## SOLID OR SPATIAL GEOMETRY.

8

Therefore, in revolving OP from the position OE to the position OF the  $\angle DOP$  changes from less than a right angle at DOE to greater than a right angle at DOF; and hence at some intermediate position OP is  $\perp OD$ .

Cor. If AB is  $\perp$  to CD, and OP is  $\perp$  to both, we have the elines mutually perpendicular to each other.

Def. 1. Three concurrent lines mutually perpendicular to one another are called the *three rectangular axes* of space, and their planes are the *rectangular co-ordi*nate planes of space. These three lines admit of length measures in three directions, each perpendicular to the other two. Hence, space is said to be of three dimensions, or to contain three dimensions, and it is frequently spoken of as tri-dimensional space, in contradistinction to the two-dimensional space of a single plane, or of plane geometry.

Def. 2. A line lying in a particular plane is a planar line of that plane; and when only oue plane is under consideration, a planar line will mean a line in that plane.

Def. 3. When OP is perpendicular to both AB and CD, it is perpendicular to the plane which these lines determine (Art. 6. Cor. 2).

OP is then a normal to the plane, and O is the foot of the normal.

Also, the plane is a normal plane to the line OP.

9. Theorem. A normal to a plane is perpendicular to every planar line through the foot of the normal.