BATTLESHIPS "IDAHO" AND "MISSISSIPPI."

The "Idaho" and "Mississippi" are sister battleships that were authorized by act of Congress March 3, 1903, which specified that the ships were to have the highest combination of speed, defensive armor, battery power, and coal endurance compatible with a displacement of 13,000 tons. The design of these ships was promptly taken up by the Bureau of Construction, and on May 27 the Chief Constructor presented to the Board on Construction five different scale designs for these vessels. On June 10, 1903, the Department adopted the report of the Board, which gave a preference to the design which is shown in the accompanying illustration, and the contract for the two vessels was ultimately let to the Cramp & Sons Company, of Philadelphia, where the vessels are now under construction.

Although we are not familiar with the features of the alternative designs which were submitted to the Board on Construction, it is evident that in the selection of the accepted design the Board was influenced by the desire to make the two ships conform, as far as possible, to the 16,000-ton battleships of the "Connecticut" class, to which they have been compared in language, more expressive than nautical, as "smaller editions." A difference of 3,000 tons in the displacement of two battleships is a large one, of course, and involves considerable sacrifice. If the reader will compare this illustration with views and detailed descriptions that we have given of the 16,000-ton "Connecticut," he will recognize at once most of the changes in battery and general appearance that have been made. In the first place, the length on the waterline has been reduced from 450 to 375 feet; the beam is about the same, 76 feet 10 inches for the "Connecticut" and 77 feet for the "Idaho;" and the respective drafts are 24 feet 6 inches for the "Connecticut" and 24 feet 8 inches for the "Idaho." From this comparison it looks as though the under-water body of the "Idaho" must be somewhat finer than that of the larger ship. A large saving has been made in the engine and boiler-room weights, the designed indicated horse-power being reduced from 16,500 in the "Connecticut" to 10,000 in the "Idaho." With this, there is a corresponding reduction in the space given up to the coal bunkers, the "Connecticut" carrying a maximum of 2,200 tons as against 1,750 tons on the "Idaho"; but, on the other hand, there is a marked gain in the steaming radius at 10 knots per hour, the smaller vessel being able to steam 5,775 knots as against 5,275 for the "Connecticut." The estimated speed on trial, however, of the "Idaho" is but 17 knots, or one knot less than that of the big ship.

A further reduction of weights, a very large one in itself, is gained in the lowering of the quarter deck. In the "Connecticut," the upper deck is continuous from stem to stern; in the "Idaho," it extends from the bow to the after end of the central broadside battery, at which point the freeboard is reduced by about 8 feet, or from say 21 to 13 feet. While there is a considerable loss of accommodation, this cutting down of the topsides is accomplished with a very considerable lowering of weights, and a consequent increase in stability. There is, however, a loss of "command" for the after pair of 12-inch guns. Still another reduction has been made in the absence of the mainmast, the new ships carrying only a foremast, as is the case with the "Oregon" class. A reduction has been made in the armament, which includes the removal of four 7-inch guns, eight 3-inch guns, six 3-pounders, and four 1-pounders. Not only is the weight of these twenty-two guns removed, but also the weight of their mounts, ammunition hoists, and large stores of ammunition.

The battery consists of four 12-inch guns, eight 8-inch guns, eight 7-inch, twelve 3-inch, twelve 3-pounders, eight 1-pounders, two 3-inch field guns, two machine guns, and six Colt automatic guns. The 12-inch guns are carried above two main barbettes, protected with armor varying from 10 inches to 6 inches in thickness, the turret armor varying from 12 inches to 8 inches in thickness, the thinner armor of the barbettes being used in the lower portions, where the barbettes are protected by the armor plating of the ship. The 8-inch guns are carried in four barbette turrets at the four quarters of the ship, the turret armor being 6½ and 6 inches in thickness, and the barbette armor 6 inches and 4 inches in thickness, while that of the sub-barbettes, or that portion which lies behind the 7-inch protection of the ship's side armor, is 3¾ inches in thickness. Eight 7-inch guns are carried in a central broadside battery, which is protected by 7 inches of armor, and they are mounted in recessed ports with semicircular shields that fit closely the port openings. One and one-half inch transverse armor walls, or screens, project from the ship's side between each pair of guns, for the purpose of localizing the effects of bursting shell. The dozen 3-inch guns are mounted as follows: two forward in the bow in sponsons, four upon the upper deck, in broadside between the 8-inch gun turrets. On the superstructure deck are four more guns, two forward and two aft, while the remaining two are carried at each end of the main bridge. The three-pounders and machine guns are distributed through the bridges and in the tops. Two 18-inch Whitehead torpedo discharge tubes complete the armament of these very formidable vessels. The ships are protected at the waterline by a continuous belt of armor (and, by the way, all the heavier armor is of the cemented Krupp steel type), which is 9 inches in thickness at the top and 7 inches at the bottom in way of the machinery spaces, and this armor reduces toward the ends of the ship successively to 7 inches, 5 inches, and 4 inches in thickness. The ship's side from the main belt to the main deck is protected, for nearly two-thirds of the ship's length amidships, by a wall of 7 inches of armor, and there are athwartship bulkheads also 7 inches in thickness.

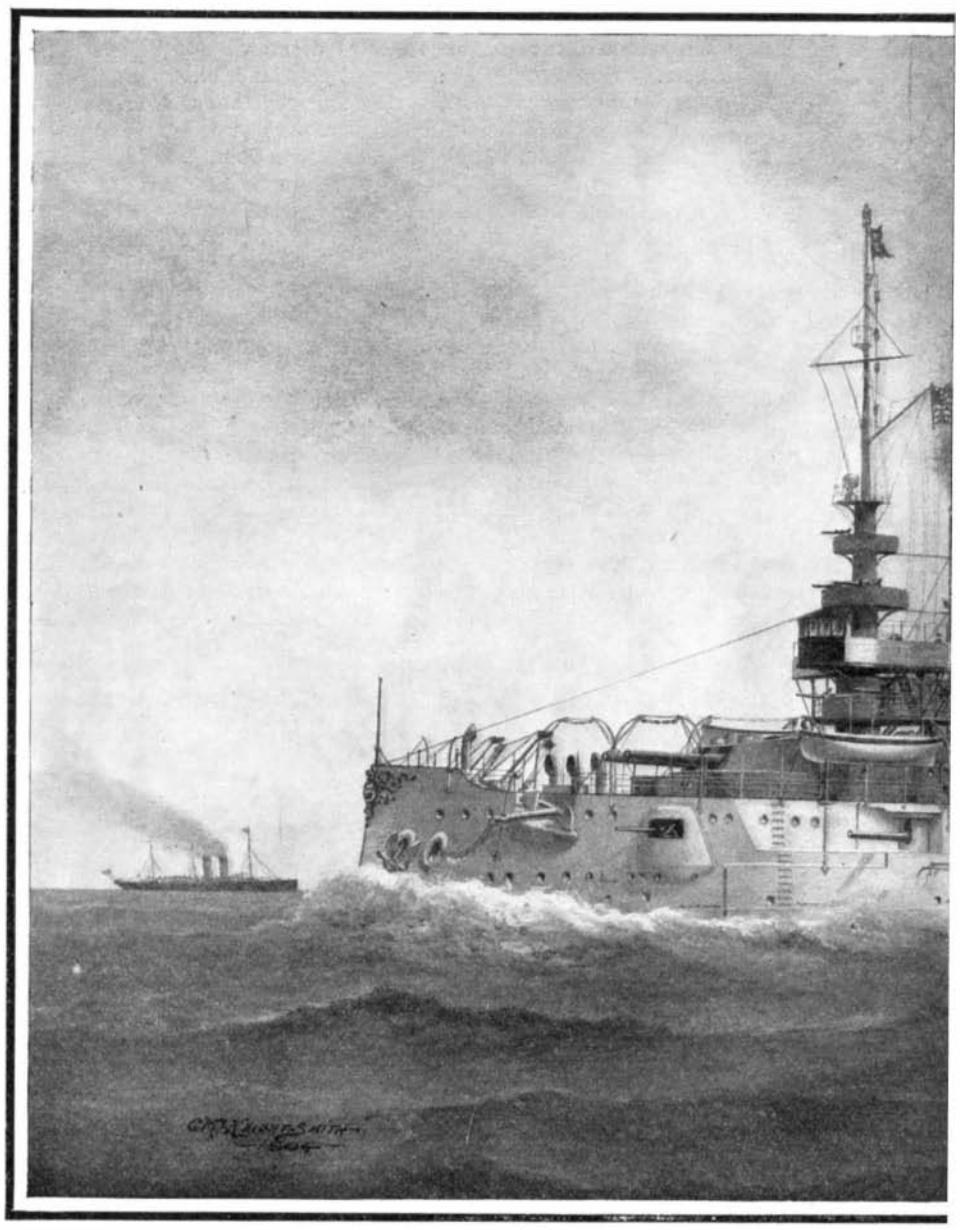
Now, although we consider it unfortunate that Congress should have limited the size of these two particular ships to 13,000 tons, preferring to have seen them of the same displacement and identical in all the features of speed, armor, and armament with the vessels of the "Connecticut" class that are now authorized or under construction, it must be admitted that the Bureau of Construction has turned out a most excellent design on a limited displacement; for the armor protection and the battery power of the "Idaho" and "Mississippi" are, we consider, fully equal to that of any of the largest of the foreign battleships that are at present being built. For their size they are the most effective battleships in the United States navy.

THE MODERN BATTLESHIP WITHIN AND WITHOUT.

On the cover of the present issue we present a striking illustration of the "Louisiana," the latest and largest of the United States battleships, with Admiral Farragut's famous "Hartford" introduced in the offing, to show the changes wrought in the past forty years. In the accompanying cut is shown in detail the interior of the "Louisiana." The ship carries four 12-inch, eight 8-inch, twelve 7-inch guns and a numerous battery of smaller pieces. She has a 12-inch belt, a 3-inch protective deck, and excellent protection for her batteries. Her speed is 18 knots. She is a sister ship to the "Connecticut," which was fully described in our issue of October 1, 1904.

The story of the complicated character of the interior of a modern battleship is one that has grown somewhat stale in the telling, and it is not the fault of the magazine writer and the occasional correspondent of Sunday supplements, if the general public is not satisfied that a great battleship or cruiser is complicated beyond the power of words to express.

In saying that the battleship is complicated we must be careful to remember that complication does not imply confusion; and that in all the practicable achievements of engineering, it would be difficult, if not impossible, to find a structure which, in spite of the many parts of which it is made up and the enormous elaboration of detail that it manifests, is really so harmoniously proportioned, or is better fitted to the ends for which it was designed. There are some subjects of which an illustration will tell more in five minutes

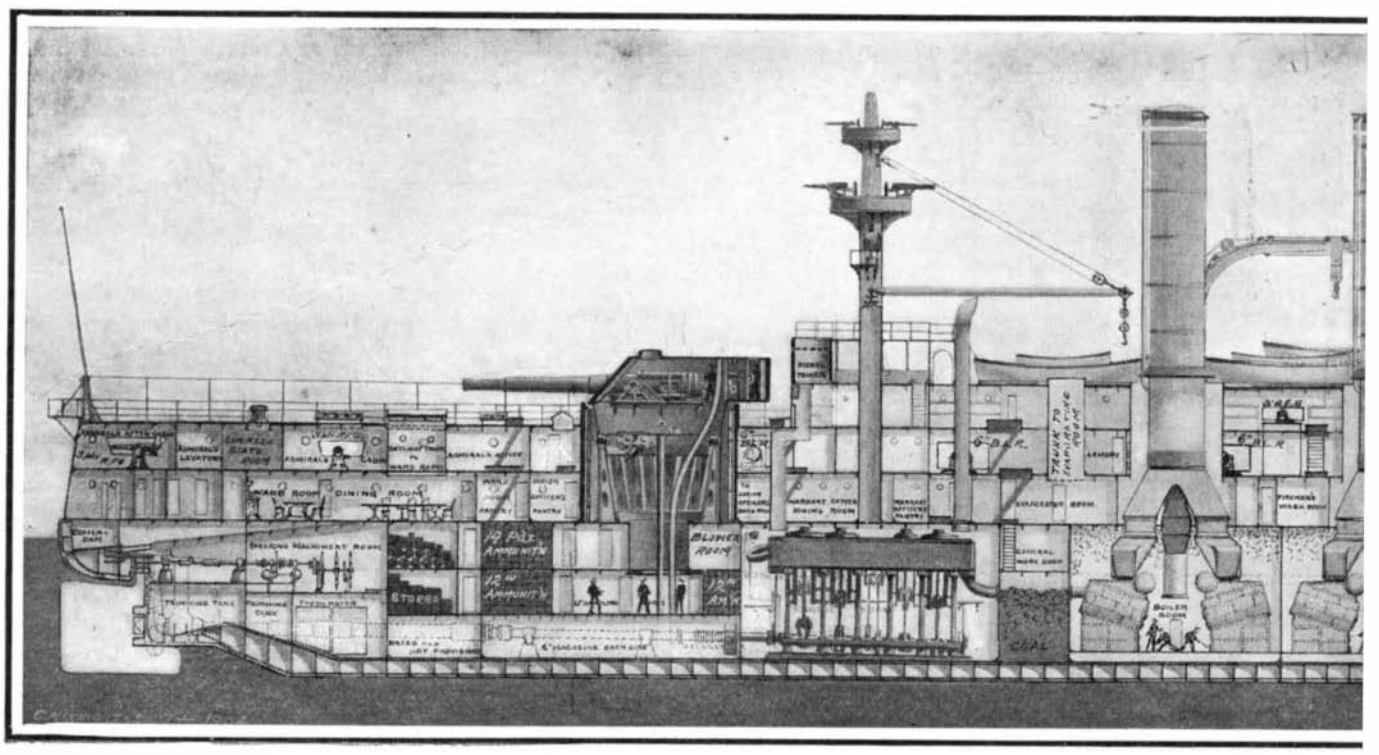


Displacement, 13,000 tons. **Speed,** 17 knots. **Coal Supply,** 1,750 tons. **Armor:** Belt, 9 inches t
Four 12-inch, eight 8-inch, eight 7-inch, twelve 3 inch, twenty

NEW BATTLESHIPS "IDAHO" AND "MISSISSIPPI,"

than tongue or pen can explain in an hour; and in presenting the accompanying view of the interior of one of the latest battleships of the United States navy, we shall not attempt to give any elaborate description of the vessel, but will leave it to the diagram to tell its own story.

The drawing is what is known as an inboard profile; that is to say, it is a vertical, central, longitudinal section through the whole length of the ship. The huge structure of which we thus obtain an interior view, is a little under 450 feet in length from the extreme tip of the ram to the end of the rudder. The foundation of the whole is the keel, which is nothing more nor less than a deep plate girder, 3 feet 6 inches in



LONGITUDINAL SECTION THROUGH THE BATTLESHIP "LOUISIANA," S