A BRIEF TREATISE ON TRIGONOMETRY

30. If an iron plane have an inclination of 3°, find the force, acting along t^{2} plane, necessary to slide a block of iron of 100 gms. (a) up the plane, (b) down the plane.

31. The friction of a metal on oak is about 0.5. What force acting at 30° upwards will move 100 kgms. of iron along a level oak floor?

32. Three reles, each 20 feet in length, are joined at the top, $a^{-n'}$ 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 pplied to A along AC, show that the force (a) acting perpendicularly to AC is p $\sin C/\sqrt{n^2-\sin^2C}$; (b) acting along BC is p {cos $C - \sin^2C/\sqrt{n^2-\sin^2C}$ }; (c) acting perpendicularly to BC is p{sin $C + \sin C \cos C / \sqrt{n^2 - \sin^2C}$ }, 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 $\frac{1}{2}\sqrt{a^2b^2+l} \ z^2+c^2a^2$.