Bridge, and other methods of constructing iron superstructures, is exceedingly interesting:

"At present there may be regarded as existing three methods of constructing wrought-iron girders or beams for railway purposes.

FIRST,—The *Tubular Girder*, or what is sometimes called the *Box Girder*, when employed for small spans, with which may also be named the *Single-ribbed Girder*,—the whole belonging to the class known as '*Boiler Plate Girders.*'

SECOND,—The *Trellis Girder*, which is simply a substitution of iron bars for the wood in the trellis-bridges, which have been so successfully employed in the United States, where wood is cheap and iron is dear.

THIRD,—The *Single Triangle Girder*, recently called 'Warren,' from a patent having been obtained for it by a gentleman of that name.

Now in calculating the strength of these different classes of girders, one ruling principle appertains, and is common to all of them. Primarily and essentially the ultimate strength is considered to exist in the top and bottom,—the former being exposed to a compressive force by the action of the load, and the latter to a force of tension; therefore, whatever be the class or denomination of girders, they must all be alike in amount of effective material in these members, if their spans and depths are the same, and they have to sustain the same amount of load.

On this point I believe there is no difference of opinion amongst those who have had to deal with the subject. Hence, then, the question of comparative merits, amongst the different classes of construction of beams or girders, is really narrowed to the method of connecting the top and bottom *webs*, so called. In the tubular system, this is effected by means of continuous plates riveted together; in the trellis girders, it is accomplished by the application of a trellis-work, composed of bars of iron forming struts and ties, more or less numerous, intersecting each other, and riveted at the intersections; and in the girders of the simple triangular, or 'Warren' system, the connection between the top and bottom is made with bars,—not intersecting each other, but forming a series of equilateral triangles,—these bars are alternately struts and ties.

Now, in the consideration of these different plans for connecting the top and bottom *webs* of a beam, there are two questions to be disposed of; one is—which is the most economical? and the other—which is the most effective mode of so doing? But while thus reducing the subject to simplicity, it is of the utmost importance to keep constantly in mind that any saving that the one system may present over the other is actually limited to a portion, or per centage, of a subordinate part of the total amount of the material employed.

In the case now under consideration, namely, that of the Victoria tubes, the total weight of the material between the bearings is 242 tons, which weight is disposed of in the following manner:

	Tons.	
Top of Tube	76	
Bottom of Tube	92	
		—168
Sides of Tube		84
Total tons		252

Assuming that the strain per square inch, in the top and bottom, is the same for every kind of beam,—say four tons of compression in the top, and five tons of