

to, made upon the strength of the bricks for the chimney in 14 specimens of different qualities and compositions. By far the strongest was the composition of fire-clay and iron-stone, which bore, making every allowance, from 200 to 350 tons on the square foot; while the common quality did not exceed from 60 to 120 tons. The Hailes stone bore upwards of 450 tons, greatly more than the result found by the experiments already shown to the Society. But which, being on small specimens, 1 inch cube, while the other was 4 inches cube, the effect might partly be due to this circumstance, together with the difference of quality in the specimens.

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*A Detailed Description of the above Chimney. By M. TAYLOR, Esq.,  
Engineer for the Edinburgh Gas Works.*

In this paper Mr. Taylor gave a minute detail of the dimensions and structure of every part of the work. The foundation was on hard shale or clay; the masonry 40 feet 6 inches square at the bottom, 12 feet below the surface of the ground; 32 feet 6 inches at the surface of the ground; and brought up by steps in hard foundation courses of Craigleith stone, dressed and square jointed. Mason-work of the most substantial description, with four eyes for connecting the main flues to the stalk. Square pedestal 65 feet high from surface of ground to top of base of brick shaft; 30 feet 10 inches square at base course; 30 feet square above base, and 27 feet 9 inches under moulding of top. Body of pedestal of neatly covered rubble-work of the strongest kind, the stones chiefly from Hailes Quarry of the best rock. The cope mouldings and base of brick shaft of Craigleith. Within the pedestal, and rising 20 feet above it, is an inner chimney or brick shaft standing quite detached, having a space from 18 inches to 2 feet clear in every part; this space covered over at the top to keep out soot deposit, but yet left free of the outer pedestal and chimney. The inner chimney is 90 feet high, 13 feet diameter inside, carried up at four different thicknesses, beginning at  $3\frac{1}{2}$  bricks thick, and ending at 2 bricks, including a lining of fire-brick, carried up the whole way at two thicknesses—20 feet at 10 inches thick, and 70 feet at 5 inches. The brick work of the best well-burnt circular stock-brick, with a course of headers in reeled order for every four courses of stretchers. The main brick shaft is 264 feet high above the stone pedestal; making, with the pedestal, 65 feet, and foundation 12 feet 6 inches—in all, 341 feet 6 inches. The shaft is 26 feet 3 inches diameter at bottom externally, tapers to 13 feet 10 inches at the height of 243 feet, at the first belt under coping 11 feet 10 inches below the top. The shaft is carried up at five different thicknesses, beginning at 35 inches, or  $3\frac{1}{2}$  bricks, for 35 feet up, and ending with 15 inches, or  $1\frac{1}{2}$  bricks, for 58 feet at the top, all built with hard circular composition brick, referred to in the experiments on the strength of bricks. Brick-work put together in the strongest manner with headers, as already described, and best band all laid in the best lime from Burdiehouse, with sharp sand, sifted and made up in the mill. The beds are kept as thin as possible, and neatly pointed-in with the edge of the trowel. All the vertical joints inside of wall, grouted up with thin lime. As a farther security, the shaft is bound with six malleable iron hoops, at intervals of

35 feet up, built into the brick-work, one brick on bed from the outside, and kept a half inch clear all round off the outside lining of brick-work, so as to allow the hoops to expand with heat without injury to the work. They are all 3 inches broad; the under three 1 inch thick, the upper  $\frac{3}{4}$ -inch each, made in three lengths, clamped together and made fast with three  $\frac{3}{4}$ -inch or  $\frac{1}{2}$ -inch rivets on each side. The projecting cope at the top is of cast iron, 19 feet 6 inches diameter over all, and in sixteen pieces about  $\frac{7}{8}$ -inch thick, screwed together with bolts through the flanches. This cope being all fitted and bound together in a mass on the top of the stalk, the brick-work was continued up, and finished with a cope, or plate of cast iron, composed of eight pieces  $\frac{3}{4}$ -inch thick, and about  $2\frac{1}{2}$  feet broad, with a round belt going 9 inches down on the brick-work, and forming a strong hoop round it. The chimney is furnished with an endless chain going up the inside of the main shaft, giving the means of ascending at any time to the top. The electric conductor stands 6 feet above the top plate,  $\frac{5}{8}$ -inch round copper made fast to stone and brick-work, with  $7\frac{3}{8}$  in. copper holdfasts let 4 inches into the masonry or brick-work, with a head on the inside and an eye on the outside to receive the rod as it was carried up. By these holdfasts an ascent can easily be made to the top by a small tackle suspended to the holdfasts. The conductor is metallically connected to all the iron-work on the stalk—the plate on the top, projecting cope, malleable-iron hoops, bolts on the top of the stone pedestal, and also the ascending chain. The rod descends into a well about 10 feet from the foundation, and is immersed about 8 feet deep in water, and the end turned up 2 feet in a horizontal direction, and flattened.

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*Extract from the Annual Report of the Board of Canal Commissioners of the Commonwealth of Pennsylvania, for the year ending Nov. 30, 1850.*

The gross receipts on all the lines of canal and railroad belonging to the Commonwealth, for the year ending the 30th of November, 1850, amounted to \$1,768,209.46, and the expenditures for ordinary repairs and breaches, including the cost of the temporary means of maintaining the passage for boats across the Susquehanna river at Clark's ferry, to \$857,228, showing an excess of receipts over expenditures of the sum of \$910,981.46. The net receipts of 1850 exceed those of 1849 by \$36,204.61.

The past fiscal year has been remarkable for the number of high freshets with which the several lines of canal yielding the largest portion of revenue have been visited. A succession of breaches occurred from the high waters in July, August, and September, by which the navigation of the main line, at its eastern terminus, and of the Susquehanna, West Branch, North Branch, and Delaware Divisions, was materially impeded by the time necessarily occupied in making extensive repairs.

To add to these calamities, on the morning of the 11th September the towing path and road bridge over the Susquehanna river, at Clark's ferry, was fired by an incendiary, and the superstructure totally destroyed, thus rendering it incumbent on the Board to fit up, at a heavy expense, a steam towing boat, for the purpose of maintaining, as far as practicable, the speedy transit of boats at that point. These combined causes, as a