SYMONS'S

MONTHLY

METEOROLOGICAL MAGAZINE.

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NOTES ON RAINFALL IN NOVEMBER.

A glance at our usual monthly table will show that the excess which characterized October has been repeated in November, in an equal or intensified degree. The excess has on the whole been tolerably uniform, but there have been some local peculiarities in Kent, which at present we have not sufficient data to fully explain. The following are the facts, their verification and explanation must await the receipt of all the Kentish returns at the approaching close of the year.

I. A new rain gauge has, through the kind assistance of Mr. G. Anderson, recently been placed at the Gas Works, Buckland, Dover, and the amount reported for November is 10·17 in. This seemed so extremely large an amount that we at once proceeded to compare the daily entries with those published in the Daily Weather Reports, and we found the total to be 9·01, and the daily observations at the two stations to hold similar ratios. We know nothing of the position of either gauge, but can readily imagine that the contour of the country would produce a large fall in the valley at Buckland, and therefore the reports may be held as evidence of a fall of ten inches at a locality where the November average is probably not one-third of that amount.

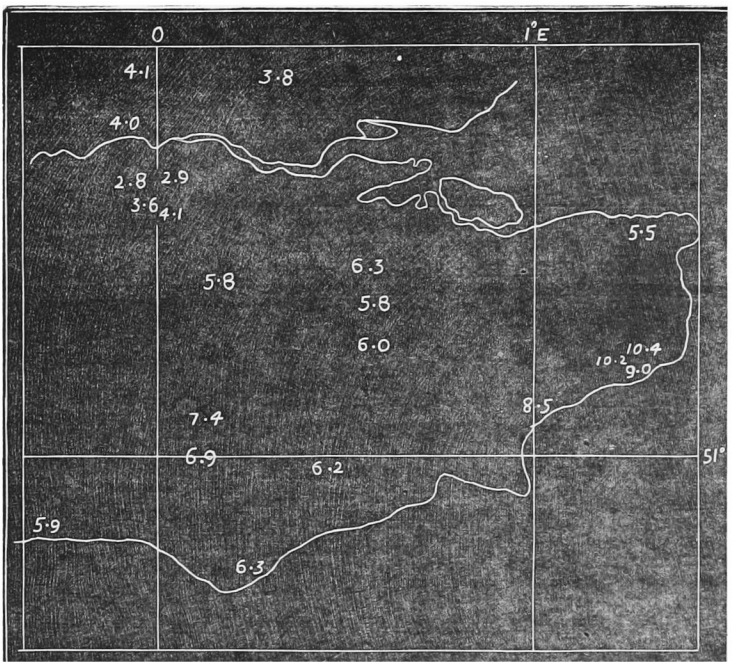
II. There are two gauges at Eltham, in West Kent, one taken daily, the other at irregular intervals; they agreed within one or two hundredths in giving only 2·90 in. as the total for November, while that at Forest Hill was still less, being only 2·79 in., which is as noticeable for its smallness and remarkable for its dissimilarity to those surrounding stations from which we have at present received returns, as are the Dover returns for excess.

These features will, however, be readily seen from the accompanying little chart, and table of supplementary returns, and we need not pursue the subject further, except to point out its dependence for proof on closely adjacent stations. With stations at the wide distances sometimes held to be sufficient, facts like these could not be detected, and if they happened to occur at one isolated station there would be no means of proving whether it was a veritable occurrence or arose from errors of observation.

Since writing the above, we have received from our observer at

Castle Street, Dover, his return for the month, which slightly exceeds even Buckland, and also the return from Hythe, which, by a diminution of about one-and-a-half inches, proves at once the accuracy of two at least of the Dover returns, and its own correctness. The figures therefore stand thus :—

Dover,	Castle Street	10·44
,,	Buckland	10·17
,,	(Daily Weather Report)	9·01
Hythe	....	8·53



		in.
I.	Harrow	3·93
	Winchmore Hill...	4·05
	Riverdale, Hanworth ...	2·93
	Pinner Hill	3·82
	Muswell Hill	4·07
II.	Bucklands, Dover	10·17
	Castle-street ,, ...	10·44
	Hythe ,, ...	8·53
	Boxley Road, Maidstone	6·31
	Staplehurst Place.....	6·03
	Riverhead	5·84
	Acol	5·52
	Bromley	4·08
	Chislehurst	3·63
	Eltham	2·90
	Worthing	5·88
	Meads, Eastbourne	6·31
	Salehurst	6·21
	Uckfield	6·92
	Crowborough	7·39

		in.
III.	Berkhampstead	4·45
	Great Missenden	4·48
	Addington	3·10
	Sandy	3·37
IV.	Wix	3·79
	Ipswich	4·30
	Diss	4·13
	Swaffham	4·81
	Hillington.....	4·32
V.	Tytherton	4·69
	Bingham Melcombe.....	6·53
	Blandford, Longthorns...	6·50
	Beaminster	6·73
	Holne...	13·36
	Druid.....	9·28
	Prison Reservoir	8·24
	,, Garden	12·38
	Rundlestone	11·36
	Kilworthy, Tavistock ...	8·74
	Okehampton..... ..	7·53

		in.
	Clawton	6·00
	Poughill	4·89
	Taunton	4·05
VI.	Sansaw	3·31
	Buglawton, Congleton	2·98
VII.	Mansfield	3·49
VIII.	Macclesfield	3·93
	Bolton	4·80
	Broughton	5·38
IX.	Beverley	3·93
	Buckden, Shipton	13·13
	Middlesboro'	2·80
X.	Birkside	16·50
	Matterdale	10·50
	Gowbarrow	10·50
	Grasmere	14·00
	Mardale	13·75
	Measandbecks	8·50
	Swarthfell	8·50
	Sharrow Bay	7·45
XI.	Llanfrechfa	9·67
	Bridgend	12·44
XI.	Heyhope	8·63
	Plas Brereton	6·32
XII.	Melrose	5·45
XIV.	Holehouse	5·75
	Cessnock	4·53
XV.	Glengorm, Isle of Mull	6·61
	Glen Etive, Argyllshire	12·35
XVI.	Dundee	4·79
XVII.	Nairn	4·24
XVIII.	Tain	4·04
	Strathconan	6·61
	Gairloch	5·78
	Sligachan	11·50
	Budgate, Cawdor	4·37
XX.	Glenville	6·63
	Glenbehy, Cara	9·22
	Lake Side ,,	8·22
	Clonmel	5·57
XXI.	Twyford	6·17
XXII.	Ballinasloe	5·83
XXIII.	Belfast	4·88

REMARKABLE FALL OF METEORS.

[The following selection of letters will serve as an indication of the principal features of the display produced by Biela's comet on Nov. 27th. Dr. Moore was kind enough to telegraph to us to look out, but alas! our view, as conjectured by Mr. Boys, was limited to the lining of M. Poey's *Pallium*—the sky in London was wholly obscured by uniform cloud.]—Ed.

To the Editor of the Meteorological Magazine.

Sir,—I send you a few notes respecting the very remarkable fall of meteors on the evening of Wednesday, November 27th. At 5.50 p.m. (Dublin time) my attention was first directed to the fact that an unusually brilliant display of falling stars was in progress, by observing three bright meteors in quick succession. They fell along diverging paths, which I was soon able to trace backwards to their union at a point nearly midway between Cassiopeia and Pleiades. In a short time it became possible to fix the radiant point with greater accuracy, for within a very few minutes so many meteors had fallen that the radii were easily traced to a focus. This I determined to be a short distance to the north-west of the star Almach, in Andromeda. My friend, Professor Robert Ball, of the Royal College of Science, ascertained by observation that the radiant point nearly coincided with the star "46 Andromedæ," although it varied slightly.

As the night was almost calm a considerable quantity of smoke gathered over the city, and dimmed the sheen of the stars from time to time; occasionally, too, detached clouds and masses of vapour fog obscured the sky in places for a short period. Notwithstanding these

drawbacks the heavens, as seen from Dublin, presented a striking and beautiful spectacle. At nine o'clock the sky was quite clear and the stars bright. As the radiant point was now near the meridian, and at a great altitude, the meteors fell in all directions, almost from the zenith, I should say at the rate of at least twenty a minute.

From this time, the number became gradually less, but two hours later the fall was still remarkable. At 10.55 p.m., a most splendid meteor shot northwards from the radiant point, and left a train of dazzling sparks in its path. Almost at the same moment, a pale star appeared far away to the N.E., and passed rapidly and with changing light athwart the sky, finally disappearing in the extreme S.W. It did not seem to belong to the great display from Andromeda, but was rather a wanderer, such as might be seen on any night in autumn.

An eye-witness of the wonderful meteor-shower of November, 1866, I had not hoped so soon to see such a display as that of Wednesday night. I calculated that in six hours at least 5,400 falling stars might have been seen from Dublin, and this number is possibly far below the true one.

In conclusion, I would ask, as no unusual display of meteors was observed—so far as I am aware—on Nov. 13 and 14, was this display the ordinary November shower delayed some 14 days beyond its ordinary period,—I am, Sir, yours very truly,

J. W. MOORE, M.D.

40 *Fitzwilliam Square, West, Dublin, November 28th*, 1872.

To the Editor of the Meteorological Magazine.

SIR,—It may interest some of your readers to know that on the evening of November 27th there was seen here an unusual display of "shooting stars." I am not astronomer enough to know whether the appearance of these was expected, but knowing the tendency of an English November to hide behind impenetrable cloud all such phenomena, I send you an acconnt of what was seen in Greece. The night was a remarkably clear one, and there was of course no moon. At half-past seven in the evening I happened to look out, and my attention was caught first by one meteor, then by another, and another, until it was a sight remarkable enough to deserve mention. At half-past ten, I had occasion to go out, and noticed that the shower of meteors was as thick as before; and then observed the sky at intervals until midnight, when I determined to count them for a while. Standing on my balcony, which looks N.W., and commands a view of one half the sky, I began to count, and in $7\frac{1}{2}$ minutes had counted one hundred. I then moved to my terrace, which looks S. and commands at most a quarter of the sky, and here I counted fifty in $4\frac{3}{4}$ minutes. I neither saw nor heard of any of remarkable size or brilliancy, but I noticed them to be distributed very evenly over the sky, and all to diverge from a point about 5 degrees W.N.W. of the zenith at midnight, (Patras is situated on latitude 38°· 17′ and on longitude

21°· 46′) and as my eye could not possibly take in all that appeared, some of them very small ones, it is perhaps probable that they appeared at the rate of 50 a minute for some hours.

Since the inundations in Italy this autumn have been so destructive and so well known, it may perhaps be interesting to you to hear that on the western side of Greece there has been an unusual deficiency of rain, the rainfall of Patras for the months of September, October, and November being less than a quarter of that of the corresponding months last year. Still more curiously, at Athens, on the E. side of Greece, only 100 miles from Patras, the autumn has been an excessively wet one during its late half.—Yours sincerely,

H. A. BOYS.

Patras, Greece, Nov. 30, 1872.

To the Editor of the Meteorological Magazine.

SIR,—I inform you with pleasure that we had a shower of falling stars last evening, (November 27th), commencing about 6 p.m., and continuing until about 9 p.m. They appeared in every part of the heavens, and some were of great brilliancy. The barometer was rising, and to day it is very bright and fine, after a long period of wind and rain,—I remain, Sir, yours truly,

T. DODGSON.

Thorpe Grange, Greta Bridge, Barnard Castle, Nov. 28, 1872.

To the Editor of the Meteorological Magazine.

SIR,—Last night we had here a fine display of Meteors. The "shower" began at 6h. (Greenwich time) and continued without intermission till 10.20., when the sky became partially clouded and continued so till after 11h., when it again partly cleared and meteors at short intervals were observed still to fall, and up to 3 o'clock this morning they had not entirely ceased; by 5, however, none were visible.

This "shower" was more copious than any witnessed since the night of the 13th of this month in 1866. The focus from which the meteors emanated is between Perseus and Cassiopeia, and only 2° or 3° to the N. of the star Almach in Andromeda. They shot forth in all directions, and often from 2 to 4 together, and so fast as to number from 15 to 30 a minute—so that in 4 hours it is computed that upwards of 3,000 must have fallen. Most of them were of a whitish colour, but some of a red and yellow hue. These were larger than the rest, and equal to stars of the 1st magnitude--leaving trains of 2° and 3° which, after the bursting of the nucleus, remained visible for 5 and 10 seconds. Tne most remarkable meteors of this colour were observed at the following times, 7h. 20m., 7h. 24m., 7h. 42m., 7h. 58m., and 8h. 3m. Three of them shot towards Ursa Major and the other two passed to the right of the Pleiades. The greater number of the light coloured meteors varied in size between stars of the 2nd and 4th magnitude, but some were so small as to be scarcely visible.

An arch of Aurora spanned the sky between N. E. and W.N.W. at

about 20° above the horizon, shooting up occasionally in "streamers" towards the zenith, greatly adding to the effect produced by the meteors. The night was frosty and nearly calm and clear, enabling this remarkable "shower" to be seen to the greatest advantage. If it be connected with the periodical one of the night of the 13th, the constellation from which the meteors emanated is very different. The 28th of November is one of the dates given in the instructions of the British Association for being on the "look-out" for meteors, but such a "shower" as occurred on the night of the 27th is surely scarcely to be expected.—I am, Sir, yours truly,

ARTHUR FORBES.

Culloden, near Inverness, N.B., Nov. 28, 1872.

THE GALE OF DECEMBER 8TH.

ALTHOUGH we have somewhat increased the size of the present number, we have not space for one quarter of the notes with which we have been favoured respecting the recent gale. We insert, however, those for which we have room, and prefix a comparative table of the pressures recorded by several of the anemometers in various parts of the country; arranging them in the order of their amount we have :—

Guernsey	53 lbs.
Beckenham	31½ ,,
Wisbeach	23 ,,
Holborn	18½ ,,
Sidmouth	10 ,,

If each of our readers who possesses an anemometer will favour us with the total horizontal motion of the air between 8 or 9 a.m. on the 8th and the same hour on the 9th, we will throw the information into a tabular form, and think it would prove generally interesting.

To the Editor of the Meteorological Magazine.

SIR,—The following particulars of the gale of Sunday, Dec. 8th, may be of service in tracing its history. It was, undoubtedly, the heaviest gale that has been experienced in this neighbourhood for many years. This is proved by the damage done. In all directions large trees (leafless, be it remembered,) have been torn up by the roots or snapped off in the middle of the trunk, while the injuries to houses and public buildings have been beyond anything that most people can remember.

The gale began about 3 p.m., on Sunday, and continued until about 6 a.m., on Monday. Its greatest violence was from 8 p.m. to 3 a.m.

The direction of the wind was at first S. and S.S.E., veering about 5 p.m. to S.W., about 8 p.m. to W.S.W., and between 9 and 10 p.m. to W., near which point it remained during the night, possibly reaching W.N.W. for a time.

The maximum force was estimated at 5, on the scale of 0—6.

The barometer fell with great rapidity during the first part of the gale, reaching its minimum at 8 p.m. The following are the hourly readings for four hours on either side of the minimum. They are corrected for index error, and capillarity, and reduced to a temperature of 32°. The height above the sea is 228 ft. The times are local.

4 p.m.	28·765 inches.
5 p.m.	28·687 ,,
6 p.m.	28·596 ,,
7 p.m.	28·534 ,,
8 p.m.	28·496 ,,
9 p.m.	28·517 ,,
10 p.m.	28·557 ,,
11 p.m.	28·594 ,,
12 p.m.	28·626 ,,

GEORGE F. BURDER, M.D.

Clifton, 10*th Dec.* 1872.

To the Editor of the Meteorological Magazine.

SIR,—There was a heavy gale last night and this morning. The barometer had been low and fluctuating so long that I had no suspicion of a gale. Two or three days had been fair, and Sunday was fine and sunny, but the barometer fell rapidly in p.m.

	Barometer reduced to Sea level.	Temp. of Air.	Wind.
8th Dec.	9 a.m. 29·461 in.	37·5	S.W.
,,	3 p.m. 29·326 ,,	43·0	S.E.
,,	10 p.m. 28·683 ,,	45·0	S.S.W.
9th Dec.	8 a.m. 28·761 ,,	38·0	S.W.
,,	9 a.m. 28·815 ,,	37·0	W.S.W.

Pressure on square foot—8th at 5.40 p.m. 4lbs.; at 10 p.m. 15lbs. 9th at 3 a.m. 23lbs. (the highest recorded here for 12 years); at 6.35 a.m. 18lbs.; at 9 a.m. 10lbs. Rain and hail, moderate at noon; fair, p.m.

I am, Sir, yours, &c.
SAML. H. MILLER.

Wisbech, 9*th Dec.* 1872.

RECORD OF OSLER'S ANEMOMETER.

Sunday, Dec. 8th, 9 a.m.—Sunshine, fresh breeze, S.S.W., backing. Barometer corrected and reduced to 32° Fah., at sea level, 29·670, 2 to 4 p.m., S.S.E., strong breeze, with heavy squalls of wind and rain; pressure 7lbs. to 8lbs. per square foot, 30 to 40 miles an hour. Between 4 and 5, during a violent squall, the wind flew to S.W., the pressure suddenly rising to 20lbs., 63 miles. 6 p.m., barometer fallen 5-tenths, 29·142. Wind, S.W., raging with the force of a hurricane, recording for three hours, 22lbs., 66 miles, with terrific squalls of 53lbs., 104 miles an hour. 9 p.m., W.S.W., force to midnight, 20lbs., 63 miles.

Monday, 9th.—The storm continued until 6 a.m., pressure 12lbs. to 20lbs., 48 to 64 miles. 9 a.m., barometer risen 1½-tenth 29·287. Gale moderated during the day to a strong breeze from W.

The total horizontal movement of the air during 24 hours, ending at 9 a.m., on Monday, deduced from the pressures recorded by Osler's Anemometer was 1280 miles; during the same period Dr. Hoskins' Robinson's Cup Anemometer registered 1272 miles. This close agreement of the two instruments confirms their accuracy.

Tuesday, 10th, 1 p.m.—Wind backed to N.E., barometer fallen since 3 a.m., 5 tenths, to 28·770. Temperature diminished 4 degrees since 9 a.m.—reads 39 degrees. Dense canopy of leaden cloud with steady rainfall.

Let us hope that the year 1872, may long continue the "annus mirabilis" in the records of Guernsey rainfall, upwards of 52 inches having already been registered. T. L. MANSELL., A.B., M.D.

Guernsey, Dec. 10, 1872.

HEAT AS MEASURED BY NATURAL *v.* ARTIFICIAL MEANS.

To the Editor of the Meteorological Magazine.

SIR,—I would have been more glad if my article in your number for October had been replied to by writers from the country, rather than from London, as my inquiry was more especially made to those who had the opportunity of reporting both on the harvest and on the thermometer, which neither of them seem to have; and as the weather is of much greater importance to the farmer than to the townsman, I should have rather had a reply from the one most interested; however as that has not been the case, I will endeavour to answer the objections to my letter put by your not-far distant correspondents; and, in the first place, I may say that although I classed May with the summer months, I do not necessarily regard it as one, but in speaking of the wheat crop it was included as having an important bearing on that crop, and its lateness in ripening I partly attributed to the coldness of May. Further on, Mr. Brumham, whose observations I reply to, tells us when summer did begin, and I certainly commend him for waiting until it was over in doing so—a plan highly advisable for all weather and other prophets to adopt—but even in this he is not so definite as I should wish. In years gone by, old Moore used to tell us the precise day, hour, and minute when each season commenced, but Mr. Brumham is less precise, and says the past summer did not commence until a few days past the 7th of June, and lasted ninety-seven days, and in a former number of the *Meteorological Magazine* he tells us it has been a hot summer and a wet one, by which I comprehend he means a greater amount of solar heat and greater rainfall in those ninety-seven days than is usually the case, but somehow there is no rule without exception, and I take one for Linton, for allowing the few days he says it was after the 7th of June ere summer commenced, to be six (I dare say any other small number would be much the same), and say that summer commenced on 13th June and continued till 18th September, making the ninety-seven days he speaks of, I find our rainfall during that time to be 6·34 in.; and I also find that the average

of the preceding sixteen years, 1856 to 1871, both inclusive, gave a rainfall of 6·66 in. for the same 97 days, therefore the season of 1872, in accordance with Mr. Brumham's law of making it, has been a dry rather than a wet one, for I may observe that more than a fourth of the 6·34 in. stated above fell in one thunder shower on 24th and 25th June. Now, in the matter of heat, I confess my belief in the value of thermometers has been much shaken of late, more especially since the records made at Chiswick for upwards of forty years have been pronounced erroneous by some great authority, and who can say but the same verdict may be passed on those now taken at Greenwich by some after tribunal? I admit having looked on those taken at Chiswick with great respect some thirty years ago, and soon after that time commenced to take such notes myself, but of late have felt the natural test of a season's heat, or otherwise, ought to have a proper place in describing it, as well as the artificial one, and when the two don't coincide I would let the natural one have it. To make my meaning more clear; I would call every morning a frosty one in which leaves, damp cloths, and such like, "stiffen," regardless of what the thermometer readings were. But Mr. Aldridge is wrong when he says I only call in the aid of the thermometer to confirm my own views and reject them when otherwise, for the fact of the harvest being a late one not being disputed, so far as I have any knowledge, by any one (Mr. Brumham himself acknowledges it to be so), I asked if the readings of the thermometer indicated a lack of heat during the period the wheat was growing and ripening, and if these readings did give a deficiency of heat, the cause of the lateness was easily accounted for; if, on the other hand, the instruments gave a greater heat than the average, then some further inquiry ought to be instituted; the matter of the harvest being a late one being an absolute fact, not subject to any opinion or any error, whereas the thermometer (as every one knows) is liable to such mishaps,—and with the example of the Chiswick observations before us, who can say that any artificial system is right? whereas we all know there have been late and early harvests through all time, and likely ever will be, and the records of such go much further back than the hundred years Mr. Brumham takes so much pains to repeat. Moreover, late and early harvests are recorded in districts where thermometers are unknown or uncared-for, and if the information those instruments impart could be transferred to some object not subject to the derangements they are, which had also the power of denoting the temperature of every minute of every twenty-four hours constituting the day, we should then only have an imitation of the living plant, which is influenced accordingly; but as such is not likely to be the case, character of the season must be taken as conjointly between such natural and artificial means as we have within our reach; and if I have expressed a leaning to the former of these tests, I can appeal to the laws which govern other sciences for having done so.

Mr. Brumham finds much fault with me for not reporting June and

July hotter months than I did; to this I can only say I could only report them as they were—the first a cold and the latter a medium month; and I may add, I am not much given to guessing, neither of the past nor the future, and all my remarks on the weather (when not otherwise stated) refer to notes I have taken myself at Linton, and if these notes do not agree with what he *guesses*, they ought to be, I must leave to a discerning public to discriminate between my observations as made and recorded on the spot and his guessing of what it was to be, as insisted on by him some months ago. I have a strong impression that most people connected with rural affairs in the north and west of England will hereafter look back on the summer of 1872 as a dull, cold, and wet one, instead of the hot one promised; at the same time do not let it be understood that I pronounce that verdict on it here; on the contrary, the ninety-seven days which Mr. Brumham has somewhat adroitly selected for his summer (after they were passed) represented a goodly number of fine warm days, which if they had been preceded by corresponding fine weather in May and June, might have entitled the season to be called a fine warm one; but that not being the case, I can only pronounce it, as a whole, a medium one, with harvest not more than four or five days later than usual, but at other places in the west and north it has been more backward, and the farming papers gave pitiful reports of the corn that was still out all through October, and one of your monthly correspondents I see mentions, some out at the end of that month. Surely a season that presents such a state of things will not be spoken of hereafter as "a hot one;" that it has been a wet one I believe few will deny; at least here taken in its entirety it has been so, although the ninety-seven days which Mr. Brumham takes for his summer were drier than the same period last year, and of the fifteen years before that—so much for prophecies!

As I hope I have sufficiently explained my reasons for dissenting from the readings of the thermometers only being taken as a proof of the temperature of a season, I need not repeat it here; and I can only promise hereafter to reply to such correspondents as furnish meteorological observations taken by themselves. I do not mention this in any angry tone, but my former letter being more especially addressed to those versed in agricultural matters, would seem to have more weight from them than if from less experienced writers; differing from me in the views taken I would be the last to find fault with. More I need not say.—Yours, &c.

JOHN ROBSON.

Linton.

To the Editor of the Meteorological Magazine.

SIR,—In this district we are decidedly at issue with your correspondent, Mr. Brumham, who appears to be quite satisfied with the fulfilment of his prediction of a fine and warm summer,—our share of which has been certainly *nil*, as the subjoined facts will show. Indeed the past season has been the wettest and least genial we have

had for many years; the land has been in a constantly saturated state, and our much-enduring farmers would be vastly amazed to hear that any one considered the summer to have been a favourable one. The total rainfall of the ten months to the end of October, was 39·93 in., the wettest months being June, 6·22 in., July, 5·60 in., Sept. 4·26 in., and October 6·66 in., while only in one month, viz., May, was the fall below 2 in. Last year (1871), which was by no means very dry, the total fall in the same period was 24·54 in., while in 1870 it was only 17·20 in., and in 1869, 21·99 in. Rain has fallen on 205 days in the ten months; the corresponding number of days in 1871 was 159; in 1870, 123; and in 1869, 146. Thunder was heard or lightning seen on 21 days, between June 1st and September 30th; and on 14 days storms of considerable violence occurred.

Next as to temperature: since the early spring we have had very little really warm weather. The mean temperature was below the average in May by 3°·6, in June by 2°·3, in August by 1°·9, in September by 0°·6, and in October by 3°·6. July was the only month since April in which the temperature exceeded the average (when the excess was only 0°·3), while the months of May, June, and October were unusually cold. We hope that when next Mr. Brumham predicts a warm summer we may get a larger modicum of it than we have had in 1872.—Yours faithfully,

BOSCAWEN T. GRIFFITH,

Trevalyn Hall, near Wrexham, Denbighshire, Nov. 13th.

N.B.—Height of top of rain gauge above sea level, 58 ft.; thermometers, on Glaisher stand, 4 ft. above soil; rain gauge and thermometers by Casella.

To the Editor of the Meteorological Magazine.

SIR,—I am glad Mr. Robson has raised the question of "Heat indicated by crops *v.* thermometer." I hope that in doing so he has opened the discussion of more than he thought for.

I cannot say that I know the special object originally proposed to themselves by those who initiated our system of thermometrical observations, because you have not yet published "Heat, when, where, and why it is observed," but it occurs to me that at the present time one of the most practical uses to be made of such observations is the comparison of the climates of different countries and localities to determine their suitabilities for the cultivation of various crops, and for the residence of persons of delicate health.

For this purpose I am sure we ought to reject at once all thermometer stands as at present constructed, all thermometers protected from radiation or enclosed in vacuum jackets, and all mean temperatures. I am afraid I shall take away your breath with this assertion, but read on.

As regards vegetation it is exposed to rain, wind, evaporation, and all the extremes of solar and terrestrial radiation. What guide then can any observations, especially of mean temperature, obtained from

thermometers protected from all these things on a stand 4ft above the ground, or, if on the ground, enclosed in a vacuum jacket, afford as to the meteorological circumstances to which crops on the open surface in the immediate neighbourhood are exposed, or as to the consequent effects on their growth or ripening?

In the same way of invalids. I know well that there are often days in this part of England when my thermometer on the stand tells me it is considerably warmer than on the previous day, a south wind is blowing, the sky is bright, and the barometer rising, but my skin tells me it is a whole great coat colder than the day before; I would not turn a dog out of doors, much less let an invalid go out, and I know by experience that "the wind is blowing through water," and that there will infallibly be a southerly gale before night fall. In this case my hygrometer would give me warning, as the humidity would have increased.

I should then like to ask this question. What is the supposed use of observations made with thermometers 4ft above the ground on stands and protected from radiation, or in jackets on the ground, and of the mean temperature thus obtained, all being as it seems to me artificially removed as far as possible from the climatic conditions of the surrounding locality? I remember a gentleman, who thought of trying to introduce vine culture into this part of England, making enquiries of me as to temperature, and remarking that, in consequence of the points I have mentioned he could get no information which would be any guide to him as to the suitability of the climate for his purpose. I saw at once that what he wanted to know was the extremes of cold and heat and the amount of humidity to which his vines would be exposed during the various seasons, and as he did not propose to grow them on Glaisher stands or in vacuum jackets I could not help him. If I could have given him even the mean cold of the nights, another mean heat of the days, and the mean nightly and daily humidity for each month in the year taken from exposed thermometers and hygrometers on or very near the ground, it would have been of some value.

You know I am the avowed enemy of all means and averages, as tending to obscure all natural differences. One might as well dress all men in garments cut to a mean measure, and then wonder that they did not all look equally well.—I am, Sir, yours truly,

THOMAS E. CRALLAN.

Hayward's Heath, Dec. 3rd, 1872.

To the Editor of the Meteorological Magazine.

SIR,—I waited to see if anyone would point out what appears to me to be a remarkable omission in Mr. Robson's calculations. When we speak of the temperature of a season as high, we mean that the thermometer *in the shade* gave a high average. But one does not need to be very learned in agricultural matters to be aware that farmers do not grow their corn in the shade; and I believe that I am right in

supposing that the sun has something to do with ripening the crops. In a wet season like the past, there is less sunshine than in a dry season like 1864, and therefore the crops may well be later, even if the temperature of the air has been higher, without taking into consideration the effect of moisture at all.—I am, Sir, yours truly,

FENWICK W. STOW.

Harpenden, Nov. 25th.

CORRECTIONS FOR DAILY RANGE.

To the Editor of the Meteorological Magazine.

SIR,—With reference to the use of the Greenwich tables for deducing the mean temperature from observations at any hour, will you permit me to state my own experience in the matter? When I lived on the Yorkshire coast, I found them quite inapplicable, owing to the influence of sea breezes. In fine weather the temperature rises faster in the early morning than at inland stations, owing to the comparative absence of mist &c., and attains its maximum between 11 a.m. and noon. The wind then veers, and about 1 p.m. the sea breeze begins to blow from the E. or E. S. E., lowering the temperature many degrees, and greatly increasing the humidity. On this account the temperature at 3 p.m. averages only about 1° warmer than at 9 a.m., whereas with the same range of temperature it should be according to the tables 5° or 6° warmer. This throws the whole distribution of diurnal range into confusion, and as for the wet bulb, its monthly mean as deduced by the Tables from the 3 p.m. observations sometimes came out higher than that of the dry bulb.

Any one can see from the Quarterly Reports of the Meteorological Committee the impossibility of deducing the temperature curve at one observatory from that of another.

Still, for south-eastern and midland stations, and in a less degree for all inland stations, I believe that the tables have their use. It is worthy of remark that with the following ranges for the different months, 10, 11, 12, 16, 18, 20, 20, 18, 16, 14, 12, 10, the corrections for the mean of two daily observations at 9 a.m. and 9 p.m. are only +0·8, +1·0, +0·8, +0·4. +0·2, −0·4, 0·0, +0·4, +0·7, +0·8, +0·9, +0·8. Would it not be better to deduce the mean temperature from the mean of two such observations and the mean of the daily maxima and minima, all uncorrected by any arbitrary figures? The corrections for the mean of the maxima and minima are not required, I believe, if a louvre board screen is used,—I am, Sir, yours truly,

FENWICK W. STOW.

Harpenden, Nov. 25th.

To the Editor of the Meteorological Magazine.

SIR,—I am glad to find the Rev. Wm. Eyre is opening up the subject of the correction of temperatures for diurnal range according to the formulæ, which however suitable they may be to Greenwich and the observations taken there, are I am confident unsuitable corrections to be applied to other places, and to my mind vitiate the observations to which they are applied. I have been for some months past com-

paring the results of observations corrected by Glaisher's Tables and those I return to the Scottish Meteorological Society uncorrected, and believe the latter to give a more correct account of our local temperature.

In a pamphlet I published on the climate of Sidmouth in 1867, I ventured on the following possibly heretical statement:—"The correction (if any be needed) for each place should depend on the results of a long series of observations taken in that place, and taken in connection with the extreme range of temperature. Such correction not having been made for Sidmouth, the results both with and without corrections have been given." Trusting the subject will be ventilated in your columns.—I am, &c.,

J. INGLEBY MACKENZIE, M.B., Cantab, F.M.S., &c.
Belgrave, Sidmouth.

DAILY VARIATIONS IN THE PREVALENCE OF RAIN DURING NOVEMBER, 1872.

The month of November has been marked by excessive rainfall over the British Islands. It commenced with a depression, advancing rapidly on the western coast, its southerly winds bringing rain to all parts of our islands on the 1st and 2nd. The 3rd was finer, but night brought a fresh disturbance to us, which, travelling north-north-eastwards along our western shores and extending laterally over the whole kingdom, renewed the downpour. Scarcely had it passed, before a new centre of circulation showed itself in the more north-westerly parts of the country. Its path lay, however, considerably to the northwards of us, and its motion being more easterly, the winds which accompanied it were westerly, and the rain, though rather general, was less heavy in most places. The 7th and 8th were much finer, but on the latter day a local depression passed up the Channel, bringing rain to our southern stations. An entire change then commenced. During the next two days, barometrical pressure increased at the northern stations, while it gave way in the south of France; northerly and north-westerly winds set in, and temperature fell; but the northerly current was not unmingled with other winds. Several very slight depressions appeared, in addition to a larger disturbance which formed over Holland, and thunderstorms, or squalls of hail with lightning, occurred in many places, while rain fell generally. This larger depression seems to have travelled southwards during the next few days, extending itself laterally over France as it did so. Showers of snow and hail fell at our north and north-eastern stations, heavy rain in many parts of France, and thunder occurred at Biarritz and Scilly on both the 11th and 12th—the barometer rising generally in a small degree on the 12th. On the 13th, a more decided recovery of pressure in the south of France was accompanied by the appearance of a depression in Holland; this, travelling westwards over France, made the rain, with snow and hail, general at our northern, eastern, and central stations, while the 14th involved France in the general

downfall—our western counties alone escaping. Another depression followed, just showing itself over Holland at 8 a.m., 15th, whence it travelled westwards for the Straits of Dover. The snow felt of late on the northern and eastern coasts gave place to heavy rain, which extended to all but the south-west of our islands, and continued, more or less, through the greater part of the 16th, when the depression began to fill up. A return to the general atmospheric conditions which prevailed prior to the 8th ensued; and, until the close of the month, a constant series of depressions passed northwards or north-eastwards over our western stations, bringing with their southerly and south-westerly winds the usual heavy rains, which are felt most in the western portions of the kingdom. In a few cases, the interval which elapsed between their advent was sufficient to allow of a clearance in the weather for several hours—at least at such stations as are situated in the more south-eastern counties; but often *borasque* followed *borasque* in such rapid succession that the sky no sooner became clear than cirrus and cirro-stratus rapidly overspread the sky, and the backing of the wind brought about a return of rain to all parts of the country.

Thus it will be seen that not only were our western and north-western coasts visited by *large* quantities of precipitation during the prevailing southerly winds of the early and latter parts of the month, but the south-eastern, eastern, and northern coasts (which had participated in those disturbances) came in for a considerable share of that which accompanied the depressions of the 13th—15th, in addition to what fell during the minor disturbances of the 11th and 12th. F.G.

CHEMICAL HYGROMETER.

To the Editor of the Meteorological Magazine.

SIR,—I do not think the Chemical Hygrometer described in your October number can be regarded as an acquisition to the stock of instruments now at the command of the meteorologist. It is an apparatus of great use in the chemical laboratory in the analysis of gases, and with care can no doubt be made to give excellent results exhibiting the amount of aqueous vapour in a given sample of air, but at any time the operation of determining the weight of water in a cubic foot of air, which is the desideratum of the meteorological observer, by this method is attended with no little difficulty, and requires considerable patience and also manipulative skill.

In the first place the proper filling of the tubes with calcium chloride, or sulphuric acid soaked pumice stone, is not an operation which can be performed hastily, then the weighing of the filled tubes in a chemical balance, the careful making of air-tight connections between them and the aspirator; the numerous precautions to be observed in passing the air through them—the dismounting and second weighing, the various calculations rendered necessary for obtaining the true volume of air, all tend to make the observation of humidity a laborious operation.

After all it would only give a mean value for the time during which

the large quantity of air necessary for a correct determination was being drawn through the apparatus, and at the conclusion of the experiment it is questionable whether the result would possess an accuracy equal to that generally attained by the comparison between the temperatures of the dry and wet bulb thermometers.

Although the instrument is not serviceable for observational purposes, yet I have no doubt but that it would be worth while for some one having sufficient leisure at command to make a series of comparisons between the hygrometric quality of the air given with this apparatus and that obtained with Mason's hygrometer, in order that the validity of Apjohn's formula might be tested under all conditions; this may have been already done, but I do not remember having met with any account of such an investigation.

I believe the absorption of water by sulphuric acid will eventually be made use of in meteorological enquiry, but I look rather to an instrument taking the form of Mr. Wildman Whitehouse's ingenious apparatus than to those now before us.

With regard to the second part of W. H. H. C's communication describing Leslie's experiment, I think he must have made a mis-statement, for I never before heard of mercury being frozen by its own evaporation *in vacuo* over sulphuric acid; the conversion of water into ice by this method is a well known experiment, but I do not see how it would succeed in the case of mercury, there being no tendency on the part of sulphuric acid to combine eagerly with mercury, as it does with water.

G. M. WHIPPLE.

PERIODICITY OF PREVALENCE OF POTATOE DISEASE?

To the Editor of the Meteorological Magazine.

SIR,—May I call your attention to the following facts in connection with the potatoe crop? The maximum disease occurred in 1846, just twenty-six years ago. This year has again shown a maximum, the interval halved gives 1859, which is known in this part of the country for the maximum growth of fine large and sound tubers, giving in some cases, one hundred and sixty sacks to the acre. This apparently shows a regularity of interval which it would be interesting to compare with meteorological results.—I am, Sir, yours, &c.

W. HATFIELD.

Stoke, Slough, Bucks.

[Is not the above statement fatal to the suggested explanation of the disease as connected with the frequency of thunderstorms? We know that thunderstorms have been more frequent than usual in 1872, and that the same was the case in 1859, and it is our impression that they were also in excess in 1846. If so, we have three years noticeable for more than an average frequency of thunderstorms, and our correspondent assigns to two of them a maximum prevalence of disease, and to one a minimum.—Ed.]

NOVEMBER, 1872.

Div.		STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL. Total Fall.	Difference from average 1860–5	Greatest Fall in 24 hours. Dpth	Date.	Days on which ·01 or more fell.	TEMPERATURE. Max. Deg.	Date.	Min. Deg.	Date.	No. of Nights below 32°. In shade	On grass.
			inches	inches.	in.								
I.	ENGLAND.	Camden Town	3·98	+ 1·57	·65	30	21	61·2	5	31·7	18	2	5
II.		Maidstone (Linton Park)	5·81	+ 2·62	·54	13	23	60·0	1	30·0	18	4	...
,,		Selborne (The Wakes)	5·78	+ 2·24	·74	22	23	57·0	5, 6	31·0	11*	6	11
III.		Hitchen	3·43	+ 1·29	·38	30	24	58·0	5, 6	30·0	17	6	...
,,		Banbury	4·87	+ 2·67	·69	26	24	59·3	6	30·0	13	6	...
IV.		Bury St. Edmunds (Culford)	4·01	+ 1·62	·58	10	21	62·0	5	31·0	16	6	10
V.		Bridport	5·76	+ 2·60	·88	21	22	60·0	5	26·0	17	3	...
,,		Barnstaple	6·27	+ 2·13	·65	30	25	60·0	7	33·0	17	0	...
,,		Bodmin	7·90	+ 2·92	1·24	22	26	58·0	3	32·0	15	1	4
VI.		Cirencester	4·82	+ 2·03	·77	26	21	...	...	...	...	...	...
,,		Shiffnal (Haughton Hall)	3·21	+ 1·64	·46	15	24	58·0	6	29·0	26	6	...
,,		Tenbury (Orleton)	4·42	+ 1·95	·65	25	25	62·8	5	27·3	18	3	15
VII.		Leicester (Wigston)	3·58	+ 1·42	·63	22	21	60·0	5, 6	31·0	17	1	...
,,		Boston	2·94	+ ·80	.42	15	21	61·0	5	30·0	19	1	...
,,		Grimsby (Killingholme)	4·11	...	·90	15	22	60·5	6	30·0	19	1	...
,,		Derby	2·36	+ ·73	·32	4	24	61·0	6	30·0	19	1	...
VIII.		Manchester	3·77	+ 1·01	·97	26	22	60·2	6	31·0	19	2	16
IX.		York	4·30	+ 2·32	·66	15	23	61·0	7	26·5	17	5	...
,,		Skipton (Arncliffe)	10·21	+ 3·76	·87	25	27	56·0	6	24·0	18	11	...
X.		North Shields	4·11	+ 1·41	1·00	15	23	67·0	6	32·0	19	1	2
,,		Borrowdale (Seathwaite)	18·64	+ 1·97	3·40	5	19	...	...	...	...	...	...
XI.	WALES.	Cardiff (Ely)	5·13	+ ·89	·80	25	20	...	...	...	...	...	...
,,		Haverfordwest	8·71	+ 3·04	1·15	23	23	57·0	5	31·0	16†	3	4
,,		Rhayader (Cefnfaes)	10·48	+ 5·90	3·10	23	23	57·0	...	20·0	...	.	...
,,		Llandudno	5·22	+ 2·06	·78	16	23	64·0	6	33·0	18	0	...
XII.	SCOTLAND.	Dumfries	3·92	+ ·70	·46	25	20	58·0	5, 6	28·5	19	7	14
,,		Hawick (Silverbut Hall)	4·92	...	·95	15	25	...	...	...	...	...	...
XIV.		Ayr (Auchendrane House)	5·27	+ 1·20	1·02	4	19	58·0	5, 6	24·0	19	12	21
XV.		Castle Toward	8·39	+ 3·75	1·95	5	17	...	...	...	...	...	...
XVI.		Leven (Nookton)	4·44	+ 1·40	·70	16	20	61·0	6	29·0	4	7	24
,,		Stirling (Deanston)	7·70	+ 4·19	1·38	4	22	60·3	6	26·9	28	11	19
,,		Logierait	5·80	...	·85	23	19	...	...	...	...	...	...
XVII.		Ballater	..	...	...	...	...	...	...	..	...	...	...
,,		Aberdeen	7·18	...	1·52	1	25	60·8	6	29·7	29	3	17
XVIII		Inverness (Culloden)	4.34	+ 1·75	·62	27	18	56·8	6	30·8	28	2	20
,,		Portree	9·36	— 1·12	1·77	6	24	...	...	..	...	...	...
,,		Loch Broom	6·67	...	1·24	6	21	...	...	...	...	...	...
XIX.		Helmsdale	6·45	...	·95	6	23	...	...	...	...	...	...
,,		Sandwick	5·02	+ 1·02	·69	9	27	54·4	6	31·6	28	3	15
XX.	IRELAND.	Cork	6·27	...	1·03	22	16	...	...	...	...	..	...
,,		Waterford	6·24	+ 2·29	·89	21	25	59·0	6	30·0	14	3	...
,,		Killaloe	5·51	+ ·62	·65	1	23	65·0	3	27·0	15	5	17
XXI.		Portarlington	3·39	— ·53	·52	22	27	62·5	6	28·0	12	7	...
,,		Monkstown	4·31	+ 1·42	1·04	22	22	...	...	...	...	...	...
XXII		Galway	5·77	...	·79	22	24	63·0	6	27·0	14	6	...
,,		Bunninadden (Doo Castle)	5·82	...	1·00	1	21	...	...	...	...	...	...
XXIII		Bawnboy (Owendoon)	...	...	..	...	...	...	...	...	...	..	...
,,		Waringstown	4·22	...	·59	30	19	66·0	6	23·0	12	9	18
,,		Strabane (Leckpatrick)	...	..	...	...	..	...	...	...	...	...	...

* And 13, 14. † And 18.

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

METEOROLOGICAL NOTES ON NOVEMBER.

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

ENGLAND.

LINTON PARK.—A wet month, with very little frost, and scarce any fog. Winds mostly from S., S.W. and W., and often very high, especially after 14th. Atmosphere generally mild, so that geraniums and such plants out of doors are yet quite fresh. T and L on morning of 24th and 26th. Bar. generally low after the 9th; the rain maintaining a continuous flood rather than a high one at any particular time, but altogether a miserable month.

SELBORNE.—An extremely wet month, the state of the ground preventing farming operations; much wheat sowing must be postponed to the spring. No less than 12·69 in. of R in the last two months falling on 43 days in that time; tempestuous wind on evening of 1st, and the 23rd, and high wind all day on 25th. L on 14th and 22nd; TS at night on 25th and morning of 26th, and at 1 p.m. on 30th; prevailing wind S. and S.W. to the 9th; N. and N.E. to the 16th, the rest of the month S.W.

HITCHEN.—Only thirteen days without rain in October and November; S on the 11th and 13th; heavy thunder-shower on 30th.

BANBURY.—High wind on 1st, 21st, to 26th. Floods on 20th. S on 10th, 12th, 13th, 17th, and 18th; L on 25th, and TS on 30th at 11.20 a.m.

BRIDPORT.—Rain fell every day from the 15th to the end of the month; T and L on 2nd, 25th, 26th and 30th. Sharp frost on the 17th, icicles hanging outside the window at 8 a.m. on 17th. South-westerly gales on 1st, 2nd, 4th, 21st to 26th, and on 30th. On the 23rd it blew a hurricane, and sea was fearfully rough; four vessels wrecked in the bay on the 24th and 25th. Fine lunar rainbow at 10.45 p.m. on the 9th; no meteors seen.

SHIFFNAL.—Rain still; only six days without, and daily from 13th to 30th, inclusive. Mild the first nine days, with S.W. wind, then cooler till 18th, with wind N.W., when S.W. again till the close. Heavy storm from S.W. at 5 p.m., and all night on 6th, and again on nights of 23rd and 25th, although frost on six nights not hard enough to cut down geraniums, &c. Only one degree difference between night of 24th and day of 25th, viz., 41°, 42°; great fluctuation throughout of the bar.; on the 30th 28·35 in., nearly reaching the fall of Jan. 24th, when it fell to 28·22 in., no strange result followed; great display of meteors on 27th from 6 to 8 p.m. when clouds hid them.

ORLETON.—Another rainy month; the land very wet, and the rivers greatly flooded during the last fortnight. Very little wheat has hitherto been planted. Temp. high till 9th, then cold to the 20th, afterwards warm to the end of the month; mean temp. about 2°·5 above the average; every frost followed by R; L frequently seen at night; distant T on 1st, 2nd, 8th and 30th. Violent winds on 6th, 13th and 23rd; bar. frequently very low, at 9 p.m. on 30th at 28·48 in. A shower of meteors after dark on the 27th, visible at intervals through openings in the clouds (which generally covered the sky) appearing chiefly to start from a point to the E. of the Pole star.

WIGSTON.—The saturated state of the earth has much retarded agricultural work. The temp. above the mean of a number of years; as compared with Nov., 1871 the Nov. of this year shows a mean of 6°·5 higher.

BOSTON.—An excessively stormy, wet month, at least eight heavy gales, principally from S.W., wind blowing on twenty days from that quarter. A very heavy N.E. gale on 13th and 14th, bringing unusually high tides; wind force 2·1 above the average (1 to 12); bar. ·35 in. less pressure than average, saturation 1·4 above the average; much land under water, and the sowing of wheat and other farming operations greatly impeded. The total rainfall for the eleven months ending November 30th, 29·61, being 9·63 above mean of previous ten years; taking the three autumn months the fall is 8·21, the greatest since 1852, when 11·05 fell.

GRIMSBY.—The weather fine for the season until 10th, when wet weather returned; much heavy land has not yet been sown with wheat. High wind on

2nd, 7th, 15th, and 24th. Gales on 6th, 23rd, and 26th, each continuing through the night; TS at 2·45 p.m. on 10th, and L at night on 25th.

MANCHESTER.—TS on 5th and 9th.

ARNCLIFFE.—Very wild night on 6th; hill tops white with S on 12th; heavy fall of S on 13th; falling stars on 27th.

N. SHIELDS.—Stormy on 1st, 7th, 11th, 13th, 23rd, and 24th; meteors seen on 27th; H on 12th and 14th; gale on 6th.

SEATHWAITE.—S on mountain tops on 14th; TS on 20th.

WALES.

HAVERFORDWEST.—One of the wettest and stormiest Novembers on record; very mild but stormy throughout; T, L, H, or R during the last fourteen days. Fearful gale on the night of the 22nd, many shipwrecks; very stormy period from 25th to 30th, with remarkable barometric depression; gale on 1st, and 9th (with tremendous squall at 11 p.m.); first S on the hills on the 11th. ·40 in. of R fell in thirty minutes on the 21st, commencing at 11.40 a.m.

CEFNFAES.—A wet month, temp. low, violent winds, chiefly S.E.; on 23rd and 24th very high winds from S.E., and on the 23rd 3·10 in. of R fell in five hours, viz. 6 to 11 p.m.

LLANDUDNO.—S on the hills on 12th and till the 24th. Heavy gale with very vivid forked L on morning of 23rd, and also on the 25th; brilliant display of meteors on 27th, commencing at six p.m.; a very fine meteor at six p.m. on 28th, breaking into sparks.

SCOTLAND.

DUMFRIES.—The first week wet and stormy; from 10th to 16th, fine, with frost; 11th, much S on the hills; from 17th to end of the month wet and stormy. A magnificent display of meteors on Wednesday evening (27th). The rainfall is 1·59 above the average of the five preceding years. Mean temp. 42·81 or 4°·48 above the corresponding month of last year.

HAWICK.—The wettest month (excepting July) that we have had here this year. Very stormy on 1st, 5th, 6th, 7th, 8th, 15th, and 23rd. The hills were white with S on the 14th, but the month has been a very open one. Beautiful meteor seen moving westwardly on the night of the 2nd, and on the night of the 27th there was a grand display of falling meteors.

AUCHENDRANE.—L on evenings of 8th and 25th; gales on 6th, 21st, and 23rd. Bar. stood at 28·46 in. on evening of 23rd; hard frost on eight mornings and nine evenings; river in flood all the month. Meteors seen on the evening of the 27th.

NOOKTON.—Gale on 5th and 6th; meteors on 27th, six to eight p.m.

CASTLE TOWARD.—A very dull month, with some extremely wet days; on the 5th between 8.30 a.m. and 5 p.m. 1·40 in. fell. On 10th heavy gale on sea and land, doing much damage, turning over corn and hay-stacks, as well as uprooting hundreds of forests trees. Hill tops covered with snow on the 10th. On the whole a very uncomfortable month for out-door labour; great fall of meteors on 27th.

DEANSTON.—More rain in this month than any previously this year; from 10th to 15th comparatively dry, some frost, and slight shower of S on 13th; gale on 10th, and a great display of meteors on evening of 27th from five to ten p.m.

ABERDEEN.—A mild but dull, stormy, and remarkably wet month. Auroræ on ten nights; L on 7th; meteors at six p.m. on 3rd, and a remarkable display of them from 5.30 to 11 p.m. on 27th.

PORTREE.—A wet, stormy month; strong gale from W. from 8 p.m. of 5th to 7 a.m. of 7th; from 10.45 p.m. of 6th to 12.30 a.m. of 7th it equalled in force the great gale of October 3rd, 1860. Fine lunar rainbow on the 11th, all the colours distinct; frost from 12th to 19th and 28th to 29th, with slight fall of S on the high ground. A grand display of shooting stars all the evening of 27th.

SANDWICK.—Wetter and colder than the mean (of forty-five years); bar. very low, standing below 29·00 on six mornings, and on six nights and on the night of 23rd lower than it had been since January, viz., 28·468; frequent auroræ and rainbows; a gale of 45 miles per hour from 4 a.m. till 4 p.m., and 55 miles per hour from 9 to 10; Iris, TS, and auroræ all on this date, the 7th.

IRELAND.

WATERFORD.—20th and 21st, 23rd and 24th stormy; 27th numerous meteors (showers) proceeding from zenith in all directions towards the horizon, but most towards the W., from 5.30 to 8 p.m.

MONKSTOWN.—An unusually wet month, not so much as regards any one day's rainfall (though there was 1·04 in. in about twelve hours on the 22nd) but its constancy, few days passing without more or less rain. Bar. 28·59 in. on 23rd, and 28·60 on 30th (uncorrected).

DOO CASTLE.—A storm on 6th, trees snapped and uprooted, stack of corn blown down, and a few houses thrown. No rain from 8th to 16th, rest of the month very wet. Meteoric shower on night of 27th. Potatoes not all up yet.

WARINGSTON.—Wet and stormy, ground perfectly saturated, and all farming operations quite suspended. A tremendous gale from W. to S.W. on the afternoon of the 6th, supposed to be unequalled since July 7th, 1839, temperature in the forenoon unusually high; a number of very large elms blown down.

THE COMING WINTER.

To the Editor of the Meteorological Magazine.

Sir,— According to several laws which appear never to have failed, the coming winter must be, on the whole, a mild or nearly a medium one. In fact it seems that a really long and severe winter is impossible this season. In the latter half of December, 1871, and in the mild winter quarter (January, February, and March) of 1872, we had very few intervals of frost. I expect more in the corresponding periods of the coming season. One of these intervals of sharp frost should occur in the early part of February, and it seems almost certain that the mean temperature of this month (February, 1873) will be below the Greenwich average of the last 50 years.

The principal law on which my prediction for the coming winter is founded, is the converse of that stated in your magazine for December, 1870, page 195, and may be briefly stated as follows:—When the Greenwich rainfall of the first seven months of the year has been large (say 14 inches or more), the mean temperature of the following December to February (inclusive), is in excess of, or about, the average, unless the mean of August to October (inclusive), has been remarkably cold, as in 1860. GEORGE D. BRUMHAM.

Barnsbury, November 30, 1872.

PRESTEL'S HYGROMETER.

To the Editor of the Meteorological Magazine.

SIR,—In reference to the atmometer described in your August No., there appear to be some defects in Prestel's apparatus which must render it useless as a correct measure of evaporation, if I understand it. In the first place the dish being exposed, the water would be taken by the birds, also, in a high wind the water would be liable to be driven over the sides of the dish, and if not splashed over, would wet the sides and cause an extra evaporating surface.

These two objections might be obviated, but the most decisive argument against Prestel's apparatus is, that the atmospheric pressure would affect the water in the gauge and keep it permanently up to the top of the tube, under any circumstances whatever.—I am, Sir, yours respectfully. HENRY DAVIS.

Derby.