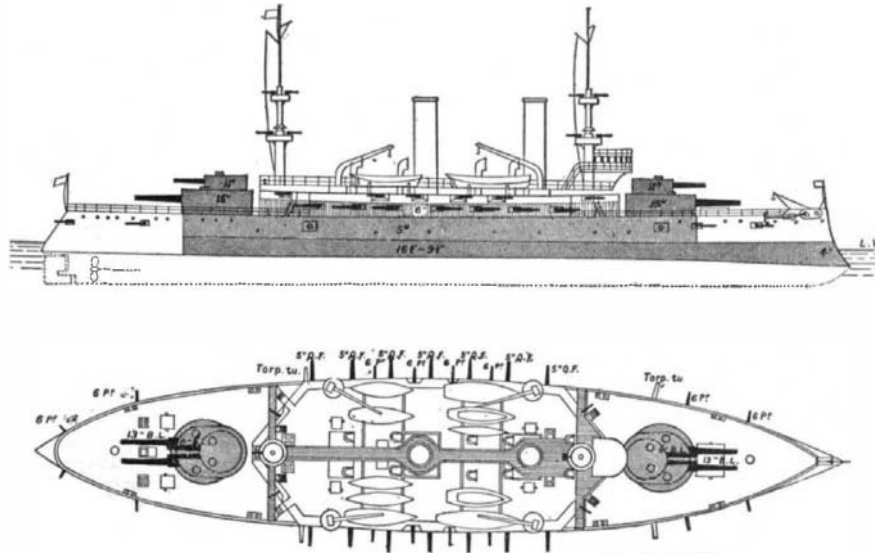


Why spend five years in building a 12,000-ton ship when, for the same cost, one could put afloat in one-fifth of the time a dozen fast little "dynamite cruisers," bearing the awesome name "Vesuvius," and each capable of sinking a battleship a minute by the simple expedient of tossing a quarter of a ton or so of dynamite aboard from her pneumatic guns? The Spanish war has passed into history, and with its passing was written the last chapter of the "dynamite cruiser" scare. It was a spectacular comedy, that midnight demonstration off Santiago Harbor, when the little craft was sent in to scatter "earthquakes" among the rocky bluffs of the Cuban coast. Later, on the morning of that memorable sortie from Santiago Harbor, the destroyers were the first to be destroyed, while it was a shell from the 13-inch gun of a battleship that caused the last of the fleeing enemy to strike colors and run for the shore.

The latest annihilator of the battleship and big armored cruiser is the submarine boat. Far be it from us to deny that this type of vessel may possess tactical and strategical possibilities, which it only requires the test of actual war to determine. Used in connection with a system of harbor defense the submarine will exert considerable moral, if not material, powers; and doubtless the possession of a few of these vessels by a blockaded port would cause the investing ships to keep continually on the move, while they would be the cause of much nervous strain and justified anxiety on the part of the enemy. But there is little likelihood that the submarine boat, any more than the torpedo shell, the ram or the torpedo-boat, will drive the big fighting ship from the high seas. The submarine boat, when submerged, is only less able to see the enemy than is a torpedo-boat at the surface when enveloped in the densest of fogs, and the impossibility of sighting the enemy, or keeping close touch upon his course, reduces enormously the chances of getting in the vital blow. We shall build submarines in greater or less numbers, but from the position of undue importance which they have taken at the appearance of the first successful type, they will be relegated, like all previous "annihilators," to their

proper subsidiary position among the fighting units that go to make up the navy as a whole. So, too, with the dirigible torpedo controlled by aerial impulses, of which we are beginning to hear again, and of which we shall doubtless hear much more in the near future. It is certainly awe-inspiring—this vision of a solitary operator, sitting secure on some headland point on shore, or within his armored station on a ship, controlling by the magic Hertzian waves the course of a



Gun and Armor Plan; "Kearsarge" and "Kentucky."

little death-dealing torpedo craft, and delivering its torpedo with unerring aim at the unsuspecting enemy. An ideal device, were it but practical; which in the nature of things it never will be, except under such a favorable conjunction of wind, weather and motionless ship, as one might wait for throughout a whole naval campaign and never secure.

There has been much evolution but no revolution in the deliberate growth of the fighting ship to its present size and power; and to the navy that can concentrate in greatest numbers the combination of a big ship, well-protected guns, a steady platform, a true eye, a quiet nerve, unflinching courage, and faultless discipline will the victory of the future belong.

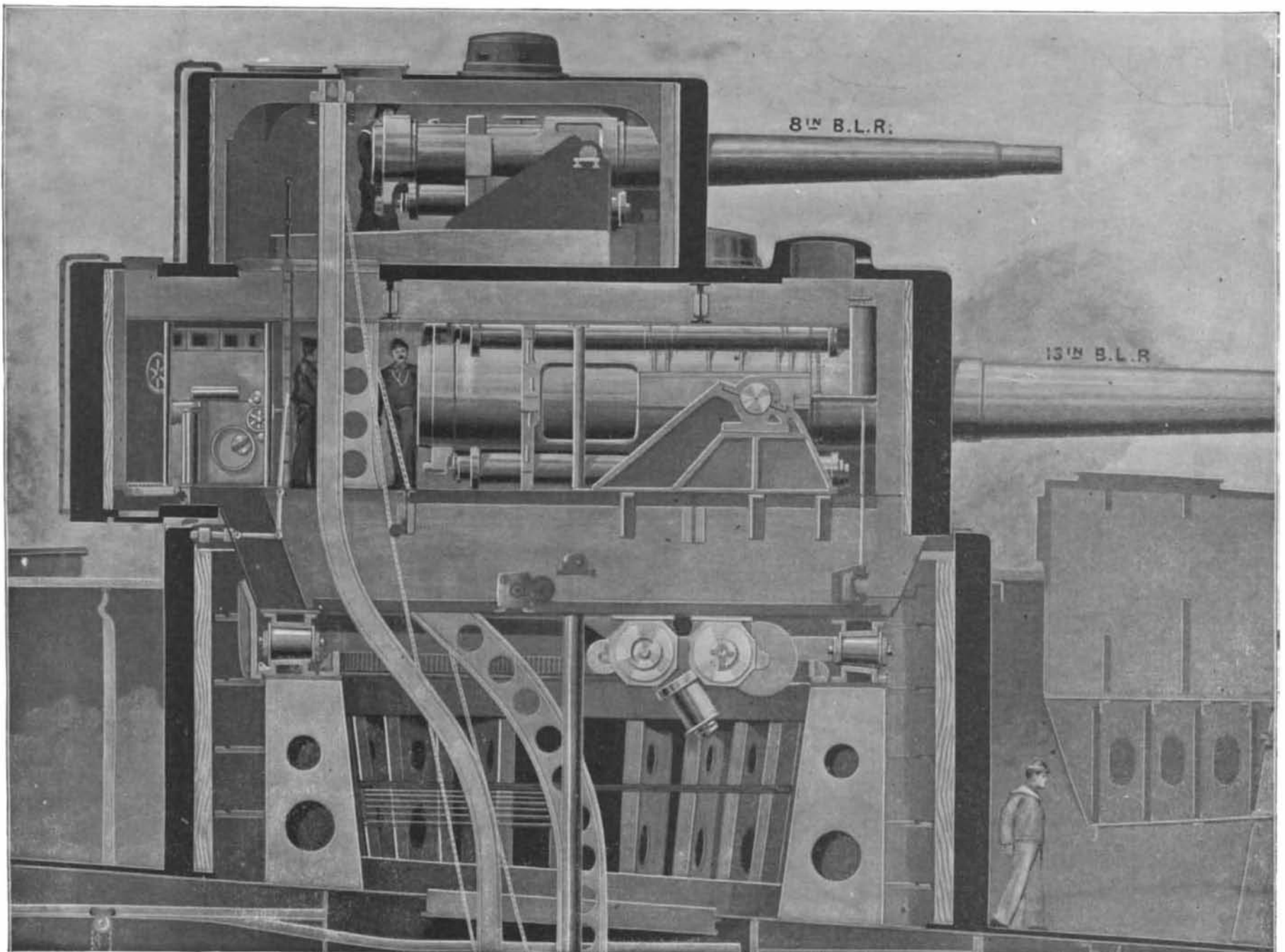
Battleships.

BATTLESHIPS "KEARSARGE" AND "KENTUCKY."

The first addition to be made after the close of the Spanish war to our small fleet of battleships (we had but four first-class battleships in commission during the struggle) consisted of two sister ships, the "Kearsarge" and "Kentucky," of about the same displacement and speed as the "Iowa," but differing radically in their armament from that vessel.

The most novel feature of the "Kearsarge" was the introduction of the now-famous superposed turret, over which there has been waged one of the most strenuous controversies of modern times. The object aimed at in this device is the securing of the greatest possible arc of fire for the various guns, and particularly for the 8-inch rifles. It was considered that by dispensing with four of the eight 8-inch guns as installed on the "Oregon," and placing the remaining guns and turrets on the roof of the 13-inch gun turrets, there would be the same concentration on either beam and also a dead-ahead and dead-astern fire, which would not be accompanied with any inconvenience to the 13-inch gun turrets. There would thus be a complete saving of the weight of four guns, two 8-inch turrets, and the necessary ammunition hoists, turning gears, etc. The idea of the double turret was from the first very strongly opposed by the Naval Bureau of Construction, both on structural and military grounds, an opposition which has at last succeeded in excluding the system altogether from our latest battleships.

Briefly stated, the structural objections are: The concentration of weight so near the ends of the vessel, tending to impair her seaworthiness; the risks in docking due to this concentration; the complication involved in concentrating at one point the large ammunition supply necessary for the four guns, and in the juxtaposition of the four ammunition hoists and the necessary power to work them; and last, and perhaps the chief of all, the abnormal stresses to which the substructure of the double turrets would be subjected from the simultaneous recoil of four heavy



LONGITUDINAL SECTION THROUGH BARBETTE AND SUPERPOSED TURRET OF BATTLESHIP "KENTUCKY."

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Displacement, 11,540 tons. **Speed,** 16.9 knots. **Bunker Capacity,** 1,591 tons. **Armor:** Belt, 10 $\frac{1}{2}$ inches to 4 inches; turrets, 15 inches to 17 inches; barbettes, 15 inches; deck: flat, 2 $\frac{3}{4}$ inches, slopes, 3 inches to 5 inches. **Batteries:** Four 13-inch B. L.; four 8-inch B. L.; fourteen 5-inch R. F.; twenty 6-pounders; eight 1-pounders; four Colts; two 3-inch field guns. **Torpedo Tubes,** 4. **Complement,** 589.

FIRST-CLASS BATTLESHIP "KENTUCKY." SISTER SHIP, "KEARSARGE."—[See page 375.]

guns. These difficulties, however, have been cleverly met and removed.

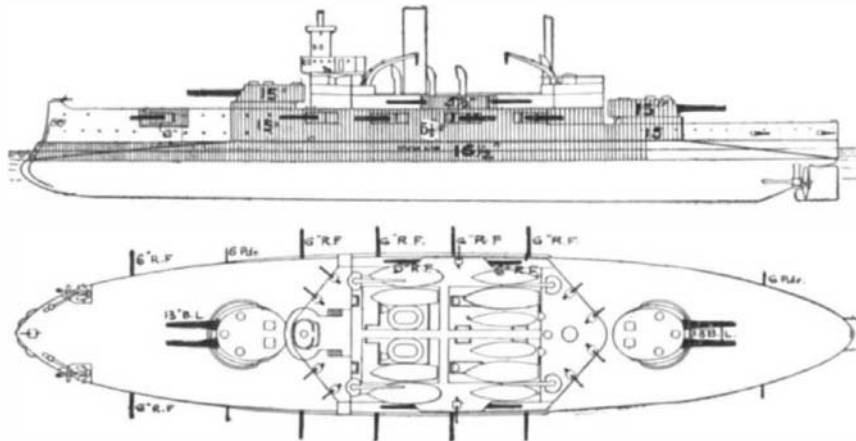
The military objections, summed up, are as follows: First, the danger of all four guns being disabled by one successful shot; secondly, the reduction in the number of separate 8-inch gun positions, as compared with the "Oregon" type, and the attendant danger that in the last stages of a hard-fought action no 8-inch fire would be available on account of disablement; thirdly, the lack of mobility in the 8-inch guns, arising from the fact that they must be trained with the 13-inch guns beneath them, whereas it might be desirable to use the heavy guns on one portion of the ship and the lighter guns on some other; fourthly, the disconcerting effect upon the sighting of the other three guns in the turret by the sudden firing of the fourth gun, necessitating, as it probably would, the resighting of those pieces; and, lastly, the risk of intrusting the training of four great guns to the skill of a single individual.

The protective deck, which in the "Kearsarge" is 3 inches thick, is indicated in the sectional view herewith shown by the full black line at the bottom of the cut. Immediately upon it is built up the great circular wall of the barbette, which extends vertically to a few feet above the main deck of the vessel and is protected by 15 inches of armor. Immediately behind this armor is a backing of oak timber, which in its turn is backed up by the heavy steel framing of the barbette. Within the barbette, and at a height of about 8 or 10 feet above the protective deck, is a massive circular track, upon which is carried, and upon which rotates, the massive double turret, the rollers upon which the turret turns being clearly shown in the engraving. Just inside of the circle of rollers, and bolted to the circular table on which the track is placed, is a large circular rack, which is engaged by the turning gear with which the turret is operated. The power for turning the turret is supplied by two 50-horse power electric motors, which are located below the floor of the 13-inch turret. These motors revolve in the same direction, both driving through bevel gears a horizontal shaft which runs across the turret. The shaft carries at one end a right-hand and at the other end a left-hand worm, each of which engages with a worm wheel at the top end of a vertical shaft. At the lower end of the vertical shaft of each of the worm wheels is a pinion which meshes with the circular rack inside the barbette, thus driving the turret.

One 20-horse power motor is located under the

central girder of the turret for the operation of each of the 13-inch ammunition hoists, the arrangement being shown in the illustration. Each 8-inch ammunition hoist is worked by a 6-horse power motor, and there are also special motors for elevating the 13-inch guns and for working the rammers which are located to the rear of the breech of these guns.

It will be noticed that whereas the front wall of the 13-inch turret lies within the circle of the barbette, the rear wall extends several feet beyond it. This is due to the fact that the section is taken on the longer axis of the turret, which is elliptical in shape, this form being better suited to the movements of the gun crews, reducing the unoccupied space at the sides and giving more space to the rear of the guns where it is needed.



Gun and Armor Plan; "Alabama" Class. "Alabama," "Wisconsin," "Illinois."

The elliptical turret is otherwise known as the balanced turret, the weights being so adjusted that there is practically no excess of load on any part of the turntable. The front walls of the turret are 17 inches in thickness, decreasing to 15 inches at the sides and rear.

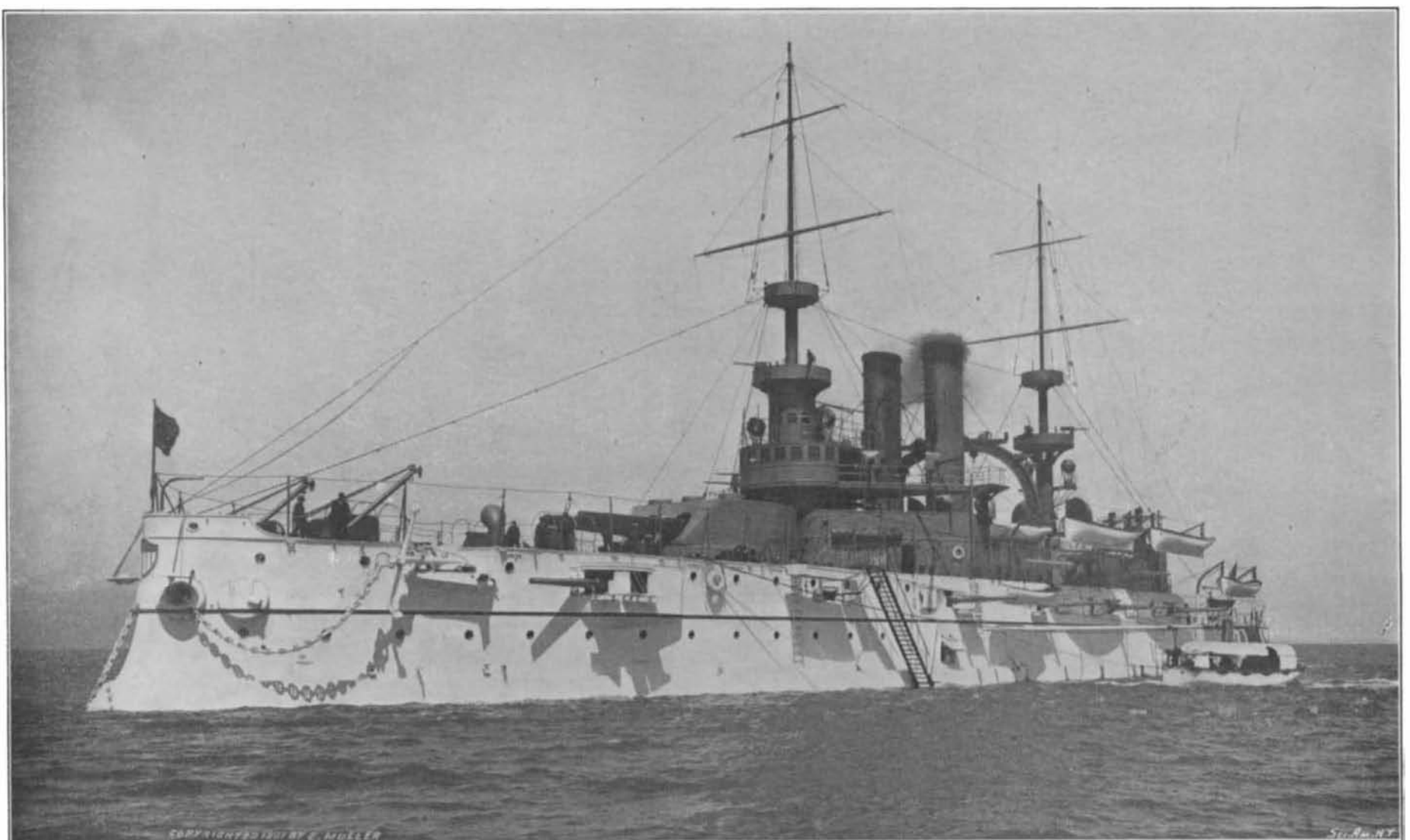
As compared with the "Oregon," the "Kentucky" is 20 feet longer on the waterline, and has 3 feet more beam, 6 inches less draft and 1,252 tons more displacement. Her maximum coal supply of 1,591 tons of coal is about the same, and she has the same speed, 16.8 knots per hour. Her waterline belt, however, is carried up to the stem, tapering from 16½ inches amidships to 4 inches at the bow. The "Oregon" is unprotected at the waterline from the forward barbette to the stem and from the after barbette to the stern. Amidships the belt is 16½ inches at the top edge, 13½ inches at the waterline and 9½ inches at the lower edge. Above the waterline belt is a wall of 5-inch armor, extending to the gun deck. Upon the

gun deck is located a broadside battery of fourteen 40-caliber 5-inch rapid-fire guns, and the whole battery is protected by 6 inches of armor with 2-inch steel bulkheads between each gun. At the barbettes transverse bulkheads extend across the vessel, protecting the central portion of the vessel from raking fire. At the level of the waterline these bulkheads are 10 and 12 inches in thickness; on the berth and gun decks they are 5 and 6 inches thick. The armor on the barbettes is 15 and 12½ inches, on the lower turrets 15 and 17, and on the upper turrets 9 and 11 inches in thickness. At the level of the top edge of the waterline belt will be a 2¼-inch protective deck, which will be thickened to 3 inches forward to the bow and 5 inches aft to the sternpost, the deck abaft the after barbette being increased in thickness to compensate for the absence of waterline protection.

The "Kentucky" and "Kearsarge," which were built at Newport News, are among the handsomest battleships afloat, and although the freeboard of 14 feet is low and the 5-inch gun is too light for the perforation of 6-inch armor except at rather close ranges, they are most serviceable ships and a valuable addition to our navy. At some future day we look to see the superposed turrets removed, the 8-inch guns emplaced in sponsons at the four corners of the broadside battery, and the fourteen 5-inch replaced by ten 6-inch rapid-fire guns.

"ALABAMA" CLASS—FIRST-CLASS BATTLESHIP "WISCONSIN."

On June 10, 1896, Congress authorized the construction of three first-class battleships, which have recently been completed and are known as the "Alabama," "Wisconsin" and "Illinois." The first named was constructed at the Cramps' Shipyard, the "Illinois" at the yard of the Newport News Shipbuilding Company, and the "Wisconsin," which is herewith illustrated, was built at the Union Iron Works, San Francisco. These fine vessels introduced a type of battleship that seems likely to become the standard type for the United States navy. Several new features are introduced in these ships, among which we may mention a change in the framing, the main frames being continuous from the keel to the armor shelf, and from the armor shelf to the upper deck. The longitudinal frames are built on a system which gives special stiffness and rigidity to the floors of the vessels, and reduces the liability to damage in grounding and docking. Special docking keels have been provided, these last being a great safeguard against undue strains when the ship is taking



Displacement, 11,653 tons. Speed, 17½ knots. Bunker Capacity, 1,310 tons. Armor: Belt, 16½ inches to 4 inches; turrets, 14 inches; barbettes, 15 inches; deck, flat 2¾ inches, slopes 3 inches to 4 inches. Batteries: Four 13-inch B. L., fourteen 6-inch R. F., sixteen 6 pounders, six 1-pounders, four Colts, two 3-inch field guns. Torpedo Tubes, 4. Complement, 530.

FIRST-CLASS BATTLESHIP "WISCONSIN." ALSO "ALABAMA" AND "ILLINOIS."