

If the upper surface of a hard stony stratum be uncovered, whether artificially in a quarry, or by the waves at the foot of a cliff, it is easy to determine towards what point of the compass the slope is steepest, or in what direction water would flow, if poured upon it. This is the true dip. But the edges of highly inclined strata may give rise to perfectly horizontal lines in the face of a vertical cliff, if the observer see the strata in the line of their strike, the dip being inwards from the face of the cliff. If, however, we come to a break in the cliff, which exhibits a section exactly at right angles to the line of the strike, we are then able to ascertain the true dip. In the annexed drawing (fig. 69), we may suppose a headland, one side of which faces to the north, where the

Fig. 69.

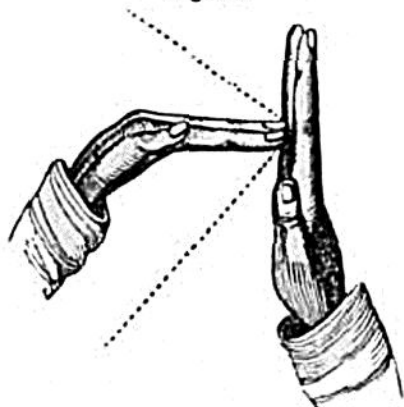


Apparent horizontality of inclined strata.

beds would appear perfectly horizontal to a person in the boat; while in the other side facing the west, the true dip would be seen by the person on shore to be at an angle of 40° . If, therefore, our observations are confined to a vertical precipice facing in one direction, we must endeavor to find a ledge or portion of the plane of one of the beds projecting beyond the others, in order to ascertain the true dip.

It is rarely important to determine the angle of inclination with such minuteness as to require the aid of the instrument called a clinometer. We may measure the angle within a few degrees by standing exactly

Fig. 70.



opposite to a cliff where the true dip is exhibited, holding the hands immediately before the eyes, and placing the fingers of one in a perpendicular, and of the other in a horizontal position, as in fig. 70. It is thus easy to discover whether the lines of the inclined beds bisect the angle of 90° , formed by the meeting of the hands, so as to give an angle of 45° , or whether it would divide the space into two equal or unequal portions. The upper dotted line

may express a stratum dipping to the north; but should the beds dip precisely to the opposite point of the compass as in the lower dotted