estimating the exact strain upon the parts of a bridge which is sustained by two different systems; for there may be unequal settlement, and the adjustment, however accurately made in the first place, may not long continue. It can, it is true, be tested at any time, by unscrewing the suspension bolts until the truss ceases to settle, and then screwing up again until the truss begins to rise; but it will generally happen that after a bridge has been a long time in operation, the two systems bear very unequal portions, and when the truss itself is not so constructed as to be susceptible of adjustment, the arch almost always sustains the whole weight of the bridge, and its load.

These and many other considerations have led the writer to the conclusion that the best method of constructing bridges is to place the entire dependence upon the arch, using the truss merely as a system of counter-bracing and a support to the roadway.

In the structure now under consideration, either the truss without the arches, or the arches without the truss, would be sufficient to bear the load.

The calculation of the strength will be made on three hypotheses:

1. That the arch sustains the whole weight.
2. That the truss sustains the whole weight.
3. That the arch and truss together form one system.

1st. Calculation of the strength of the bridge on the supposition that the arch sustains the whole weight.

The data required in this case are,

Distance of centre of gravity of half truss from abutment 37½ feet.
Distance from centre of pressure of arch at skew-back, to centre of pressure at crown 20½ “
Cross section of arches in middle of span 1044 sq. in.
Cross section of arches at skew-back 1188 “
Weight of half-span 1281 pounds per foot, 102,600 pounds
Load on “ 2000 “ 160,000 “
Total load 262,500 lbs.