An object having three dimensions may be shown on a single plane by means of ***projection***. The projection of a point on a plane is a point .The projection of a line on a plane is generally a line. The plane upon which points or lines are projected is the ***plane of projection***. The ***direction of projection*** is the direction in which a point is projected into the plane of projection. The direction of projection is perpendicular to the plane of projection in ***Normal projection***.

Normal projection is illustrated in Fig. (1). Points and lines have been projected into the horizontal plane represented by the upper surface of the blocks. In Figure (1-A), point ***B*** is the projection of point ***A;*** line ***EF*** is the projection of line ***CD***. In Figure (1-B), line ***GI*** is the projection of line ***GH*** into this plane.

The line of intersection of two planes is the trace of one plane upon the other. The trace of one plane of projection upon a second plane of two planes is call*ed a* folding line. In normal projection the angle between two planes having a common folding line always **90** degrees.

To represent a plan (*map*) and a *section* on one plane (paper), it is required to rotate the section into the plane of the map around the ***folding line*** as an axis. In the following problems it is best to consider the section as lying below the folding line; the section will then be rotated upward into the horizontal plane. In figure (1-C), point B is the projection of point A into a horizontal plane; point C is the projection of point A into a vertical plane represented by side of the block. Figure (1-D) shows the projection after the vertical plane has been rotated into the plane of the paper about the folding line (F.L.) as an axis.

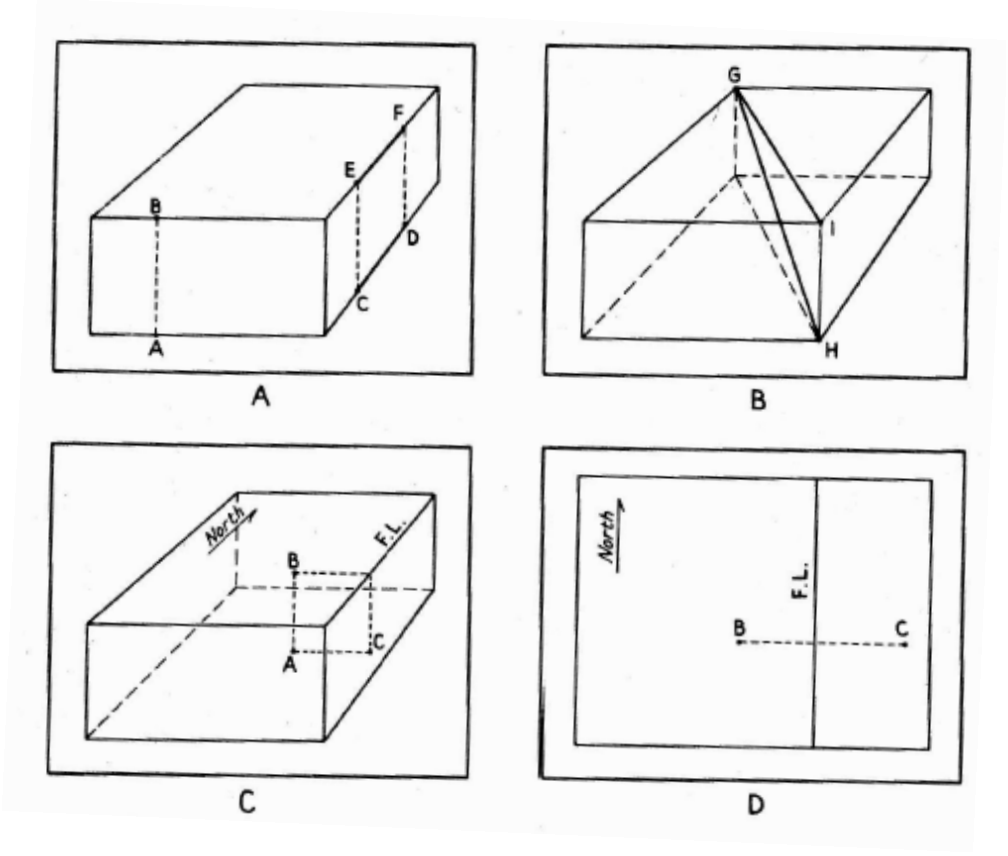

Figure. (1): Normal projection of points and planes on horizontal and vertical planes.

Exercise (1): A vein that strikes N40ºE and dips 40ºNW intersect a vein that strikes S30ºE and dips 55ºNE.Draw the projection of the intersection of the intersection of the two vein on a horizontal plane, and find the attitude of the intersection

Exercise (2):A joint that strikes N41ºE and dips 55ºNW intersects a vein that strikes N64ºW and dips 40º SW. Draw the projection of the intersection on a horizontal plane ,and find the orientation of the intersection

Exercise (H.W.): a vertical vein that strikesN49ºW intersects a joint that strikes N39ºE and dips 41ºNW.Determine the trend and plunge of the intersection.

Exercise (H.W.):The two limbs of a fold strike N62ºE and S46ºE,dip 34ºNW and 56ºNE,respectively.Find attitude of the hinge line of the fold .

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Procedure:

(1) Draw AB and CD parallel to the respective strike of the vein.

(2) Construct a folding line FF' perpendicular to AB**.**

(3) Using these folding lines as the horizontal, to make cross section. Draw HH' parallel to F.L. and at an arbitrary distance (h) from FF'. HH' and II' represent a level which will be called the lower reference plane (L.R.P.) F" is the intersection FF' with AB.

(4) Draw angle FF"J and G'G"K equal to the respective dips of the two veins. F"J intersects HH' at J'**.**

(5) Draw J'M and K'L parallel to AB and CD. These two lines represent the horizontal projections (H.P.) of contours on the two veins at (h) distance below the plan. Point N is the (H.P.) of intersection of the veins on the L.R.P. and point O is the intersection of the two veins on the plan.

Therefore, line ON is the (H.P.) of the intersection of the two veins.