

versed curve in the line near the entrance, and causing it to lead into the tunnel upon the prolongation of the tangent which forms its axis; this alteration at a small increased cost will beautify the route, and producing a saving of 20 degrees of curvature, will be an essential improvement.

This tunnel is 3118 feet long, and its transverse section of excavation 27 feet wide by $25\frac{1}{2}$ feet high, the sides being cut plumb, the top a semi-circle, and a solid tow path of rock being left in; when completed the arch will necessarily contract its dimensions, and it will then have, a water way of 19 feet wide, and 7 feet maximum depth, furnishing a greater water section than the Aqueducts now in use, a solid tow path of 5 feet clear width, guarded by a brick parapet, and the soffit of the arch at the crown will be 17 feet above the water line of the canal—thus offering a convenient and ample navigation for the transit of single boats or boats in a single line.

The excavation hewn throughout its course from the solid rock, has been carried on by means of two sets of working shafts, wrought by horse gins, the shafts being 188 and 122 ft. deep respectively; and also by open drift from the south portal, where the excavated materials were carried out upon a rail road laid on the tunnel bottom, and thrown away as spoil bank in the river.

The excavation has been uniformly advanced by blasting in two breasts, first, the *heading*, being a cut of $12\frac{1}{2}$ feet high next to the crown of the tunnel; and second, the *bottoming*, being a thorough cut of 13 feet deep, extending from the floor of the *heading* to bottom of canal, or rather to the bottom of the tunnel which is one foot below.

Upon the 5th day of June 1840, the *heading*, which by day and night (Sundays excepted) had been wrought without intermission, since June 1837, was completed and opened by effecting a junction between the working proceeding north from the southern portal, and that driving south from the deep working shafts; the other shaft workings having been finished in the year 1839.

This junction took place at a point 1503 feet inward from the south portal, and 340 feet deep, beneath the surface of the ground. Upon clearing the way for the instruments of the Engineer, it was found that all the lines and levels previously given in the several workings, under all the disadvantages caused by a transfer of levels down the shafts, by the smoke