The difference between these weights is more than sufficient to compensate for the difference of span; besides which, in the Ferry Bridge, made according to my designs and instructions, I was lavish in the thickness of the side-plates, and the bearings, which are included in the above weight, were stiffened by massive pillars of cast-iron.

For a further example, let me compare the Boyne trellis bridge (held by some to be the most economical) with the present Victoria tubes. The Boyne Bridge has three spans; the centre one being 264 feet, and the height is 22 feet 6 inches. It is constructed for a double line of way, and is 24 feet wide. The total load, including the beam itself, the rolling load at 2 tons per foot, and platform, rails, &c., amounts to 980 tons, uniformly distributed.

The bridge is constructed upon the principle of "continuous beams," a term which signifies that it is not allowed to take a natural deflection due to its span; but being tied over the piers to the other girders, the effective central span is shortened to 174 feet; in fact, this *principle* changes the three spans into five spans. Now, the effective area given for compression in this centre span is 113½ inches, which gives a strain for the 174 feet span of nearly six tons to the inch in comparison.

The Victoria tubes are so dissimilar in form and circumstances to the Boyne Bridge, that it is a troublesome matter to reduce the two to a comparative state. However, the Victoria tubes are known to be 275 tons in weight, 242 feet in span, and of 19 feet average depth, the strain not being more than four tons per inch for compression, with a uniform load of 514 tons, which include its own weight, sleepers, and rails, and a rolling load of one ton per foot.

The Victoria Bridge has not been designed upon the principle of continuous beams, for practical reasons, including the circumstance of the deep gradient on each side of the centre span, and the great disturbance which would be caused by the accumulated expansion and contraction of such a continuous system of ironwork in a climate where the extremes of temperature are so widely different; otherwise, the principle alluded to was first developed in tubular beams, namely, in the Britannia Bridge.

But since we are only now discussing the merits of the sides, let the Boyne Bridge be supposed to have sufficient area in its top to resist four tons per inch (the proper practical strain), and let the spans be not continuous; it will be found by calculation that the area required at top will be 364 inches instead of 113½ inches, and the weight of the span would be found by calculation to come out little short of 600 tons, whereas it is now 386 tons; and if we suppose the Victoria tube to carry a double line of *way*, and 24 feet wide, with a depth of 22½ feet, even if we double the sides in quantity, the whole amount of weight will be certainly very little more than 500 tons for 242 feet span.

It will be necessary to conclude my remarks with some further observations relative to the comparisons under our notice, which are of vital importance in considering the design of such a bridge as that to be erected for the Grand Trunk Railway of Canada.