THE OLD BOONTON FORGE.

The building of the great reservoir near Boonton, N. J., which is to furnish Jersey City with its water supply, will cause the final disappearance of one of the most famous landmarks of American history—Old Boonton Forge. This queer structure, half brick and half wood, lies in the valley of the Rockaway River, the river itself almost brushing its side in its journey toward the Hackensack. Directly across the country road which holds its uneven way toward Boonton is the old red house where Washington and Lafayette spent many weary days and weeks at various times during the New Jersey campaign.

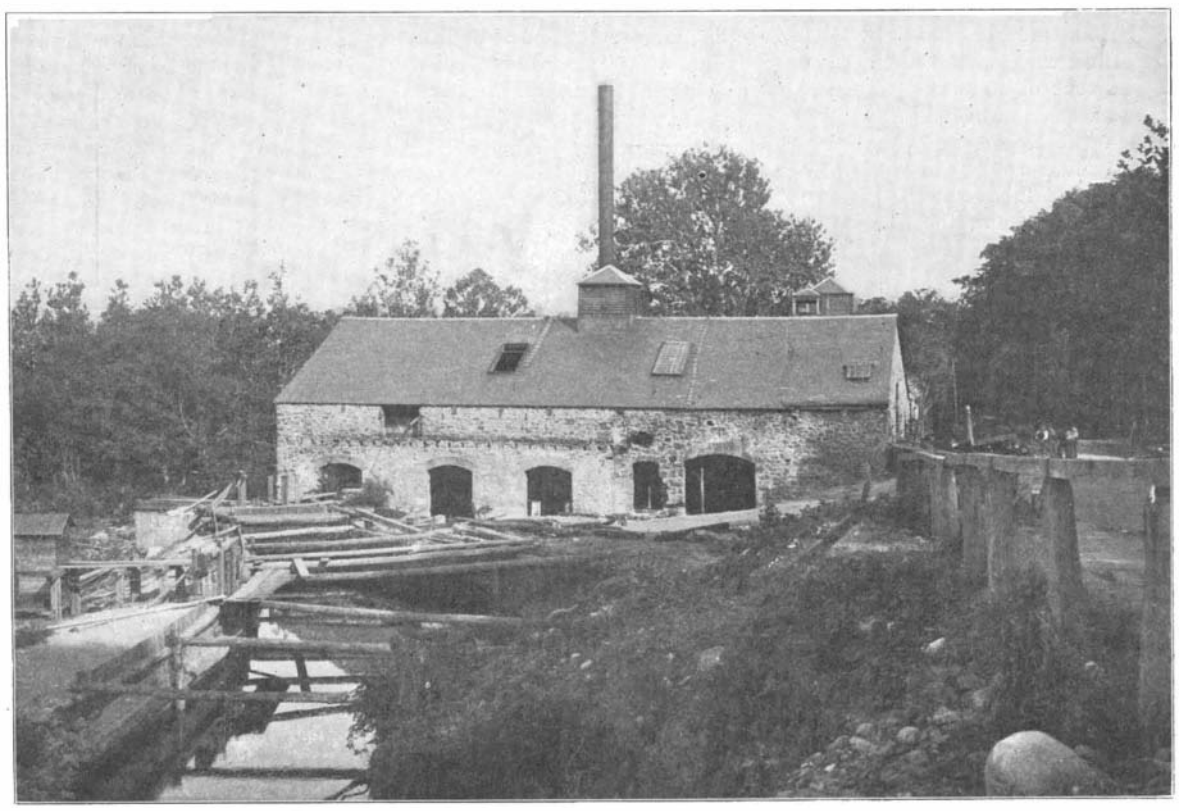
Just now the Forge is being used as a machine shop by the reservoir contractors, but in the latter half of the eighteenth century it held a place that was peculiarly its own. The structure was built in 1760, just about the time that the English Parliament issued an edict that no ironwork could be manufactured in the American colonies, and providing severe punishment for any one who violated the command. It so happened that the New Jersey people wanted some ironwork, and Boonton Forge was selected as the place of making. There had never been any ironwork manufactured in the colonies before, but it was executed in earnest at the Forge, and the work of manufacture went on without opposition until the Revolution broke out, being carried on with profound secrecy. The atmosphere about Boonton was exceedingly patriotic, and the people were extremely proud of the Forge, which they had dubbed "Liberty Forge." When Washington's men began operations in New Jersey it was found there was dire need of ammunition, and that the cannon would soon become practically useless because of the seeming impossibility of obtaining the necessary cannon balls. Then it was that the Forge entered upon its proudest days. There was a good deal of iron stored there, originally obtained for purposes of peace, but the consent of the owners was easily secured, and by Washington's order the fire of the Forge soon blazed in the work of casting shot to hurl against the British.

Hundreds of cannon balls were made and turned over to the Continental artillery before the patriotic work ceased, and it is current history that Washington said the task performed at Boonton Forge had much to do with the success of American arms.

Until the building of the reservoir began, the Forge was silent and untenanted, except when occasionally it was found useful for some special work that the equipment of the building lent itself to. It is lively enough to-day, but within a year's time the water of the reservoir will stand one hundred feet deep over its site.

The reservoir whose building has doomed the old Forge will be a notable work when complete. The land which it will contain is all of historic interest. Some of the farms included have been in the possession of the same families for two hundred years. The reservoir itself will be 2 1-7 miles long and 1½ miles wide at its longest and widest points, the total circumference being 10 miles. There are 200 acres of woodland to be cleared, and by January, 1902, everything above six inches in height upon the 970 acres of land that water is to cover will have been uprooted and carried away.

It will be necessary for the water to journey 23 miles after it leaves the reservoir before it reaches the Jersey City mains, the trip being made through a series of pipes and conduits. It will pass twice under the Passaic River, and once under the Hackensack. The construction of reservoirs and aqueducts for the water will when completed have occupied little more than two years. The work has a number of unusual features, but none are more interesting than the fact that it is the only reservoir so far as known that has for its site a Revolutionary battleground.



OLD BOONTON FORGE—A PRE-REVOLUTIONARY FOUNDRY WHERE CANNON BALLS WERE CAST FOR THE CONTINENTAL ARMY.

MOST POWERFUL EXPRESS LOCOMOTIVE IN THE WORLD.

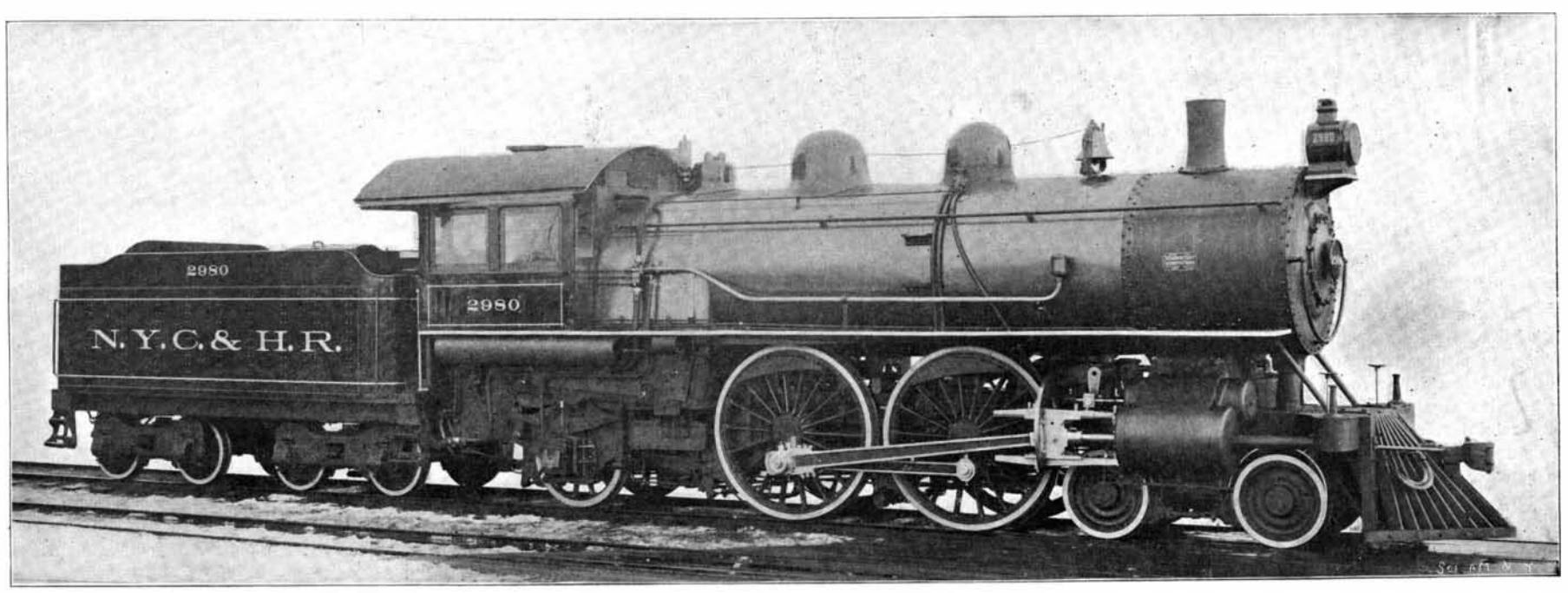
It is now nearly a decade since the New York Central and Hudson River Railroad Company introduced into its service a powerful express locomotive which, at the time, was probably the most efficient engine of its type in the world. We refer to the locomotive known as No. 999, a typical eight-wheeled, American locomotive, which, in those days, was distinguished from other American locomotives in service by the great size of its drivers, which were 7 feet in diameter, its large heating surface of 1,900 square feet, and a boiler pressure of 190 pounds to the square inch. This engine and its somewhat modified successors have been doing excellent work in hauling the Empire State Express and the fastest, long-distance trains of this railroad.

The rapid increase in the weight of trains, coupled with the utter impossibility of reducing the speed (indeed, it is certain that in the very near future our railroads will have to make an increase in the speed of their so-called fast trains), led the Superintendent of Motive Power of the railroad, Mr. Waitt, to design an express locomotive which is intended to haul heavier trains at the present rate of speed, or the same trains at a higher rate of speed, than is now accomplished. This engine, which forms the subject of our accompanying illustration, is of the very popular Atlantic type, which differs from the American type to which No. 999 belongs in having the four-coupled drivers placed well forward under the center of the boiler with the connecting rod coupled to the rear instead of to the front driver, a pair of trailing wheels being placed beneath the firebox, as shown in the cut.

The primary object aimed at in the new locomotive is to provide a huge boiler with sufficient capacity to insure a plentiful supply of steam at 200 pounds pressure under the most exacting conditions of service. The American type of engine, in which the firebox is carried inside the frames and between the axles of two pairs of driving wheels, necessarily imposes restrictions on the size of the firebox, and limits the grate surface and firebox heating surface. One advantage of the Atlantic type is that by the use of the small diameter trailing wheels, the firebox may be carried above the frames and project laterally beyond them, and there is no severe limit placed upon the length of the firebox, as there would were it carried between the driving axles. In the New York Central engine the firebox has an internal width of 6 feet 3⅜ inches, and a length of 8 feet, with a grate area of 50.3 square feet and a total heating surface of 180 square feet. The outside diameter of the boiler at the first ring is 6 feet, and it contains 396 2-inch tubes, which are 16 feet in length over the tube-sheets. The heating surface of the tubes reaches the enormous total of 3,298 square feet, and adding to this the heating surface of the firebox, and 27 square feet as the heating surface of the water-tubes, we have a total heating surface for the whole boiler of 3,505 square feet. This is by far the largest amount of heating surface ever given to a passenger locomotive, and it is only exceeded by the largest freight locomotives in the world, the Pittsburg, Bessemer and Lake Erie consolidations having 3,805 square feet.

It certainly looks as though the designer's expectation that the boiler will supply 200 pounds of steam in any quantities that the cylinders may call for will be easily realized.

As the cylinders are 21 inches in diameter by 26 inches stroke, it will be understood that when they are working up to full power an unusual amount of adhesion will be required, and to meet this emergency the engine is fitted with what is known as an adjusta-



Cylinders, 21 inches by 26 inches. **Drivers,** 79 inches diameter. **Weight of Engine,** 176,000 pounds. **Total Heating Surface,** 3,505 square feet. **Steam Pressure,** 200 pounds. **Tractive Effort,** 25,350 pounds.

THE MOST POWERFUL EXPRESS LOCOMOTIVE IN THE WORLD.