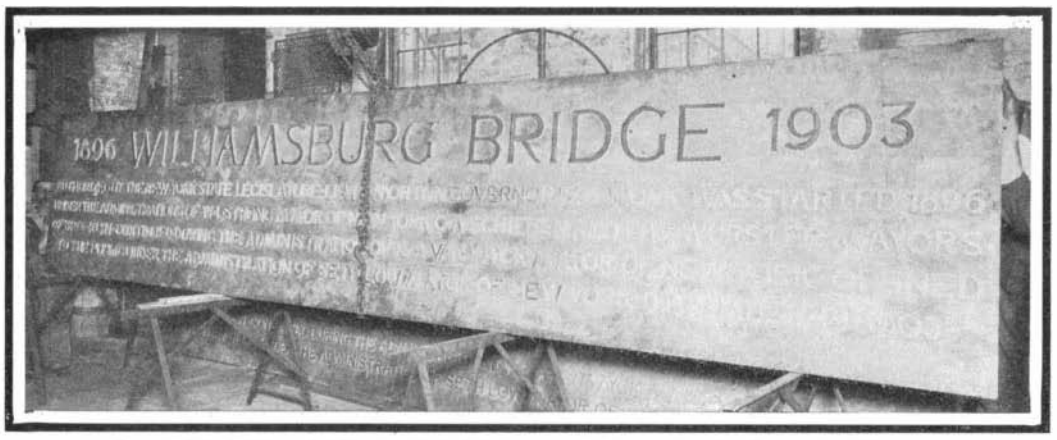
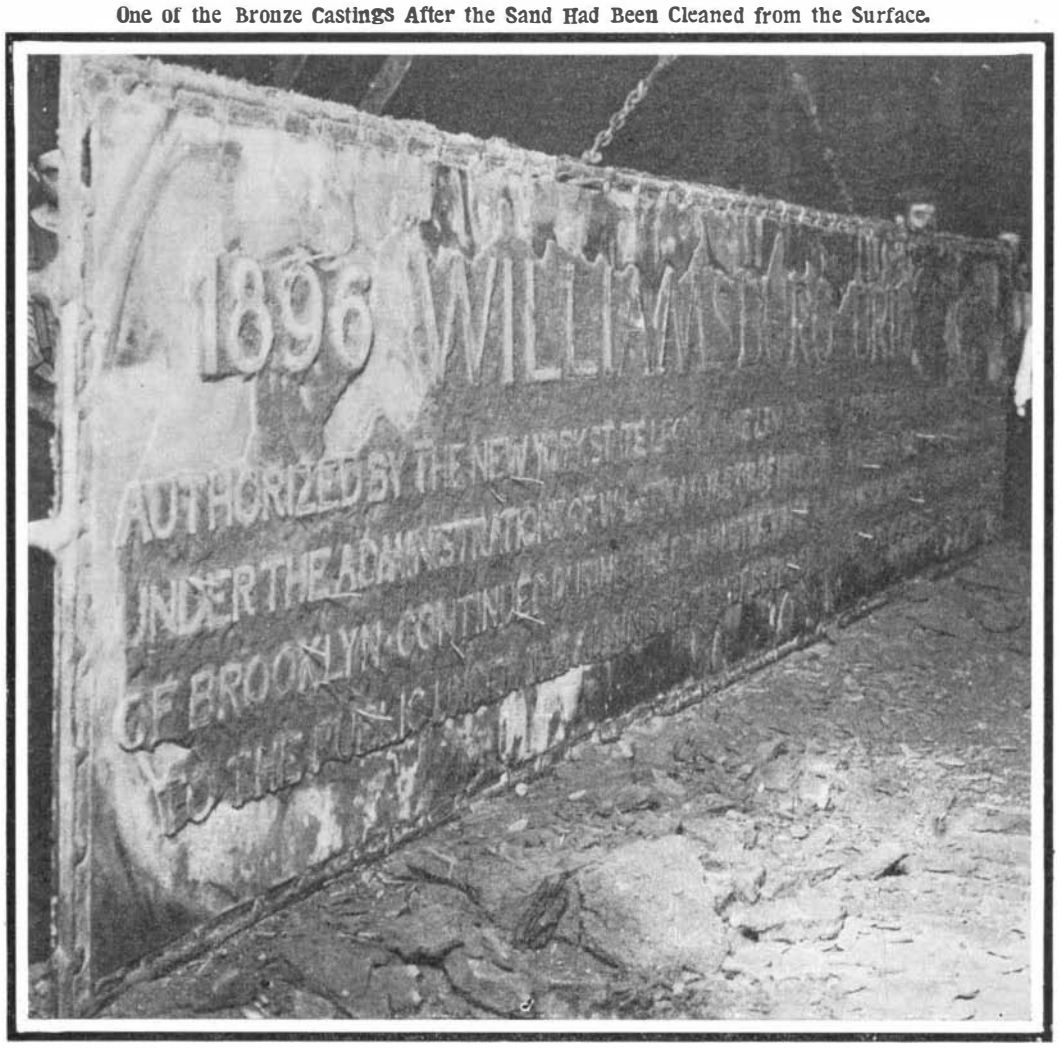
THE CASTING OF THE WILLIAMSBURG BBIDGE ENTABLATURES—A NOTABLE TECHNICAL ACHIEVEMENT.

The thousands of foot passengers who, in the near future, will walk beneath the great entablatures of the Williamsburg Bridge, on which the history of that structure is briefly emblazoned in letters of bronze, will probably never realize that, like the bridge itself, the great plates represent a technical achievement that is without a parallel in this world. No new process was employed in casting these expansive sheets of bronze; and still they are noteworthy for the fact that never before have plates of such great area and comparative thinness been successfully cast in one piece. For the details that we are enabled to present of the making of the entablatures we are indebted to Mr. S. U. Barr, of the William H. Jackson Company, at whose New York foundry, 229-239 W. 28th Street, the work was carried out.

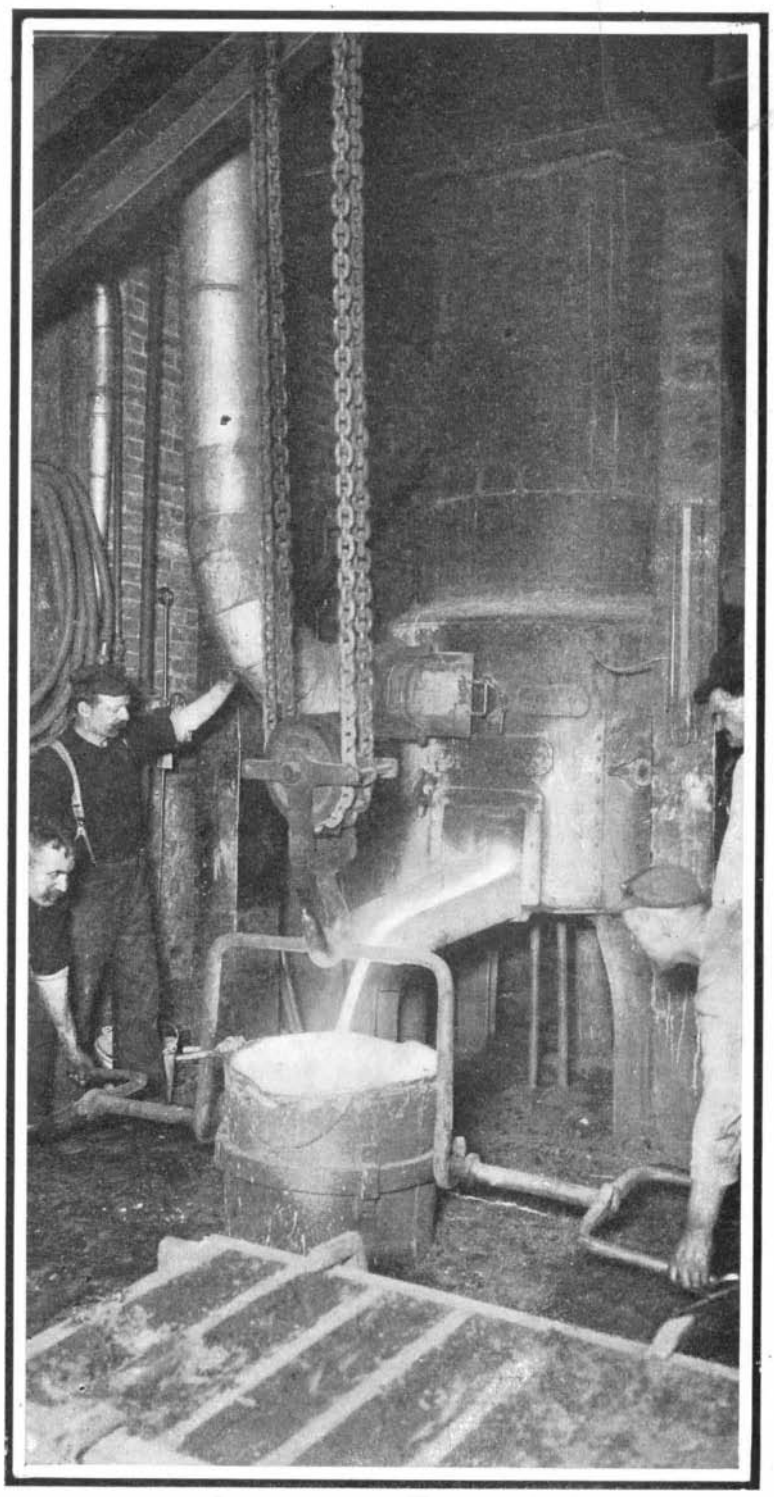
When it is considered that each of the two tablets has a total length of 52 feet 7 inches, a width of 4 feet 3 inches, and a weight of three tons, and the great



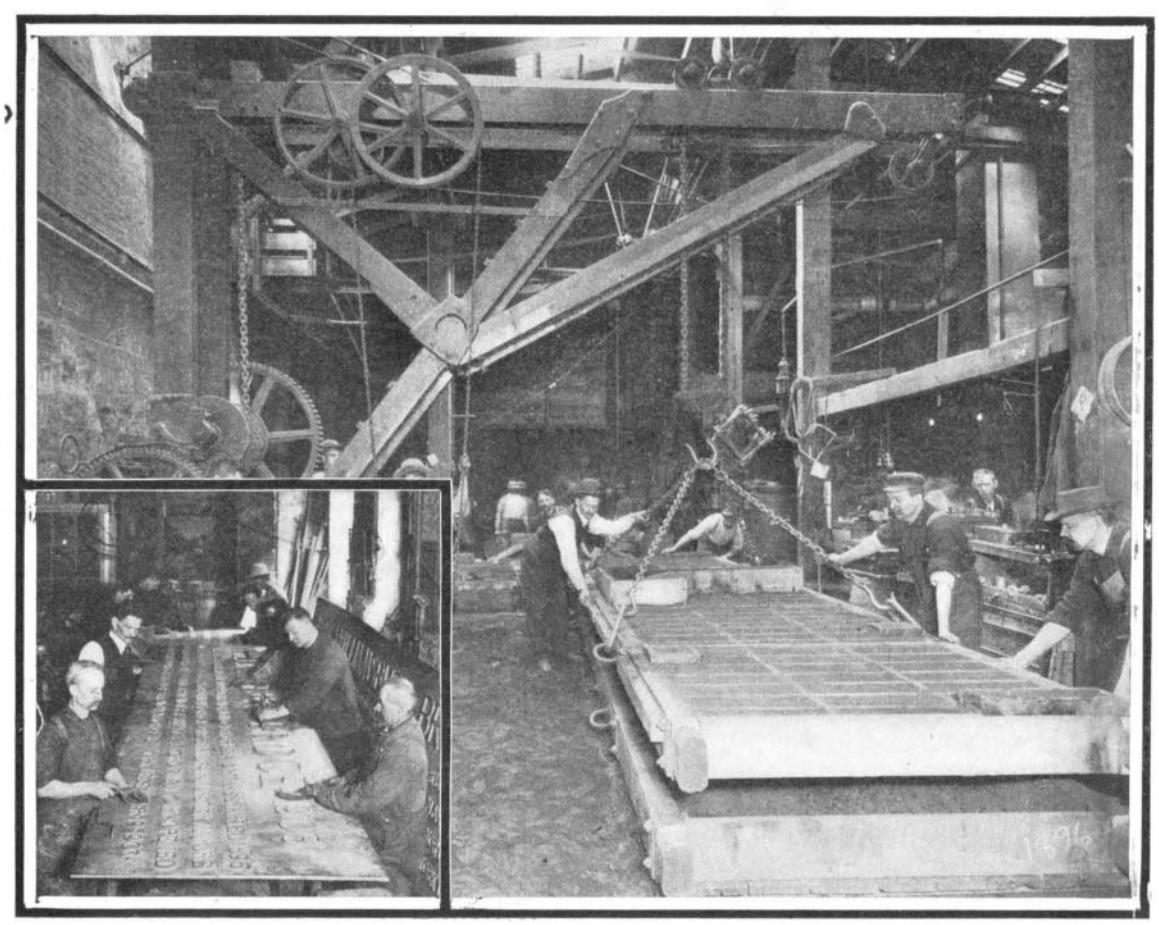
One of the Bronze Castings After the Sand Had Been Cleaned from the Surface.



The Casting as it Appeared When Lifted from the Sand Mold.

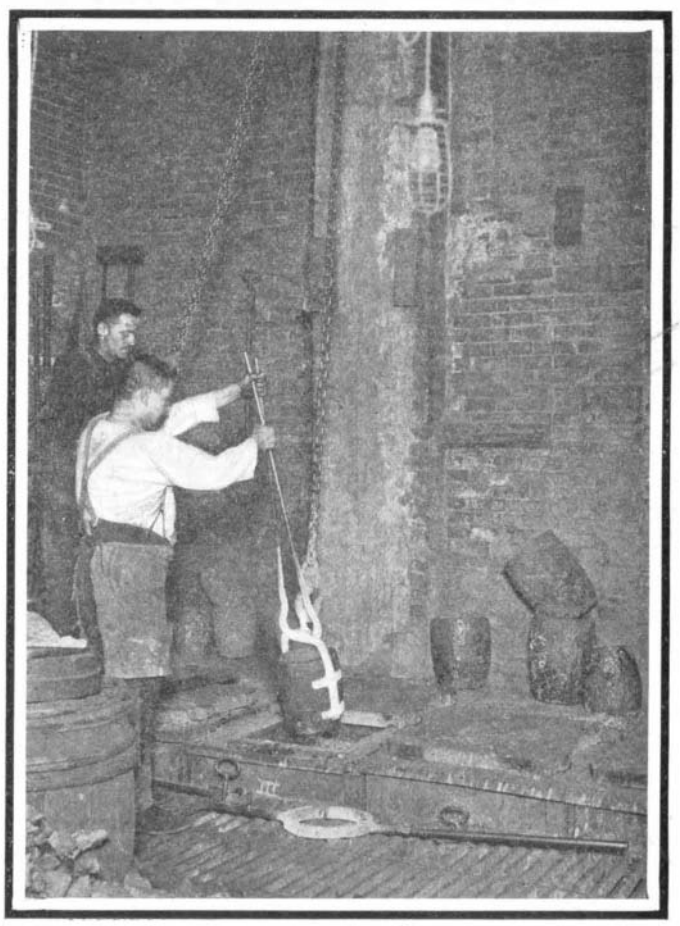


The Molten Bronze Metal Flowing from the Cupola.



Workmen Cleaning Up and Finishing the Surfaces of the Letters.

Closing the Mold Before Casting.



The Ordinary Bronze Furnace for Melting Bronze in Crucibles.

THE CASTING OF THE WILLIAMSBURG BRIDGE ENTABLATURES.

rapidity with which molten metal cools when poured over a large surface in a thin layer, some idea of the difficulty that was presented may be gleaned. The entire tablets are made up in three pieces with center and two end sections. The center sections are now cast and are 22 feet by 4 feet 3 inches. Since the total thickness of each tablet was to be only ⅜ of an inch, the nice problem of making a wooden pattern that could be readily handled without warping was presented for solution. Special kiln-dried wood was employed. The letters forming the inscription, varying in height from 3 to 9 inches, were fashioned separately and glued in place. The extent of surface was such that the pattern was made in three sections.

of an inch thick. The metal as it ran into the mold seemed bound to chill as it came into contact with the cold sand before it had spread over the entire surface to be covered, and to leave holes and other imperfections in the casting. It was therefore necessary to devise some means of running the metal into the mold so that it would fill every part, before there was time for it to chill. The desired end was attained by pouring the metal into the flask simultaneously at seven different holes, so that it first filled a trough which surrounded the entire mold and from which the metal ran into the mold through 125 connecting passages or "gates" as they are called. Twelve hundred pounds of metal were poured into the trough from a ladle, held

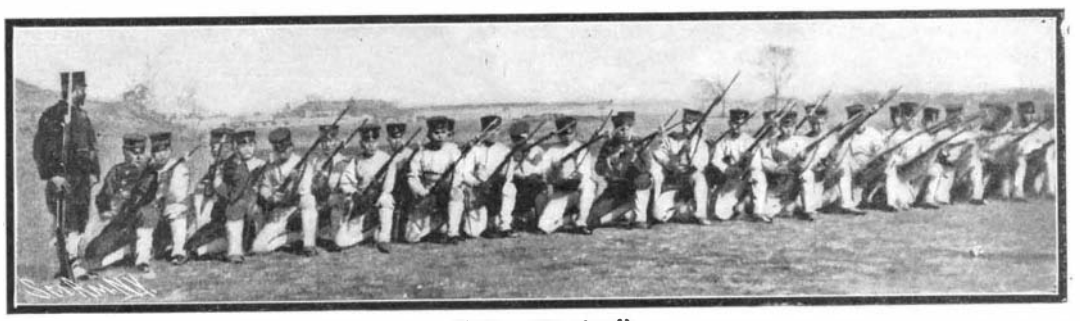
12,000 pounds, was effected by means of the crane which had been previously used in pouring the 1,200 pounds of bronze already mentioned.

The preparation of these castings, the largest of their kind in the world, may well be considered a praiseworthy metallurgical achievement, of which the makers are justly proud; and the tablets themselves, a fitting tribute to the men whose energy gave us the new bridge.

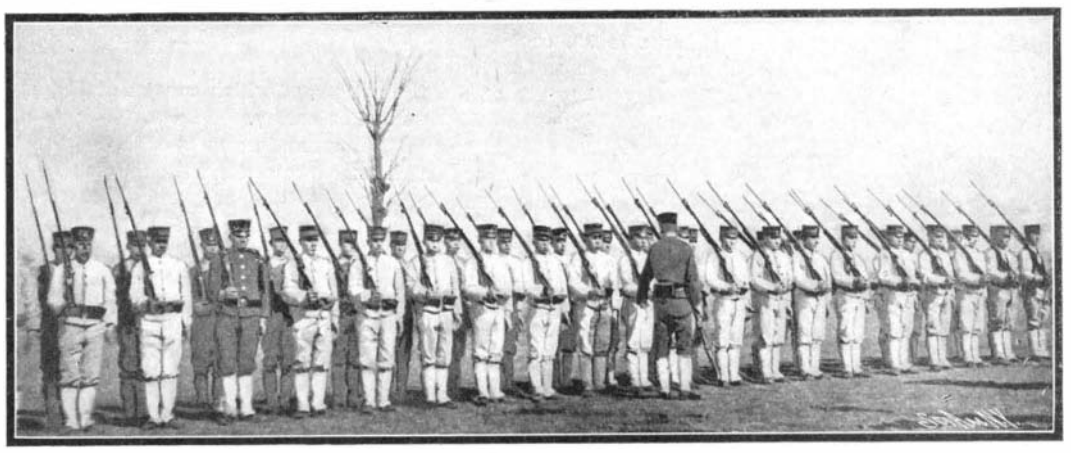
THE JAPANESE ARMY AND ITS GUNS.

The effective strength of the Japanese army has doubled during the period between the war with China and the present one with Russia. According to the

In the Trenches.



"Repel Cavalry."



Infantry at Drill.

Hauling Baggage to the Troop Trains.

Third Regiment, Imperial Guards.

Infantry Heavy Marching Order.

JAPANESE ARMY VIEWS.

The melting and mixing of the great quantity of metal required in the casting operation was no easy matter. The novel plan was adopted of first melting the copper and other metals in crucibles in the usual charcoal furnace, and of casting these metals, after having been mingled in the correct proportions, in ingots. These bronze ingots, some time before the actual casting was undertaken, were charged into a cupola of the type used in iron and steel foundries. Thus the bronze was melted in one charge, with a more intense heat than would otherwise have been attainable, and with the result that it was more fluid.

The preparation of the mold to insure successful casting was another question that presented not a little difficulty. It seemed almost a hopeless task to attempt the casting of a plate 100 square feet in area and ⅜

in position by a powerful crane, and the remaining 1,800 pounds from crucibles, each manipulated by five men. The ladle with its 1,200 pounds of molten metal and the smaller crucibles in the hands of the men were tipped simultaneously. The trough and the gates leading from it to the mold served their purpose admirably. So ample was the provision for conducting the bronze to every part of the mold, that when the flask was removed and the sand broken away, a casting was found that was perfect in every respect. In order to lead away the gases impounded in the mold, numerous ducts had been made in the sand. From these the vapors poured in dense clouds for minutes after the metal had been cast.

The task of handling and turning a flask 25 feet long, 5 feet 7 inches wide, and 1 foot thick, weighing

present law, all male subjects between the ages of seventeen and forty are liable to service either in the army or the navy. The army, which has been organized by German officers, is divided into the active, or standing army, the reserve, the landwehr, depot, and the landstrum. The period of service in the active army is three years, and it is levied from able-bodied youths twenty years of age. After service in the active army a term of four years and four months is required in the reserve. The landwehr is made up of those who have completed their term in the standing army, and in this branch of the servise they are required to serve five years. The depot is divided into two classes—the first depot, composed of those who have not served in the active army and the term being seven years and four months, and the second