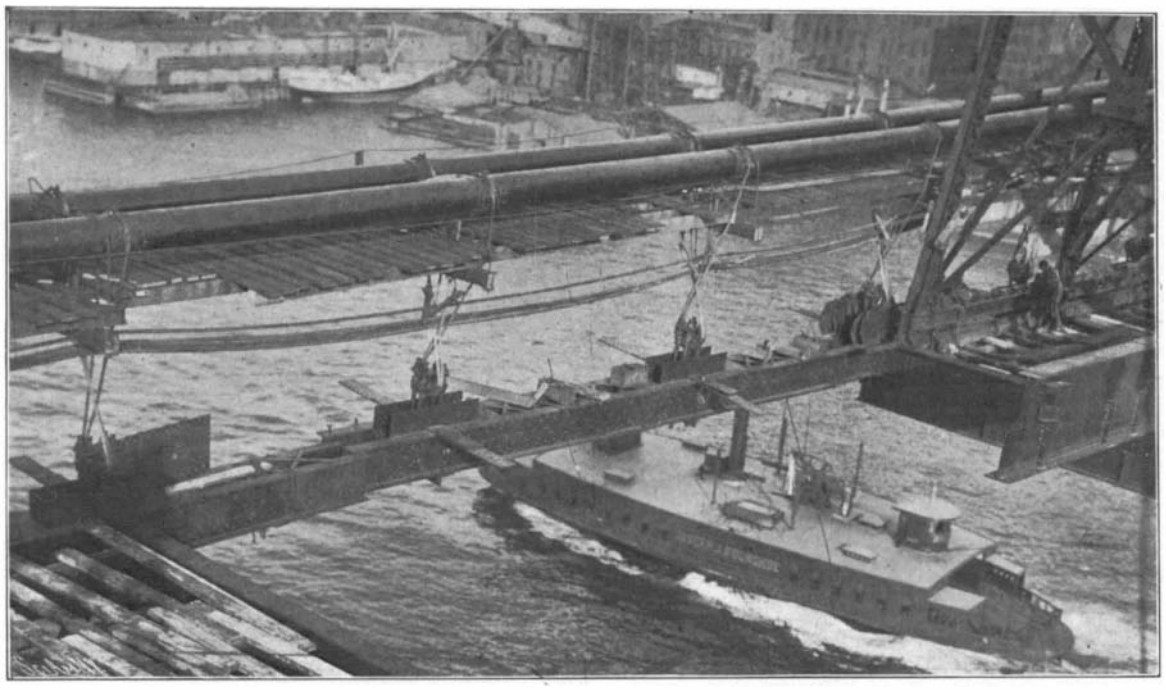
COMPLETION OF THE FLOOR OF THE NEW EAST RIVER BRIDGE.

In January last the Pennsylvania Steel Company, who have the contract of the construction of the floor system of the new East River Bridge, received notice to commence construction. In spite of the fact that it was the depth of winter, they have made such excellent progress that last week the floor system had been built entirely across the 1,600-foot span, ready for the work of building the stiffening trusses and lateral connections. The floor proper of the bridge consists of a series of transverse plate steel girders 4½ feet in depth, which extend entirely across the floor of the bridge for its full width of 120 feet. These girders occur at each point of support of the floor system by means of vertical suspenders from the main cables above; and the distance between them is exactly 20 feet. The spaces between these girders, or floor beams as they are called, are bridged by parallel longitudinal lines of plate-steel girders of a little more than half the depth of the floor beams. There are altogether twenty-three parallel lines of these longitudinal stringers in the width of the bridge, and they extend entirely throughout the structure from anchorage to anchorage. Twenty feet in from the outside of the roadways, and lying in a vertical plane between each pair of cables, are the two great stiffening trusses, which extend the full length of the bridge. Extending between the top chords of these trusses at each panel point, and above the roadway, is a large and heavy truss which serves by means of vertical ties to support the floor beams at two intermediate points between the stiffening trusses, thus relieving the bending stress on the floor beams, and permitting them to be made shallower than would otherwise be possible.

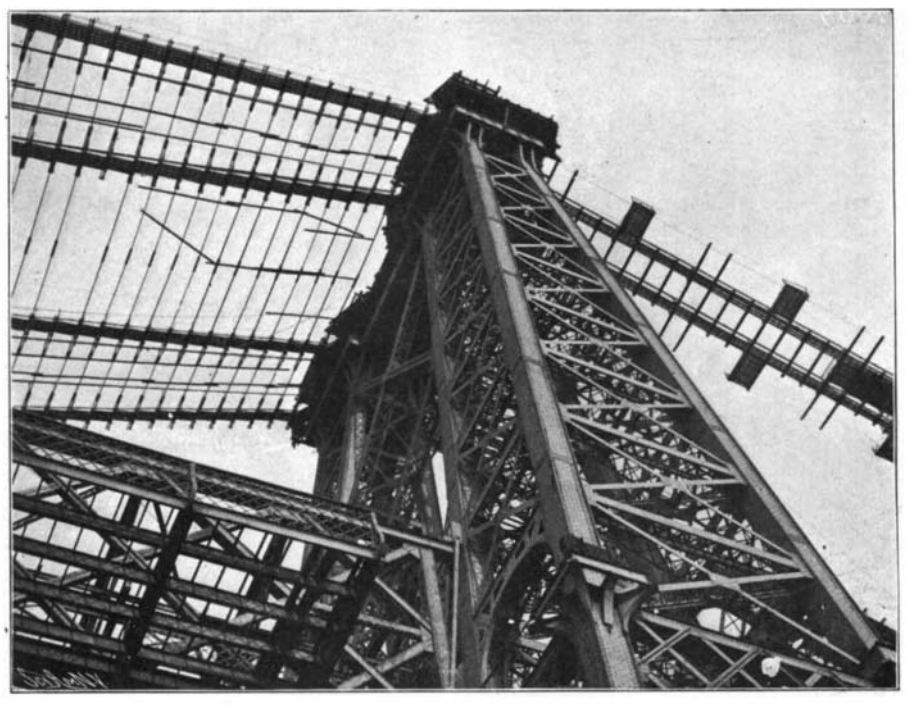


Making the Final Connections at the Center of the 1600-foot Span. The Member Shown Suspended from the Cables is a 60-foot Section of the Bottom Chord of the Stiffening Truss.

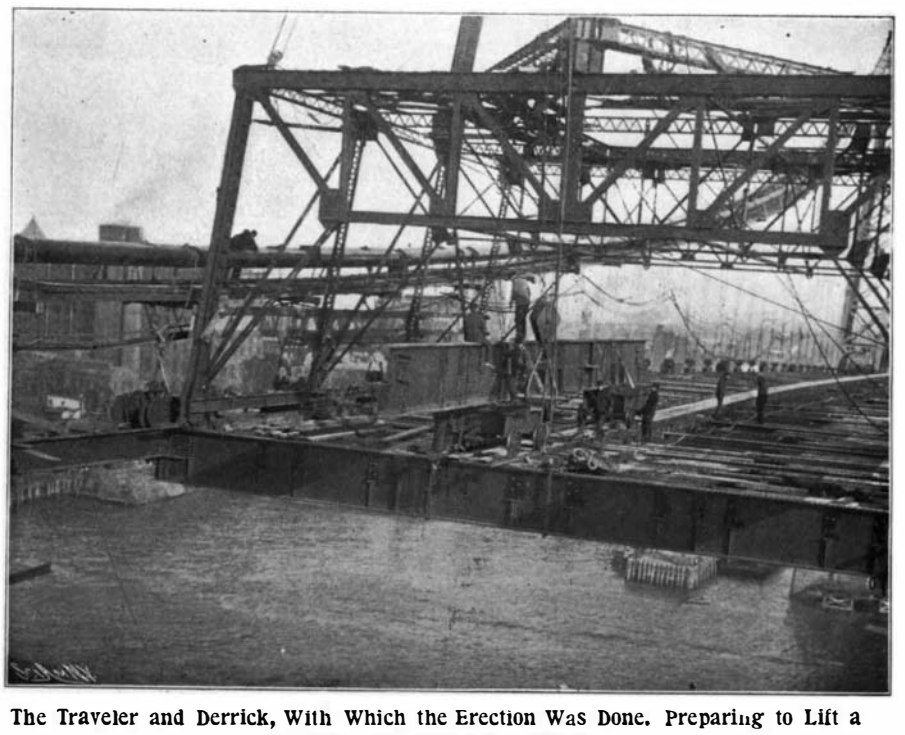
The work that has already been completed by the contractors consists of that portion of the floor system that lies between and includes the bottom chords of the stiffening trusses, and it is made up of these two bottom chords, the floor beams, the longitudinal girders, and the series of steel bents upon which the elevated railroads will be carried. This portion of the floor was erected first, and as soon as it was connected up at the center, the bridge workmen commenced building on the external cantilever brackets which form a continuation of the floor beams and extend beyond the stiffening trusses to carry the two 20-foot roadways.

When the contractors started to build out the roadway from the towers, the main span between these towers consisted of the four great cables with steel-wire suspenders hung from them at intervals of 20 feet. At the bottom of each suspender, as they were left by the cable contractors, were four heavy steel bolts, complete with nuts at each end of the bolts. The length of the suspenders had been so graduated that the bottom of the suspender bolts was in proper relation to the curve which the floor of the bridge is designed to assume when the whole load of the completed floor system is hung on the suspenders. The process of erection consisted in first building out the bottom chords of the two stiffening trusses in sections, and bolting them to the suspender bolts mentioned above, and then putting in place and bolting up between the chords the network of floor beams and stringers. For carrying on this erection, the contractors built two large travelers, each carried on four axles 20 feet apart, with a stiff-leg

View Looking Along Axis of Bridge, Showing the Floor Between Cables Erected Cantilever Extensions of the Floorbeams, Extending 20 Feet Beyond the Cables, will be Bolted on, Making a Total Width of Floor of 120 Feet.



Vertical View Looking Up One of the Towers. Taken Before Cables Were Strung.



The Traveler and Derrick, With Which the Erection Was Done. Preparing to Lift a 10-ton Floorbeam into Position.

COMPLETION OF THE FLOOR OF THE NEW EAST RIVER BRIDGE.

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derrick at the front end of the traveler. The tracks for the latter were laid above the first line of longitudinal stringers inside the bottom chords of the truss, and as the floor framing was built up, the traveler moved forward over it. Across the top of the front bent of the traveler was a strong, transverse lattice girder, at the center of which was pivoted the 62-foot boom of the derrick, and the foot of the derrick mast. The two stiff-legs were carried back to the last bent of the traveler as shown, and when a heavy load was to be lifted, the bottom frame of the traveler was clamped to the upper flanges of the floor stringers.

The material for the floor system was brought on scows to a landing near the foot of the towers, hoisted on to a tramway, run out to the front of the base of the towers, and then hoisted to the level of the floor system by a crane which placed it on a trolley, the trolley in turn carrying it out to the erecting traveler on the bridge. The chords were built out in 60-foot sections, representing each a length of three panels, the weight of each section being 25 tons. The floor beams which were the next heaviest single load, weighed 10 tons each. As soon as the 60-foot chord lengths with the floor beams and stringers between them had been bolted up, the traveler moved forward 60 feet, and another section of the floor was built out, the operation being repeated until the two gangs of workmen met at the center of the span. The whole 1,600 feet of floor, weighing no less than 2,750 tons, was erected and bolted up in six weeks' time, a most creditable performance, and a rate of speed which, if it had been observed on some other portions of the work, would have hastened the final completion of the bridge materially. The next operation will be to erect the 50-foot stiffening trusses, the lateral carrying trusses for the floor beams, and the various details of the lateral wind truss system. Second only in importance to the erection and bolting up of the floor and truss is the work of riveting, which follows along close after the first erection. The riveting purposes an air-compressing plant has been built on the Brooklyn shore, and a 6-inch main has been laid across the bridge.

To facilitate erection, and to insure that when the final riveting up takes place the bridge will hang at its proper designed curves and level, the contractors have drawn up a blue-print showing where the material of the trusses and lateral system is to be placed along the bridge ready for erection. Every one of the many thousands of angles, posts, girders, etc., is numbered, and has its place assigned it somewhere on the great 1,600-foot span. Each piece will be laid upon the floor in the reverse order in which it is required, so that when the erectors start work there will be no time lost in hunting for particular sections, but they will be right at hand ready to be put in place, and incidentally performing the important function of loading the flexible structure to the true lines, in which it will be inflexibly held when the stiffening truss has been erected and riveted up. We are indebted to Mr. Walter T. Brown, the Resident Engineer of the Pennsylvania Steel Company at the bridge, for courtesies extended during the preparation of this article.

THE HUNTER'S POINT DRY DOCK, SAN FRANCISCO.

The Pacific Coast now has at Hunter's Point, San Francisco, the newest and one of the finest dry docks in the United States, and one of the largest and best in the world. It is the property of the San Francisco Dry Dock Company, and its construction was begun about two years ago. Its dimensions are: 750 feet long, 122 feet wide at the top and 80 feet wide at the level of the top of the keel-blocks. At high tide there is 28 feet of water over the sill of the dock, which can accommodate comfortably the largest vessel in existence. It was built by Mr. Howard Holmes.

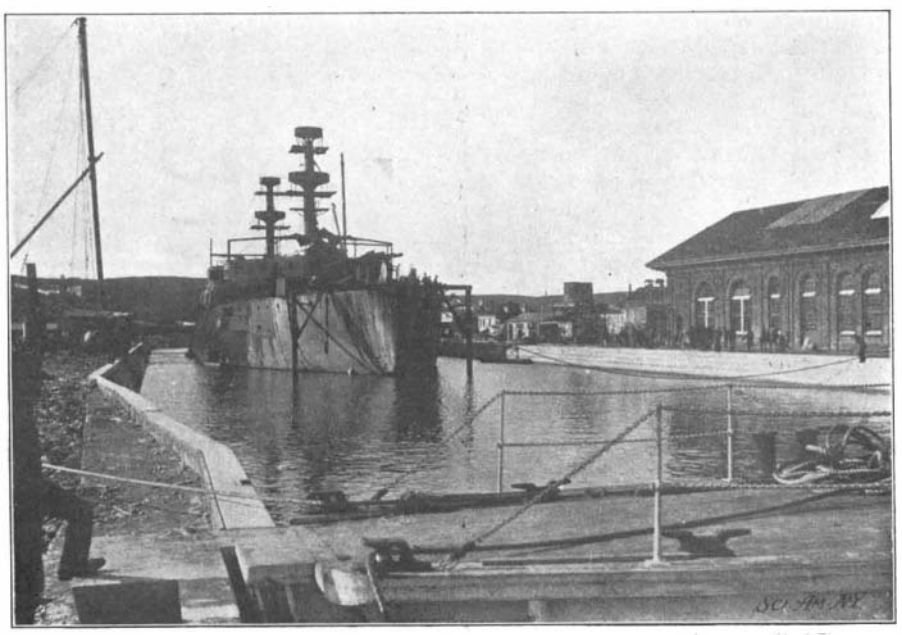
During the visit of the late President McKinley to the Pacific Coast, he was present at the launching of the United States battleship "Ohio" on May 18, 1901, at the Union Iron Works, San Francisco. On Thursday, January 29, the new dock was officially opened to receive the battleship, which is 393 feet long and 72.2 feet wide. With her crew, stores, armament, ammunition, and coal aboard, she will displace 12,440 tons.

The battleship was towed from the Union Iron Works by three tugs, and was pushed by them into the dock, the pontoon gate of which had been floated away. The gate was then placed in position and filled with water until it sank into snug contact with the rubber cushions of the sill.

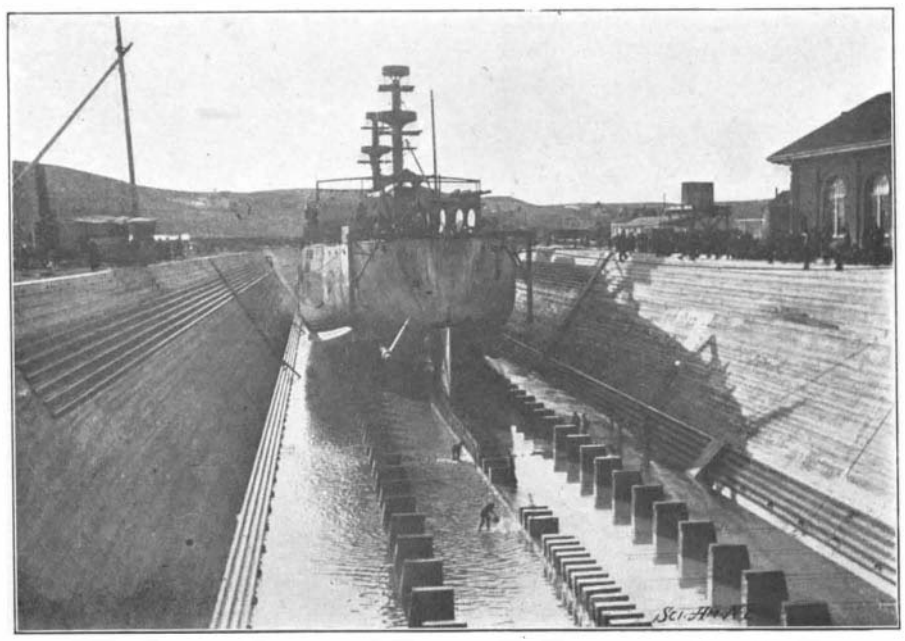
The dock engineer started the three centrifugal pumps, which together draw out 120,000 gallons of water per minute, at 12:45 P. M., and at 2:50 P. M. the battleship stood high and dry on the keel blocks. A copy of the battleship's plans had been given to the dock superintendent, and the shape of the keel and hull, together with the draught and displacement, had been carefully considered and the position of the keel-blocks calculated. The stationary blocks were set to conform as nearly as possible to the curve of the keel, and above these were placed blocks in such a position that, when the water was pumped out, the vessel would rest evenly and without strain or danger of buckling her bottom plates. The lines on which the stem and stern of the vessel were to rest were marked by stakes on either side of the dock. As the water receded and exposed the underbody of the battleship, an army of laborers, with scrapers and brushes, removed the marine growth and barnacles, so that, by the time the water was all out, the vessel was nearly clean. The "Ohio" had not been docked for ten months, but there was not so large an accumulation of barnacles upon her bottom as had been expected.

When the battleship entered the dock, there was eleven feet of water between the sill and her keel. As she rested easily in position after the water had been pumped out, there was four feet of water on each side of her at the narrowest part of the dock. Between the gate of the dock and the stern of the "Ohio" there was room enough to dock another great vessel more than 300 feet in length. The battleship received two coats of antifouling paint, her under-valves were examined, and her immersed body was put in excellent condition.

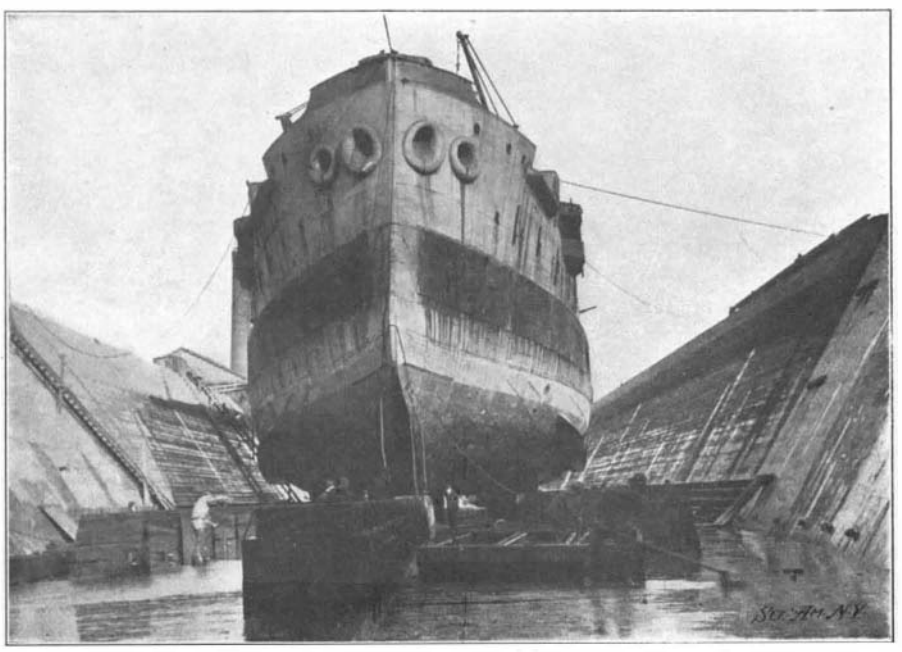
THE GATE OF THE NEW DRY DOCK AT HUNTER'S POINT, SAN FRANCISCO.



THE "OHIO" IN THE NEW DRY DOCK, VIEWED FROM THE GATE.



VIEW SHOWING GREAT LENGTH OF DOCK, SUFFICIENT FOR ANOTHER BATTLESHIP.



U. S. BATTLESHIP "OHIO" IN THE NEW DRY DOCK AT HUNTER'S POINT, AFTER THE WATER HAD BEEN PUMPED OUT.

The British Admiralty has definitely decided to adopt the French gray color as the official war paint for all the vessels in the navy. This decision has been arrived at after prolonged experiments with various tints, but French gray is the color which renders a vessel the least conspicuous and renders it a difficult target to hit. Hitherto the vessels have always been painted in three or four colors—black for the hull, white upper works above the deck level, yellow funnels, and often a red band along the water line, corresponding with the Plimsoll mark upon vessels of the mercantile marine. The new color is a mixture of black and white paints in the proportion of 11 ounces of the former to 6 pounds of the latter. The vessels of the Channel squadron are being transformed, and the Mediterranean and other fleets will be similarly treated as soon as possible. The painting of each ship costs $5,000.

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