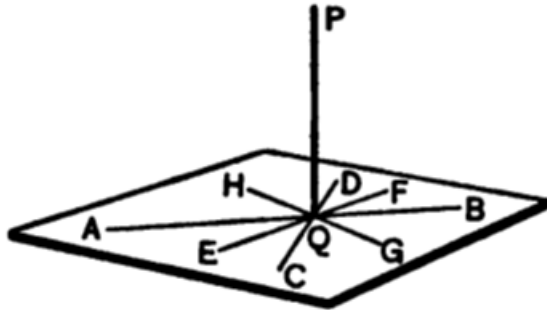


Perpendiculars to a given line at a given point on that line, in three dimensions



Given a line, a point on the line, and a plane containing that line, a basic result in Euclidean geometry states that there is a unique perpendicular to the given line at the given point, and contained in the given plane. The drawing above shows the need to choose a plane containing the line. Observe that there are multiple lines to **PQ** which are perpendicular to that line at **Q**. The line **PQ** and the lines perpendicular to **P** at **Q** determine distinct planes. In fact, the union of perpendiculars to **PQ** is a plane which is perpendicular to **PQ** at **Q**.