equation $w = \frac{B\,D^3}{\cdot 0125\,l^2} = \frac{6 \times 12}{\cdot 0125 \times 16^2} = 3240$ pounds weight, that will cause a deflection of $\frac{1}{40}$ inch to 1 foot, or $\frac{16}{40} = \frac{2}{5}$ of an inch in 16 feet.

The actual weight being 5282 pounds, the deflection will be in proportion, or $\frac{2}{5} \times \frac{5282}{2240} = \cdot 65$ inch deflection caused by the passage of a locomotive.

Counter-Braces.

The greatest possible strain upon the counter-braces, being equal to the strain upon the braces of the middle panels due to the variable load, will be 1200 pounds.

The cross-section of the 4 rods $\frac{5}{8}$ diameter is $1\frac{1}{4}$ square inches. The greatest possible strain per square inch, 9600 pounds.

SECOND HYPOTHESIS.

Calculation of the strength, on the supposition that the arch supports the whole weight.

The span of the arch is 60 feet, and rise 8 feet 9 inches.

The weight on the half arch being 96,443 pounds.

Distance of centre of gravity from support, 15 feet.

Cross-section of two arches in middle, 35·6 square inches.

Cross-section of two arches at ends, 40·6 do.

$w = P =$ pressure per square inch, we will have

$$P \times 35{\cdot}6 \times 8{\cdot}75 = 96443 \times 15,$$

whence $P = 4644$ pounds = strain per square inch—middle of arch.

The pressure at the skew-back is to the pressure at the crown as the hypothenuse is to the perpendicular, or as 7·50 : 6·32.

But the cross-section at the skew-back is also increased in