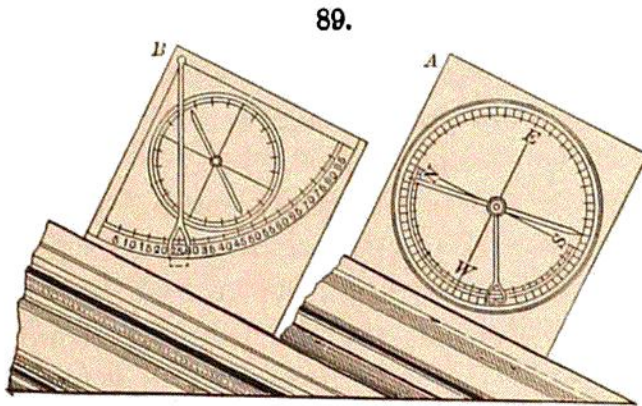


is in the opposite direction from the dip. The *strike* is the horizontal direction, *st* (Fig. 87), at right angles to the dip. The direction of strike is ascertained



by means of a compass; and the angle of dip by a *clinometer*.

A *clinometer-compass* is a compass in which the movement of a plummet measures the angle of dip, the degrees being marked on a graduated arc, as shown in Fig. 89. The compass in its best form has a square base, with one side of the square parallel to the N.-S. line, so that the side

may be used in place of the line, or the instrument may be applied by one side to the rock, or used in sighting distant slopes.

The edges of outcropping layers give the true dip only when the section affording them has the direction of the dip, as those on the right side of Fig. 87, or those of the side 1 in Fig. 88; but those of sides (or sections) 2 and 3 in the latter figure vary in direction from the dip; and those of 4 have no dip, but are horizontal, and have therefore the direction of the strike.

In the best clinometer-compass the square base is about 3 inches in diameter. A clinometer (Fig. 89 B) is easily made out of a block of hard wood, 3 to 3½ inches square, and half an inch thick. A small compass may be set into the same block, with its N.-S. line parallel to one side of the block, as in the figure, making the instrument serviceable for taking directions of strike or dip, though too small for good compass work.

In making observations, first take the *strike*, and in recording it refer it to the *north* point; *e.g.* N. 20° E. (if that be the direction), never S. 20° W.; only the direction of glacial scratches should be referred to the south point. Next note whether the dip is easterly or westerly, and measure the amount; if 50° easterly, then it is 50° in the direction S. 70° E., this course being at right angles to the strike. The entry "strike N. 20° E., dip 50° E." includes the whole. To obtain the true strike, the edge of the laminated rock selected for the measurement must be *perfectly* horizontal; if there is none such in an outcrop, draw a horizontal line on one of the beds. The error from a variation from horizontality increases as the dip decreases, and becomes null only when the dip is vertical.

In taking the strike, the side of the square compass parallel to its N.-S. line should be used; and it is better to apply it to a piece of board laid over the rock than to the rock itself. But it is not necessary to put it on the rock; it is generally best to make the observation standing, with the N.-S. side of the compass between the eye and the outcropping edge. The same method may be used also in taking the dip; and if the observer is in the line of strike, he can thus take the dip even when the ledge is rods distant. The slope also of a mountain on the horizon can be obtained with a clinometer in the same way.

Before making a measurement, it must be ascertained that the outcrop is not that of a boulder, or of layers displaced by the growing roots of trees; and that the particular locality will give a mean, not a local, result. Perfectly uniform strikes or dips for a distance of a hundred yards are not generally to be expected, — a fact that will trouble the young geologist in his first field observations.

When, among the exposed sections at a place, none is at right angles to the strike,