

eliminated. To overcome the dip of the north end of the needle downwards, the ordinary compass needle has attached to the south arm of the needle a bit of brass wire at the proper distance from the pivot, so that the needle will swing horizontally. In the instrument before us this is accomplished by fastening the fibres to an arm extending about one-half of an inch above the body of the stirrup, thus causing the point of suspension to be raised so high above the centre of gravity of the magnet that the latter is little affected by the dip and will hang sensibly horizontal in ordinary latitudes.

On the south end of the magnet is a graduated scale, divided into 60 equal parts, one division being equal to two minutes of arc, and on the north end is a small lens of such shape as to bring the scale into focus in the small observing telescope when the latter has been focused on a distant mark. This telescope, as will be noticed, is mounted eccentrically on the same support as the magnet box. It is provided with collimation and wye adjustments. The instrument is leveled by means of the striding level resting on the pivots of the telescope. The azimuth or reference mark may be sighted with the telescope by looking directly through the box, the magnet having either been removed or lowered out of the way, and by turning aside the glass window and reflector placed at the south end of the box to throw the necessary light on the graduated scale. On the north end of the box is simply a round opening—no glass window—and hence both the mark and the scale can be observed directly without looking through any glass windows. To shut out air currents the dark hood is fastened to the box and fitted tightly over the telescope tube.

To eliminate the error in the declination that may be due to non-coincidence of the *geometric* and of the *magnetic* axes of the magnet, the magnet is turned around 180° in the stirrup, so that the part which was on top before is now at the bottom. The scale at the south end will now be inverted and the figures read from right to left. The mean of the readings taken with magnet erect and with magnet inverted determines the magnetic axis.

The small tube on the right of the glass tube containing the suspension fibres is a thermometer for noting the temperature inside the box