NEW TORPEDO BOAT FOR THE SPANISH GOVERNMENT.

In view of the large sums recently appropriated by Congress for the construction of war ships and torpedo vessels, the new vessels and improved naval structures of other governments assume especial interest on this side of the Atlantic. We give herewith illustrations of a remarkable torpedo boat lately built in England for the Spanish government, for which, and the subjoined particulars, we are indebted to the *Engineer*. The name of the vessel is El Destructor.

She is a twin screw cruiser of nearly 200 feet length. Her beam is 25 feet, and her depth 13 feet. She is built of high tension steel, and consequently her scantlings are light; but to give her the requisite rigidity she has a large number of partial bulkheads throughout her length. In order to avoid the ravages of corrosion as much as possible, every piece of steel or iron in her is galvanized. It is usual in small vessels such as torpedo boats to galvanize the whole of the material to the height of the water line; but we know of no vessel which can be called seagoing which is galvanized throughout.

The scantlings in torpedo boats are so light that the greatest care has to be taken in looking after these boats; but in a vessel which is intended to act as a cruiser it is an indispensable condition that those who have charge of her should not be in such fear and trembling as they would be if her scantlings were those of a torpedo boat. Hence in the Destructor it has been necessary to have many parts in excess of requirements of strength, solely to avoid the risk of effective damage from corrosion. It is obvious that in a vessel of this size, attaining, as she does, such an enormous speed as 23 knots, the greatest attention must have been given to saving of weight in the hull and machinery. Her designers and constructors, Messrs. Thomson, are both torpedo boat and cruiser builders, and consequently this vessel has partaken as much as possible of the advantages of the torpedo boat without sacrifice to her qualities of seagoing cruiser. As may be seen from the illustration, she has a ram bow, which would be used without much hesitation by a daring commander. She has a bow rudder, which has been fitted to her partly to assist her maneuvering and partly to act as a leeboard when she is under sail. It would also be of advantage in case of derangement of the after rudder. It is not, however, of so much importance in this vessel as it is in the ordinary torpedo boats in which it is usually fitted, for the Destructor has a new type of rudder fitted, known as Thomson and Biles' patent sternway maneuverer, which is a development of the rudder we described as being fitted to the Russian torpedo boat Wiborg, in our issue of October 22. This rudder, in the Destructor, has an area of 80 square feet. The lines of the ship are carried out to the back of the rudder, and the profile view of this back gives the stern the appearance of an ordinary narrow yacht's rudder.

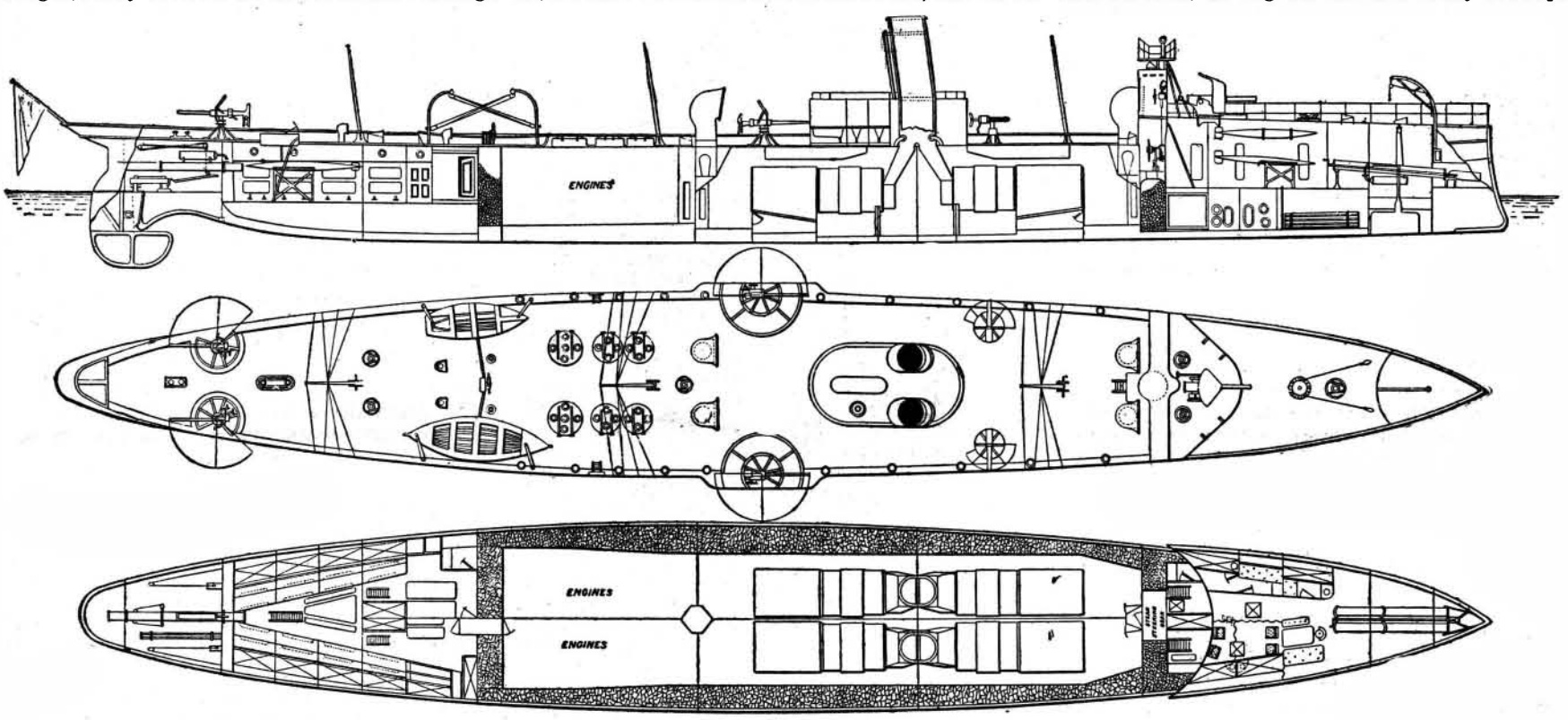
A closer examination shows that the ship is divided by a horizontal plane at about the water line, and when the helm is put over, the whole of the after part of the ship below the water line swings bodily round. The deadwood is arched up sufficiently to allow the two propellers to be as near as possible; but the chief point of value in this rudder is the partial compensation on the forward part. It is known that if a plane surface is advancing through water at an oblique angle, the pressure on the fore end of the plane is very much greater than on the after end. The effect of this is that the pressure on the comparatively small portion on the fore side practically balances the twisting moment caused by the pressure on the after side. This results in a double advantage—the first is, that the strength of all the steering apparatus may be very small; the second is, that as long as the proportion between the areas is properly maintained, the rudder area, and consequently the turning or maneuvering power of the boat, may be increased indefinitely. This rudder has not the disadvantage of the completely balanced rudder which has been fitted in vessels of the Royal Navy, for the pressure against the upper deadwood caused by the reaction of the pressure on the rudder is very effective itself in turning.

Further, the advantage of having the vessel completely under control when going full speed astern is very great, and has never been attained by an ordinary rudder. The part of the rudder on the fore side, in this new plan, then acts exactly as an ordinary after rudder would, because it is on the after side of its axis. This form of rudder has been very successfully fitted in some torpedo boats built for the British government by Messrs. Yarrow & Co. One of these boats was tried recently, and our contemporary, *Engineering*, in a recent issue, speaking of these trials, says: "The helm was put over at once, as fast as the powerful steam gear would work it, either to port or starboard. The result was remarkable, not to say startling. The enormous rudder area would at once throw the stern round, and the great column of water would rise up aft, the boat would heel inward somewhat, and the circle was completed in a marvelously short space of time." We gave the results of the turning trials of the Destructor in our description of December 25. The steering gear which works both bow and stern rudder is an arrangement of Messrs. Muir & Caldwell's, and it has the additional capability of being able to work the capstan. The torpedo armament of this vessel consists of two tubes in the bow and one in the stern, each tube having two torpedoes appropriated to it. Two broadside tubes are to be fitted on the upper deck, but the exact type is not yet decided. The gun armament consists of one 9 centimeter central pivoted gun on the forecastle, four 6 pounder rapid firing guns on the broadside, and two 37 mm. Hotchkiss revolvers forward.

With this armament the Destructor ought to be capable of justifying her existence if ever she meets a fleet of torpedo boats. She is divided into thirty-nine water tight compartments, some of which are again divided by having a double water tight side, so arranged that the space between the two skins forms bed places. The engines are in two separate compartments, the boilers are in four. The boilers and engines are completely encircled by coal bunkers. The bunker bulkhead abreast of the machinery is ¾ inch thick, and affords protection against small gun fire. A cross bulkhead forward of a circular form is fitted to protect the boilers, engines, magazines, and steering gear from raking fire. A circular conning tower, affording protection from small gun fire, is fitted well forward. There are three masts, with a fore and aft rig. These masts hinge down, the whole being arranged so that the operation of striking the masts may be done in a few minutes. The engines are triple expansion. The boilers are of the locomotive type, and the full power of 3,800 horses was attained for the moderate mean air pressure in stokeholes of 2½ inches. This very moderate pressure compares well with the usual practice of torpedo boats, which is from 4 inches to 6 inches, and the results in consumption of fuel and condition of boiler were most satisfactory. The boilers did not show a single weep or sign of leakage, and the consumption for four hours was only at the rate of 2·1 pounds per I. H. P. per hour, showing that the vessel could steam at full speed for about 700 knots. There is no other vessel afloat that could go 700 knots in thirty-two hours, or even could go 525 knots in twenty-four hours, which is at the same rate. There was no reason, at the end of the four hours' official trial of this vessel, why she should not have gone on at the same speed for twenty-four hours. The radius of action of this vessel at 11½ knots was proved to be 5,100 knots.

This vessel is the first of a type which has long been asked for by naval officers. Placed under the charge of any of our best young lieutenants or commanders, such a vessel would be of the greatest service to a fleet. Vessels of this type are not expensive.

Why is it that with the best skill in the world in ship designing, with the best experience in naval construction, and with the most energetic and able naval officers in the world, our Admiralty allow themselves to be hopelessly beaten by a private firm of shipbuilders? Why cannot they do in vessels of this class, as we understand the Spanish Minister of Marine did in the case of the Destructor, state his conditions and ask private shipbuilders to produce designs in competition? If the conditions are clearly stated as to armament, radius of action, tonnage, complement, and sail area, leaving the builders to say what speed they will guarantee and what price they will charge the whole matter will then be in a form for settlement by any person of common sense. Naturally the Admiralty constructors and engineers will wish to criticise the designs, but if the firms selected for the competition be limited to those really competent, the criticisms of the constructors and engineers will not be any hinderance to the work of selecting the best, for the matter will be, in the way suggested, largely a question of who will guarantee the most speed, and is the highest speed offered worth the price asked? We may very well take a lesson from the Spaniards in this matter, and release some of our ablest naval constructors and engineers from their work of discussing these questions so wearily over and over again with every new official who has the power to ask questions and the wish to be educated, and to give them an opportunity of using their well recognized skill and ability in bringing our dockyards to the level of private shipbuilding yards in economy of production and in rapidity of delivery.



EL DESTRUCTOR—NEW TORPEDO BOAT FOR THE SPANISH GOVERNMENT.

Cheap Method of Platinizing Metals.

In this new process, the metallic object is covered with a mixture of borate of lead, oxide of copper, and spirits of turpentine, and submitted to a temperature of from 250° to 330°. This deposit, upon melting, spreads in a uniform layer over the object. Then a second coat is laid on, consisting of borate of lead, oxide of copper, and oil of lavender. Next, by means of a brush, the object is covered with a solution of chloride of platinum, which is finally evaporated at a temperature of not more than 200°.

The platinum adheres firmly to the surface, and exhibits a brilliant aspect. If the deposit be made upon the first coat, the platinum will have a dead appearance. Platinizing in this way costs, it is said, about one-tenth the price of nickel plating.—*Le Genie Civil.*