side fibre represented by \( a'b \) or \( a'b' \), \( d = \) depth of beam, and let the width of beam be taken as unity. Then from what has preceded we have the average force \( P \) or \( P' \) (equal to the areas of either triangle or \( \frac{1}{2} C \times \frac{1}{2} d = P \)) multiplied by the leverage of action, or the distances apart of the centres of gravity of the triangles. That is to say, \( P = \frac{1}{2} C \times \frac{1}{2} d \times \frac{1}{4} d = \frac{1}{6} C \ d^2 \). For any breadth \( b \) other than unity, this expression becomes

\[
P = \frac{b \ d^2}{6} C = \frac{\text{area of cross-section}}{6} \times d \ C \ldots \ldots \ldots \ldots \ldots (1)
\]

This is a general expression for the resistance of any beam having a rectangular cross-section, and is called the moment of resistance of the cross-section (usually designated by the letter \( R \)). When this value equals that due to the weight multiplied by its leverage of action, called the moment of rupture, or \( M \), there is perfect equilibrium between the rupturing and resisting forces, or, in algebraic expression, \(" M" = "R."\)

The constant \( C \) is called the modulus of rupture, and were it not for certain discrepancies that occur in the resistance of material when subjected to direct compression or tension, and to cross breaking, its value would be given experimentally by the force necessary to tear apart or compress a bar of a given material. It is unnecessary in this place to point out what these discrepancies are, but simply the fact. Professor Rankine recommends that the value of \( C \) for any kind of material be determined by taking eighteen times the force necessary to break with a centre load a bar one inch square, placed