

# SYMONS'S MONTHLY METEOROLOGICAL MAGAZINE.

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## EARTHQUAKE OF OCTOBER 30TH.

IF anyone wanted evidence of the prevailing ignorance as to correct time—we do not mean time true to seconds or tenths of a second, but correct to a minute—he would be abundantly supplied by the last earthquake, which we believe really occurred at 10.35 p.m., but which is reported to have been felt at all sorts of times within half an hour thereof. We put the subject prominently forward, because we think many observers are not so careful as they should be to have some one clock or watch about the correctness of which there should be no doubt. Let us give just one instance of the necessity of so doing, and an instance which will bring us back to our subject. Earthquake shocks travel at the rate of about 14 miles per minute, therefore as the shock was felt at Pembroke and Blackheath (210 miles apart), and at Liverpool and Torquay (200 miles apart), it is abundantly clear that if the times had been taken with any approach to correctness, we should have known considerably more about the shock than we now do. For instance, if it was a surface shock travelling S to N., it should have been a quarter of an hour earlier at Torquay than at Liverpool, and of course the time should get gradually later at intervening stations, instead of which it is irregular in the extreme. The theory has been propounded that these last earthquakes have their origin not in the ordinary subterranean regions of volcanic fires, but much nearer the surface, in the explosion of large accumulations of gas in the coal measures. If this were the case, the time would have varied considerably, in circles, having the site of explosion for their common centre; but, as we have before stated, the recorded times are so discordant as to be of very little use. If we could have relied upon their being within three or four minutes of correct, we might have done something in the matter.

The accompanying map shows all the places at which we are at present aware of its being felt, and it will be noticed that their grouping agrees very well with that which prevailed in October, 1863.

We believe the recent shock to have been, at all but one or two places in Monmouthshire, slighter than that in 1863, in fact, so far as we have heard, one clock only has been stopped, viz., at Worcester.

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*To the Editor of the Meteorological Magazine.*

SIR,—It may interest you to know that a violent shock of earthquake was felt at the Hendre House, two miles from Newcastle and

seven from Monmouth, on Friday night, October 30th, at 10.30 p.m. ; three chairs were upset in the dining room, and the shock was altogether more violent than the one in 1863.—Yours truly,

H. E. SEGRAVE.

*November 2nd.*

*To the Editor of the Meteorological Magazine.*

SIR,—A distinct shock of earthquake was experienced in many parts of this city at 10.25 p.m. Friday, October 30th. At the time, I was writing in my dining room ; the street was quiet, the house also, most of the inmates having retired to bed. The sensation was as if a heavy piece of furniture had fallen down, and was accompanied by considerable vibration and a loud rumbling noise ; the shock lasted about three seconds. Although I had never experienced the shock of an earthquake, it occurred to me at once what it was, and on the following morning I was confirmed by many friends, some of whom had been in countries where they are more frequent.—Yours, &c.,

C. S. BARTER, M.D.

*Bath, November 3rd.*

*To the Editor of the Meteorological Magazine.*

SIR,—An earthquake having visited this neighbourhood during the past night, I hasten to inform you of the occurrence, though I have no doubt you will be inundated with communications on the subject, as it is highly improbable that such a visitation should have been exclusively confined to this locality. The first shock was felt at half-past ten last night, the second at about three o'clock this morning. The undulatory movement appeared to me to proceed from S.E. to N.W. in one regular wave.

The vibration in the first case was sufficiently violent to considerably alarm many of those who felt its effects, as proof of which I must tell you that a little daughter of mine jumped out of bed, under the impression that the house was about to fall, and could with difficulty be persuaded to again retire to rest ; some small cottages situated about a quarter of a mile from here were so shaken that the poor people who inhabited them sat up the greater part of the night.

In a gentleman's house at Chippenham, some crockery, I am told, fell off a shelf through the violence of the oscillation.

No reports, however, of any serious consequences arising from the shock have reached me, and no noise, as accompanying it, is spoken of by anyone. As far as the instruments in my possession are concerned, I was unable to detect any disturbance whatever. The barometer remained steady at the reading taken at 9 p.m., viz., 29.86, as corrected for temperature only. The lowest registered by my thermometers was, in air 47°, on grass 44°. Wind light from west ; rainfall nil ; sky tolerably clear ; humidity, as shown by hygrometer, 93. The temperature never sank between 9 p.m. and 9 a.m.

I am, Sir, yours truly,

F. BONNYCASTLE GRITTON.

*West Tytherton, Chippenham, Wilts,  
31st October, 1868.*

## THERMOMETER STANDS.

*(Continued from page 138.)*

THE stand which we have next to describe is that known as "Glaisher's" from the inventor's name, and "Greenwich" from the place where it was first used in 1841. This stand has been so long in use, so generally employed in England, and so many different modifications are called by the owners "proper Greenwich stands," that we have prevailed upon Mr. Glaisher to favour us with the following detailed description :

DESCRIPTION OF THERMOMETER STAND BY JAMES GLAISHER, Esq.,  
F.R.S., F.R.A.S., PRES. MET. SOC., &c.

"The objects of the stand are, to sufficiently protect the thermometers from radiation, reflection, and conduction of heat, and from rain, and to expose the bulbs of all the thermometers, so that the air passes freely to them from all directions at all times. It consists of an upright post firmly fixed in the ground, carrying a revolving frame. This frame is made of  $1\frac{1}{4}$  in. deal, planed down to about an inch, and consists of a horizontal board (through which the vertical post passes), of a vertical board, connected with one edge of the horizontal board and projecting upwards, and of two inclined boards, one of which is connected at the top of the vertical board, and the other at the other edge of the horizontal board, and the other inclined board is parallel to the first inclined board, being separated by blocks about 3 inches in thickness. The latter inclined board is covered with zinc ; to the top of it is hinged a penthouse, or projecting roof, (A) of sufficient width to prevent rain falling on the bulbs of the thermometers when the wind is blowing towards the face of the stand. In addition, there is a narrow piece of half-inch deal (c) fixed to the edge of the horizontal board, near to the lower part of the inclined board, projecting downwards four inches, to prevent the rays from the rising or setting sun falling upon the thermometers. The frame is always turned with its inclined part to the sun, and the air passes freely through the frame, so that heat which is conducted through the outer inclined board meets with a current of air passing between it and the second inclined board ; and the heat which may pass through the second inclined board meets with a much larger volume of air passing between it and the horizontal and vertical boards.

"The stand is to be planted as far from walls or buildings as possible.

"The dry and wet bulb thermometers (D) are attached to the vertical board (B) and near its centre, so that their bulbs are three or four inches below the horizontal board, and four feet above the soil.

"There are two narrow pieces of thin wood affixed to the face of the vertical board on either side, at a distance from each other of less than the length of the thermometers, the one pair for the maximum thermometer, with its bulb 4 feet above the soil, and the opposite pair for the minimum thermometer, with its bulb 4 feet above the soil, the maximum and minimum thermometers being a little inclined, so that the bulb of the minimum thermometer (E) is lower than the other end of the ther-

rometer, and that of the maximum (F) a little higher than the other end of its tube.

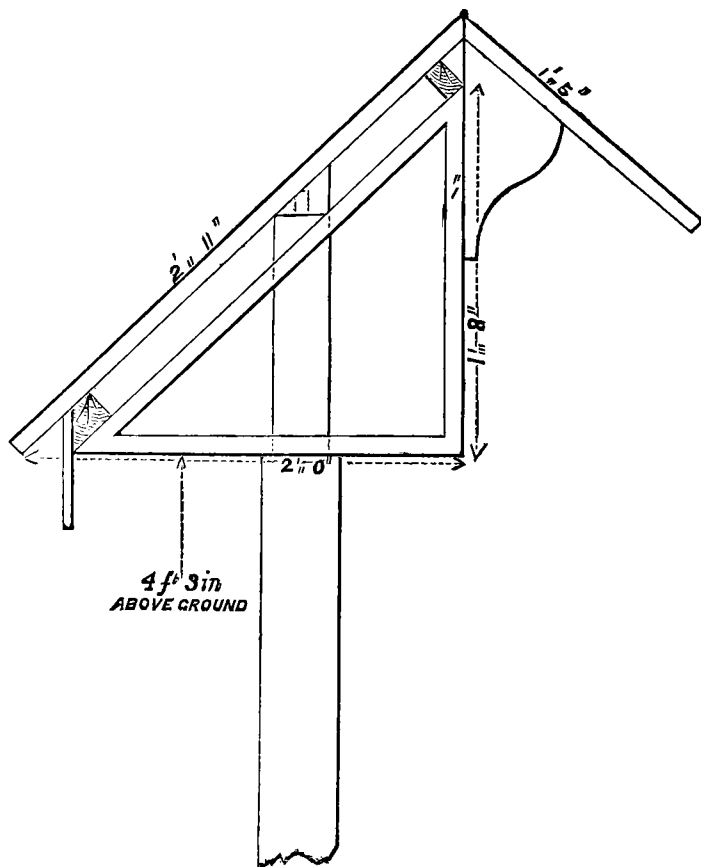
"The size of the frame is dependent upon the number of instruments it has to carry, and upon their lengths: if the stand is to carry the dry and wet thermometers, and the maximum and minimum thermometers only, its length should be the sum of the lengths of these two thermometers, together with the width of the dry and wet bulb thermometers, with a little space between them, as well as at the ends of the maximum and minimum thermometers.

"If the maximum and minimum thermometers be one foot each in length, and the space occupied by the dry and wet bulb be four inches, then the length of the horizontal board should be three feet or very nearly; the height of the vertical board about one and a half feet, and the breadth of the horizontal board 18 or 20 inches.

"The space above the thermometers on the vertical face is available for observations by Daniell's hygrometer, or Regnault's hygrometer, or ozone observations, or any other experiments.

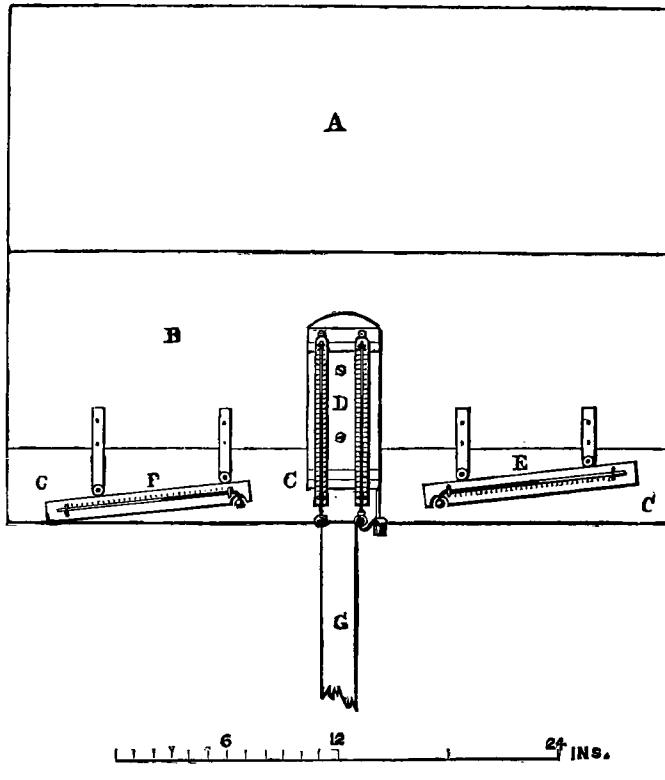
"Should more extended series of observations be contemplated, then a stand equal to that of the Greenwich stand would be necessary."

*Fig. 1. Glaisher's Stand.—Side View.*



The exact lateral dimensions of the Greenwich stand are marked on fig. 1, and whatever the breadth of the stand, they would remain the same. At Greenwich the breadth is 4 ft. 10 in. In fig. 2 we have shown the breadth as 3 ft., and the arrangement above recommended for ordinary observers.

Fig. 2. Glaisher's Stand.—Front View.



### REVIEWS.

THE pressure on our space for several months past has prevented any notice of many important publications, and the accumulated number is now such that extreme brevity must characterize our notices.

*Report of the Meteorological Committee of the Royal Society for the year ending December 31st, 1857.* 8vo, 75 pages, 6 plates.

*Report of an Inquiry into the connection between Strong Winds and Barometrical Differences.* Presented to the Committee of the Meteorological Office by R. H. SCOTT, Director. 8vo, 49 pages, 2 plates.

On the 30th of April, 1865, Admiral FitzRoy's career of useful toil ceased, and for some months subsequently his system was most energetically continued by T. H. Babington, Esq., the late Admiral's scientific assistant; on the 15th of December, 1866, a committee of the Royal Society were appointed to superintend the office. Their first report

bears date December 31st, 1867, and has been waiting for notice some few months. When the composition of the committee was first announced, considerable dissatisfaction was felt by many meteorologists, and some very personal criticisms were published. We, however, were no party thereto, preferring, and believing it more proper, especially considering the very high repute of all the members, to wait until they had had a trial. The record of the first year's work is now before us, and we do not see (excepting perhaps one or two of their appointments) how it would have been possible to fulfil the designs of the Royal Society more ably than they have done.

The Royal Society suggested three leading topics—Ocean Meteorology, Storm Signals and Land Meteorology. As regarded the meteorological observations at sea, they, by their representative on the previous enquiry committee,\* recommended that a mode of grouping returns on cards should be tried; this was done to the extent of filling up several hundred, but did not prove so advantageous as was expected, and was therefore abandoned in favour of a modification of Admiral FitzRoy's old data books, and as four out of the ten persons employed in the office are stated to be engaged in the "Reduction of Logs," we may hope that no long period will elapse before some really serviceable publications are issued. Storm signals have always been disliked, and, if we may so say, snubbed by the Royal Society, and their meteorological committee endeavoured to do the same. But however much poor FitzRoy may have been chaffed, and however much he may have damaged the cause by the constant prediction of "N.W. to N. and E.," in spite of all, the unscientific British public believed in storm signals, nearly every nation in Europe copied the system, the British Association for once opposed the Royal Society, and now—well the present state of affairs is best indicated by the following letter and telegram:—

"WEATHER SIGNALS.

"TO THE EDITOR OF THE TIMES.

"Sir,—I am instructed by the committee of this office to communicate to you the subjoined extract from a letter just received from Herr von Freeden, director of the Nord-Deutsche Seewarte at Hamburg, which may be of interest to some of your readers:—

"The fact that on Friday, October 23, we received intelligence of the hurricane which reached us on the Sunday, has induced the harbour authorities to request that the Seewarte would act on the message sent by you, and allow the FitzRoy drum signal to be hoisted both here and at Cuxhaven. Hitherto I have only been able to give publicity to your telegrams by posting them at the Bourse and sending them to the newspaper *Börsenhalle*, but henceforward they will be communicated to the public officially."

"Accordingly the drum signal will be hoisted at Hamburg and Cuxhaven, and will have the same significance there as it has at a British station.

"I am to state that telegraphic intelligence of storms has been sent to Hamburg since the beginning of February last, and that Herr von Freeden has kept a continuous check on the accuracy of the information sent from London ever since that date.—I have the honour to be, Sir, your obedient servant,

"ROBERT H. SCOTT, Director.

"Meteorological Office, 2, Parliament Street, November 3rd."

"CALCUTTA, October 20th.

"The Meteorological Department has organized the system of storm-signals, to be exhibited at several prominent places in this city."

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\* *Meteorological Magazine* Vol. I., p. 67-69.

The distinguishing feature of the new management is the investigation of the land meteorology of the British Isles. This takes the lion's share of the £11,000 expended in 1867, and the description of the instruments forms the main portion of the report now before us. The details are so clearly given, the plates so explicit, the skill evinced in the arrangement of the instruments so great, and the price of the report so low, that we will not enter into any description, but recommend our readers to get copies for themselves. There is one point upon which we hope the next report will be explicit, namely, the position in which these splendid instruments have been placed. We look forward also with much interest to a statement of the mode of tabulating and publishing the very voluminous records which these instruments will supply.

The second work above mentioned contains a discussion of the observations (as published daily in the *Times*) from the coast stations, with reference to the probable accuracy of prediction, to be obtained by the method of barometric gradients, a term suggested by Mr. Thomas Stevenson, C.E., in the *Journal of the Scottish Meteorological Society*, for January, 1868, and popularly explained in *Good Words*, June, 1868. We need not tell meteorologists that the term, though new, only implies attention to a modification of a rule which has been accepted by almost all the writers on the subject, which forms the basis of Buys Ballot's *Aëroclinoscope* and of his storm signals, nay more, which had, singularly enough, been the subject of a pamphlet by one of Mr. Scott's subordinates, published only a short time before.

The law is very tersely expressed by Mr. Scott in the following words :—

“ If any morning there be a difference between the barometrical readings at any two stations, such as Groningen and Maestricht, a wind will blow on that day in the neighbourhood of the line joining those stations, which will be inclined to that line at an angle of  $90^\circ$  or thereabouts, and will have the station where the reading is lowest on its left hand side.”

The paper gives the results in about 1000 cases, and the rule is shown to hold good as to *direction* 94 times in 100, and as to *direction and force* about 3 times in 5.

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*Results of Meteorological Observations made at the Radcliffe Observatory, Oxford, in the year 1865, under the superintendence of the Rev.*

ROBERT MAIN, M.A., Radcliffe Observer. 8vo, 66 pages.

ALTHOUGH much smaller than the Greenwich volume, the Oxford observations have always an air of freshness which is very pleasant. In the present volume we note the record of temperatures on the top of the lofty tower of the observatory (105 feet) every day in the year, and a table epitomizing ten years ozone observations, from which Mr. Main deduces the following results :—

1. The greatest quantity of ozone generally occurs in the spring, and the least quantity in October and November.
2. The absolutely greatest quantity occurs in May.

3. There is in every month less ozone in the evening than in the morning.

Considering the great interest now taken in the position of thermometers, &c., we should be glad in the next volume to see rather more copious details of the positions of the various instruments, with engravings in elucidation. But we hope nothing will be left out in order to make room, for there is nothing in the volume that can be spared.

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*Results of the Magnetical and Meteorological Observations made at the Royal Observatory, Greenwich, 1866.*—(Extracted from the Greenwich Observations, 1866). Quarto, 364 pages and 1 plate.

In addition to the usual copious magnetical and meteorological details, the present volume contains a description of a new and very simple mode of recording the velocity of the wind, which has been mounted by Mr. Browning, the description being elucidated by a plate. It may be convenient to state a few of the principal magnetical and meteorological results for 1866 :—

MAGNETISM .....	Mean Declination.....	20° 27' 47"
" .....	" Dip .....	68° 1' 16"
BAROMETER .....	Mean (at 159 ft.).....	29·714 in.
" .....	Max. " .....	30·506 "
" .....	Min. " .....	28·450 "
TEMPERATURE .....	Max. (July 13th).....	87·2 degrees.
" .....	Min. (January 13th) .....	23·7 "
" .....	Mean .....	49·8 "
HUMIDITY .....	" .....	82
CLOUD .....	" .....	7·1
RAIN .....	No. of Days .....	173
" .....	Total Depth .....	30·72 in.

A very full list of luminous meteors in the celebrated November shower closes the volume.

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*Meteorological Report for 1867*, edited by the REV. R. F. WHEELER, M.A. [From the Natural History Transactions of Northumberland and Durham.] 8vo, 32 pages, and several large folding tables.

THE most complete, most interesting, and, in all respects, the best local meteorological report we have seen. The editor will soon have to abandon his large folding tables, as they are yearly getting larger, better, and more unwieldy, and for them he will have to substitute consecutive tabular pages. We rejoice at the ample details of meteorology, crops, fruits, natural history, &c., and at the energy and ability of the editor being backed by such a capital corps of observers.

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*Meteorological Tables, &c.*, 1867, by C. BARHAM, Esq., M.D. [From the Journal of the Royal Institution of Cornwall.] 8vo, 11 pages.

THE banks of the Tyne and the Land's End have not perhaps much in common, yet the next work on our list contains the returns from

the south-west of Cornwall, from Truro, Helstone, St. Sennen Land's End, Penzance, Bodmin, &c., carefully edited by Dr. Barham. These local abstracts require only nurture and perseverance to render great services to meteorology and natural history; in the latter branch the Cornishmen must look to their laurels in more senses than one.

*Third Annual Report on the Sanitary Condition of Merthyr Tydfil, being for the year 1867, by the Medical Officer, T. J. DYKE, Esq., F.R.C.S., &c.*—White & Sons, Merthyr. 8vo, 23 pages.

THE record of marvellous progress which we have previously noted in this town continues, and the death rate, which in 1852 was thirty in a thousand, in 1867 was under 21. The town is, as readers of *British Rainfall* are well aware, in a district of heavy rainfall—50 or 60 in. per year; this, with a dense population, no drains, and no means of obtaining, or rather retaining, pure water, led to the usual results. The mortality was 30, the average age at death was 17, and the town was altogether as uncomfortable as it was unhealthy; now all that is changed. The rain, instead of soaking and soddening the ground, runs into 34 miles of sewers, and purges them thoroughly, while that which falls on the hills is intercepted, stored, cleansed, and supplied plenteously throughout the houses of rich and poor alike; the water is even softer than in 1866, for it averages only 3 degress of hardness.

## THE SUMMERS OF 1865 AND 1868.

*To the Editor of the Meteorological Magazine.*

SIR,—Notwithstanding the reported heat of the past summer, an examination of the registers of former years reveals the fact that the average temperature of the five summer months of May, June, July, August and September, has this season been only a trifle over that of 1865 for the like period, as will be seen by the following figures, which denote the average max. thermometer in the shade for the day, and the usual min. for night, thus:—

1865.		
	Average max.	Average min.
May .....	70·9	46·2
June .....	76·7	48·5
July .....	77·1	51·5
August .....	73·3	50·5
September .....	78·0	53·1
Average for 5 months ...	75·2	50·0
1868.		
May .....	70·5	45·6
June .....	74·2	49·0
July .....	81·4	55·5
August .....	74·7	53·7
September ...	74·8	51·1
Average for 5 months ...	75·1	51·0

From the above it will be seen that the average day temperature in 1865 was a trifle higher than it has been the past season, but has been more than compensated by the greater heat of the night; but the whole difference is much less than might be expected, when we remember the hot weather in July, and in fact the advantages the present season has had over 1865 was in consequence of the high temperature of that month and the small rainfall of the season—only 8·06 inches falling in 1868, against 12·88 in 1865, and the still greater disadvantage that year presented, of the hottest and driest weather being at the end of it, the September of that year being, in my opinion, a more remarkable month than any in 1868, and one which much increased the average temperature of the period given, so that by the end of that month the growth of trees and other things of a permanent character were as far advanced towards maturity as they were the past season at the same time, and notwithstanding the great rainfall of that year, (exceeding that of 1860 in this district), I would regard it as a more favourable season in many respects than the one we are now passing through.

J. ROBSON.

*Linton Park, Staplehurst, October 31st, 1868.*

### SHADE TEMPERATURE.

*To the Editor of the Meteorological Magazine.*

SIR,—As you have invited discussion on the question of shade temperature, and the desirability of adopting among observers some uniform plan of thermometer stand, I venture to offer a few remarks thereon.

Shade temperature of the air, I take it, is that which is indicated by a thermometer wholly protected from the sun's rays, and from radiation by surrounding walls, &c. <sup>(1)</sup>

It seems to me that the thermometer stands generally in use are open to the objection that they become more or less heated *en masse* by the direct rays of the sun during the day, and cool down rapidly by radiation during the night. I have noted a fall of two degrees occurring in a thermometer moved two or three inches in advance of the board of one of these stands, on which it had been suspended in contact, while the temperature remained unaltered in another thermometer left in contact with the board. <sup>(2)</sup> I find, also, that not using a stand, I register a lower temperature by day, and higher by night, than is registered by my neighbours using ordinary stands. This difference amounted to from one to five degrees during the day and from three to six degrees during the night, within the last eight days. <sup>(1)</sup> My thermometers (made by Casella) are suspended on an iron railing, at the distance of ten inches before a window, about ten feet from the ground, facing north-west, and screened effectually from the west by a range of coach-house and stable buildings, extending at a right angle from the wall in which is the window referred to, so that not a ray of sunshine reaches it all the year round. The bulbs of the thermometers

are freely exposed to the air, and I cannot but regard them as favourably placed for registering the actual temperature of the air. I concur in your observations upon the almost infinite variety of houses and grounds, and although retaining a preference for my own arrangements, and mistrusting the ordinary thermometer stands, I can see the importance of uniformity upon the form of thermometer stand, and shall be ready to submit to the dictum of the learned in these matters when they shall be agreed thereon.—I remain, yours, &c.,

W. B. KESTEVEN.

*Holloway, November, 1868.*

[Mr. Kesteven has done such good service by calling attention to irregularities in solar radiation temperature records, that we gladly allow him to break a lance against thermometer stands. On their behalf, however, we submit two or three notes, which will be most readily recognized by small figures we have ventured to insert in his letter.

(<sup>1</sup>) Walls, especially thick ones, are marvellous storehouses of temperature—by day far colder than the surrounding air, and at night correspondingly warmer.

(<sup>2</sup>) The thermometers had no right to be in contact with the board. (See p. 155)

We are very glad that Mr. Kesteven recognizes the improbability of any other observer having a similar position for his thermometers, and welcome most heartily so able a convert to uniformity.—Ed.]

## REGISTRATION OF RAINFALL.

*To the Editor of the Meteorological Magazine.*

SIR,—Is the moisture produced by heavy dews (which I often find in my rain gauge) to be recorded as part of the “rainfall?” I have often been puzzled about this, and I should be glad to know what is considered the proper practice by those who have had the greatest experience in these matters. This morning, at 9 o'clock, I measured ·007 in., resulting from the frosty dew of last night, the minimum temperature at 4 feet having been 34°·7, the wet and dry bulbs reading alike, 45°·7, and every object being completely saturated with the dew and fog.

As the addition to the rainfall proper, of even the small amounts produced as above, must make some considerable difference in a year's observations, and as uniformity of practice is so especially desirable, I shall be very much obliged if you will publish this letter.

Yours obediently,

BOSCAWEN T. GRIFFITH.

*Trevalyn Hall, Wrexham, October 12th, 1868.*

[Dew is certainly to be included in the total amount, since so far as measurement is concerned, rain includes Rain, Snow, Hail, Fog, Dew, in fact all collectable moisture whatever be its form. The above quantity being less than 0·01 inch, should be returned to the gauge, and left to augment the next measurement.—Ed.]

## SOLAR RADIATION TEMPERATURES.

*To the Editor of the Meteorological Magazine.*

SIR,—I have registered the reading of a black bulb thermometer *in vacuo*, and an ordinary exposed black bulb (both by Negretti and Zambra, and tested at Greenwich), for the last two years and more, and although most of your readers are aware of the difference, it is evident from the correspondence in your last two numbers that some are not. Both instruments were placed on forked sticks, two inches above short mown grass, and during the two years from July 1st, 1866, to June 30th, 1868, the results were as follow.

Excess of black bulb *in vacuo*, was—

From 1° to 5° on ...	19 days.
Over 5° and under 10° on .....	57 "
" 10°     "     15°     " .....	110 "
" 15°     "     20°     " .....	156 "
" 20°     "     30°     " .....	361 "
" 30°     "     40°     " .....	27 "
Exceeded 40° on ..	1 "

Least difference, 1°, November 30th, 1867, foggy and calm.

Greatest, 44°, August 1st, 1866, bright sun, and heavy gale blowing.

Average difference for two years, 19°·22.—Yours truly,

THOS. WARING.

*Waringstown, Co. Down, November 2nd, 1868.*

## METEOROLOGY AT NORWICH.

*(Concluded from page 146.)*

## THE METEOR SHOWER OF AUGUST, 1868.

Mr. Glaisher read the following paper by Mr. G. Forbes:—

Having been requested to write an account of what I saw during the late August meteor shower, I shall attempt to state as shortly as possible the appearance at Cambridge on the nights of the 10th, 11th and 12th of August. The meteors were in general small, and those trains which appeared to vanish instantaneously were probably optical delusions. No meteors were observed to burst. Attention was chiefly directed to determining the numbers and the radiant point. Being unprovided with a suitable chart, I was only able to lay down the directions of the meteors about Cassiopœia. Though such observations were limited in number, yet they were the most trustworthy ones, in that the lines of flight had to be produced but a short distance. I should have considered the numbers hardly sufficient but for the remarkable agreement between the position of the radiant thus determined on the 10th of August and that determined on the same day last year. The diagram shows the direction of eight, which alone were suitable for my purpose. The point marked A is probably, as nearly as can be determined from them, the radiant point. Its position is R A 2h. 16m. N P D 31°. B is the point discovered last year. Its position is R A 2h. 43m. N P D 29° 30'. On the night common to the 11th and 12th of August, the meteors were far more erratic. Not more than five or six came from about the radiant point of the previous evening. They seemed to come from the point marked A1. On the

evening of the 10th the directions were much more generally from the radiant point than last year; for though so few were charted, many more were seen to pass in directions through the same radiant. On neither night did I see any meteors coming from the radiant in Pisces which I determined last year. As to numbers, the best idea of them will be obtained from the table, in which all those appearing to come from about the radiant are collected into one column, while the erratic ones are placed in another. From this it appears that the hourly average on the evening of the 10th was 20, which, compared with the average of 25 last year, shows that the shower has not yet ceased decreasing since the maximum in 1863. The night of the 11th gave seventeen conformable meteors in the hour; but on this night, owing to the clouds in the early part of the evening, and the brilliancy of the moon in the latter part, I was only able to observe for one hour. The colour of the meteors was almost uniformly white, but on the evening of the 10th, at six minutes past eleven, an erratic one passing Cassiopœia was green and red, scintillating like Sirius, and equal to a third magnitude star. In the case of a meteor leaving a train, the nucleus was generally noticed to pass beyond the end of the train. This appearance struck me even more forcibly in the great November shower of 1866. In such a case the nucleus disappeared suddenly without previous diminution of brilliancy. This, if it was no optical delusion, is important when considered in connection with the prevailing theory of the illumination of these bodies. On the 10th the paths of two meteors were curved. The first appeared before I had begun noting them down. The second, marked A in the diagram, described the curve shown there. The only other one I ever saw describe a curve of this sort was on the 21st of October, 1866, at eleven o'clock, when the curve marked B was described round B Aurigæ. The meteor A appeared at 12h. 11m. 38s. The trains were generally broken in the middle, just as in last year's shower. I then thought the haziness of the sky was the cause, but this year the 10th of August was one of the clearest nights I ever saw. The most curious appearances in the late shower were—1st, the description of the curves; 2nd, the passing of the nucleus beyond the end of the train (this is perhaps an optical delusion); 3rd, the undiminished brilliancy of the nucleus before its sudden extinction; 4th, the fact that the density of the shower still continues to decrease each year; and 5th, the apparent change in the position of the radiant point on successive nights. This, however, is possibly an error arising from an insufficient number of observations; but it was suspected by Dr. Twining in America many years ago. In fact, he found the radiant point on ten successive nights in the great August shower of 1863, and so far from agreeing, these points on being joined in order, formed a regular curve. I have now mentioned everything worthy of notice which I saw during the late shower; and I hope that, when combined with other observations in different places, these remarks may not be altogether useless.

## OCTOBER, 1868.

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° on grass
		Total Fall.	Difference from average 1860-5	Greatest Fall in 24 hours		Deg.		Date.	Deg.	Date.		
				Dpth.	Date.							
inches.	inches.	in.										
I.	Camden Town .....	2.54	— .05	.59	25	13	66.2	12	27.8	19	6	
II.	Staplehurst (Linton Park) ...	2.07	— 1.03	.60	3	11	66.0	12	27.0	19	6	
III.	Selborne (The Wakes).....	3.41	— .80	.68	6	13	64.0	24*	27.5	17	6	
III.	Hitchen .....	2.89	+ .34	.61	3	14	58.0	6, 15	30.0	18	2	
IV.	Banbury .....	2.36	— .07	.53	3	13	60.0	10†	25.0	19	6	
IV.	Bury St. Edmunds (Culford) ..	2.62	— .09	.53	3	11	62.0	6	26.0	19	4	
V.	Bridport .....	3.32	— .71	.65	6	17	69.0	12	27.0	20	5	
"	Barnstaple .....	5.59	+ 1.47	1.07	7	22	66.0	13	33.5	20	0	
"	Bodmin .....	6.01	+ .69	.90	24	22	63.0	11	36.0	18	0	
VI.	Cirencester .....	2.64	— .85	.60	26	12	...	...	...	...	...	
"	Shifnall (Haughton Hall) ...	1.50	— .74	.25	3	17	58.0	10†	25.0	20	3	
"	Tenbury (Orleton) .....	2.24	— .99	.66	6	19	63.0	10	26.3	18	5	
VII.	Leicester (Wigston) .....	...	...	...	...	...	...	...	...	...	...	
"	Boston .....	3.22	+ 1.10	1.36	3	16	62.2	12	31.0	19	2	
"	Gainsborough .....	...	...	...	...	...	...	...	...	...	...	
"	Derby .....	...	...	...	...	...	...	...	...	...	...	
VIII.	Manchester .....	4.50	+ .69	.68	6	24	64.0	10	30.0	2	4	
IX.	York .....	2.92	+ .40	.76	3	15	58.0	10	29.0	18	2	
"	Skipton (Arnccliffe) ...	7.53	+ .87	1.20	31	19	60.0	1	34.0	19	0	
X.	North Shields .....	2.08	— 1.20	.67	2	12	59.5	31	31.0	19	1	
"	Borrowdale (Seathwaite) .....	...	...	...	...	...	...	...	...	...	...	
XI.	Cardiff (Town Hall).....	4.36	...	.83	16	16	...	...	...	...	...	
"	Haverfordwest .....	5.50	+ .31	1.07	28	15	61.0	12	28.0	18	1	
"	Rhayader (Cefnfaes).....	3.95	— 1.65	1.01	28	22	83.0	...	28.0	...	3	
"	Llandudno .....	2.56	— 1.40	.56	28	21	64.1	10	34.6	19	0	
XII.	Dumfries .....	3.53	— 1.39	.49	24	22	62.0	10	28.0	19	2	
"	Hawick (Silverbut Hall) ...	2.13	...	.36	28	16	...	...	...	...	...	
XIV.	Ayr (Auchendrane House) ...	5.86	+ .91	1.01	28	22	61.0	11	26.0	20	4	
XV.	Castle Toward .....	5.37	— .38	1.02	24	25	61.0	11	27.0	18	19	
XVI.	Leven (Nookton) .....	1.89	— 1.86	.40	24	14	58.0	5	28.0	20	4	
"	Stirling (Deanston) .....	4.83	— .08	.50	16	21	59.3	9	24.0	20	12	
"	Logierait .....	2.77	...	1.15	25	18	...	...	...	...	...	
XVII.	Ballater .....	1.80	...	.66	24	13	58.3	31	24.0	20	9	
"	Aberdeen .....	1.96	...	.67	24	13	60.0	10	28.2	19	14	
XVIII.	Inverness (Culloden) .....	1.90	...	.39	19	12	56.6	31	33.2	20	0	
"	Fort William .....	11.37	...	1.63	31	27	...	...	...	...	...	
"	Portree .....	14.20	+ 3.42	1.92	14	28	58.2	10	33.8	18	0	
"	Loch Broom .....	8.52	...	1.06	16	28	...	...	...	...	...	
XIX.	Helmsdale .....	3.44	...	.57	24	17	...	...	...	...	...	
"	Sandwick .....	5.34	+ .42	.58	15	24	57.0	6	34.4	20	0	
XX.	Cork .....	2.87	...	.78	5	18	...	...	...	...	...	
"	Waterford .....	3.72	— .68	.74	23	25	61.0	12	34.0	19	0	
"	Killaloe .....	6.20	+ 1.13	1.20	23	24	59.5	11	30.0	19	1	
XXI.	Portarlinton .....	2.08	— 3.05	.44	24	24	63.5	11	31.0	18	1	
"	Monkstown .....	1.00	— 2.92	.30	23	11	...	...	...	...	...	
XXII.	Galway .....	6.16	...	1.18	23	26	63.0	3	32.0	17¶	0	
"	Bunninadden (Doo Castle) ...	4.11	...	.53	23	24	57.0	10	28.0	2	5	
XXIII.	Bawnboy (Owendoon) .....	4.38	...	.65	5	27	63.0	11	31.0	4**	3	
"	Waringstown .....	2.13	...	.35	5	19	64.0	11	31.0	18††	3	
"	Strabane (Leckpatrick) .....	3.31	...	.35	23	25	61.0	9§	27.0	19	11	

\* And 25th. † And 13th. ‡ And 24th & 31st. § And 10th & 11th. || And 19th.

¶ And 20th. \*\* And 16th & 17th. †† And 19th & 20th.

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

# METEOROLOGICAL NOTES ON THE MONTH.

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.

CAMDEN TOWN.—Dahlias in good condition till the 5th of November.

LINTON PARK.—Frosts on six days; those on the 19th and 20th unusually severe for the time of year; L on the evenings of the 21st and 22nd; high winds on the 3rd and 24th, but on the whole it may be considered a fine month.

SELBORNE.—Several trees (apple, dogwood and others) with second blossom; very high wind on 24th; two trees blown down in my grounds.

BANBURY.—Gale on 24th, trees blown down; H on 21st.

CULFORD.—High wind on 24th; mean temp., 46°·5; the weather during the whole month has been fine for the time of the year.

BRIDPORT.—A wet month, with the exception of the 2nd week, which was fine.

CIRENCESTER.—Dahlias killed between 18th and 20th. A large meteor seen at midnight of the 8th. A great crop of acorns, and fine Spanish chesnuts.

HAUGHTON HALL.—A slight shock of earthquake felt about 10.50 p.m., on 30th; the sensation was as if a door had been shut heavily below stairs, but no other noise; it lasted about two seconds; it was felt generally in this neighbourhood; the temp. had been high. Great and sudden changes of temp. during the month, with frequent R, but no weight of it, the greatest fall in one day being only 25 in. The potatoes left in the ground, instead of being lifted at the usual time, have done well; the second crop of tubers doubtful as to keeping, the skins being hardly fast. The rhododendrons flowered a second time, the blossom appearing from the centre of the former one, then in seed. Many ferns, too, especially Filix-mas, that had withered from heat, sprouted again, as in the spring.—[ERRATUM. Last month Ackerspit should have been Ackerspritt.]

MANCHESTER.—This has been the first month since March with a rainfall above the average; H on 17th, 26th, 29th, and with thunder on 23rd.

ARNcliffe.—Unusually wet month; gale from W. on 30th.

NORTH SHIELDS.—H with T on 16th.

## WALES.

HAVERFORDWEST.—The month commenced fine and calm, with white frosts in the mornings; from 6th to 10th very wet; another wet period, alternating with cold uncertain weather, set in on the 15th, and continued with increasing wetness and stormy weather, till the end of the month.

CEFNFAES.—A sensible shock of earthquake was felt on the night of Friday, the 30th, about 11 o'clock, accompanied by a rushing noise, as of a steam engine going past at full speed; its direction appeared E. and W., and was felt at many places in this neighbourhood. The month has been generally wet, with stormy winds chiefly from the S.W.; violent gale on the 24th; snow on the 18th.

LLANDUDNO.—H, snow, T, and forked L on the 19th.

## SCOTLAND.

DUMFRIES.—A few fine days at the beginning; the rest of the month broken weather, with occasional frosts; snow on 17th and 19th; H on 18th, 21st, and 29th; the end of the month very stormy; mean temp. 1°·5 below the corresponding month. Rainfall also below the average of last five years.

HAWICK.—A mild month; T and L on 16th; fine aurora on the night of the 19th; and beautiful rainbow on the morning of the 25th. Potatoes are not keeping well in this neighbourhood.

AUCHENDRANE.—The rainfall is above the average; the winds have been principally equatorial, and the weather stormy and, towards the end of the month, boisterous.

CASTLE TOWARD.—The first half of the month mild, the latter stormy, cold, and wet, with frosts almost every night after the 12th. Bedding-out plants are

still unhurt, although 27°·0 was registered on the 18th: the frosts being always followed by R may account for it. Many of the laurestinus are already in full flower.

DEANSTON.—Although there has been a good deal of R there has also been a fair allowance of sunshine, 115 hours against 119 in September; some sharp frosts, and on the 19th a slight fall of snow and a heavy fall on the hills; T on 6th and 15th; aurora on 19th.

LOGIERAIT.—A very wet month: auroræ on several nights; keen frost on the 19th.

BALLATER.—Aurora on 19th; both rainfall and temp. below the average; Locknager covered with S on the 1st of October, the first time this season, the nearer ranges white on morning of the 20th. The potatoe crop a fair one, with no trace of disease, and secured in good condition.

ABERDEEN.—L on the evenings of the 13th, 15th, 18th, and 23rd; auroræ on 7th, 15th to 23rd, 25th and 26th. A fine month but rather cold, the mean temp. (45°) being 1°·3 below the average; winds generally light, S.W., W., and N.W. more frequent than usual.

FORT WILLIAM.—S on the hills on the 6th, low on the hills on 15th, and all covered with it on the 18th; ice nearly half-an-inch thick on the 19th. Very wet month.

PORTREE.—The month has been very wet, cold, stormy, very squally throughout, with coating of S on the hills and several heavy H showers. Much of the corn is still unstacked in the latest part of the island, and the potatoes unlifted. Only two dry days during the month.

LOCHBROOM.—On the whole this has turned out one of the wildest and stormiest Octobers of recent years; 28 rainy days in the month, and not one fine one since the 11th; fortunately, except potatoe lifting, little of harvest work was undone on its "enter," and owing to its surly conduct, many potatoes are still exposed to its inclemency.

SANDWICK.—Heavy gales on the 6th and 16th; auroræ on 9th, 10th, and 19th to 23rd, very fine on 21st; solar halo on 5th; lunar rainbow on 25th; the month has been wetter and colder than the mean; TS on morning of 26th. A shower of large H at 10 a.m. on 27th was the most remarkable incident in the month; many of the hailstones were the largest I ever saw, six of them weighing half an ounce, or two scruples each, half an hour after the shower, being twice the weight of those which broke 40 panes of glass in the Manse in 1843; but from this shower coming more obliquely, and on the N. and W. sides, only 20 panes were broken. There was smaller H mixed with it; most of the hailstones were round like marbles, but some were pear-shaped.

#### I R E L A N D.

MONKSTOWN.—A very severe gale on the 24th.

DOO CASTLE.—Wet month; R on almost every day, accompanied by strong winds; gales on the nights of 5th and 24th, still further establishing "periodic gale about the 25th, &c." Potatoe digging progressed, despite of the inclemency of the weather and its unsuitableness for this kind of work. S on the mountains on 17th.

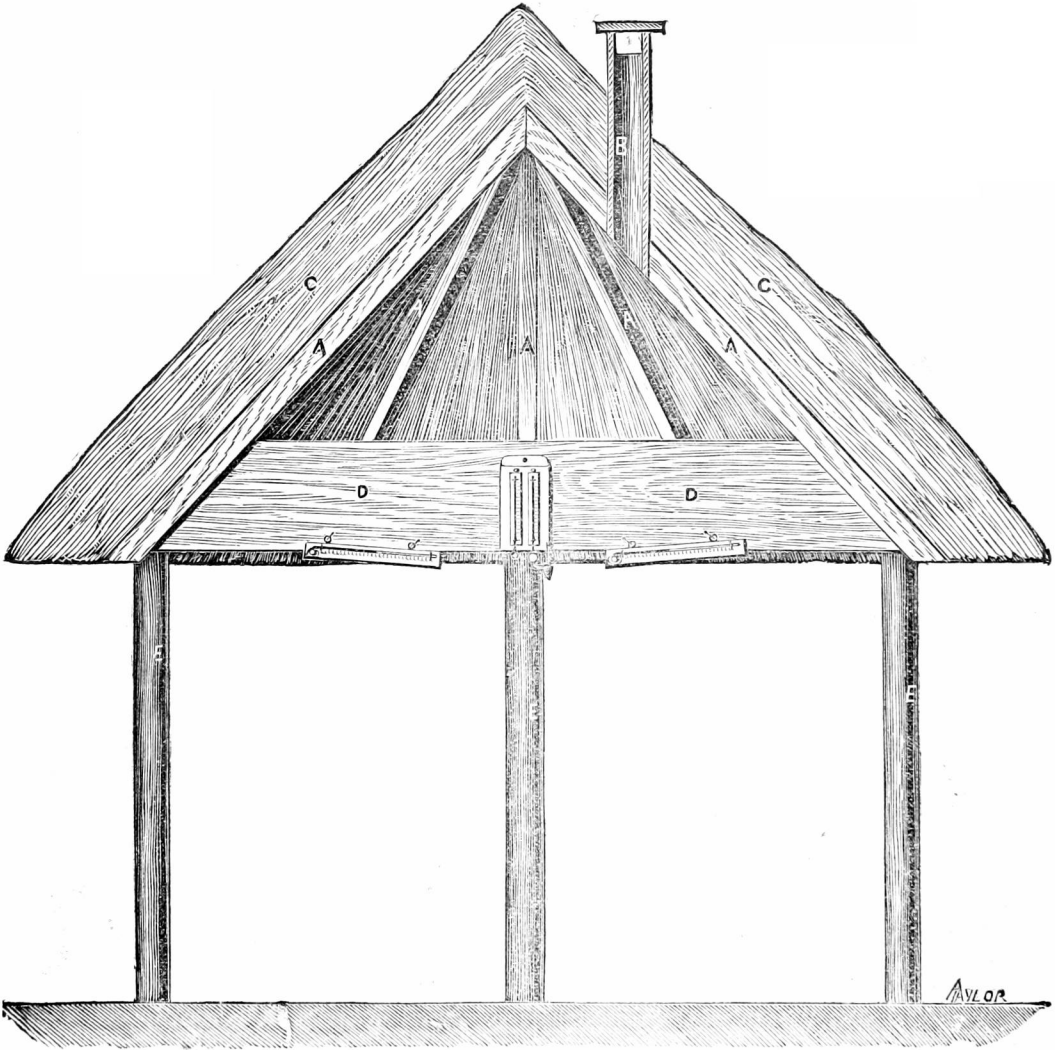
OWENDOON.—First S on mountains on 17th; great aurora on 19th; high gale on 24th; temp. in shade, 57° on 31st.—[Total rainfall in September should have been 3·05.]

WARINGSTOWN.—An extremely fine and enjoyable month; several heavy gales towards the end; potatoe crop very good.

LECKPATRICK.—Very cold month; temp. lower than ever recorded here (for this month); frost on grass on 16 nights; rainfall for the year to the end of this month only 29·63 in.; during the same period in 1867 there fell 41·47 in.; great scarcity of water hitherto; some wells still unsupplied with water; latter part of the month stormy; short gale on 24th.



# MARTIN'S THERMOMETER STAND.



A A A A Rafters.

B Chimney.

C C Thatch.

D D Thermometer Board.

E E E Posts.