakes as well.

Some of the fleetest and most valuable craft on the river had steamed away from the Dubuque yards, convincing evidence of the capability of Iowa ship-builders. These facts were carefully explained by the Secretary of the Navy, B. F. Tracy, in reporting on the contract to Congress. He further remarked upon the value of a shipyard "at a point remote from all possible attack",

and urged the encouragement of similar establishments in the large cities along the Ohio and the Mississippi rivers, that the "benefits arising from the shipbuilding industry" might be more widely distributed. While the later suggestion was doubtless made as a political expedient, and in spite of considerable opposition on the part of eastern lobbyists, the contract was awarded to the Dubuque firm, who completed the vessel in a manner thoroughly creditable to themselves and satisfactory to the government.

BEN HUR WILSON