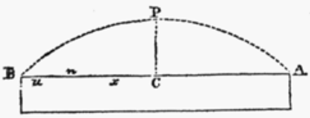
the beam. This expression can be put under the form $\frac{w}{2d}u - \frac{w}{2dl}u^2$.

FIG. 40.



If we make $u = o$ or $u = l$ the expression in either case becomes o, and if we express the values of the strains by the ordinates of a curve of which the above is the equation, we find that the curve passes through the points B and A at the ends of the beam.

If we differentiate the expression $\frac{w}{2d}u - \frac{w}{2dl}u^2$ and place the first differential co-efficient equal to zero: we have $\frac{w}{2d} - \frac{w}{2dl}u = o$ whence $u = \frac{l}{2}$ and the maximum is at the centre C.

The value of the maximum strain found by substituting $\frac{l}{2}$ for u is $\frac{wl}{8d}$. Let this value be represented by the line C, p and p will be a point of the curve.

To ascertain the nature of the curve, we will transfer the origin from B (the point from which u is reckoned) to p.

First make $u = (\frac{l}{2} - x)$ we obtain for the value of the ordinate when the expression is reduced $y = \frac{wl}{8d} - \frac{w}{2dl}x^2$ which is the equation of the curve when the origin is at C.

Again make $y = \frac{wl}{8d} - y'$ and we obtain $y' = \frac{w}{2dl}x^2$, which is the equation of the curve when the origin is at p, but this equation is that of a parabola; hence, the ordinate of a parabola drawn through B, p, and A will exhibit the intensity of the horizontal strain at any point, and furnishes a geometrical method of obtaining it.