

TRANSACTIONS OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

Report on Atmospheric Waves. By MR. BIRT.

The report consists of three parts:—the first having reference to the information we at present possess, relative to such individual waves as have been determined: the second treating of the barometric curves which result from the crossing of the north-westerly and south-westerly waves, the two principal systems common to Europe—the most prominent subject being that particular curve known as the “great symmetrical wave of November:” and the third embodying the results that have been obtained during the last year, illustrative of the symmetry of the “great wave,” more particularly the locality of greatest symmetry, and the departure from symmetry in certain directions.

Under the second head, the author has thrown together the result of his inquiries into the *forms* presented by the barometric curves at certain stations, and has devoted attention to the symmetrical curve of November, as it has been observed at the Observatory at Greenwich, in the years 1841 to 1845. In connexion with this subject, the author remarked, “it has been assumed that the symmetrical wave of November consists of *five* subordinate waves, giving rise to the *five* maxima which characterize it, the central maximum forming the apex of the symmetrical curve, the remainder being subordinate thereto. (Association Reports, 1846, p. 125.)

“Upon a close inspection of the curves of the ‘great wave,’ as laid down from the Greenwich observations, six subordinate maxima can be traced, three on each side the central apex, which, in all the years, is by far the most prominent. The mean curve leads to the conclusion, that *Greenwich is not the point of greatest symmetry*, its closing portion being depressed more than two inches below the commencement. The next feature is the decided rise of the mercurial column, during a period of sixty-eight hours preceding the transit of the crest; the value of this rise is $\cdot 7$ inch, or about $\cdot 010$ inch per hour. The fall is not so precipitous; the barometer appears to be *kept up* in this locality by the *first subordinate maximum* succeeding the crest, so that, at the epoch of sixty-eight hours after transit, the value of the reading is more than two inches higher than at sixty-eight hours before transit. At eighty hours after transit a precipitous fall commences, which continues during the next twenty-four hours, the mercury sinking $\cdot 36$ inch, or about $\cdot 015$ per hour. The fall afterwards continues, with two slight interruptions, answering to the subordinate maxima, until the close of the wave, 148 hours after transit.”

The peculiar features of the mean curve, especially the difference between the initial and terminal readings, $\cdot 241$ inch, combined with certain features exhibited by the “great wave,” at its last return, has suggested the possibility of expressing numerically the departure from symmetry for any station that may be selected. This departure from symmetry is strikingly manifested by the observations of 1846, especially as we proceed from Brussels, the European nodal point, towards

Ireland and the north-west of Scotland, and is well seen in the series of curves, illustrating the author's report in the last volume of the Association Reports.

Three principal maxima characterize these curves on the 5th, the 9th, and the 12th of November; and the differences of altitude between those of the 5th and 12th, have been employed to indicate the deviation from symmetry in the direction already alluded to. The discussion of these differences, and the results deduced from them, form the third part of the report.

The author has laid down, on a map of the British Isles, these differences, and from them constructed a chart of the lines of equal deviation from symmetry—these lines range from $\cdot 100$ inch—which passes north-west of the Channel Islands, proceeds towards the Isle of Wight, skirts the shores of Sussex and Kent, and passes through Ramsgate—to $\cdot 550$ inch, which passes through Limerick, is slightly curved as it crosses Ireland, and proceeds nearly in a straight line across the Scottish Islands, to the north-west of Great Britain. The values of these lines express the *depression* of the maximum of the 5th below that of the 12th. Among these lines, the author regards the direction of that representing $\cdot 260$ inch as the best determined. It appears to have passed near, and to the west of, Helstone, this station exhibiting a deviation of $\cdot 258$ inch; it then proceeded along the coasts of Cornwall and Devonshire, crossed the Bristol Channel, entered Wales, and continued its course across Glamorganshire, towards Brecon, which it left to the north-west, as it rather abruptly changed its direction, and proceeded towards Gloucester, which it passed through. It appears to have undergone considerable inflexion, as it traversed the central parts of England, rising again towards Nottingham, which is removed $\cdot 025$ inch from it to the west; it finally left the shores of England, at the south-eastern angle of Yorkshire, and entered on the German Ocean.

The author solicited attention to a feature which characterizes all these lines, especially the one just traced, viz., the decided inflexion they undergo as they pass over the land.

The chart exhibits *two* systems of inflexion, one being peculiar to Ireland and England; the general direction of the lines undergoing a change as the line of greatest symmetry is approached, the inflection being governed apparently by the masses of land; and the other to Scotland, the inflexion being very decided over the land northward of the Firth of Forth.

From the *single* instance discussed by the author, the result appears to be, that the symmetry of the barometric curve is departed from in a greater degree at *inland* stations; a greater difference between the points selected, being exhibited at such stations than at the sea coast on either side. The report closed with some remarks on the non-persistence of the *direction of these* lines of deviation from symmetry, and on the high probability that they revolve about the nodal point of the two principal systems of atmospheric waves, Brussels.

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