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THE BRITISH ASSOCIATION AT BRADFORD.

THE recent meeting has had one singular feature with respect to meteorology,—not only has there not been a single paper by any local observer, but there has not been one from Yorkshire, or any of the northern counties, and only one (communicated to the Botanical section), from Scotland. We regret that some of the able northerners present did not bring forward some of the stores of information which we know them to possess. It was otherwise in Brighton last year, and we hope will be otherwise in Belfast next year.

Annexed is our usual list of observers, past and present, who attended the meeting :—

Ackland, Rev. T. S. Balne.	Lawton, W.	Hull.
Brooke, C., F.R.S. ...	Lund, C.	Bradford.
Crompton, Rev. J. ...	McLandsborough, J., C.E.	Shipley.
Crossley, E.	Melville, A. L.	Lincoln.
Crossley, L. J.	Moffat, T., M.D.	Hawarden.
Dawson, H.	Muirhead, H., M.D. ...	Cambuslang.
Dymond, J. J.	Pengelly, W., F.R.S. ...	Torquay.
Elliot, R., F.R.S.E.	Phillips, Prof. J., F.R.S.	Oxford.
Everett, Prof. J. D. ...	Robson, J. W.	Huddersfield.
Field, Rogers, C.E. ...	Smith, D. ...	Birmingham.
Filliter, E., C.E.	Smyth, J., junr., C.E. ...	Banbridge.
Foster, W.	Sopwith, T., F.R.S.	London.
Galton, F., F.R.S. ...	Stewart, Prof. B., F.R.S.	Manchester.
Glaisher, J., F.R.S. ...	Symons, G. J.	London.
Gott, C., C.E.	Waterhouse, J., F.R.S.	Halifax.
Grabham, G. W., M.D.	Watts, W.	Piethorne.
Harrison, J. P.	Whipple, G. M.	Kew.
Herschel, Prof. A. S.	Wilson, C.	Garstang.
Hooker, J. D., M.D.,	Woodd, C. H. L.	Hampstead.
F.R.S.	Woodward, C. J.	Birmingham.

On looking over this list, one cannot but regret that amid the one, two, or three thousand members and associates it is very difficult to pick up individual persons whom one wishes to meet. It also seems a pity that, as a rule, meteorologists do not hold more together than they have done. At the Edinburgh meeting Mr. Milne Home, as Convener of the Council of the Scottish Meteorological Society, gave a breakfast to the principal meteorologists at the meeting. We cannot expect to find

a Mr. Milne Home at every town the Association visits, but surely it only requires *the will*, to arrange for a friendly breakfast limited to meteorologists, and to take place on the morning of the day (the Monday) appropriated by long established custom to the discussion of Meteorological papers in section A.

The following is the list of papers and the order in which they were read :—

- G. J. Symons*, On Negretti's Test Gauge Solar Radiation Thermometer.
Prof. Balfour, Report on the Influence of Forests on Rainfall.
Prof. Zenger. On the action of symmetrical conductors and lightning conductors.
F. H. Wenham, On the influence of temperature on the elastic force of springs.
G. M. Whipple, On a new new form of Rutherford's minimum thermometer.
Prof. Everett, Report of the Committee on Underground Temperature.
G. J. Symons, Report of the Rainfall Committee.
 On the Rainfall of 1872.
Prof. Herschel, On the conductivity of rocks.
S. H. Miller, Experiments on Evaporation and Temperature.
 Documents relating to the establishment of meteorological stations in China.
G. M. Whipple, On a new electrical Anemograph.
J. Glaisher, Report of Committee on Luminous Meteors.
Rogers Field, On a new aneroid barometer.
C. Meldrum, On a periodicity of cyclones and rainfall in connection with the sunspot periodicity.
Arturo de Marcoartu, On the application of telegraphy to navigation and meteorology.
Arthur Schuster, On a curious phenomenon observed on the top of Snowdon.
G. M. Whipple, On the passage of squalls across the British Isles.
J. Park Harrison, Lunar influence on clouds and rain.

According to custom we give precedence to the several reports, but hope in subsequent numbers to give abstracts of all the above papers, and of the discussions upon them.

THE INFLUENCE OF FORESTS ON RAINFALL.

Professor Balfour submitted the report of the Committee on the Influence of Forests on Rainfall.

It stated that, after some inquiry and correspondence, the committee heard of two localities, viz., Carnwath, Lanarkshire, and Abernethy, Speyside, Morayshire, which seem likely to be suitable stations for carrying on the inquiry entrusted to them, owing to wood likely to be cut down soon, and assistance expected from the proprietor. The station in the Speyside district the committee had not yet been able to visit, but a sub-committee visited Carnwath on the 11th July last. Three stations were placed at the disposal of the Committee, and Mr. McLean offered most handsomely to cut down the trees at the station which should be selected at the time, and in the quantity which would, in the opinion of the committee, best suit the objects of the inquiry. The three localities were visited by the sub-committee, who fixed on one as the best. The extent of woodland on which it was proposed to place the station was 62½ acres, but there was a much greater extent of woodland in the neighbourhood. (A tracing showing these areas was exhibited in the section). The committee proposed to erect two sets of instruments, and that the instruments should be read twice daily. It was proposed, for one year at least, to compare the observations on the wooded and naked knolls, and to cut down none of the trees; and it was also proposed to delay the planting of rain gauges at Nos. 1 and 2 until a sufficient space had been cleared around No. 2 by cutting. The committee hoped in the course of a few months to be able to make arrangements for the establishment of the second station at Speyside, where the forests were pure Scotch fir of a

magnificent growth. To meet the outlay, the committee required a renewal of the grant of £20.

Dr. Hooker, F.R.S., said that in the list of instruments which the committee proposed to use he had not heard thermometers for earth temperature mentioned, he thought that most important, and he also thought the area somewhat small.

Mr. G. J. Symons quite agreed with Dr. Hooker that the proposed experiments would be incomplete without earth thermometers which would indicate both the temperature, and humidity of the soil. He, however, was astonished at the proposal of the committee. The subject was one of great importance, which had been attacked by Becquerel, and still more ably by the Hon. G. P. Marsh, in his splendid work, "Man and Nature." Mr. Symons was evidently of opinion that the proposal of the committee was on far too limited a scale; he did not deny that some results might be obtained, but he felt sure that on fuller consideration the committee would bring forward some proposal more worthy themselves and of the importance of the subject.

REPORT OF THE UNDERGROUND TEMPERATURE COMMITTEE.

This report, read by Prof. Everett, the Secretary of the Committee, was mainly a statement of continuous rather than striking progress. Details of correspondence with parties in various quarters of the world who have undertaken to assist were given, some of those most popularly interesting being the great tunnels of Mont Cenis and St. Gothard, although to us the scientific value of results from such districts appears much less than from great depths in more level countries, and we are glad to find that though the Committee encourage the former they do not neglect the latter.

Mr. W. Sissons asked whether as the depth increased the temperature rose?

Professor Everett said that it did, but the rate of increase varied in different places, being as low as 1° Fahrenheit in 100 feet in a few cases, and at a great number of places about 1° in 50 feet.

The President said that two sources of complication existed, affecting an accurate record of the temperature. In sinking the thermometers down into deep wells they might disturb the temperature, for the thermometers were sunk into a liquid, and consequently, as the liquid strata of different temperatures superposed each other, they were sure to be always mixing more or less, and thus a very reliable indication could not be obtained of the spot to which the thermometer had been sunk. It was a difficulty he supposed that would be acknowledged.

Professor Everett replied that it was so, but such disturbance was very small and calculations were made to provide as far as possible against error. Even if the temperature increased by one degree per foot, instead of one degree for fifty or a hundred feet, the difference in density would only amount to one fifty-thousandth part, and therefore the amount of motion caused by it would be very small.

In answer to another question, Professor Everett said the temperature of the water at the top was always colder than at the bottom.

REPORT OF THE LUMINOUS METEOR COMMITTEE.

Shooting-stars and large fireballs have appeared during the past year in more than usual variety. Large meteors have presented themselves in considerable numbers, and ordinary shooting-stars in a more striking manner as regards the explanation of their origin than has been the case in former years. Of both these kinds of shooting-stars, both large meteors and meteoric showers, much accurate information has reached the committee; but the extent of the knowledge acquired on all hands, has at the same time advanced so rapidly, that a smaller amount of attention has this year been directed towards the discussion of the individual descriptions, than the committee have hitherto bestowed upon them. A more complete reduction of the separate observations will be attempted when the opportunities of the committee allow.

Those meteors, however, which have been observed simultaneously at more than one observing station have been selected from the collection for transcription in suitable columns in this report, and a list of large meteors is added, among

which some have occurred that have without doubt been noticed, and may have attracted attention in other directions. Two of the largest fire-balls seen in Great Britain were aërolitic, or burst with the sound of a violent explosion on November 3rd, at 5.30 p.m., and February 3rd, at 10 p.m. The first passed over the central part of Scotland, and the second burst over Manchester and its neighbourhood. Aerolitic meteors and aerolites have also been noticed in the scientific journals of other countries, which have given rise to experiments on the composition of aerolitic substances, both chemical and microscopical, the conclusions of which continue to extend the range of our speculations regarding the origin of these bodies. Thus the existence of carbon and hydrogen in the atmosphere from which the largest iron meteorite yet found (a few years since upon the shores of Greenland) was expelled, confirms the discoveries of Grahame and Professor Mallet, in America, of the existence of the same gases in other meteoric irons. Dr. Wöhler has thus detected the oxides of carbon as gases in the vast meteoric iron of Ovfak found in Greenland, and brought to Stockholm during the last few years by Prof. Nordenskiöld, and the same gas was found by Prof. Laurence Smith in the siderite which fell recently in the United States. A connection between comets and meteorites appears to be indicated by these discoveries, for in the spectra of some of the former gases containing carbon appear to have been certainly recognised by Dr. Huggins.

The past year was distinguished by the occurrence of a most remarkable star shower on the night of November 27th, to the expected appearance of which astronomers were looking forward with especial attention from the unexplained absence of the double comet of Biela (to which it belongs) from its accustomed return in the last three of its periodical revolutions. The probability of the comet's path being marked by a meteoric stream into which the earth might plunge on or about Nov. 27 every year was already become a certainty, by the observation of such a meteoric stream on Nov. 30, 1867. On that night M. Zezioli, of Bergamo, observed a distinct star-shower, which, according to Schiaparelli, certainly belonged to the missing comet. Although the exact date of the shower could not be foretold with certainty from the want of recent observations of the comet, yet every probability was favourable to its reappearance last year, and those who awaited it, as well as many who did not, were surprised by the brilliant spectacle which it suddenly presented. At the first approach of darkness on the evening of the 27th of November, the cloudy state of the sky unfortunately deprived observers in the south of England of witnessing the sight, but in Scotland, and north of the Midland Counties of England many uninterrupted views of it were obtained. On the European continent and in the United States of America, as well as in the East Indies, at the Mauritius and in Brazil observers were equally fortunate in recording its appearance, and few great star-showers have hitherto been more satisfactorily observed, or indeed more abundantly described. In an astronomical point of view the agreement of the time and other circumstances of its appearance with the supposed path of the lost comet is so exact as to prove that the calculations made by astronomers of that comet's orbit cannot be affected by any errors of a large or sensible amount, and proof almost certain is thus obtained that the disappearance of the comet is owing to no unexplained disturbances of its path; but that like some former comets of variable brightness, it has not improbably faded for a time out of view, and that at a future time a reasonable expectation may be entertained of re-discovering it pursuing its original path in repeated visits to the earth's neighbourhood, and to the field of telescopic observation.

Only partial views of the ordinary periodical meteor showers of December, January, and April last were obtained, of which some descriptions are contained in the Report.

Reductions of the scattered meteor-observations on ordinary nights of the year are an important subject of the Committee's inquiries, which have been kept in view in their operations of the past year. Captain Tupman having obligingly placed a list of nearly 6,000 such observations (made by himself) at their disposal, the greater part of which he has reduced to their most conspicuous radiant points, the present purpose of the Committee is most effectually obtained by the publica-

tion of the valuable meteor list which has thus unexpectedly come into their possession; and a graphic projection of the radiant points has been prepared, which will be printed as an illustration of the copious information that will be gathered by observers from the contents of Captain Tupman's list. The catalogue will be distributed this year to observers interested in the research; and to enable suitable lithographic charts to be added to it, it is hoped that the members of the British Association will assist the Committee with such liberal communications of their observations as they have hitherto abundantly supplied.

REPORT OF THE RAINFALL COMMITTEE.

Your Committee are glad to be able to report steady progress in the various branches of rainfall work under their supervision. The new stations started in Scotland, as explained in our last report, have, with few exceptions, been carefully attended to. Your Committee desire to record their thanks to the Directors and Secretary of the Highland and Dingwall and Skye Railways for the very great assistance already afforded, and which your Committee hope to render still more valuable by the personal inspection of the Stations by their Secretary at an early date. Gauges have been established at, and continuous records have been received from, upwards of 25 stations on these lines. Your Committee regret that the vicinity of the Caledonian Canal, and the West of Ireland are still very destitute of observers, and that several Welsh counties, *e.g.* Cardigan and Carmarthen, must be added to the list of districts in which observers are especially needed. Your Committee do not, however, enlarge upon this subject on the present occasion, because they hope at an early date to present a revised edition of the list of stations published in the Report of this Association for 1865, and such remarks will be more appropriate then than now. The list published in 1865 has, mainly in consequence of the development of the work under the auspices of the Committee, become obsolete, as it does not contain more than two-thirds of the data now collected. The new list will contain all records known at the date of publication, and will be invaluable to future enquirers.

The whole, nearly 2000, of the forms of enquiry respecting the positions, &c., of the rain gauges in the country were issued last October. Of these about 750 were not returned, and therefore at their meeting in June of the present year the Committee instructed their Secretary to send a second application to each of these persons; by this means many more have been obtained. The total number received up to the present time is 798. The returns have been sorted, the angular elevations of surrounding objects computed, blank forms prepared, and the tabulation has been commenced on a plan of which a specimen was shown. Although the mass of information thus procured is so large, the Committee cannot but regret that a considerable number of the forms have not been returned, and that it seems probable that those who have neglected to send them back are the persons respecting the positions of whose gauges information may be most desirable. Your Committee therefore feel that there is no alternative but to press forward the personal examination of all these stations as rapidly as possible. It is satisfactory to them to find that the views which they have steadily held of the paramount importance of personal inspection of the stations have not only been recognized and acted upon by the Meteorological Committee of the Royal Society, but have met with great support upon the Continent. At the meeting of the French Association for the Advancement of Science, at Bordeaux, September, 1872, the following resolution was passed:—"We think that rules universally applicable can be laid down for the verification of instruments, and the inspection of Meteorological stations, and we believe that it would be one of the greatest advantages which can possibly be realized in Meteorology." The same subject was discussed at the Meteorological Conference held at Leipzig, in August last, and the following resolution was adopted:—"It is desirable to make a periodical inspection of the stations of each system as frequently as possible." In consequence of the issue of the position forms previously mentioned, our Secretary has been obliged, both by considerations of time and money, rather to curtail these personal examinations, the number described in the appendix to the present report is however 63, bringing the total up to 486, to

which should be added those tested by Mr. Buchan with the apparatus presented to the Scottish Meteorological Society last year; of which, owing to Mr. Buchan's absence at Vienna, the details have not yet been received.

It will be remembered that the gauges erected in certain parts of Wales, and those erected in East Cumberland and Westmoreland, by Mr. Symons, in 1865, were transferred to this Committee some years back. As some of the observers have died, and some of the gauges have been disabled, your Committee have directed their Secretary to go over the district, and re-arrange them as may seem most expedient.

The experimental gauges erected some years since at Calne, at the expense of Colonel Ward, and subsequently removed to Strathfield Turgiss and Hawsker, and of which the results were reduced, presented to this Committee, and by them inserted in their 1869 and 1870 reports, have been finally dismantled, and preserved for future use, if required, it being considered that the points which they were constructed to test have been thoroughly investigated.

During the decennial period extending from 9 a.m. January 1st, 1860, to the same hour on January 1st, 1870, there were 317 records of rainfall kept in the British Isles, without the omission of a single shower. These records therefore give 38,040 monthly values, or 3170 values for each month of the year, and afford by far the most reliable basis for investigation into the seasonal distribution of rainfall ever yet available. Accordingly your Committee have had them all converted into per-centages of the yearly totals at the several stations, and tabulated in the same manner as those for previous decades, given in our report for 1868. We give on the present occasion the per-centages for each individual station, because it has been remarked that we have not given monthly averages, and the per-centages are readily reconvertible into monthly means by a simple process explained by the Committee. They also give the means for each group, and, for comparison, the corresponding values for the previous decade, 1850-59, and also the departures of each group from the mean of each district. These values strengthen the evidence which we adduced in the 1868 report of the greater relative wetness of winter months at Western stations, and especially at those of large rainfall. But though they corroborate the fact of the oscillation, they rather reduce its amount. It is satisfactory to find that the general inferences drawn by Mr. Gaster, and quoted in the 1868 report, are so far corroborated by the fuller information now obtained, that, except as hereinafter noted, we may refer to that report as giving a fair *resumé* of the facts in the present, always remembering that the 1860-69 decade has shown the various features in a less marked degree than the decade 1850-59.

In order to facilitate an accurate determination of the months in which the maximum and minimum rainfall usually occur, we have compiled other tables, which give the months of maximum and minimum respectively for two complete decades, for England, Scotland, and Ireland, adopting the same sub-division into districts, and grouping according to amount of annual fall, as in the previous tables.

The essential difference between the two decades is, that in 1860-69 July as a month of maximum rainfall has disappeared altogether, and April has become more frequently that of the minimum. In fact, during the last ten years April has been the driest month at most stations in the British Isles, while in the previous decade this distinction was pretty equally shared by February and May.

With a view to determining whether "the same relative monthly values are found at the same station in all decennial periods" the Committee selected 17 registers, each extending over at least 40 successive years, while 4 extended over 50, and 1 over 60 successive years, and reduced them in the same manner as the 1860-69 values. These are given in a table, and the result can hardly be called satisfactory: they show the same general features as the two decades which have been discussed in detail, such as the larger per-centages in winter months in wet district, and in the summer and early autumn in dry districts, but the months of maximum and minimum shift about to an extent which would not be expected considering that each value represents the average of ten years.

An examination of these records, all embracing more than one-third of a century, proves that however steady the ten yearly average amount of rain may be, its

distribution over the months in not so by any means, so that as far as our present investigations go it is impossible to lay down any general law as to the precise month of maximum and minimum fall.

The rainfall of 1872 was so excessive that the Committee, although in accordance with previous practice, postponing full discussion of its peculiarities until 1874, instructed their Secretary to offer a few remarks upon it after the conclusion of the Report.

Mr. Symons then proceeded to describe, by the aid of large maps, the principal features of the rainfall of 1872, and explained that while the total annual rainfall usually ranges within one-third above or below its mean amount, there were in several separate localities instances of excess of not 33, but 60, 70, and even 77 per cent., all of these being absolutely without precedent during at least 148 years.

The President said that it appeared from the map that in Westmoreland, usually one of the wettest districts, the excess in 1872 had not been proportionally great. Had it been otherwise the district must have been completely drowned out. The wind seemed to have been tempered to the shorn lamb.

Mr. Symons said it was quite true that the excess at the very wet stations had been much less in proportion than elsewhere. Had it been otherwise the fall at the wettest station would have been, within an inch or two, 25 feet—say 290 to 300 inches.

ON AN IMPROVED FORM OF ANEROID FOR DETERMINING HEIGHTS, WITH A MEANS OF ADJUSTING THE ALTITUDE SCALE FOR VARIOUS TEMPERATURES,

BY ROGERS FIELD, B.A., C.E.

The author begins by stating that the object aimed at in designing this improved form of aneroid was to simplify the correct determination of altitudes in cases such as ordinarily occur in England, and that the instrument is therefore arranged to suit moderate elevations, say of 2000 feet and under, and is not intended for considerable elevations.

Before proceeding to describe this instrument, he briefly recapitulates the general principles on which the measurement of heights by a mercurial barometer depends, and for this purpose he refers to the mercurial barometer as the original source from which the graduations on the aneroid are obtained. If an observation taken at one station is compared with that taken at a higher one the difference of the readings of the barometer will give the height of mercury which balances the column of air between the two stations, so that knowing the relative weight of air and mercury we can determine the height of the column of air, or, in other words, the vertical height between the two stations. The relative weights of air and of mercury are variable, being affected by the gradual reduction of the pressure of the air as we ascend, and also by variations of temperature; the accurate determination of their relative weights is the principle which lies at the basis of the various formulæ that have been proposed for barometrical measurement of altitudes, although the problem cannot be stated in such a simple form as this.

The preceding general principles apply to the aneroid equally with the mercurial barometer. A good aneroid is always graduated by direct comparison with a standard mercurial barometer, so that the readings of the aneroid represent those of a mercurial barometer, and the better the aneroid the more accurate this representation will be. A well constructed aneroid, however, differs from a mercurial barometer by being compensated to a certain extent for the effect of the temperature on the instrument itself, so that this need not be taken into account, more especially as the effect of temperature on the instrument only becomes important when the temperature of the station differs considerably, which it will not do in moderate elevations.

The conditions, therefore, which have to be taken into account in the present case, are, 1st. the pressure of the atmosphere, and 2nd. the temperature of the air.

Various formulæ are given by different authorities for determining the altitude readings of the barometer, but they do not differ much for small altitudes, though this is far from being the case with great altitudes. The table which is adopted in

graduating the present Aneroid is that given by the Astronomer Royal in the "Proceedings of the Meteorological Society, vol. iii., page 406," and gives results which lie between those of the other authorities.

Aneroids constructed for the determination of elevations by readings from an altitude scale consist of two classes, one in which the altitude scale is fixed, and the other in which it is movable at random. The first class of aneroid with a fixed scale is accurate in principle, but the scale only allows for one of the conditions which have to be taken into account, viz., the varying pressure of the atmosphere, and the other condition, or temperature of the atmosphere, has to be allowed for by calculation. The second class of aneroid, that with a movable scale, is radically wrong in principle as ordinarily used, inasmuch as the movable scale must be graduated from one fixed position of the zero, and when the zero is shifted at random according to the position of the hand of the instrument, the scale necessarily becomes inaccurate.

In the improved aneroid the scale of altitudes is movable, but instead of being shifted at random according to the position of the hand of the instrument, it is moved into certain fixed positions, according to the temperature of the atmosphere, so that the shifting of the scale answers the same purpose as if the *original* scale were altered to suit the various temperatures of the atmosphere. The aneroid is graduated for inches in the usual way on the face, but the graduation only extends from 31 to 27 inches, so as to preserve an open scale. The outer movable scale is graduated in feet for altitudes, and the graduation is laid down by fixing the zero opposite 31 inches. This is the normal position of the scale, and it is then correct for a temperature of 50°. For temperatures below 50° the zero of the scale is moved below 31 inches, and for temperatures above 50° the zero of the scale is moved above 31 inches; the exact position of the zero for different temperatures has been determined partly by calculation, and partly by trial, and marked on the rim of the aneroid. In order to ensure the altitude scale not being shifted after it has once been set in its proper position, there is a special contrivance for locking it in the various positions. The altitudes are in all cases determined by taking two readings, one at each station, and then subtracting the reading at the lower station from that at the upper.

The movable scale requires to be set for temperatures before taking any observation, and not shifted during the progress of the observations. This will practically not give any inconvenience in the case of moderate altitudes, as small variations of temperature will not appreciably affect the result, and so long as the temperature does not vary during the course of the observations more than 6° or 8° from that at which the instrument is set, the result may be accepted as practically correct.

In conclusion, the author states that the principle of allowing for the variations of temperatures of the atmosphere by shifting the altitude scale does not profess to be theoretically accurate, but simply sufficiently accurate for practical purposes. In order to satisfy himself that this was the case, the author carefully tested the aneroid by comparing the readings obtained for different temperatures from the shifted scale with the correct readings as given by calculations from the normal position of the scale, and found that the maximum error was 8 feet, and the average error under 3 feet, errors which are practically inappreciable.

The instrument was constructed by Mr. Casella, of Holborn Bars, London.

In the short discussion which followed, and in which Prof. Everett, Mr. Glaisher, Mr. Symons, and Mr. Whipple took part, general approval was expressed of the arrangement.

(To be continued.)

THE HEAT AND THUNDERSTORMS OF JULY 22ND.

To the Editor of the Meteorological Magazine.

SIR,—In your articles on the heat and thunderstorm of the 22nd July, in the last two numbers of the "Meteorological Magazine," I do not see any returns from Cumberland. If not too late I will now

supply the omission. Monday, the 21st July, was a very fine warm day, the maximum temperature in the shade being $82^{\circ}0$. The following day was much hotter, the maximum in the afternoon being $89^{\circ}1$. This, with two exceptions, is the highest temperature observed here during the past twelve years. The exceptions were 25th July, 1870, and 4th August, 1868. On the former of these dates the thermometer registered $89^{\circ}4$, and on the latter $89^{\circ}3$ in shade. About 5 p.m., on the 22nd, distant thunder was heard in the S.E.; and from that time till about 9 p.m. thunder and lightning were almost incessant, apparently from nearly all quarters of the heavens in succession. There was not during this time much rain. Thunder and lightning occurred again early on the morning of the 23rd, commencing before 3 o'clock and continuing till near 5 o'clock. This storm was accompanied by heavy rain, 0.675 in. being in the rain gauge at 9 o'clock that morning.

I have not heard of any damage being done by the lightning in this neighbourhood.—I am, Sir, yours, &c.,

H. DODGSON, M.D., F.M.S., &c.

Cockermouth, Cumberland, Oct. 7th, 1873.

To the Editor of the Meteorological Magazine.

SIR,—In your magazine for this month you express a doubt whether the TS at Liverpool, on July 22nd, is the same as that on the S.W. of Scotland. I was then at New Brighton, and will tell you what I saw, premising that I did not at the time take memoranda, and must therefore trust to memory.

L and T began about $5\frac{1}{2}$ p.m., coming up from the W.S.W. This storm was not such as actually to produce rain, but the L was very vivid and almost constant, forked and not far distant. This passed off northward, before $6\frac{1}{2}$ p.m., and very probably is the storm that went to the north of Scotland—its direction being quite that way.

Another came up soon after 6 p.m., say about $6\frac{1}{4}$, from the south—I think along the Cheshire side of the Mersey, *certainly not from Liverpool*, but owing to the steep hill in that direction behind me, I could not precisely give the point of the compass. This continued until about 8 p.m., it began to rain about 6.35. L and T very vivid and near. This passed over to N.E. For more than one hour the street opposite to me was quite impassable. A perfect torrent of water was rushing down it—an occurrence *most* unusual at New Brighton, for the sand there will immediately absorb almost any amount of rain.

The storm over Liverpool was quite distinct from this, and did not commence until later—some time after 7 p.m.

I will not assert that the storms were originally and entirely distinct, most probably they were one at their first origin, but certainly they appeared at New Brighton as three, in the way above mentioned.

Yours very truly,

ALFRED NORTH.

September 16th, 1873.

THE VIENNA CONGRESS.

[It is satisfactory to notice the much greater promptitude with which the proceedings at Vienna have been reported than that manifested at Leipzig. Proofs of the discussions were received in this country before the delegates had returned, and the following resumé appeared within a fortnight of the close of the Congress. We have no doubt that our readers will (even if they read it in the *Times*) be glad to have it in a permanent form.—Ed.]

THE METEOROLOGICAL CONGRESS AT VIENNA.

To the Editor of the Times.

SIR,—It may be of interest to some of your readers to have a brief account of the proceedings of the recent Congress at Vienna.

Delegates were sent from every European Government except France, but those from Spain and Greece were unable to attend. In addition the United States and China were represented, the latter through the Customs Department. The British Colonies were unable to send delegates, owing to distance, &c. In all, about 40 members were present.

The proceedings were formally opened on the 2nd of September by Dr. C. von Stremayn, Minister of Public Instruction, and were continued daily until the 16th. The protocols of the meetings are in the press, and will appear officially in German and French, while I have undertaken to public an English translation as soon as practicable.

It is not possible to give a full account of the proceedings before the appearance of the report, but some short notes of the most important practical decisions may not be uninteresting to the general public.

Temperature.—No recommendation was made as to the exposure of thermometers, the question being too difficult for solution at present. The *maximum* or [and? Ed.] *minimum* thermometers are always to be read at the latest observing hour in the evening, and the readings put down to the day on which they are made. Certain combinations of hours are laid down as admissible for thermometrical observations.

Wind.—It is proposed to use the Swiss hinged plate as a cheap instrument for measuring the force of the wind, as a substitute for the simple estimation of that force, which is generally fallacious unless when it is made by seafaring men.

Rain.—To be measured in the morning and put down to the previous day. The gauge to be about 8 in, diameter, and at a level of one yard, or, better, 1½ yard above the ground.

Ozone, atmospheric electricity, and some other elements are excluded from those which are to be necessarily observed at ordinary stations.

Means are to be taken for local time, civil days, months, and years, and for Lustra (five year periods), beginning 1876; and also for temperature only for the 73 five-day periods.

Storm warnings.—It is recommended, while abstaining from direct prophecy, to give an indication, by signal, of the probable direction of the wind which may blow.

An elaborate paper on this subject, by Dr. G. Neumayer, will be published with the report, together with extracts from the replies received to a circular issued by him, Professor Buys Ballot, and myself last spring.

The Congress agreed to adopt a proposal made by Gen. Myer on behalf of the United States' Government, with reference to the establishment of a system of really simultaneous meteorological observations over the globe, for the purpose of facilitating weather study. It is not possible now to obtain simultaneous observations for weather charts over an extensive area in Europe. An effort is to be made to induce as many observers as possible all over the globe, to record one single set of observations daily at a fixed epoch of Greenwich time; The signal service of the United

States undertaking for its system the Meridians where the observation hour will fall during the night time.

These observations are to be recorded so as to be in existence for future weather study, but not to be sent by telegraph unless the recipient bears the entire cost of such transmission.

Lastly, a Permanent Committee, consisting of MM. Buys Ballot, Bruhns, Cantoni, Jelinek, Mohn, Scott, and Wild, has been appointed to watch over the progress made towards uniformity in observation, &c., and to make arrangements for the assemblage of another Congress in three years. This Committee will publish annual reports.

I may express the hope that several of the above decisions will be found useful for the progress of our science. It must, however, be clearly understood that the notes I have given are only my own recollections, aided by uncorrected proofs of the protocols, and are not authoritative in any way. The reports in the Vienna papers were incorrect, so that I did not think it worth while to send them to London.

It only remains to notice the cloud which has fallen on us since the Congress broke up. Professor Donati, one of the most active of the members there, has, I cannot doubt it, fallen a victim to the climate of Vienna. He felt it seriously, as all of us did, and the day before he left he spoke often to me of his wish to get away, and he left before our sittings closed. It was then too late for him—the mischief was done—and he died of cholera soon after reaching Florence. The only wonder to me is, that his was the only death among our number.

Your obedient Servant, ROBERT H. SCOTT.

September 29.

REVIEW.

Report of the Astronomer Royal to the Board of Visitors of the Royal Observatory, Greenwich, June 7th, 1873, 4to.

It may be convenient to many of our readers to have an epitome of the statements in the above which bear most closely upon meteorology :—

A railed platform has been erected over the roof of the Magnetic Observatory, to facilitate observations of shooting stars * * *

The temperature of the magnetic basement is still maintained, as during past years, in almost perfect uniformity * * *

The question may perhaps be considered whether chronographic registration should be introduced for sudden meteorological phenomena, such as shooting stars, auroral beams, &c. A small portable chronograph adapted to mechanical registration, which the observatory possesses, appears likely to be suitable for these observations * * *

The absolute measures of horizontal magnetic force are prepared to the end of 1872 ; the dips, as usual, are reduced to the last observation.

The following are the principal results for 1872 :—

Mean westerly declination	...	...	19°37, nearly
Mean horizontal force	...	...	{ 3·876 (in English units). 1·787 (in Metric units).
Mean dip	...	...	{ 67. 46. 15 (by 9-inch needles). 67. 47. 44 (by 6-inch needles). 67. 49. 35 (by 3-inch needles).

The vane of Osler's Anemometer made, in the year 1872, 3·0 complete rotations in the positive direction N, E, S, W.

Considerable progress has been made in the reductions of the photographic records of thermometers from 1848 to 1868. The diurnal changes of the dry-

bulb thermometer, as depending on the month, on the temperature waves, and on the barometric waves, have been computed and examined for the whole period ; and a considerable portion of the exhibition of results is ready for press. The similar reductions for the wet-bulb thermometer are far advanced. * * *

A short meteorological report is sent daily by telegraph to the Paris Observatory, for insertion in the Bulletin. A morning report is also sent by post to the Paris Observatory, to the British Meteorological Office, to some post offices, and some newspapers ; and a report of the weather to 3h p.m. of each day is sent to three newspapers. The extremes of temperature during the 24 hours preceding 9h a.m., deduced from observations with the ordinary instruments, are exhibited to the public on a card, which is placed every morning below the public barometer. * * *

Very lately, application has been made to me, through the Board of Trade, for plans and other information regarding time-signal-balls, to assist in guiding the authorities of the German Empire in the establishment of time-signals at various ports of that state. In other foreign countries (see Professor Langley in Silliman's Journal, 1872, November,) the system is extending, and is referred to Greenwich as its origin.

In Britain the demand for these signals has increased so much that a tariff of annual charges for time-signals, originating from this Observatory and circulated by the Post Office Telegraphs, is published in the "British Postal Guide," and exhibited at some post-offices. * * *

In the important post-office of Lombard Street, the action of a galvanic current sent from Greenwich mechanically corrects the clock. At the Westminster Palace a signal is sent from Greenwich for the guidance of the attendant. Each of these clocks automatically sends us signals to acquaint us with its state. The errors of the Westminster clock were below 1s on 67 per cent. of days, below 2s on 96 per cent., and below 3s on 99·6 per cent. * * *

As regards the future probable history, there is one matter which has gradually been forcing itself on my attention, and which I think may ultimately bring on an extensive change in the personal arrangements of some observatories, namely, the increase of facilities for making observations. This applies principally to magnetical and meteorological observations. The inevitable result of it is, that observations are produced in numbers so great that complete reduction becomes almost impossible. At the time of making the observation, reduction such as can then be effected is rather annoying ; and when the reduction is long deferred, the amount of work to be done is sufficient to dishearten even a resolute computer. In former years I have felt this in some measure in regard to magnetical observations which, however, I have succeeded in reducing in two long periods of years, and of which the results, as I trust, possess considerable value. In the last few years, I have entered vigorously upon the reduction of 21 years' photographic registers of the thermometers ; but the labour has been very great, far greater than, upon a hasty examination, I could have conceived ; and some time must yet elapse before the reductions can be carried out to the extent which I contemplated. Yet until this, or at least a large part of it, is done, the rich store of observations is useless.

Of the enormous number of meteorological observations now made at numerous observatories, very few can ever possess the smallest utility.

It may soon be necessary to alter the proportion of the two great sections of an observatory establishment ; perhaps to diminish the observing power, certainly to increase the computing power. It is even conceivable that it may be found political to refer the computations to a national computing establishment. I do not, however, urge these matters as requiring immediate action ; I merely desire to record ideas which may possibly have their influence in guiding future arrangements.

G. B. AIRY,

Royal Observatory, Greenwich, 1873, May 22nd.

SEPTEMBER, 1873.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL.					Days on which "01 or more fell.	TEMPERATURE.				No. of Nights below 32°	
		Total Fall.	Difference from average 1860-5	Greatest Fall in 24 hours.		Max.		Min.					
				Dpth	Date.			Deg.	Date.	Deg.	Date.	In shade	On grass.
		inches	inches.	in.									
I.	Camden Town	2.46	+ .20	.93	14	11	72.0	27	40.3	22	0	0	
II.	Maidstone (Linton Park).....	2.69	+ .47	.87	15	14	76.0	27	40.0	22	0	0	
III.	Selborne (The Wakes).....	3.19	+ .75	1.00	14	14	69.0	1	33.0	27	0	2	
IV.	Hitchin	2.49	+ .63	.49	14	14	66.0	1	35.0	21*	0	0	...
V.	Banbury	1.49	— .88	.25	9, 10	14	68.0	27	32.0	29	1	...	4
VI.	Bury St. Edmunds (Culford).	2.72	+ 1.11	.65	14	13	69.0	20	30.0	28	2	...	4
VII.	Bridport	1.66	— .66	.33	14	12	69.5	27	39.0	24	0	...	0
VIII.	Barnstaple.....	3.16	— .60	.48	14	20	75.5	28	41.0	24†	0	...	0
IX.	Bodmin	4.14	+ .47	.92	7	22	67.0	20	45.0	23	0	...	0
X.	Cirencester	1.10	— 1.76	.31	3	12	...	...	...	...	...	...	...
XI.	Shiffnal (Haughton Hall) ...	1.43	— .52	.40	13	14	67.0	1	32.0	29	1	...	...
XII.	Tenbury (Orleton)	1.34	— 1.34	.47	13	12	72.5	27	29.0	29	1	...	1
XIII.	Leicester (Wigston)	1.45	— .76	.31	9	12	75.0	1	30.0	28	...	...	...
XIV.	Boston	2.01	+ .44	.40	14	12	73.0	27	37.0	22‡	0	...	...
XV.	Grimsby (Killingholme)	2.45	— ...	.72	15	14	69.0	2	35.0	30	0	...	...
XVI.	Derby.....	1.58	— .76	.47	13	14	70.0	27	35.0	29	0	...	...
XVII.	Manchester	2.48	— 1.21	.53	9	17	75.7	27	33.0	29||	0	...	2
XVIII.	York	1.84	— .49	.49	13	14	70.5	27	31.0	30	1	...	...
XIX.	Skipton (Arncliffe)	4.49	— .47	.86	9	19	70.0	26	26.0	27	3	...	...
XX.	North Shields	2.16	+ .46	.44	30	15	68.0	27	37.2	30	0	...	...
XXI.	Borrowdale (Seathwaite).....	13.70	+ .49	4.00	30	18	...	...	...	...	...	...	...
XXII.	Cardiff (Ely)	3.19	— .56	.60	8	16	...	...	...	...	...	...	...
XXIII.	Haverfordwest	3.73	+ .02	.99	13	17	67.0	27	32.0	28	0	...	1
XXIV.	Rhayader (Cefnfaes).....	2.71	— 1.13	.66	9	22	73.0	...	31.0	...	...	...	...
XXV.	Llandudno.....	2.65	+ .31	.51	6	16	75.5	27	41.0	30	0	...	...
XXVI.	Dumfries	2.82	+ .09	1.30	30	15	69.0	27	33.0	22	0	...	...
XXVII.	Hawick (Silverbut Hall).....	2.56	— ...	.84	30	18	...	...	...	...	...	...	...
XXVIII.	Kilmarnock (Annanhill).....	5.86	— ...	2.35	30	16	69.4	28	33.8	7	0	...	1
XXIX.	Castle Toward	5.34	+ .72	1.35	12	16	63.0	2	...	...	...	...	...
XXX.	Leven (Nookton)	3.42	+ .94	1.04	30	20	75.0	27	34.0	7	0	...	6
XXXI.	Stirling (Deanston)	4.02	+ .87	1.00	30	17	69.8	27	31.0	7	2	...	4
XXXII.	Logierait	3.31	— ...	.63	30	14	70.0	27	33.0	21	...	...	...
XXXIII.	Braemar	6.67	+ 4.03	3.31	14	22	68.3	24	35.0	29	0	...	6
XXXIV.	Aberdeen	3.94	— ...	.89	14	22	69.2	1	35.5	22	0	...	3
XXXV.	Inverness (Culloden)	5.57	— ...	.89	15	21	67.8	27	41.0	30	0	...	4
XXXVI.	Portree	4.12	— 6.64	1.01	10	26	...	...	...	...	...	...	...
XXXVII.	Loch Broom	5.07	— ...	1.04	15	21	...	...	...	...	...	...	...
XXXVIII.	Helmsdale	5.49	— ...	.87	10	26	...	...	...	...	...	...	...
XXXIX.	Sandwick	3.51	— .15	.48	17	19	69.0	27	38.0	9	0	...	1
XL.	Caherciveen Darrynane Abbey	6.59	— ...	1.16	14	21	...	...	...	...	...	...	...
XLI.	Cork .....	...	...	...	...	...	...	...	...	...	...	...	...
XLII.	Waterford	3.39	+ .26	1.39	14	20	66.0	17	38.0	29	0	...	...
XLIII.	Killaloe	5.26	+ 1.10	1.85	30	16	67.0	24	35.0	22	0	...	...
XLIV.	Portllington	1.76	— 1.52	.67	14	19	68.0	1	30.0	28	1	...	...
XLV.	Monkstown	2.08	+ .09	1.28	13	12	...	...	27.0	28	2	...	2
XLVI.	Galway	4.14	— ...	1.32	29	14	71.0	22	32.0	6	1	...	...
XLVII.	Bunninadden (Doo Castle) ..	2.42	— ...	...	...	...	...	...	...	...	...	...	...
XLVIII.	Waringstown	2.72	— ...	1.02	30	17	71.0	24	33.0	21	0	...	1
XLIX.	Edenfell (Omagh).....	4.13	— ...	1.52	30	18	65.0	27	30.0	21	3	...	...

*And 28. †And 29. ‡And 29. ||And 30.

+ Shows that the fall was above the average ; —that it was below it.

METEOROLOGICAL NOTES ON SEPTEMBER.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; TS for Thunderstorm; R for Rain; H for Hail; S for Snow.

ENGLAND.

LINTON.—First half of the month dull, cold, and wet; the latter half very dry and fine, the 20th, 25th, 27th and 28th very warm and bright, and more like July than September; no high winds, and (notwithstanding the heavy R on the 8th, 14th and 15th, amounting to nearly two inches) the ground at the end of the month was very dry, so that on the whole it may be recorded as a favorable month.

SELBORNE.—On 14th heavy and repeated showers; 25th, frost on the low ground; fogs on 26th, 27th, 28th and 30th; frost on the grass on 26th and 27th; prevailing winds W. to S.W. during the first half of the month; harvest much retarded by wet weather.

BANBURY.—TS at 11·30 a.m. on 3rd; 8th and 14th, high winds; 26th and 27th, fog.

CULFORD.—T on 1st, 2nd, 14th and 15th, and a heavy fog on the morning of 25th; preternaturally cold weather set in about the commencement of the month and R fell more or less on nearly every day until the 15th, after which no rain fell, and the weather became remarkably fine, the max. temp. of the month 69°, and the mean of the month 51°·2, both being below the average.

BRIDPORT.—Wet till 16th; very fine during the remainder of the month; all the corn gathered.

SHIFNAL.—The weather, previously so detrimental to the harvest, continued through the first half of this month, and the crops were with difficulty secured, all being more or less damaged. Those deferred to the latter end fared better; rain almost daily till the 17th, with low temp., the max. never exceeding 62° after the 1st when it was 67°; the wind varied from N.W. to S.W. up to the 25th, when it changed for three days to S.S.E., then back to N.W.; T in S. at 1 p.m. on 15th, with heavy R, dense fog on 26th; bar. on 22nd 30·17, the highest since February 18th; potatoe crop abundant but much diseased, not a mushroom here.

ORLETON.—The first half of the month was generally cloudy, with frequent falls of R and little sunshine, the latter half was dry and favorable for the harvest, with a fair proportion of bright days. The temp. of the whole month was more than 2° below the average, and lower than that of any September since 1863. A very severe frost occurred on the morning of the 29th. Distant T was heard on 3rd and 15th, and L seen on the night of the 1st. No great wind; bar. at 9 a.m. on the 22nd stood at 30·35.

BOSTON.—TS on 2nd, 3rd and 14th; very foggy on the morning of the 26th; temp. of the month 48°, being below the average. The harvest for white corn finished by about the 19th; first part of the month very wet, but continuous fine weather from the 15th to the end, which will be of incalculable value to the potatoe crop, and for preparing the land for wheat seed, &c.

GRIMSBY.—L at 10 p.m. on the 2nd; TS and R at 3 p.m. on third. Rime for the first time on the 22nd; beautiful weather from the 18th to the end. The harvest better got in here than in many places; good crops on the wolds, a light yield on the clays; potatoes better than for many years past.

DERBY.—The latter part of September has been charming, more like summer than we have had this year. The bar. readings were excessively high, on the 22nd it was 30·36, or corrected for sea level 30·54; with the exception of a few days in February last, the pressure has not been so great since January, 1870. Mean temp. 3° above the average.

MANCHESTER.—TS on 3rd and 14th.

ARNCLIFFE.—TS on 14th.

NORTH SHIELDS.—TS on 14th.

SEATHWAITE.—TS on 9th and 11th; T on 14th; L on 10th; 4·00 in. of R fell on 30th.

WALES.

HAVERFORDWEST.—The first half of the month resembled the weather of the preceding one, the latter half was fine, with easterly winds and clear sky, and

proved eminently favourable to the saving of the harvest, which appears not to have suffered so much as was feared.

CEFNFÆS.—Prevailing wind during the month N.W., nights generally frosty.

LLANDUDNO.—3rd, TS during the night; 7th, remarkably clear, the Isle of Man visible, on the 8th still more so, Liverpool and the Isle of Man both seen distinctly. On the 14th several slight showers, otherwise fine; 15th, stormy till noon then fine till 3.30, when there was a peal of T and R. At 1.30 p.m. on 27th the difference between the wet and dry ther. was 14°, the dry being 75°, the wet only 61°.

S C O T L A N D .

DUMFRIES.—First two days showery, then fine to the 9th, from that to 20th showery, then fine to the close. But for the heavy fall (1.30 in.) on the 30th, the rainfall of the month would have been much below the average. Mean temp. 1°·7 below the average; T on 11th and 14th. The weather on the whole favorable for harvest work, and crops in this district were secured generally in capital condition. The produce much greater than anticipated; potatoes much diseased, the injury varies from a third to two-thirds diseased.

SILVERBUT HALL, HAWICK.—A cold and (with the exception of nine fine days at the end) wet month. Very fine lunar rainbow on the night of the 5th, followed by three fine days and frosty nights; T and much L on the night of the 14th. Potatoe disease very general in this district.

ANNANHILL.—Rainfall heavy, 2.35 falling on the 30th; from the 4th to 8th and from 20th to 26th were dry, and farmers had good weather for carrying their grain, but the late heavy rains have put a stop to that for the present; very little grain uncut in this neighbourhood. Winds principally westerly, light to moderate. Evening of 18th gale from W.N.W., with pressure, during some of the squalls, of 20lbs. to the square foot, and travelling at the rate of 70 miles an hour at 7 p.m., the gale being accompanied by T, L, R and H. Ozone well developed; the month generally unhealthy; typhoid fever very prevalent. Death rate 29 per 1000. In a note the observer says on Oct. 1st '90 in. fell, on the 2nd .80 in., and on the 3rd that the R showed no signs of abating, that they had had tremendous floods in Ayrshire, and the rivers were very large.

CASTLE TOWARD.—Prevailing winds W. and N.W. Great flood on the 12th and also on the 21st; on 22nd and 23rd gales from N.W. Harvesting operations commenced early; the month throughout has been anything but favorable, and every glimpse of sunshine has had to be taken advantage of; the whole of the grain has been cut, and our barnyards begin to have a cheering appearance, the yield generally is splendid in this locality. Potatoe disease continues; turnips never looked better. Sheep and cattle healthy and pasture still abundant.

DEANSTON.—Weather still unsettled and rainy; fickle for the harvesting of the cereal crops, which are fine in quality and weigh well, a good deal still standing out, both cut and uncut.

BRAEMAR.—In general a dark month, unfavourable for the ripening of the corn; snow on the hills on the 7th; TS with very heavy R in the evening of 14th, fall in the 24 hours, 3.31, being the largest amount recorded at this station since its establishment in 1856. L on 26th and 27th. Total fall of the month 6.67, being 4.03 above the average.

ABERDEEN.—Bar. pressure and temp. rather below the average, rainfall considerably above it. The earlier part of the month cold and unusually wet, the latter part fine and warm. On the 15th there were unusually heavy floods in the Dee and the Don; said to have been the highest since August, 1829. At bridge of Dee, Aberdeen, the water marked 10 feet on the piers, and reached the spring of the arches. Large quantities of corn swept from the haughs. Lunar rainbow at 8.50 on 7th; frequent silent lightning and occasional distant thunder.

PORTREE.—A very squally month; heavy H showers on 18th; hills coated with snow on the 30th; very damp throughout, only four days without R, and yet there has less fallen than in any September since the register began in 1860. A strong gale from the S. on 27th and 28th. Harvesting much retarded by the showery weather, nearly half the corn cut, but only a little carried to the stackyard, but we trust to the Highlanders' harvest month, viz., October. Cattle and sheep thrive well on the pastures.

LOCHBROOM.—Except the week between the 22nd and 29th, we had not a propitious day for the harvest in the whole month; much corn is still out, and indeed there is a good deal yet uncut. There was an excellent crop had it been well secured, but it has sustained much damage. The green crops and grass are excellent, and there is no disease here in the potatoes.

I R E L A N D.

DARRYNANE ABBEY.—Very heavy R on the 14th from 10.30 a.m. to 4.30 p.m., the rest of the day and night showery, total fall in the 24 hours 1.16 in. Winds during the month variable, having been easterly from 3rd to 6th and 21st to 26th, rest of the month chiefly N.W. All this summer the N.W. winds have been accompanied by fogs, which I never remember before.

DOO CASTLE.—Remarkably fine month, the harvest has been got in in prime order.

WARINGSTOWN.—Unsettled until the 20th, when a fine week did much good here, but there is still much grain in stock and some yet uncut.

OMAGH.—Although the rainfall of the month has been heavy, an abundant harvest has been secured in very fair order.

SUPERPOSED CURRENTS AND CAPTIVE BALLOONS.

To the Editor of the Meteorological Magazine.

SIR,—An appearance worthy of notice has, I think, occurred here to-day, at 3 p.m. There were three strata of clouds, and each going exactly in the contrary direction.

	Surface Wind blowing to the North.
	1st strata of Cloud going to the South.
2nd	„ „ „ North.
3rd	„ „ „ South.

Yours truly,

JAMES NUTTER.

Granchester Mills, Cambridge, Oct. 9th, 1873.

[The above is a remarkable case, exceeding even that quoted by Luke Howard, in his "Climate of London," Vol. II, p. 91, where he reports on Oct. 29th, 1809, four currents, viz: E.S.E., N., S.W., and S.S.E. We have added the last two words to the title because the above letter is closely connected with that subject, and we have often contemplated bringing before our readers the desirability of its renewed study. The British Association at one time granted funds for experiments with captive balloons, but they were of quite a different class to those mentioned by Luke Howard, and required for the purpose of detecting such phenomena as those mentioned above. The experiments designed (but, as far as we can ascertain, not carried out), and for which funds were granted by the British Association, were for the determination of temperature and other changes at one fixed altitude. We think something quite different is worth trial.—Ed.]