Let \( dD \) and \( eE \) represent two arch-braces extending from the points \( d \) and \( e \) near the centre to the abutments. If we disregard compression, the effects of which will be considered subsequently, it is evident that the weight of the portion \( dc \) may be regarded as suspended from the points \( d \) and \( c \), and will be entirely transmitted to the abutments, exerting no influence whatever upon the parts \( Ad \) and \( eB \).

If \( aD \) be another arch-brace, the portion \( ad \) will be suspended from \( a \) and \( d \), and its weight transmitted to the abutments by \( aD \) and \( dD \).

The calculation of the strains in this case, therefore, becomes extremely simple; we can regard the whole weight of the bridge as supported by the arch-braces, and the load upon the ordinary braces will be only that which is due to the small intervals \( ad, ac \); at \( d \) for example the strain upon the ordinary brace would be one-half the weight on \( dc \), at \( a \) it would be one-half the weight on \( ad \), and it therefore follows, that by the introduction of arch-braces of sufficient size to make their compression inconsiderable, the ordinary timbers may be reduced to very small dimensions.

The weight upon any arch-brace \((dD)\) is one-half the load upon \((ad + ac)\). Call this weight \( w \), and let \( DE = s, DN = h, DN = m, NE = m', \) and \( l \) = length of brace \( Dd \);

Then \( s : m' : : w : \frac{wm'}{s} = dc = \) portion of the weight transmitted to \( D \).

Also \( h : m : : \frac{wm'}{s} : dp = w \frac{mn'm'}{sh} = \) strain upon the brace \( bD \). This strain is a maximum when \( m = m' \) or when \( b \) is at the centre.

We cannot however regard the arch-brace as incompressible; on the contrary, it is known that timber will admit of a re-