that diagonal of it which passes through the point will represent in magnitude and direction the Resultant of the Forces.

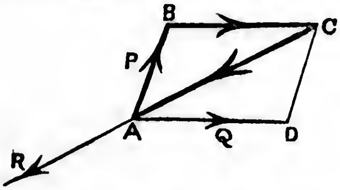
Also, if any number of Forces act at a point, the necessary and sufficient conditions of equilibrium are that the algebraic sums of the Forces resolved along three mutually perpendicular directions shall separately vanish.

The following propositions are historically interesting, though included in what has preceded.

27. *Triangle of Forces.* Triangle of forces.

If the directions of three forces acting at a point, be parallel to the sides of a triangle taken in order, and their magnitudes be proportional to these sides, they will keep the point at rest. Stevinus.

For if $ABC$ be the triangle, and $A$ the point at which the forces act; then, completing the parallelogram $ABCD$, the two forces represented by $AB$, $BC$, will be represented by $AB$, $AD$, and their resultant by $AC$, which is equal and opposite to $CA$, the third force.




28. Conversely. If three forces acting at a point and keeping it at rest, be represented in direction by the sides of a triangle taken in order, these sides will represent them also in magnitude.

29. Hence, all problems relative to three forces keeping a point at rest are reduced to the solution of a plane triangle. Thus, if $P$, $Q$, $R$, be the forces, and the angle between $P$ and $Q$ be represented by $(P, Q)$; then the angles of the triangle in the above proposition are the supplements of the angles between the forces; and, since the sine of an angle is equal to that of its supplement, and the cosine of an angle is the cosine of the supplement with opposite sign, we have (Trig. §34, 40.

$$\frac{P}{\operatorname{Sin}(Q,R)} = \frac{Q}{\operatorname{Sin}(R,P)} = \frac{R}{\operatorname{Sin}(P,Q)}\text{'}$$

Lami's Formulas.