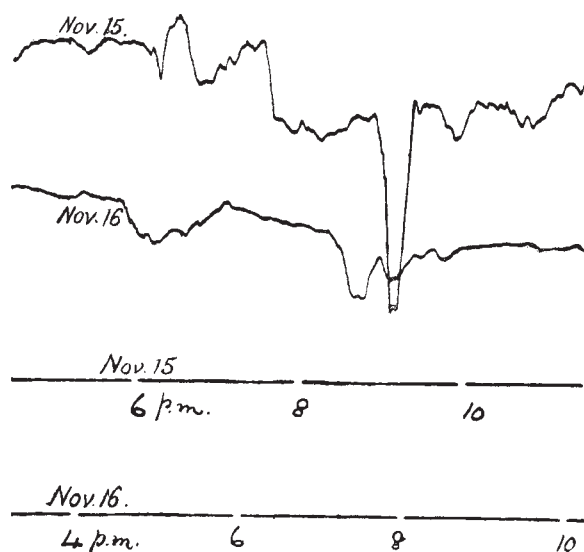


Magnetic Storms and Aurora.

IN view of the interest recently displayed in theories as to the origin of magnetic disturbances, attention may be directed to some rather curious phenomena exhibited during the magnetic storms experienced lately. Usually when a magnetic element during a storm suffers a large deviation in one direction it does not simply return to, but overshoots, its original value, and oscillates about its undisturbed position. If we liken the curve to the outline of an island on a map, a conspicuous indentation of the coast line is usually accompanied by a correspondingly pronounced promontory. Whilst this is much the more common phenomenon, it is by no means very unusual to have, as it were, an isolated bay in an otherwise straight coast line; only when this happens the "bay" seldom forms a deep indentation, and the curvature of its outline is seldom very great. On November 15, during the recent display of aurora, a somewhat remarkable instance of a nearly isolated "bay" presented itself in the declination curve trace at Kew. Taking, again, the geographical analogy, it resembles—as may be seen from the accompanying copy of the curve¹—a regular estuary. We have, commencing at 8.53 p.m., an easterly movement, which in twelve minutes reduced the declination about $32'$, while in the subsequent twenty minutes the declination increased $34'$, thus returning very nearly to the value it had half an hour before. This was by no means the only movement during the magnetic storm of November 15, but it was far and away the most conspicuous one. Its remarkable form would predispose one to attribute it to some very special cause, which one would naturally associate with the coexisting aurora. Curiously, however, a very similar movement was experienced three days earlier, when no special auroral display seems to have been noted in this country, the intervening days being free from any large disturbance. This earlier disturbance—a copy of which is also shown—took place on November 12, also in the evening, but nearly $2\frac{1}{2}$ hours earlier than that on November 15. The conspicuous movement on November 12 began about 6.30 p.m. The easterly movement was fully larger than on November 15, being about $35'.5$, while the return swing to the west was about $36'.5$. The double movement occupied about thirty-eight minutes, and so somewhat longer than on November 15, but this is chiefly due

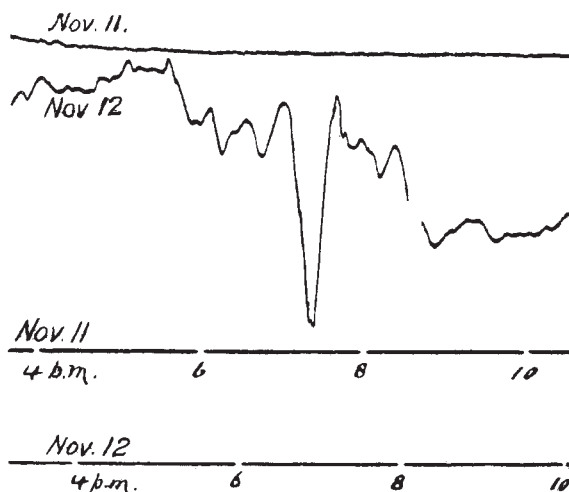


to the movement on November 12 beginning and ending somewhat less abruptly.

The total ranges of the declination disturbances on November 12 and 15 were respectively about $42'$ and $50'$. The other elements were also disturbed, the horizontal

¹ Two days' curves—each with its base line—are taken on each photographic sheet; the upper is always the earlier.

force range being approximately 200γ on November 12 and 250γ on November 15 ($1\gamma = 0.00001$ C.G.S. unit). In each of these horizontal force curves there was also a prominent movement somewhat analogous to the above movements in the declination, but not synchronous with them, and with an increase of force. The horizontal force movement on November 12 was the more striking, the force increasing by about 180γ in thirteen minutes, and



then falling off about 155γ in the next thirteen minutes. On November 15 the nearest analogous movement was of a more normal character, an increase of 110γ , occupying about ten minutes, being followed by a fall of 160γ in the next twenty minutes. On November 12 the prominent horizontal force change was only a few minutes later than the prominent declination change, but on November 15 the most prominent horizontal force movement preceded the prominent declination movement by about $2\frac{1}{2}$ hours. There were considerable horizontal force movements at the time of the prominent declination movement on November 15, but they were of a more commonplace character. The disturbance on November 12 commenced about 9.30 a.m., terminating about midnight; that on November 15 lasted much longer, starting about 3.15 p.m., and continuing for about thirty hours.

CHARLES CHREE.

National Physical Laboratory, November 21.

Absorption Spectra of Ultra-violet Rays by Vapour and Liquids

IN connection with some letters recently published in NATURE (vol. lxxii. pp. 557, 630), the following note may perhaps have some interest. Researches on the above named subject have been made in the physical institute of the University of Erlangen. Dr. Pauer (*Wied. Ann.*, lxi., p. 363, 1897) has determined for a great number of substances the position of the absorption bands, and Dr. Müller (Erlangen Inaugural Dissertation, 1903, *Sitzungsberichte der physikalisch-medizinischen Societät in Erlangen*, vol. xxxiv., p. 188, 1902) has tried to get some values of the absorption coefficients of vapours. By the researches of Friedrichs and Grebe, the results of Pauer have been in many respects amplified. Perhaps I may direct attention to the fact that Dr. Pauer found that the law of Kundt on the displacement of the absorption bands towards the red with increasing refraction index or dispersion is true when passing from the vapour to the liquid and then to the solutions in different media. His observations were made on benzol, toluol, the isomers of xylol and æthylbenzol, chlorobenzol, bromobenzol, iodobenzol, anilin, nitrobenzol, pyridine, bisulphide of carbon. Benzol and bisulphide of carbon were especially carefully treated by him.

Erlangen, November 13

E. WIEDEMANN.