

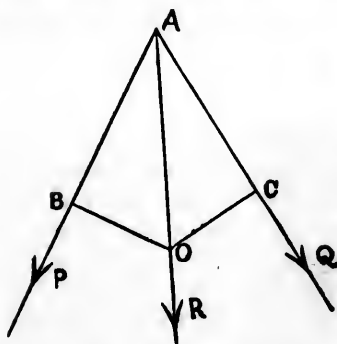
### CHAPTER III.

#### FORCES IN ONE PLANE ACTING ON A SYSTEM OF RIGIDLY CONNECTED POINTS, WHICH CAN TURN FREELY ABOUT A FIXED POINT IN THE PLANE.

32. Two intersecting forces act on a rigid system, in the same plane with a fixed point round which the system can turn.

Condition of equilibrium when the two forces meet.

Let  $O$  be the fixed point;  $P, Q$ , two forces in the same plane with  $O$ , their directions intersecting in  $A$ , at which point, rigidly connected with  $O$ , they may be supposed to act.



Then if  $R$  be the Resultant of  $P, Q$ , in order that the point  $A$  and the whole system with which it is rigidly connected may be kept at rest, it is

necessary and sufficient that the direction of  $R$  shall pass through the fixed point  $O$ : that is,  $AO$  must be the direction of  $R$ . Draw  $OB, OC$  perpendicular to the directions of  $P, Q$ . Then, resolving the forces at  $A$  in a direction perpendicular to  $AO$ , we have (§ 21, 22):

$$P \sin OAB - Q \sin OAC = 0, \text{ and therefore}$$

$$P \cdot OB - Q \cdot OC = 0, \text{ or,}$$

$$P \cdot OB = Q \cdot OC.$$