

that its circular end be facing the observer the sides $a c$ and $b d$ will appear much shorter, and the ends will be as nearly as possible circles. Compare Figs. 26 and 27. A common error is to draw the cylinder too long, hence great care should be taken in making comparisons of the various dimensions. Although sloping planes have been left for future discussion, the sloping cylinder may be attempted at once, as the same rules govern the drawing in sloping positions as in the horizontal or perpendicular positions. Figs. 28, $a b c$ and d , will explain themselves. It may, however, be noted that when the axis of the cylinder appears quite vertical, as in Fig. 28, c and d , although the cylinder itself is sloping, the long axis of the elliptical ends are quite horizontal. This is the only case in which this can occur.

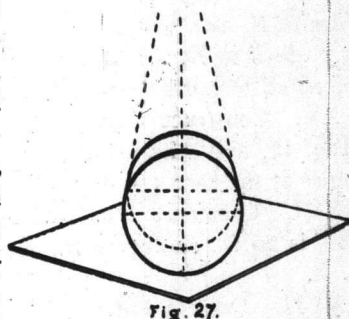


Fig. 27.

Fig. 29 shows a drawing of a ring. As the ring is only a section of a hollow cylinder, it may be well to devote a small space to it here. It will be seen that the upper surface consists of two concentric circles, and the lower one the same. It only remains, therefore, to show how the two are joined. We have seen that the sides of cylinders are *nearly* at right angles to the long axis of the circular end. In the case of the ring or short cylinder, these sides may be considered to be *quite* at right angles, and therefore parallel, hence in drawing the ring, first obtain the ellipse representing the outer edge of the upper surface, then draw $a f$ and $b g$ at right angles to the long axis of the ellipse. Through f and g draw a similar ellipse to the upper one. To show the inner edge of the ring two smaller ellipses should be drawn in the same manner, but it will be noted that only a portion of the lower one is seen, and that inside the hollow of the ring.

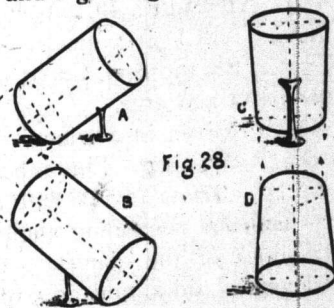


Fig. 28.

Careful study of Fig. 29 will show that each pair of ellipses, being so near together, may be drawn exactly similar. The student may at first be inclined to attempt to draw the upper ellipses, showing the same amount of space between all the way

round. This would obviously be wrong, as a casual glance at the remarks on foreshortening and Fig. 13 would show. Care should, therefore, be taken to get the correct proportions of the major and minor axes of each ellipse independently. Another common error is to forget that the lines $d h$ and $a f$ are really equal. In no case could $a f$ or $b g$ be greater than $d h$, yet it is frequently drawn so. (Fig. 29 B.) It is also quite common to find these lines $a f$ and $b g$ curved, instead of being perfectly straight and parallel, and forming the boundary lines of the lower and upper ellipses alike. (Fig. 29 A.)

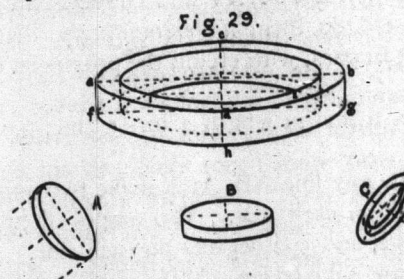


Fig. 29.

But probably the most fruitful source of error lies in not recognizing the fact that *the short axis of the figure bisects every curve*; thus $c h$ in Fig. 29 has the same drawing on either side of it. The line 1 2, in Fig. 29 C, is therefore evidently wrong, since the curve ending in these points is not bisected by the short axis of the drawing. A glance at Fig. 29 will show that the line 1 2 should be *parallel* to the long axis. This will be true whatever the position of the ring. It will also be found that the important fact mentioned above holds good not only in rings, but in cylinders, cones, vases and all other symmetrical figures.

Erratum.—In the last article the first line of print under Fig. 19 should be the last line of the column.

When a noted biologist was lecturing on the dangers of bacteria, a Frenchman in the audience said to a German, "He is speaking of germs; now I see where your name comes from."—"No," said the German, "he is speaking of Paris-ites."—"Be-dad," said an Irishman who overheard them, "Ye're both wrong. It's Mike-robes they are."

Professor Flinders Petrie, the great British Egyptologist, in a lecture at Paris recently, stated that human history has been traced back in detail 9,000 years, and that Egypt is the seat of the oldest historical civilization, although there are proofs that the forerunners of the races there came from other regions.

I find the REVIEW very helpful indeed. I enjoy its breezy articles very much.