COLUMBIA BRIDGE.

The bridge across the Susquehanna river, at Columbia, consists of a series of spans of about 200 feet each, the whole length of the bridge being about 1 1/2 miles. This structure consists of a truss composed of braces and ties, strengthened by the addition of an arch, and although the bridge is straight the upper chords are not continued across the piers. From the absence of counter-bracing, it might be inferred that considerable vibration would be produced by the passage of a load. This is in fact the case; the undulation caused by a passing car can be felt at a distance of several spans. Many of the bridges on the Philadelphia and Columbia Railroad are on the same principle. They are very light structures, but the absence of counter-braces is an objection. The following figure will give an idea of the plan.

![Fig. 93.]

The old bridge across the Susquehanna at Harrisburg, one half of which remains, is similar in principle to that at Columbia, except that it contains heavy counter-braces of nearly the same size as the braces themselves. It is encumbered with unnecessary timber, but in other respects the arrangement is good.

A portion of this bridge was recently carried away by a flood, but it has since been rebuilt. The railroad bridge across the Susquehanna at the same place is on the double lattice plan.

An arrangement something similar in appearance, but differing altogether in principle from the Columbia bridge, and which would possess greater stiffness, consists of a single arch attached to a counter-braced truss. No doubt can be entertained of the ability of the arch to sustain a load if change of figure can be prevented; and the counter-braces would effect-