

when making the intensity observations, and the small counter-weight directly below the reflector serves as a counter-balance to the telescope.

The upper part of the magnetometer bearing the magnet box and telescope is fastened to the base and horizontal circle by two screws and may thus be quickly removed, and the theodolite for determining the true astronomical direction may be substituted. The theodolite or alt-azimuth attachment is shown in the right of the figure. Thus the same base horizontal circle serves for both the magnetometer and the theodolite attachments. The horizontal circle has a diameter of 11.2 centimetres (4.4 inches), and the vertical circle, of 9.8 centimetres (3.85 inches). Both circles are graduated to half-degrees and read by opposite verniers to minutes.

The horizontal circle is graduated clock-wise from 0 to 360°, while the vertical circle is graduated anti-clockwise from 0 to 90° in each quadrant. For vertical circle east, when sighting south, the readings of the vertical circle give at once the altitude of the object, and in the reversed position, the zenith distance.

For the intensity observations, when the magnet above described is used as a deflector, two graduated wooden arms (not shown in the illustration) are inserted beneath the magnet box. On the arms rests a slider supporting the deflector at the same height as the auxiliary magnet in the box and at any desired distance.

The next figure (Plate XV, No. 2) illustrates an instrument similar to that used in determining the magnetic inclination or dip. It is of the usual Kew pattern and known in the Coast and Geodetic Survey as Casella Dip Circle No. 56/4440. In this instrument the needle is flat, tapers to a point on each side, is 3½ inches long and is mounted so that it swings in a vertical plane instead of in a horizontal plane, as in the case of the surveyor's compass. The pivots of the needle swing on agate planes and are ground as accurately as possible. The needle is enclosed in a glass case to shut out all air currents and is provided with a lifter for lifting the needle off the agates or letting it down on them preparatory to observing. The angle of dip is read off on the vertical circle outside the glass box. The pointings on the ends of the needle are made with the aid of microscopes. The box with the