

Miers's "Contributions to Botany" is no less valuable than any of its predecessors as a record of laborious and conscientious devotion to science. A. W. B.

An Elementary Treatise on Statics. By J. W. Mulcaster F.R.A.S., Military Tutor. (London: Taylor and Francis.) THIS is a good book without any of that attempt at cramming, too common now in our elementary text-books. It is calculated to give the reader a good grasp of the elements of Statics. It goes over the usual ground, states and proves the principles well and clearly, and contains in each chapter a numerous and excellent series of examples. These examples consist of "graduated and classified groups of problems, each involving distinct statical principles." These, the author says, he finds, and our experience entirely agrees with his, make "an impression on the student's mind otherwise not attainable with problems indiscriminately taken." We gather from the book that it is the production of a good and practical teacher. J. S.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.]

The Aurora Borealis of Nov. 9 and 10

As the magnificent display of Aurora on the evening of the 10th was witnessed here under very favourable circumstances, and as several of its phases were of unusual occurrence, an abridged account may not be uninteresting.

The Northern Lights were first noticed at about 7.30 G.M.T., the appearance being that of a pale white light, which gradually rose from the N.N.W., until it completely enveloped the Great Bear, but was not sufficiently strong to hide even the faint star near Mizar. Towards 8.40 the auroral mist assumed the more definite form of three broad white bands, stretching across the sky from E. to W., the uppermost band lying just below Vega and Pollux.

At the same time a bank of dense black cloud rose from the N. horizon to the height of η Ursæ, and shot forth dark streamers as far as the upper arch of light. The streamers E. and W. were brighter than the central part, and waves of light moved slowly and at regular intervals from these brighter parts of the horizon, mingling together at the centre of the arch.

At 9.10 a very bright streamer made its appearance.

Up to this time the display had been colourless, but at 9.20 it assumed a greyish tinge, and had extended by 9.25 as far as β Cassiopeia.

At 9.30 the western extremity of the arch was of a bright red colour, whilst only a slight appearance of redness was visible in the E.

The aurora then became wonderfully brilliant, and the rapidity of the changes surpassed anything that had been seen here for years. Flashes of light were succeeded by waves, and these in their turn by small detached clouds, which travelled rapidly across the sky. At 9.45 the waves and streamers seemed to converge to a point slightly S.E. of β Andromedæ.

In the square of Pegasus a curiously-formed cloud, in the shape of an enormous bird, suddenly appeared and disappeared several times, sending forth each time streams of light E. and W., as if from its outstretched wings.

At 10 the auroral light was strongest, and then the waves, moving rapidly from the N., appeared to return for a short distance on their path when they had passed a few degrees S. of the zenith, like waves breaking on the sea shore.

At 10.30 two distinct arches of light, the upper one passing through β Andromedæ, the lower one near Polaris, intersected each other E. and W. at an altitude of about 20° .

At 10.40 all colour had disappeared in the west, but a very brilliant red streamer stretched from the E. nearly to the Twins. About this time a thick cloud of elliptic shape was formed between the points N.W. by N. and W. Beneath this cloud was a pale auroral glare, and from its upper side a mass of broad dark streamers rose towards Polaris. At the E. end of the cloud a very broad streamer moved gradually westward, and shortly afterwards a similar streamer formed near the W. and moved in the same direction.

At 10.45 α Arietis was the centre, towards which the new violet-coloured streamers and the waves and flashes tended.

The last-mentioned cloud was then replaced by another similar in form, but situated farther from the E., its outer streamers of a yellowish green colour meeting in Cassiopeia.

At 11 the only colour visible was the violet in the W.

At 11.5 a point S. of γ Pegasi was the centre of motion.

At 11.15 the dark streamers were sharply defined, but extended only a few degrees above the cloud. Ten minutes later the stars below Vega and Ursa minor were completely hidden, and then from 11.25 to 12.15 the aurora gradually died away, leaving only a faint white glare on the N.W. horizon. S. J. PERRY

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ON Friday evening, Nov. 10, I was fortunate enough to witness a brilliant display of the Aurora Borealis, which, if it did not surpass, certainly rivalled, that of Oct. 24, 1870.

At 9h. 20m. G.M.T. the whole sky was literally covered with auroral streaks to within 30° of the southern horizon, all apparently converging to a point near α Andromedæ. The streaks were of a white colour, having a slightly blueish tint (probably caused by the mass of intervening air), and their form, to within 15° of the point of convergence, was perfectly straight. The radial point was shown by an irregular mass of auroral light, from which bright streaks were spread out in every direction, those to the south being much shorter than the streaks to the north or west. The appearance of the sky at the time was that of the outstretched wing of an enormous bird. At 9h. 22m. a rich crimson glare was visible in the S.W., dividing the constellations Pegasus and Cygnus, and at 9h. 25m. a resplendent beam of white light 2° in width was conspicuous in the N.E.; its length was about 50° , and it was nearly parallel in direction with a line joining the stars α Capella and β Aurigæ, but $3'$ to the left of them. It remained visible for 5m.

At 9h. 25m. 30s. a white luminous meteor (apparently one of the "Leonides") shot swiftly across the constellation Pisces, having a brightness = Sirius, duration $0^s 5^{\text{sec}}$, and length of path $10'$, left no train or sparks.

At 9h. 32m. the constellation Perseus was overspread by a luminous glare of a reddish colour (known to dyers by the appellation of "ruddy brown," and which did not disappear for about 10m. At 9h. 34m. the crimson glow reappeared in the S.W. between Cygnus and Pegasus, thereby completing a gorgeous arch about $15'$ in width, extending from the S.W. to the N.E. horizon, passing over the constellations Cygnus, Lacerta, Perseus, Auriga, and Orion. This crimson belt divided the sky into two halves, that on the north being full of auroral streaks, two columns of which were very conspicuous in the north, passing over Ursa Major and extending nearly to the zenith. A small dark cloud lying horizontally across them divided them into two parts, each of which was distinctly visible.

At 9h. 40m. the streaks had entirely disappeared, being replaced by a diffused auroral glare, similar in appearance to the sky before dawn; but at 10h. the streamers reappeared with equal brilliancy. The radial point had now moved to 2° below β Andromedæ, and was now clearly pointed out by an irregular curve, or hook, about $4'$ or $5'$ in diameter, which, although observed at different times during the evening, was never completely formed, as 90° or 120° were always wanting to form a complete circle.

At 10h. 23m. a curious phenomenon presented itself. A small irregular patch of crimson light, about twice the diameter of the moon, appeared over β Triangulii, which slowly and gradually expanded, but after a lapse of about 30s. (when about $15'$ in diameter), its colour changed to the ordinary bluish white of the aurora, the phenomenon lasting altogether about 2m. At 10h. 25m. a broad greenish white band appeared in the N.E.

By this time the centre of convergence had reached β Triangulii, thus showing apparent progressive motion towards the east at the rate of about 15° per hour (which is the rate of the rotation of the earth upon its axis). It is worthy of notice that in the auroral displays of October 1870 the same stars formed the radiant, and its motion was in the same direction.

At 10h. 37m. a beautiful crimson beam appeared in Auriga (in the same position previously occupied by the white streak at 9h. 35m.) Its length was about 40° , and at 10h. 50m. a gorgeous triple streak was visible in the same position, which presented the appearance of a broad crimson ribbon, with a border of white on each side. In about five minutes it faded out of sight.

At 11 o'clock the auroral light was again diffused over the whole northern sky, bounded on the south by a bright milky