Canadian Society of Civil Engineers.

INCORPORATED 1887.

TRANSACTIONS.

N.B.—This Society, as a body, does not hold itself responsible for the facts and opinions stated in any of its publications.

MASONRY WORK OF THE CHEAT RIVER BRIDGE.

By Cecil B. Smith, A.M.Can.Soc.C.E.

To be read Thursday, Jan. 4th, 1894.

This bridge, built during 1892-93, by the Baltimore & Ohio R.R.Co., at its crossing of this river, on the State Line R.R., between Uniontown, Pa., and Morgantown, W. Va., was, with other work, put in charge of the author of this paper in July, 1892.

Amongst the first duties were to establish, accurately, the highest known flood level, and also to make surveys and soundings of Cheat River for 2½ miles above the proposed bridge site, this latter information being needed to demonstrate to the Federal Government that this river was unfit for navigation and its improvement impracticable, in order that the grade of our crossing might be placed, as near as safety might warrant, to the flood level.

The highest known water was in July, 1888, when the river rose exactly 30 feet, above pool level, at this point.

It will be understood that the Cheat River empties into the Monongahela immediately below the bridge, and that this latter river is improved for navigation from Pittsburg, Pa., to Morgantown, W. Va., by a series of dams and locks, which pool the water about every 10 miles, on an average.

Pool No. 9, of Monongahela, backs 2 miles up Cheat River, at low water, and has raised the water level at the bridge site 8 feet, or from an original depth of 5 feet to a present one of 13 feet at low water.

The grade line was put 35′ 6″ above pool, and bridge seats 32′ above pool, or only 2 feet above the highest known flood level.

This seems very little margin, but when it is considered that only exceptional floods raise over 15 or 20 feet, and that any higher water than 30 feet would allow the water to flow over a large area, through the village of Point Marion, and thence to the Monongahela by another channel, it will appear quite sufficient, especially as the drainage area for 150 miles and including all its branches is in a mountainous region where the conditions are not likely to be ever changed, by clearing the land, to any great extent, for cultivation.

The Bridge consists of 4 through spans 135′ centres, and 2 half through plate girders of 85′ and 65′ over all, or a total length of 690 feet, and is now being put in by the Pencoyd Bridge Works.

It will be noticed, by the general plan, that 200 feet of the bridge is on a 9° 45′ curve. This is arranged for by lengthening Piers I and II (Plate XIII) sufficiently to space the main trusses of these spans enough wider than those on tangent to allow for curvature.

This is not as bad a feature as it otherwise would be, owing to the proximity of a depot and town, thereby causing trains to slow down at the bridge.

The triangulations were carried out in duplicate and checked to $\frac{1}{10}$ foot; the average was taken, and found afterward, by actual measurement, to be within $\frac{1}{20}$ foot of being correct.

The main base line was laid out exactly parallel to the axes of the piers, and both base lines were hubbed and levelled every 50 feet. The