the same principle as is customary for Right Ascensions. All the star observations are reduced to the mean places for the beginning of the year. Seventeen observations were made of the R.A. of the Moon's bright limb, and two of the horizontal diameter.

With the Equatoreals twenty-one occultations have been observed. The final equations in the Greenwich form have been computed for forty-seven occultations, observed between 1884, October 4, and 1887, February 10.

Comet 1886 I. (Fabry) was observed for place altogether on nineteen nights between 1885, December 7, and 1886, April 1; Comet 1886 II. (Barnard), on fourteen nights between 1885, December 27, and 1886, April 15; Comet 1886 V. (Brooks I.) on four nights between May 6 and May 20. These observations are completely reduced, and all the comparison of stars have been observed on the Meridian two or three times. Comet Barnard-Hartwig, at present visible, has been observed for place on seven nights between December 19 and January 5.

The 18-inch Reflector has been fitted with a new declination-axis, and is now sufficiently rigid; but the driving movement is very irregular.

An instrument by Kahler, of Washington, D.C., for determining absolute personal equations in observing transits, has been brought into use with the Morse chronograph.

Mr. Wigglesworth's Observatory, Scarborough.

The building of the observatory was commenced in the summer of 1884, and by the end of the year the dome was ready for the reception of the instrument. The dome is 30 feet in diameter, hemispherical in shape, and covered with very strong papier-mâché, $\frac{1}{3}$ inch in thickness, which is rivetted with copper rivets to the framework of T-iron. The shutter is of a construction originally introduced by Messrs. T. Cooke & Sons. It has the form of a semicircle striding over the dome. The tail end terminates as a pivot, while the other end, which is the base of the real shutter, rests on a rail. The shutter therefore turns round the pivot in a circle of more than 30 feet radius. It moves with great ease, and practically without noise. On the top of the dome is another rail, to steady the shutter in case of a strong wind. The slit has a width of 5 feet 10 inches at the bottom, and of fully 3 feet at the top. The dome is supported by a brick wall 13 feet in height from the floor to the top of the flat rail on which the wheels of the dome are running. The dome is turned by a cogwheel running in a rack-circle, and is moved with great ease. The rigidity of the dome is very great; it has never been noticed to shake, even when the wind was very strong.

The telescope, which was also constructed by Messrs. T. Cooke

& Sons, was set up in the dome in February 1885. The object-glass, which is a very fine one, has a clear aperture of 15·5 inches, and a focal length of 231·5 inches. The mounting is executed in Cooke's well-known style. Both the polar axis and the declination axis are of steel. There are no friction wheels to the latter, but the instrument turns with great ease in declination. The hour circle reads to 2 seconds of time, and the declination circle to 10 seconds of arc. The latter is read from the eye end of the instrument. The clamps and slow motions in right ascension and declination are worked from the eye end. The driving-clock is of the same construction as that at Dunecht, but without the electric control. There are two finders of 2·5 inches aperture. In front of the object-glass is an iris-diaphragm, by which the aperture may be reduced down to 4 inches. It is worked by a rod from the eye end, and the aperture is read off on a dial. It has been found very convenient on many occasions; the full aperture, however, gives as a rule the best definition.

The mean-time clock is believed to be a unique specimen. It was invented and made at the beginning of this century by George Prior, who was a watchmaker in Leeds, and who received a medal of the Society of Arts for the escapement in this clock. For a long time it was the standard clock of Leeds; after the death of George Prior, however, it came into the possession of Mr. Wigglesworth. The impulse received by the pendulum is independent of the train of the clock; it is given every alternate second by a spring, which is then pushed back to its starting-point by a tooth of the escapement wheel. There is a great difference between the two drops of the escapement wheel; the one is nearly three times as large as the other, and on this difference depends the impulse given by the spring to the pendulum. At the long drop the spring is pushed back; at the short drop it is released, and gives impulse to the pendulum until it is arrested by the next tooth of the escapement wheel. The length of the drop is best seen by the motion of the seconds hand, which shows alternately long and short seconds; the beat, however, is perfectly even—one second is as long as the other. The locking is effected by jewelled detent springs, which are independent of each other. Steel and zinc bars form the compensation of the pendulum, and by the addition of a very small mechanism they have also been made to act as a metallic thermometer. The clock keeps very good time, and has a clear, sharp beat.

There are two spectroscopes by Browning, a reversion spectroscope for observing the Sun, and a McClean star spectroscope.

A micrometer by Merz was kindly lent by Lord Crawford in July 1885. It has only one micrometer screw, but a fine movement can be given to the whole micrometer by two screws in

the adapter, which is a more convenient arrangement than to have two micrometer screws.

Regular observations were commenced in September 1885.

The value of the micrometer screw was determined from numerous transits of *Polaris*.

The new star in *Andromeda* was observed on fourteen nights, and the results have been published in the *Monthly Notices*.

Nova *Cygni* was examined on several occasions.

Gore's new star was examined with the spectroscope and measured from neighbouring stars on two occasions.

The dimensions of *Saturn* were also measured with the micrometer.

Comet 1885 *a* Barnard was observed for place on two nights.

Comets 1885 *d* Fabry, and 1885 *e* Barnard, were each observed on five nights.

In 1886 the observations were of a similar kind.

The dimensions of *Saturn* were measured on one occasion.

The nebula in *Andromeda* was examined on several occasions, but no changes could be detected in it. The same was the case with Nova *Cygni*.

Gore's new star was measured on three nights.

Comet 1885 *e* Barnard was observed once in this year.

Comet 1886 *f* Barnard-Hartwig was observed on twenty-one nights, and some sketches of it were also made.

Comet Finlay was observed twice.

The minor planet *Sappho* has been observed six times at the request of Mr. R. Bryant.

A want of star places has often made a delay in the reductions inevitable.

The adopted co-ordinates of the observatory have been taken from the 6-inch survey map, and are—

Longitude of Observatory $= 1^m\ 38^s{\cdot}9$ west of Greenwich.

Latitude „ $= +\ 54^\circ\ 16'\ 30''$.

The height above the level of the sea is about 150 feet.

Royal Observatory, Cape of Good Hope.

The present report includes the period January 1 to December 31, 1886.

Observations with the transit-circle have been continued regularly throughout the year, the objects of observation being the Sun, *Mercury* and *Venus*, the stars on the list of the Cape Ten Year Catalogue for 1890, comet comparison stars, stars occulted by the Moon, stars employed in determining latitudes in connection with the Geodetic Survey, and stars employed in