32. Three poles, each 20 feet in length, are joined at the top, and their feet rest at the vertices of an equilateral triangle with side 12 on level ground. (a) Find the angle of inclination of each pole. (b) Find the vertical height of the tops.

33. If, in Ex. 32, 100 lbs. be suspended from the tops of the poles, find (a) the end pressure on a pole, (b) the horizontal thrust at the bottom of a pole; the weight of the pole being not considered.

34. ABC is a triangle of which AB and BC are rigid rods. C is fixed, and A is compelled to move in the line AC. If a force, p, be applied to A along AC, show that the force (a) acting perpendicularly to AC is $p \sin C / \sqrt{n^2 - \sin^2 C}$; (b) acting along BC is $p \{\cos C - \sin^2 C / \sqrt{n^2 - \sin^2 C}\}$; (c) acting perpendicularly to BC is $p\{\sin C + \sin C \cos C / \sqrt{n^2 - \sin^2 C}\}$, where n is the ratio $AB : BC$.

(This exercise embodies the principles of the crosshead and crank in the steam engine.)

35. From the corner of a cuboid a piece is cut off by a plane saw cut, which reaches to the distances a, b, c respectively on the three edges. Prove that the area of the section is $\frac{1}{2}\sqrt{a^2b^2 + b^2c^2 + c^2a^2}$.

36. At the vertices of an equilateral triangle line segments, a, b, c respectively, are drawn normal to the plane of the triangle. Show that the area of the triangle formed by connecting the outer points is $\frac{1}{4}\sqrt{\{3s^4 + 4s^2(\Sigma a^2 - \Sigma ab)\}}$, where s is the side of the equilateral triangle.