actually does not turn his body and drawing materials until his line of direction passes through some conspicuous part of the object, even if this causes the line of direction to be other than horizontal. It will, perhaps, be evident to the student from this, that there is nothing about the drawing of an object taken by itself, to indicate its position with regard to anything but the picture plane. Our idea of the size and position of objects is formed by comparing them with one another and with certain things which are fixed, as the surface of the earth and the horizon, or, in other words, with a horizontal plane.

It is evident that a circle cannot be placed so that one of its diameters is not parallel with the picture plane, and that the diameter, which is parallel to the picture plane, suffers no change of direction or diminution in length by foreshortening, but only by reason of its distance from the picture plane. This diameter, however, is not represented by the transverse axis of the ellipse representing the circle. Reference to Fig. 7 will make it plain that the apparent widest part of a circle or a sphere is a little nearer to the eye than the centre, and it is this apparent longest line (*C D*, Fig. 7) which is parallel to the picture plane that is represented by the transverse axis of the ellipse. It will be seen that the relative lengths on the picture plane of *A B* and *C D* are *a b* and *c d*, the diameter *A B* appearing the shorter.

The fact that the transverse axis of an ellipse does not correspond to a diameter of the circle it represents, can be proved by drawing a square containing a circle and representing both in perspective. The perspective centre of the circle, found by drawing the diagonals of the square, is above or below the transverse axis of the ellipse according as the circle is represented as being below or above the level of the eye, the transverse axis of the ellipse being in the centre of the ellipse, bisecting the conjugate axis.

This, together with the relative foreshortening of the diameters of the circle, is shown in Fig. 8, which illustrates the appearance of concentric circles. The diameter *A B*, of the largest circle is divided into eight equal parts, and other circles are drawn with the same centre, their circumferences passing through the points of division. If these circles be horizontal one diameter of each will be horizontal, and they will be in the same line. Suppose this line to be *C D*, then *C D* will contain the apparent longest diameter of the circles and *A B* the shortest diameters. The line *A B* will be divided into eight parts all unequal, while the divisions of *C D* will be equal.

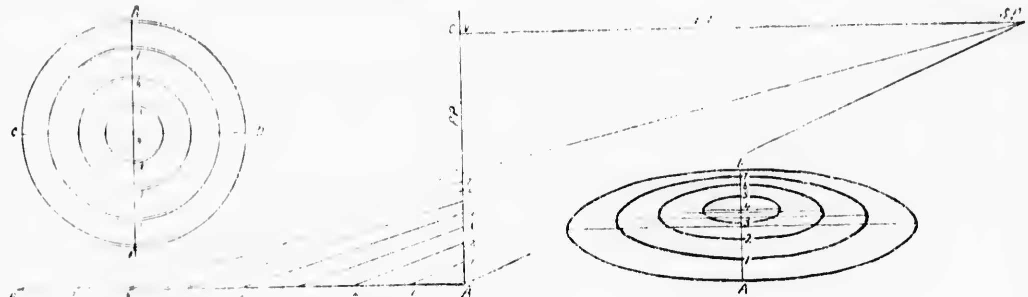

FIG. 8.

Let S P represent the position of the eye of the spectator, P P the picture plane, L D the line of direction, and *A B* with the divisions 1, 2, 3, 4, 5, 6 and 7, the diameter, *A B*, of the largest circle perpendicular to the picture plane. The rays of light passing from the points 1, 2, 3, 4, etc., in *A B* to S P, cut the picture plane in the points 1, 2, 3, 4, 5, 6, 7, *b* which give the perspective positions of these points as compared with *A*. The divisions of *A B* decrease in size as they approach *b*. The point 4 indicates the position of the centre of the circles as compared with *A* and *b*. As stated before, the transverse axis of an ellipse bisects the conjugate axis. Thus the transverse axes of the four ellipses in question will be midway between *A* and *b*, 1 and 7, 2 and 6, and