iron bridge can be constructed at less expense than is now sometimes incurred in the erection of wooden ones, and the durability, with proper care, is almost unlimited.

An iron arch, constructed in a manner similar to the above, would be perhaps the cheapest and best support for an aqueduct. As the load in this case is always nearly constant and uniform, the curve of the arch should be a parabola.

No practical difficulty need result from expansion and contraction, particularly if iron tie-rods are not used for the lower chords. The counter-brace rods can be so proportioned and disposed as to compensate for changes in the arch, and keep the tension constant.

IRON BRIDGE OVER RACOON CREEK,

PENNSYLVANIA RAILROAD. (*Plate* 11.)

This bridge depends for its support upon 4 counter-braced arches, constituting a single system, unconnected with any self-supporting truss. The arches are in pairs, one on each side of each truss; they are composed of plates of malleable iron, 1 inch by 3 inches, placed one upon another—3 at top and 3 at the bottom of each, separated by pedestals and diagonal braces, and secured in place by wrought-iron clamps and bolts. There are, consequently, in the two trusses 24 leaves or plates, 1 by 3, arranged in groups of 3, the separate plates breaking joints with each other.

The diagonal-braces between the arches are connected by iron keys, kept in place by the clamp bolts.

Each skew-back has 4 box-shaped cavities to receive the ends of the plates.

The top chord is of wood, 12 by 12 inches. The lateral, diagonal, and counter-braced rods pass through it, and are se cured by cast-iron angle-blocks, and nuts on the outside.

The roadway is on top. The weight is transmitted to the arch by means of hollow columns or cylinders. Each cylin-