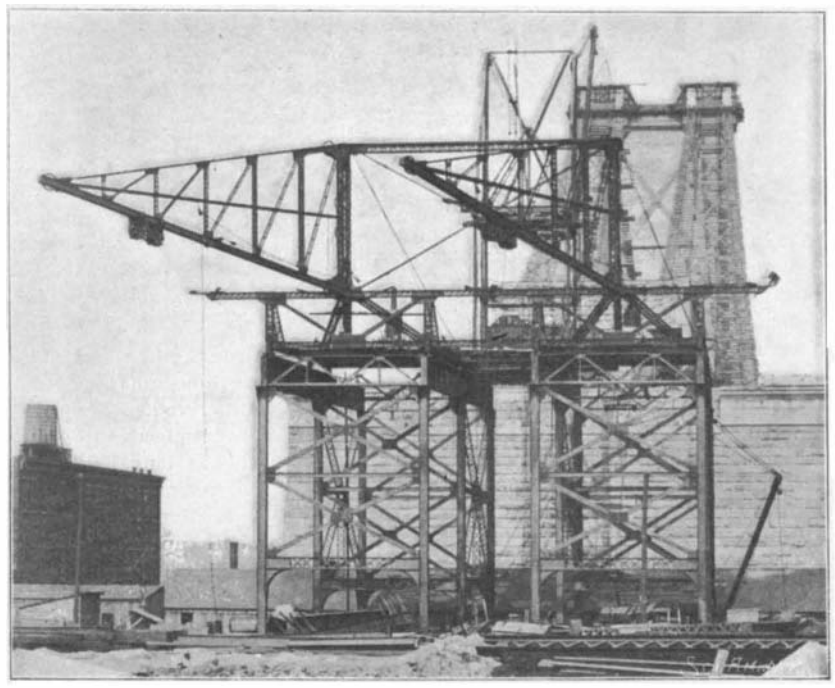
BUILDING THE APPROACHES OF THE NEW EAST RIVER BRIDGE.

The towers, cables and suspended roadway of the new East River Bridge are, of course, the most important part of that structure, and by virtue of their conspicuous position, are just now the most in the public eye; and yet it is a fact that, of the great elevated highway connecting Brooklyn with Manhattan, the portion which spans the East River is rivaled in extent and in the weight of materials that enter into it by the two great approaches by which the roadway is carried up from the street grade to the level of the tops of the anchorages. The approach on the New York side is 2,500 feet long, and calls for the delivery of no less than 12,000 tons of steel for its construction. The Brooklyn approach is 1,744 feet long, and the material in it will weigh 6,000 tons. Each of these structures would in itself be a notable work among the great bridge structures of the world, were they not eclipsed by the more daring and difficult suspended structure across the river.

On each side the approach consists of a massive viaduct 114 feet in width over all, with provision for travel on three separate decks or platforms. The lowest deck will carry the street railway tracks, of which there are four. This structure is carried upon four longitudinal rows of massive latticed columns, which are spaced 60 feet apart longitudinally. Every alternate pair of columns is braced to form an open tower construction. Upon the caps of the columns are four longitudinal lines of 62½-foot plate girders, and above the plate girders are placed the transverse floor-beams, which carry the street cars. These floor-beams are carried out beyond the columns to a distance of 13½ feet in the form of cantilever projections, which serve to carry the floor of the two roadways. Above the two inside lines of the girders above referred to, is constructed another viaduct with its columns spaced 22 feet 10 inches apart longitudinally, and above these columns are placed the floor-beams which carry the double-track elevated railway. This elevated railroad structure commences at the inshore end of the anchorages and descends on an easier grade than the platform for the street railway cars, which will have to be brought gradually down to the street surface on a three per cent grade. The elevated structure descends until it is at the proper elevation to connect with the elevated systems in Brooklyn and New York. Immediately below the elevated viaduct flooring, the supporting columns are strongly sway-braced, and beneath the sway-bracing is a platform for bicycles, the footwalks being carried at the level of the street-car tracks.

Our photograph shows an ingenious design of traveler by which the main portion of the viaduct up to the level of the street-car tracks is being erected. This traveler is seen in the foreground of the illustration with its two booms swung out over the adjoining foundations. Behind these, and standing upon the two interior lines of the columns, is a square timber tower which forms part of the derrick for erecting the elevated structure, this portion of the viaduct being built as the lower story is completed. The first traveler is a massive affair, weighing 70 tons. Its overhang is sufficient to enable it comfortably to cover one panel or 62½ feet of the viaduct. Its floor platform is 60 feet in length by 87 feet wide. At the front of the platform is a transverse riveted truss 10 feet in depth, and above this truss, at two of the panel points, rise the two extensions of the vertical posts which form the masts for two triangular booms, each 75 feet long and 30 feet in depth at the masts. The masts are tied together at the top by a horizontal latticed strut, and the top of each mast is also guyed back to the longitudinal sills of the traveler platform. The whole traveler is carried on a dozen double-flanged wheels, three beneath each longitudinal member of the platform. When the traveler is in operation, it is wedged up clear of the forward wheels, and the front transverse girder is thus given a solid bearing upon the completed portion of the viaduct. Each of the booms can swing through an arc of 180 deg. and upon the lower flange of each is a trolley which is capable of lifting a 20-ton load. With this traveler, the heavy material of the viaduct, including the longitudinal plate-girders and floor-beams, can be expeditiously lifted and swung into position, ready to be bolted up for the riveters.



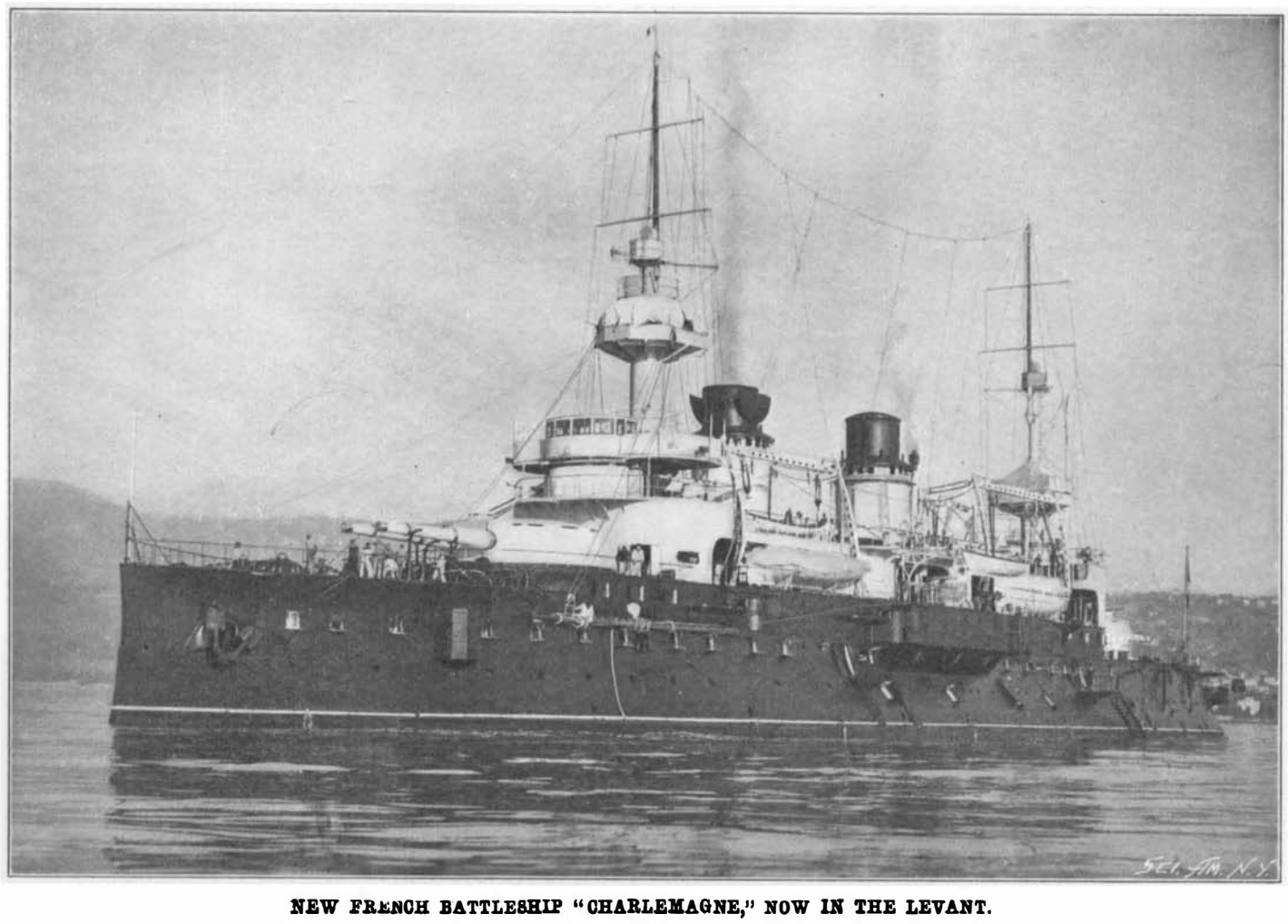
SEVENTY-TON TRAVELER ERECTING THE BROOKLYN APPROACH TO THE NEW EAST RIVER BRIDGE.

The rear traveler which, as we have shown, follows along behind the front traveler as the first story of the viaduct is completed, consists of a tower 40 feet high with two boom derricks at the top, each of which swings a 54-foot boom. With this plant the bridge erecters are making good progress, and the indications are that the approaches will be complete by the time the great suspended span is ready for opening.

FRENCH FIRST-CLASS BATTLESHIP "CHARLEMAGNE"

Among the powerful ships of the French Mediterranean fleet which has gathered in the Levant to enforce the demands of the Republic upon the Sultan of Turkey, the latest and most powerful are the three identical first-class battleships "Gaulois," "Charlemagne" and "St. Louis." The "Charlemagne," which was launched in 1895, embodies several features which, while they have appeared in earlier vessels of other navies, are new in the French navy. The most novel of these is the method of mounting the main battery. In the battleships of the "Carnot" and "Charles Martel" type, which immediately preceded the "Charlemagne," the four heavy guns of the main battery are carried in four separate turrets, on what is known as the quadrilateral plan, two of them being carried on the center line, one forward and one aft, and one on either beam amidships. This was a popular arrangement in vessels built during the eighties, and though it was abandoned in other navies, it has remained longer in favor among the French. In the "Charlemagne," "St. Louis" and "Gaulois," the main battery has been placed in two main positions, one forward and one aft, as in our own "Kentucky" and "Alabama," and the secondary battery has been gathered within a central citadel which is covered with a complete wall of vertical armor. By making this change France has at last fallen in line with the other nations, and adopted a plan which seems likely to be permanent. The "Charlemagne" has a displacement of 11,275 tons on a maximum draft of 27 feet 6 inches. She is characterized by a lofty freeboard and her midship section shows the curious "tumble-home" (a survival of the days of the wooden three-decker), of which we have a solitary example in our own navy in the "Brooklyn." The tumble-home sides allow a concentration of fire parallel with the keel of the ship, and it has the further advantage of bringing the weights well inboard, and thereby contributing to stability. It has a serious drawback, however, in the fact that the living quarters of the crew are considerably curtailed.

The protection of the hull of the "Charlemagne" embodies some novel structural features. Immediately at the water-line is a continuous belt, which is 6 feet 6 inches in depth, and tapers from a maximum thickness of 15¾ inches amidships to 3 inches at stem and stern. Above this belt is another which is 3 feet in depth, and 3 inches in thickness. Immediately at the top of the main belt is a 3½-inch armored deck, and at the bottom of the belt, below the water-line, is an armored deck which is 1½ inches in thickness. From the top of the 3-inch belt up to the level of the main deck, there is no armor protection, except around the ammunition hoists leading to the 12-inch guns. The secondary battery, which is located within the superstructure amidship, is protected by 3 inches of armor, while the 12-inch guns are protected within turrets of 15¾-inch armor. The obviously weak point in the armor plan is the unprotected space between the main deck and the armored deck, for it would be possible for an enemy to send high-explosive shells through the sides of the vessel and explode them immediately beneath the guns of the secondary battery. The damage wrought by such shells in the recent trials of the "Belleisle" show that a few well-placed shells of this character



NEW FRENCH BATTLESHIP "CHARLEMAGNE," NOW IN THE LEVANT.

Displacement, 11,275 tons. **Speed,** 18.1 knots. **Maximum Coal Supply,** 1,100 tons. **Armor:** Belt, 15¾ inches; gun positions, 15¾ inches; deck, 3½ inches. **Armament:** Four 12-inch, ten 5.5-inch rapid-fire, eight 4-inch rapid-fire, sixteen 3-pounders, 18 smaller guns. **Torpedo tubes,** 4. **Complement,** 681. **Date,** 1900.