

The changes of dip and total force are derived from those of the two components of the force, but the change in the dip is also known by the induction inclinometer.

The above named differential instruments are ordinarily read seven times in each day, namely, at 6 a.m., 8 a.m., 10 a.m., 2 p.m., 4 p.m., 10 p.m., midnight.

The differential instruments when read only by the eye, but with sufficient frequency, are adequate to reveal the existence and general character of many interesting facts, but without the aid of self-recording magnetometers, it is impossible to ascertain the changes that take place in the values of the elements during the intervals between the times of reading, and whose amount and times of occurrence should be exactly known, in order that the connection between magnetic and other physical phenomena may be traced out.

The photographic self-recording magnetometers at Toronto, resemble, in their general character, those in operation at the Observatory of the Royal Society at Kew, and are mounted in an underground room where the changes of temperature are very slow and minute. These instruments have been working very satisfactorily since the beginning of the year.

METEOROLOGICAL OBSERVATIONS.

The ordinary meteorological instruments for observations by the eye, are read six times daily. In addition to these, since the early part of 1876, we have had a photographic barograph and thermograph in successful operation, and also, since the spring of 1875, an anemograph, constructed by Beck, of London. These self-recording instruments are similar to those used at the seven observatories in connection with the British Meteorological Office.

ASTRONOMICAL OBSERVATIONS.

The Observatory is not furnished with apparatus suitable for astronomical research. The astronomical observations are not made in the interests of astronomy, but are subservient to other purposes and are almost entirely confined to transits for time. The correct time determined at this establishment is necessary for our magnetical and meteorological observations. It is also the standard by which all the clocks and watches in Ontario have been regulated for more than thirty years, and for more than six years the Observatory has given time, daily, to the City, by striking all the fire alarm bells at a fixed instant (11:55 a.m.)

EXTRANEOUS WORK.

There are sundry services rendered to the public which add considerably to our work, and which, although they do not strictly form part of the duties of the staff, are naturally associated with them. The following are some of the services referred to:—

- (1.) Giving information on scientific subjects to visitors.
- (2.) Supplying information by telegraph and mail to applicants in Canada, and other countries.
- (3.) Examining instruments brought for comparison.

The operations, however, under the title of extraneous work, which have occupied the most prominent place in late years, are those of the Meteorological Office, which originated at the Toronto Observatory, and has been carried on since, to a great extent, by the labours of its staff.