

Monday, 5th January 1846.

Sir T. MAKDOUGALL BRISBANE, Bart., President, in
the Chair.

The following Communications were read:—

1. On a new variety of Gamboge from the Wynaad. By Dr Christison.
2. Results of the Makerstoun Observations, No. 1. On the Relation of the Variations of the Earth's Magnetism to the Solar and Lunar Periods. By J. A. Broun, Esq. Communicated by Sir T. M. Brisbane, Bart.

The observations from which the following results are deduced, were obtained during the years 1844 and 1845, by means of the bifilar magnetometer, described in the Makerstoun Observations for 1841 and 1842; they are corrected for temperature by a method previously described.*

From the Observations for the year 1844, the diurnal variation of the horizontal force is found to consist of two maxima and two minima; *the* minimum occurs at 10^h 20^m A.M. (Makerstoun mean solar time is used throughout), *the* maximum at 5^h 30^m P.M.; a minimum occurs at 2^h 20^m A.M., and a maximum at 5^h 30^m, or 40^m A.M.: two inflexions occur in the mean curve between 3^h and 4^h P.M., and between 8^h and 9^h P.M. The periods of maxima and minima vary throughout the year, and the morning maximum is greater than the afternoon maximum in winter.

The diurnal range is greatest in July and least in January; the mean of the ranges for these two months, the range for the month of March and for the month of October, are each nearly the mean diurnal range for the year.

The author shewed to the Physical Section of the British Association in June 1845, that the Makerstoun Observations for 1842 indicated a well-marked annual period of horizontal force, consisting of maxima near the solstices, and minima near the equinoxes; in correcting the Toronto Observations for 1842, by the method already noticed, he had arrived at the same result. He has now verified this period from the Makerstoun Observations for 1843, 1844, and 1845.

* Transactions of the Royal Society of Edinburgh, Vol. XVI. Part. 1.

The mean horizontal force for each month is nearly the same as the mean for midnight and for 1^h P.M.

The secular variation is positive, the increase being considerably less for 1845, than for any of the previous years.

When the annual variation is eliminated from the means for each month, the author finds that the secular variation is scarcely sensible about 6^h 40^m A.M., an hour *after* the morning maximum, in the first six months of the year 1844, and about 4^h 40^m P.M., an hour *before* the afternoon maximum, in the last six months of the same year.

A lunar period for the horizontal force has been deduced, which (like the annual period, and the sun's declination) shews maxima when the moon has its greatest N. and S. declination, and minima between these periods. Each of the years 1844 and 1845 give nearly the same result.

The author has also deduced a period depending on the moon's phase or synodical revolution, consisting of a maximum of horizontal intensity, about two or three days after the new moon, and a minimum about two or three days after the full moon: this period is shewn with the same distinctness and regularity in each of seven months of 1844.

The Observations for 1844 and 1845 have each been investigated for the determination of a period connected with the moon's hour angle; the author finds this period to consist of two maxima and two minima. From the Observations for 1844, *the* minimum occurs about 5 hours before the moon's meridian passage, *the* maximum about 1½ hours after the passage of the inferior meridian; a maximum occurs before 4^h after the meridian passage, and a minimum about 8 hours after the meridian passage. These periods have been verified by the Observations for 1845, excepting that, for 1845, the secondary maximum occurs before 3 hours after the meridian passage: the range for each year is nearly the same, being about a tenth part of the mean diurnal range for the year.

3. Experiments and Investigations as to the influence exerted over some Minerals by Animal and Vegetable matter, under certain conditions. By Mrs Margaret Henrietta Marshall. Communicated by Sir T. M. Brisbane, Bart.

It occurred to the author, while examining the fossils of various