value, we find \( P = \frac{9000 b d^3}{y^2} \), a remarkably simple formula, which gives the extreme limit of the resistance to flexure of a white pine post.

The same expression may be employed to determine the constants used in the ordinary formula for the stiffness of beams. For this purpose let the equation \( P = \frac{90 b d^3}{c l^2} \) be transposed, which will give \( c = \frac{90 b d^3}{P l^2} \). Find \( P \) by applying a string to a flexible strip of the material to be experimented upon, in the manner of a chord to an arc, and ascertain the tension on the chord with an accurate spring balance. It will be found that, whether the strip be bent much or little, the tension on the chord, as shown by the spring balance, will be constant, and this tension, in pounds substituted for \( P \), will give the value of \( c \) without requiring, as is necessary with other formulæ, an observation of the deflection.

Experiments made upon these principles with strips of white pine, yellow pine, and white oak, 5 feet long, \( \frac{1}{4} \) inches wide, and \( \frac{1}{4} \) inch deep, gave the following results:

The observed tensions were,

- White Pine, 7\( \frac{1}{4} \) lbs. value of \( c = 0.0097 \)
- Yellow Pine, 6\( \frac{3}{4} \) “ “ “ = 0.0108
- White Oak, 6\( \frac{3}{4} \) “ “ “ = 0.0104

As the stiffness is inversely as these constants, it follows that white pine is stiffer than yellow pine or oak. The experiments of Tredgold give similar results.

**Tension.**

When a force is applied in the direction of the axis of a suspension rod, the resistance is directly proportional to the area of the section; and, consequently, it is only necessary to multiply this area by the number expressing the resistance of a square inch. As metals are the only substance well suited to resist tensile strains, we find that they are almost exclusively employed for this purpose, and generally in such lengths,