just as it might permit of the wagging of the ears, or of the scalp movements, which may be occasionally witnessed in those gifted with such accomplishments.

It is in the hope, then, that some one who has studied anatomy from a mechanical stand-point may throw some light upon this somewhat obscure matter, that I have asked a question which, I trust, my be one not unworthy of the consideration of "philosophical" anatomists.

New University Club, Oct. 16 J. C. G.

Magnetic Storm Oct. 14—18

ON the 14th of this month a magnetic storm commenced at 10.20 P.M., and lasted until 11 P.M. of the 18th. It was as remarkable for the extent as for the duration of the disturbances. The only lull in the storm was during the afternoon of the 16th.

The general character of the perturbations was the same throughout, consisting mostly of long movements of the needle to and fro on either side of the mean position. There was a very striking coincidence between the curves of the 15th, 16th, 17th, and 18th during the morning hours, the maximum westerly deviation having been attained at about 6 A.M. on each successive day. During the afternoon of the 17th, the greatest movement of the declination needle towards the west was equal to that of the previous morning, whilst the oscillations towards the north were greater than on the other days of the storm. The movements of the vertical-force magnet were frequently too great to be recorded on the photographic paper, and this magnet was several times thrown off its balance. The horizontal-force magnet was more violently disturbed at the very commencement of the storm than at any subsequent period.

The remarkable coincidences that are now being discovered between these magnetic disturbances and other important natural phenomena render it useful to draw attention to those changes in the magnetic force of the earth which present any feature particularly worthy of notice. The storm I am now referring to is on several accounts the most important that has occurred since 1867, and it is to be hoped that some practical spectroscopist has had favourable weather during these few days, as a magnificent array of solar prominences may not improbably have rewarded his interesting labours.

Stonyhurst Observatory, Oct. 23 S. J. PERRY

Circular Rainbow

BEING, in company with a friend, Mr. Hall, on the east peak of the Berceau (3,640 ft.) on the 25th inst., a circular rainbow was visible at 2.30 P.M. upon the upper surface of light white clouds that drifted from S. up the rocky valley which was E. of where we stood—though the true wind was W. and moderate. The sky was almost of the richly dark Italian blue, across which a few clouds (cirrus) slowly passed.

When first seen the diameter of the outside of the circle was 10°, but it increased gradually up to 15°. The colours of the "bow," which was somewhat less than 1° in width,—were the same as in the common rainbow, and very vivid. When we were a few yards apart, each saw only his own figure within the circle, large and well defined, so that the movement of an arm became visible. Before long the shadow of the mountain on which we stood invaded the lower portion of the circle, depriving it of its colour, but not always destroying its continuity;—and my figure remained complete even where the continuity was destroyed. Light clouds passed across the sun, causing a partial, rarely a complete, disappearance of this most beautiful phenomenon, which we watched with great interest for twenty-six minutes—how long it had existed before 2.30 I know not.

M. MOGGRIDGE

Earth Currents and Sun-spots

IN the last number of NATURE there appears a letter from Mr. W. H. Preece respecting the recent occurrence of electric storms of considerable intensity; and in connection with this interesting subject it may be worth while relating that the solar spots have lately (that is to say, during the last few weeks) been larger than usual. One of them attained great proportions, and was distinctly visible to the unassisted eye (on October 15) through a fog which partially obscured the sun's intense light. On the date mentioned this spot had completed about one-half of its transit across the solar disc, and it is remarkable that on the same day the electric storms attained their maximum, and "the interruptions to business were serious," as remarked by your correspondent. The spot referred to was not so large as several which appeared during the two preceding years, but exceeded in magnitude any of those which have come under my observation during the present year. It disappeared from the sun's western edge on about the 21st of October; but just previously to this the spot had been considerably smaller, and showed indications of dissolution. The spots now visible on the solar surface are not very conspicuous; there are, however, two visible of the larger class—one of these is situated in the north-east quadrant, and the other in the south-east quadrant, and they are situate at about the same distances from the limb. Between these spots there were yesterday two small ones perceptible running parallel with the equator.

Bristol, Oct. 28 WILLIAM F. DENNING

Measurement of Faint Spectra

MAY I suggest, as a supplement to Mr. Capron's clever arrangement for spectral measurement, a method which I have found useful with faint spectra. It is that a part of the slit should remain fixed, while the upper or lower half, or the middle only, should be movable. In this way two images of the spectrum are formed, one of which may be made to move over the other like a vernier; and thus any line may serve as an index, when, from want of light, it would be impossible to see the brass points. We obtain in this way many of the advantages of Zöllner's reversion spectroscope.

With such an arrangement, and with an embossing edge attached by a spring to the movable slit, so as to register on a card when pressed, I have succeeded in making several tolerable measurements of the faint auroral bands, which it was difficult to perform by direct comparison. It is, of course, necessary to have at least one line of known position in the field.

North Shields, Oct. 22 HENRY R. PROCTER

Merrifield on the Deviation of the Compass

WILL you kindly pardon my again troubling you with an explanation?

Last week, seeing what I considered a harsh review of my little book, in NATURE for Oct. 17, I, in the midst of my work and the heat of the moment, penned a reply to my reviewer, without thinking more of the matter. To-day, whilst giving a lesson on the subject to a pupil, I saw my error; and I beg to plead guilty to that "looseness" which has led to inaccuracy in the passage quoted from page 52. Instead of "deviation" I meant, and should therefore have said, "Vertical iron shows the same indirect magnetic force," &c., and to my class I have always used these words. I now tender my apology to my reviewer for my hasty letter, and beg to thank him for pointing out this "looseness and inaccuracy." I trust you will make this letter as public as my last. JOHN MERRIFIELD

Navigation School, Plymouth, Oct. 26

Rainfall in Bombay

As it may interest some of the readers of NATURE to know the amount of rain which fell on one occasion during the heavy monsoon rains which recently occurred at Bombay, and which I regret to see in your Notes had so disastrous an effect upon the library of the Asiatic Society, I quote the following from a letter which I have just received from my friend Mr. C. Chambers, F.R.S., Director of the Colaba Observatory, dated 10th Sept., 1872.

"Just a week ago we were treated to 7·20 inches of rain in two hours, which is nearly twice as heavy as I have known before, *i.e.*, had personal experience of."

In order that we may form some idea of the enormous amount of the downpour, we must imagine the whole rain which has fallen in this neighbourhood since June 8, to have been concentrated in the time named; or, perhaps, better still, to suppose that the heaviest part of the shower which fell about half-past twelve, on the 3rd inst., and lasted for seven minutes, had continued for two hours.

Mr. Chambers was some time ago much troubled by the