

THE TRIAL TRIP OF THE ARMORED CRUISER "COLORADO."

The successful trial trip of the new armored cruiser "Colorado" over the Cape Ann course, in which the vessel averaged 22.24 knots an hour, marks this vessel as the fastest armored warship in the United States navy. Previously, the armored cruiser "Brooklyn," with a trial speed of 21.91 knots an hour, was the fastest vessel carrying side armor. The favorable outcome of the trials is particularly gratifying to navy officials, for the reason that the "Colorado" was the first to be put to the test of a large class of sister vessels in which are included, besides the "Colorado," the "Maryland," "Pennsylvania," "South Dakota," "California," and "West Virginia." That all of these vessels will have no difficulty in making their contract speed of 22 knots is further suggested by the trials held November 2 of the "West Virginia," which averaged 22.14 knots in running twice over the same course of 44 miles.

The "Colorado" is unquestionably the handsomest ship in the United States navy, and what we say of her in this respect, of course, applies to all six ships of her class. In the first place, because of her great length, she has much of the long, rakish appearance of a transatlantic liner. Indeed, as a matter of fact, she is longer than the famous Cunard liners "Umbria" and "Etruria," which were, at one time, holders of the transatlantic record. These vessels are just 6 inches shorter over all than the "Colorado," whose length over all is just 502 feet. In beam she greatly exceeds the "Umbria," measuring 69 feet 6½ inches as against 57 feet 2 inches; but her mean draft is, of course, considerably less, being 24 feet 1 inch, as against say 28 feet for the liner. When she is fully

does not express the absolute limit of the speed of the "Colorado," for on the trip from Philadelphia to New York, she indicated as high as 25,000 horse-power, and the speed rose to near the 23-knot mark.

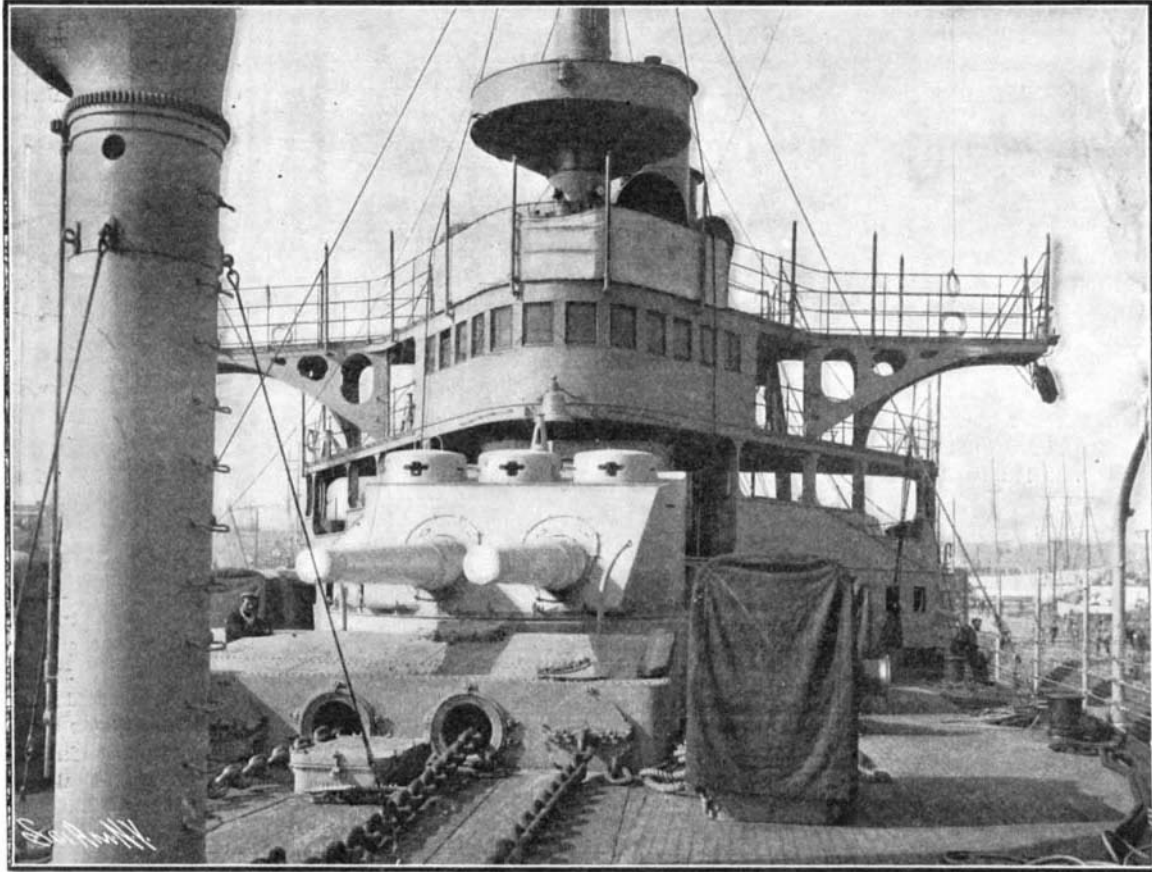
The protection of the "Colorado" consists of a complete waterline belt, 7 feet 6 inches deep, which has a maximum thickness of 6 inches amidships and thins down to 3½ inches at bow and stern. Associated with the vertical belt is a continuous protective steel deck, which on the flat portions is 1½ inches in thickness, and on the slopes has maximum thickness of 4 inches, which is equivalent to at least 6 inches of vertical armor. If to this be added the protection afforded by the coal in the bunkers, representing an equivalent of a few inches more of armor, we have a total resisting power equivalent to, say, 14 or 15 inches of vertical armor, so that the shells, even of the heavier guns

These reach back far enough to afford very efficient protection against the fragments of bursting shells that may enter from the side on which the particular batteries are placed.

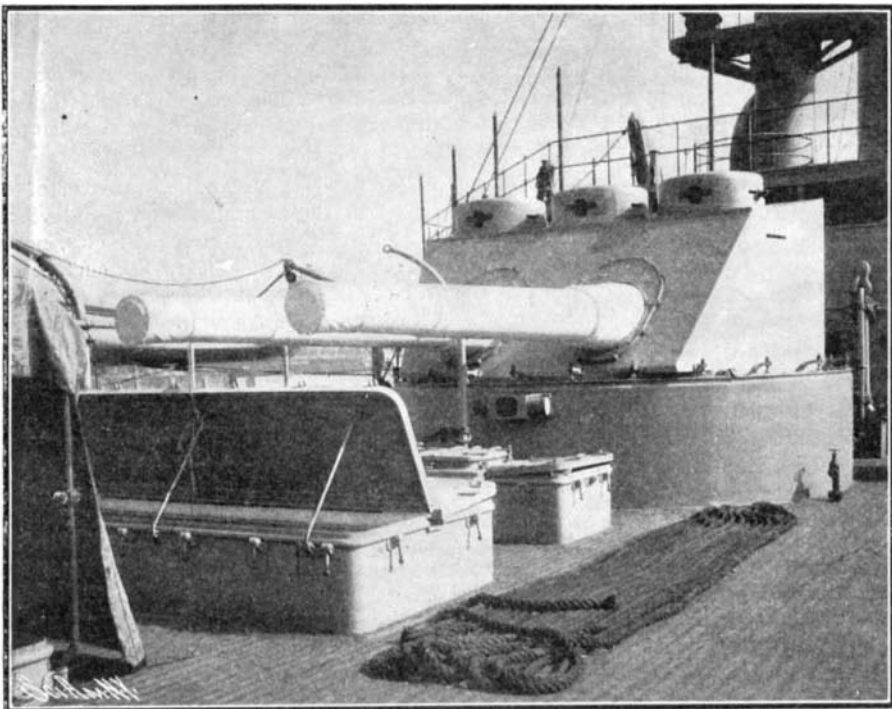
The main deck extends flush throughout the whole ship, and upon this deck, above the four corners of the 6-inch battery, there are four casemates with 6 inches of protection, in each of which is mounted a 6-inch 50-caliber gun, capable of firing from abaft the beam to dead ahead or dead astern, the total arc of fire being 150 degrees. Between the 6-inch guns on each broadside on this deck are mounted four 3-inch 50-caliber guns, and on the gun deck are eight other 3-inch guns, four firing through casemates at the bow and four at the stern of the ship. The conning tower is protected by nine inches of armor, and the signal tower aft by 5 inches. The main armament of this fine

vessel consists of four of the new 45-caliber, 8-inch, high-velocity rifles, mounted two forward and two aft in barbette turrets, the turrets being protected by 6 inches of armor with front port plates 6½ inches in thickness. The turrets are mounted above shallow barbettes, and armored ammunition tubes pass down from the barbettes to the ammunition rooms below the protective deck.

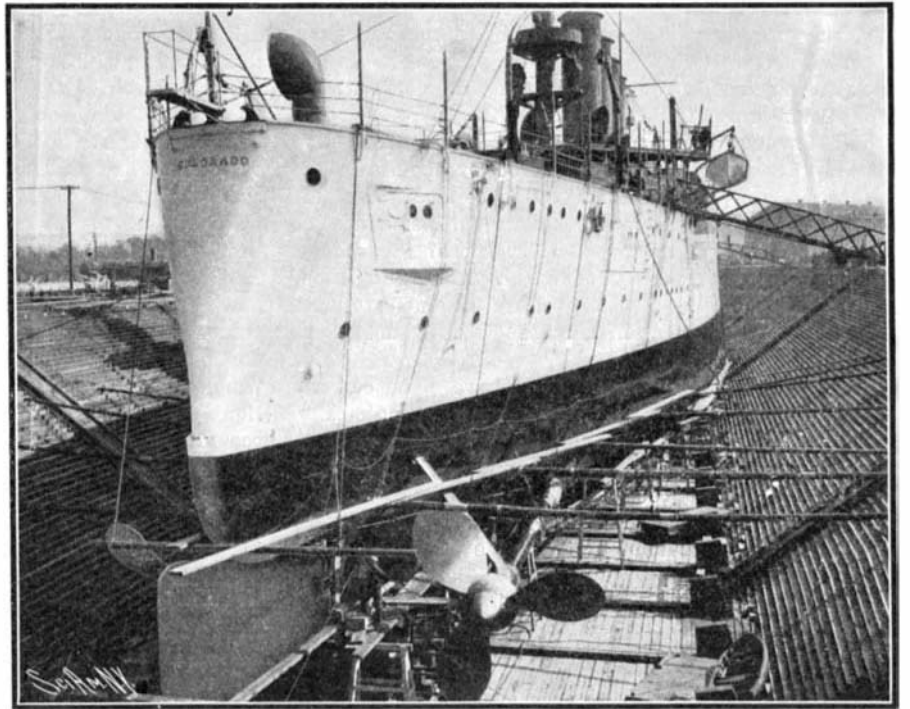
The important question of ammunition supply has been carefully worked out, and the guns are provided with the latest patterns of electric hoists, designed especially for our own warships. The guns in the main battery are electrically controlled. The electric hoists are capable of supplying two projectiles per 8-inch gun per minute; and for the 6-inch guns three projectiles per gun per minute, which is amply sufficient for the speed of fire that will be obtained during the stress of battle, when constantly-



VIEW LOOKING AFT FROM BOW OF "COLORADO," SHOWING BRIDGE AND FORWARD PAIR OF 8-INCH GUNS.



VIEW ON QUARTER DECK, SHOWING AFTER PAIR OF 8-INCH GUNS.



STERN VIEW OF ARMORED CRUISER "COLORADO."

equipped for a cruise, and is carrying a normal coal supply of 900 tons, the mean displacement of the "Colorado" is 13,680 tons; but when her bunkers are filled to their full capacity of 2,000 tons, and the vessel carries her maximum supplies of stores and ammunition, her displacement is 15,138 tons, which is not so very far short of the displacement of the crack transatlantic liners "Campania" and "Lucania."

The "Colorado" is driven by twin-screw, vertical four-cylinder, triple-expansion engines, whose contract horse-power is 23,000, steam being supplied by thirty Niclausse water-tube boilers with a total grate area of 1,600 square feet and a total heating surface of 68,000 square feet. During the trial trip, the engines worked with remarkable smoothness and absence of heating, a clear indication of accurate workmanship both in the shops and by the erecting gangs. The average speed of 22.24 knots for the whole course of 88 miles

of the enemy, should find it difficult to penetrate to the boiler or engine rooms and magazines, except at the nearer ranges, and then only if the hits were made normal to the side of the ship. For about a third of the length of the vessel amidships, a wall of 5-inch armor is carried up to the level of the main deck, that is through the height of two decks, with athwartship bulkheads of 4-inch armor joining the ends of these side walls. Within this central battery, and mounted on the gun deck, five on each side, are ten 6-inch 50-caliber guns. They fire through recessed casemates, and are provided with semicircular shields fitting with a slight clearance against the casemate opening, the protection to the guns thus being very complete against shells of 6-inch and even heavier guns. To localize the destructive effects of projectiles that may enter the battery and burst inside, screens of 2½-inch steel extend inboard from the outer wall of armor.

changing ranges and the many distractions of the fight will render impossible the high rates of fire which have been obtained with the same guns during target practice. The normal ammunition supply consists of 83 projectiles for each 8-inch gun, 132 for each 6-inch, and 166 for each 3-inch gun, the weight of the normal supply of the ammunition for all guns combined being about 700 tons. An interesting fact is that the total weight of armament on this ship is 2,219 tons, and the total weight of the machinery 2,100 tons.

As viewed in drydock at the Brooklyn navy yard, New York, previously to her trials, the "Colorado" made a very favorable impression. The contour and general proportions, although they are dictated, of course, by purely military considerations, nevertheless are, to the nautical eye, very harmonious and convey an instant impression of speed and power. The armament, according to the latest ideas, is somewhat

light for a ship of this displacement, the defect, if such it may be called, having been remedied in the latest ships of the "Washington" type, which will carry not only more and heavier armor, but a much more powerful armament. A careful inspection of the "Colorado" shows her to be apparently an excellent shipyard job; and there is no doubt that if this good work prevails through every ship of this class, the United States navy will receive a most valuable addition to its fighting power.

NOTABLE ST. LOUIS AIRSHIPS.

The newspapers within the last two weeks have had occasion more than once to comment upon the successful experiments conducted at the Louisiana Purchase Exposition with the Baldwin and Benbow air-

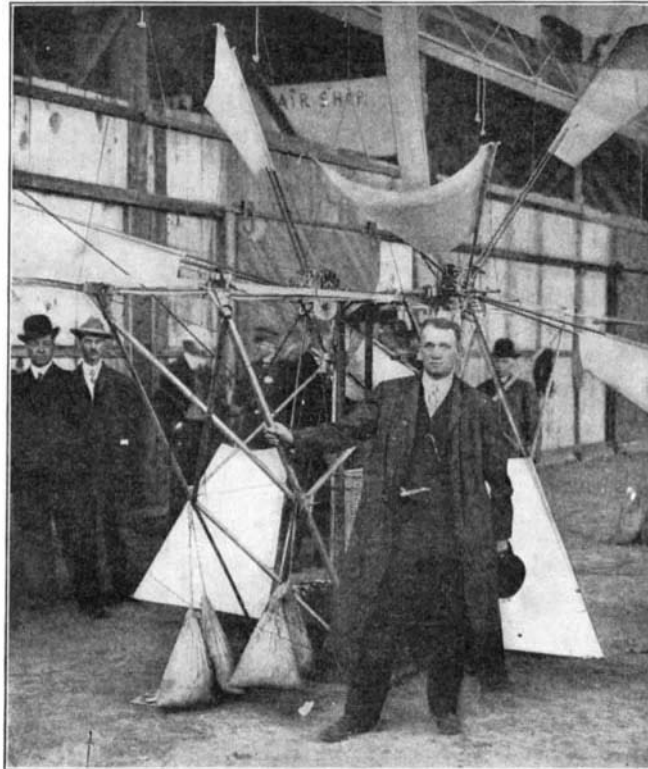
ships, both of them craft built on the well-known lines followed by Santos Dumont. He succeeded in alighting without injury to himself or to the machine. The second attempt, which was made on October 13, was still more successful. After circling in every direction at a height of 2,000 feet above the Cascades, the aeronaut returned to the place from which he started, covering 3½ miles, part of the way against an 8-mile wind. On the return trip the airship sailed slowly over the exact spot from which it had risen twenty-eight minutes previously, and glided about 100 feet farther west, where it alighted. The vessel in this breeze seemed to answer her helm well, and seemed to be under perfect control.

On November 1 a third successful flight was made, high above the western portion of the Exposition grounds, the journey ending in the Stadium, adjoining

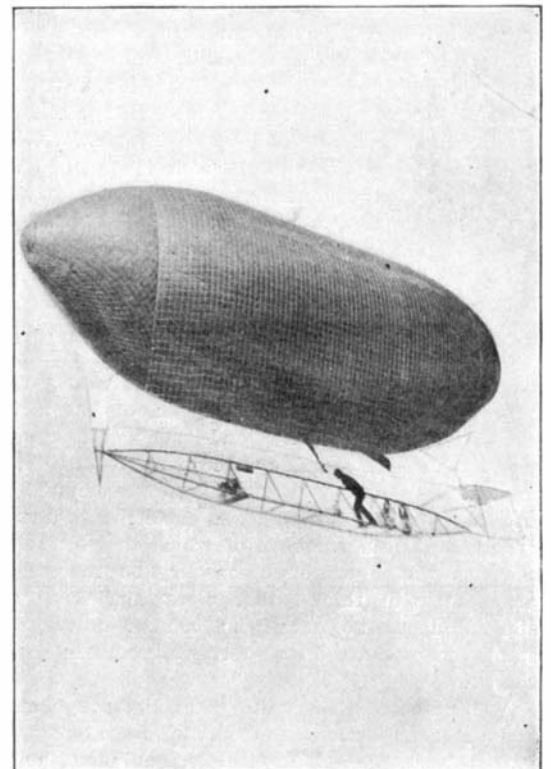
900 pounds. Directly beneath the central line of the gas bag, and attached to its cords, is a horizontal spar, made of steel with the exception of a short prolongation of bamboo aft, to which the rudder post is attached. To this rod is suspended a framework of aluminium suspended by steel rods and stiffened with piano wire. The car is prolonged fore and aft into long beaks, similar to and parallel with the main spar. It is divided into two compartments, the forward one containing a 10-horse-power gasoline engine, and the other a rectangular wicker basket in which the aeronaut stands. This arrangement, it will be observed, is rather similar to that adopted by Santos Dumont. The engine is kept cool by means of an electric fan. The propellers are geared to the engine by a belt and pulley. Each propeller is composed of four



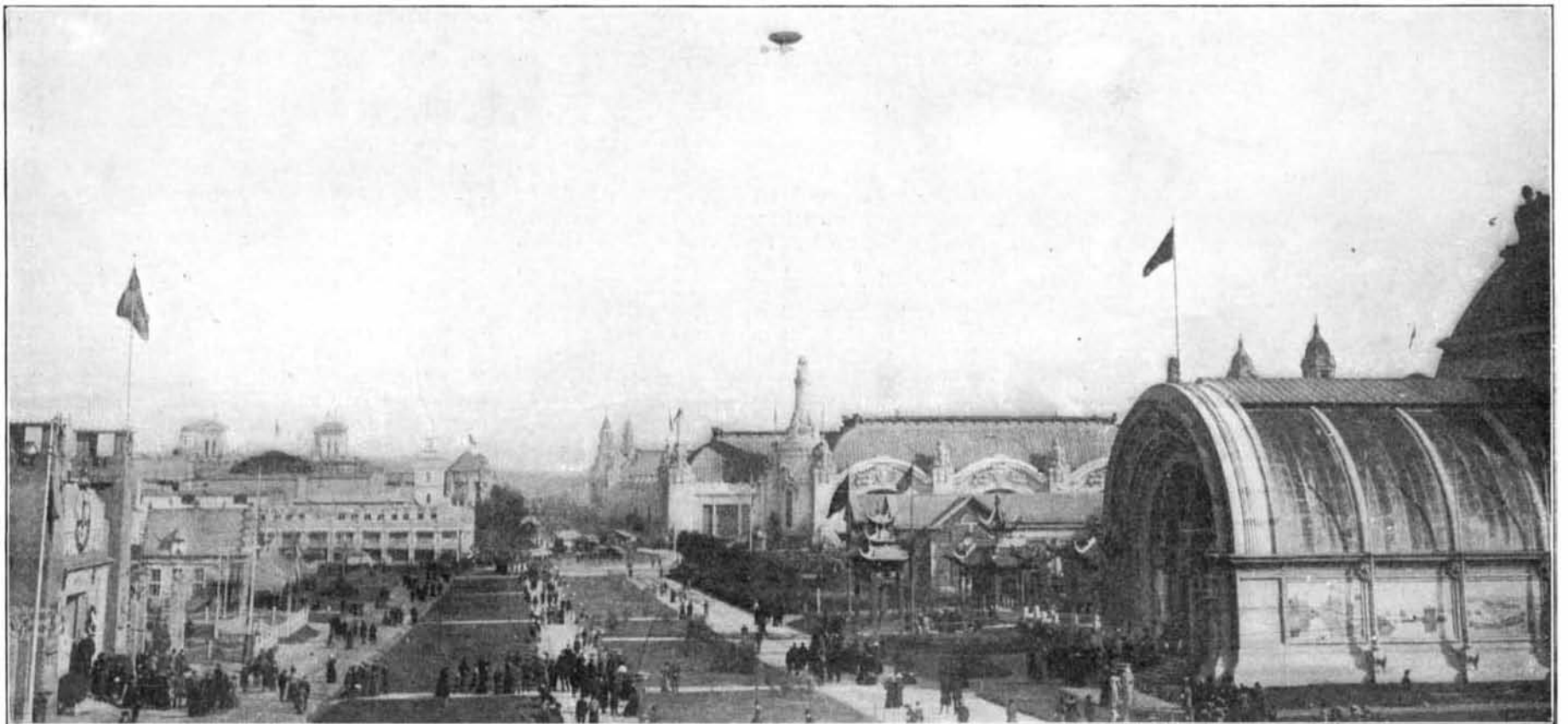
The Ascent of the Benbow Airship.



Benbow Standing Beside the Propelling Machinery of His Airship.



Baldwin's Airship Under Way.



Baldwin's Airship at a Height of 600 Feet Above the Exposition Palaces.

NOTABLE ST. LOUIS AIRSHIPS.

ships, both of them craft built on the well-known lines followed by Santos Dumont.

Baldwin's airship has been described with some fullness in these columns. For that reason it is necessary merely to give in this place a brief account of its performances. Manned by A. Roy Knabenshue, of Toledo, Ohio, its first ascent was marked by the execution of evolutions in a 10-mile northwest wind that rapidly increased to 18 miles. In the teeth of this breeze, the airship moved back and forth at a height of from 300 feet and upward over the Exposition grounds, and twice returned nearly to the point from which it set out. On the occasion of this first ascent, the spark of the gasoline engine failed to work, the propeller stopped, and the airship drifted helplessly in the wind. By shifting his own weight and by cleverly manipulating the rudder and ballast, the aeronaut succeeded in turning the craft around, and in raising and lowering

the Aerial Concourse. The airship rose to an altitude of 1,600 feet, and descended upon the exact spot where the aeronaut had decided to land.

The last trip of the Baldwin airship ended unfortunately. After two accidents the airship started, broke away, and went a long-distance flight on its own account. After the aeronaut had descended to repair an exhaust cap, the airship broke away. The airship was found later sixteen miles west of St. Louis. It was uninjured by its wild night flight except for two small rents in the gas bag.

Another airship of promise is that invented by a Montana man, Mr. T. C. Benbow, in collaboration with Mr. H. J. Wells. The Benbow dirigible balloon is constructed on somewhat different principles from Baldwin's. It is much larger, the cigar-shaped bag being 74 feet long and 21½ feet in diameter, having a capacity of 14,000 cubic feet and carrying a weight of

6-foot blades or wings, made of canvas stretched on bicycle tubing and braced with piano wire. The vanes are collapsible, and by an ingenious mechanical device are made to close up at each revolution, remaining open just long enough to seize and grasp the air, and presenting a minimum resistance while returning to the point of the greatest efficiency. An aerial propeller is thus constituted, not unlike the feathering paddle-wheels found on many river steamers. By this peculiar application Benbow hopes to obtain the motion of the human hand in swimming, the change of position of the vanes on the feathers of birds during flight being also imitated. The operation of the vanes may be modified by means of a crank placed conveniently to the hand of the navigator. These are to cause the vessel to ascend or descend at will. While vertical trimming is thus controlled by causing the opening and closing of the vanes to take place at

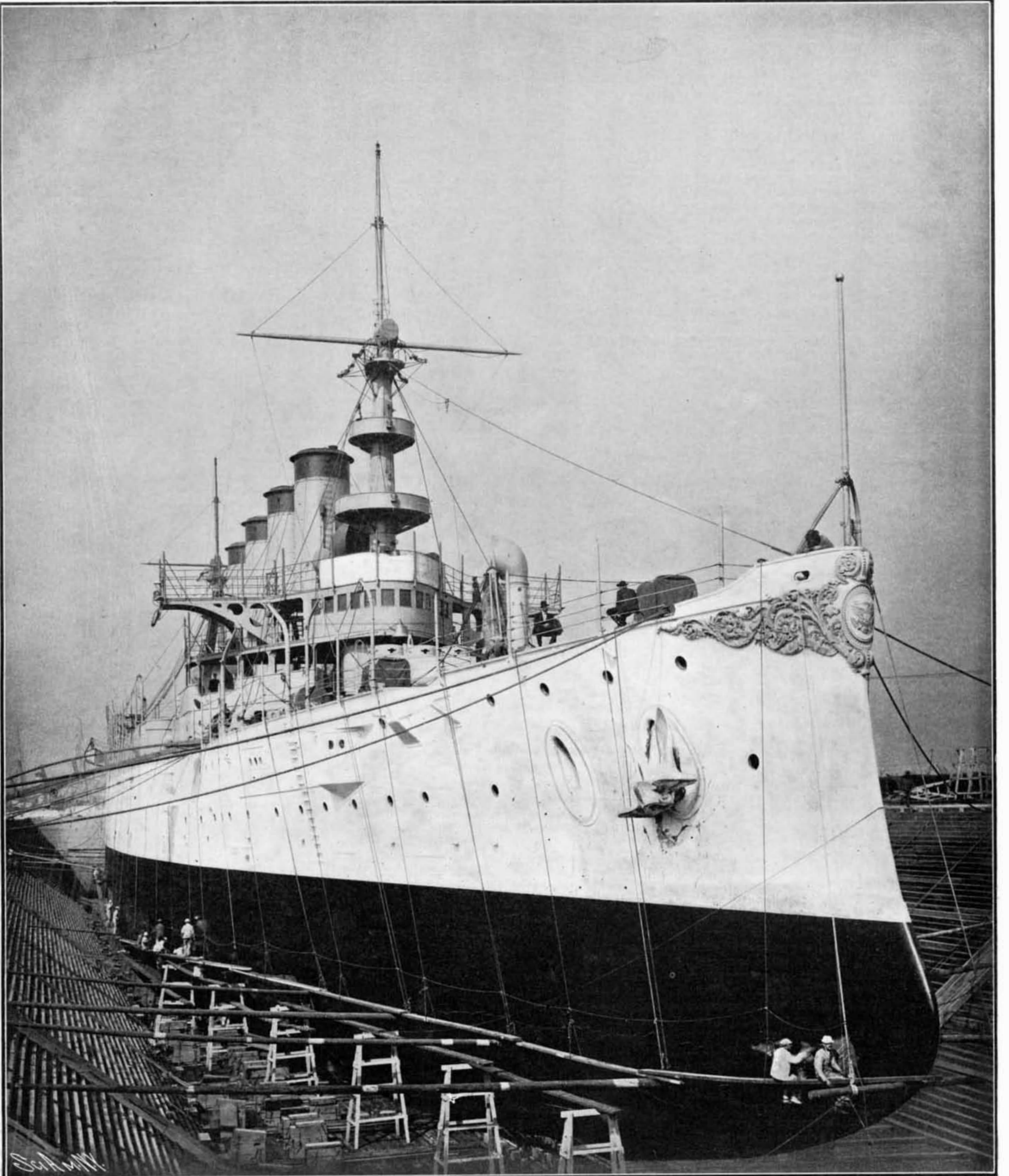
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Displacement, 13,680 tons. **Speed,** 22.24 knots. **Coal Supply,** 2,000 tons. **Armor:** Waterline belt, 6 inches to 8 inches; Deck, 1½ inches on flat, 4 inches on slopes; Battery, 5 inches; Casemates, 6 inches; Turrets, 6½ inches. **Armament:** Four 8-inch; fourteen 6-inch; eighteen 3-inch; twelve 3-pounders; sixteen smaller guns. **Torpedo tubes:** 2 submerged. **Complement,** 822.

The Sister Ship "West Virginia," on Her Official Trial, November 2, Averaged 22.14 Knots.

NEW ARMORED CRUISER "COLORADO" IN DRYDOCK AT THE BROOKLYN NAVY YARD.—[See page 336.]