

SYMONS'S  
MONTHLY  
METEOROLOGICAL MAGAZINE.

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CCLXIV.]

JANUARY, 1888.

[PRICE FOURPENCE,  
or 5s. per ann. post free.]

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THE BOLIDE OF NOV. 20TH, 1887.

*To the Editor of the Meteorological Magazine.*

SIR,—The evidence collected in your December number appears conclusive as to the passing of a meteoric body through our atmosphere and in close proximity to the earth; but I venture to think that it is also conclusive against the theory of its having “exploded” or broken up in its passage.

Having marked on a map all the places where the sound is reported to have been heard, and bearing in mind the other points mentioned by the various observers, I think the actual line passes slightly to the north of Cambridge, Thame, and Upper Lambourne. This line, it may be observed, skirts for the greater part and lies wholly to the north of the escarpment of the chalk. Now except Risely, Brackley, and Reading, it does not appear that the sound was heard at any point lying more than 10 miles (or, except in very few places, more than 7 miles) N.W. or S.E. of this line, and it is expressly stated that no report was heard at Hertford, which would lie about 18 miles off the line.

If the noise was due to an explosion at any point in the 84 miles between the vicinity of Newmarket and that of Lambourne, it is inconceivable that it should be heard (if it took place at the central point) for 42 miles to the N.E. and S.W., and yet be heard only over such a narrow belt from N.W. to S.E.

But Mr. Mathison's evidence makes the point stronger. He heard the sound as from the S.W. If, therefore, it was due to explosion, the sound from it must have travelled back to Newmarket at least 70 miles, and yet the farthest points at which it was heard right and left near Thame were Brackley and Reading, or about 18 miles from the supposed point of explosion.

But again Mr. Mathison's postscript is most important—“To me it was decidedly S.S.W. ; some say just the opposite quarter.”

Surely these facts, and many others which a reperusal of the evidence will bring to notice, all point to this, that the sound was not a momentary but a continuous one along the whole line of flight

and due solely to the resistance of the air to the high speed of the meteor. When we consider that (putting aside diurnal revolution) the earth would meet even an object stationary in space at the rate of about 18 miles a second, and that we have no means of measuring the rate of motion of the meteor itself, or therefore the actual or relative speed at which it passed through the atmosphere, and recollect the amount of sound that so small a body as a rifle ball can produce in its flight at a comparatively low rate of speed, while again we cannot measure the size of the meteor, we have, I think, sufficient to account for the sounds (mostly described as rumblings) which your correspondents heard.

Again, as far as can be judged, the sound was comparatively uniform, which is quite inconsistent with an explosion at one point in so great a length of line. No doubt it appears to have been loudest near Thame. Possibly at this point the line of flight would be tangential, and so nearest, to the earth's surface, or the formation of the ground may have pent in the sound.

That the sound was heard exceptionally at Risely, Brackley, and Reading would be due to local causes. The first two places lie in valleys of denudation (on the oolite and lias respectively), lying so as to catch a sound from the S.E. Reading again lies in the Thames Valley, which runs thence nearly at right angles to the supposed line, and would therefore conduct the sound. On the other hand, the chalk escarpment and the Welwyn Valley would cut off the sound from Hertford.

Hoping to see further details this month,

I remain your obedient servant,

JAMES G. WOOD.

8, *Lansdowne Crescent, W.*  
*January 3rd, 1888.*

[As intimated in our last, we have forwarded all fresh accounts of the phenomenon to Mr. Fordham. The above belongs, however, to a different category, and we are glad of the privilege of inserting it. We think that while Mr. Wood has proved the existence of the meteor almost as thoroughly as if it had been seen throughout its path, and has also established the continuity of the sounds and the probable accuracy of his explanation, he might have left a small portion of noise for the flaking-off of the coat of the meteor by excessive heat, which, in other cases, has been observed to be accompanied by loud reports. Although we still think that there was a final explosion near Thame, and probably were minor ones at points on the route where the crust flaked-off, we are quite prepared to believe that there was a roar all along the track. It must, however, be remembered that the air, at the altitude at which the meteor probably passed, would not be at all dense.—ED.]

## ROYAL METEOROLOGICAL SOCIETY.

THE usual monthly meeting of this Society was held on Wednesday evening, the 21st instant, at the Institution of Civil Engineers, 25, Great George Street, Westminster, Mr. W. Ellis, F.R.A.S., President, in the chair.

The Rev. R. Barker, Mr. W. W. Day, M.D., Mr. H. N. Dickson, Mr. H. Harries, Mr. P. S. Jeffrey, B.A., Mr. H. A. Johnstone, and Mr. J. Wolstenholme were elected Fellows of the Society.

The following papers were read :—

(1). "The mean Temperature of the Air at Greenwich from September 1811 to June 1856," by Mr. H. S. Eaton, M.A., F.R. Met. Soc. This is a discussion of the Meteorological Journals of the late Mr. J. H. Belville and those of the Royal Observatory. The general results of this investigation are :—1, That there was no appreciable change in the mean annual temperature of the air at Greenwich in the period 1812 to 1855 inclusive. 2, That on the eminence on which the Royal Observatory is situated the average temperature at night, or rather in the early morning, is in all cases higher than over the lower grounds. 3, That with a north-wall, or possibly a north-window exposure, higher maximum temperatures are found at the lower stations. 4, That the movements of the thermometer are retarded with a north-wall exposure, as compared with an instrument on an open stand, especially where the situation is a confined one, the indications of the thermometer not following changes of temperature so promptly owing to the modifying influence of the adjacent building.

(2). "Report on the Phenological Observations for the year 1887," by the Rev. T. A. Preston, M.A., F.R. Met. Soc. The past season was a most exceptional one. For flowers it was disastrous; fruit was generally a failure, though there were exceptions; those kinds which promised well turned out very small or spoilt by insects. Vegetables were universally poor, roots were destroyed by insects or drought, and green crops soon passed off. The wheat crop, however, was better than was expected. Barley on light lands was poor, but that which was sown early was satisfactory. Meadow hay was not up to an average crop, but clover and seed hay were much more nearly so. In Kent the fruit crops turned out lighter than usual, but the prices have ruled higher.

(3). "Earth Tremors and the Wind," by Prof. John Milne, F.R.S., F.G.S. The author has made a detailed examination of the tremor records obtained in Tokio, and compared them with the tri-daily weather maps issued by the Imperial Government of Japan. From this comparison the following conclusions have been drawn :—1, Earth tremors are more frequent with a low barometer than with a high barometer. 2, With a high barometric gradient tremors are almost always observed, but when the gradient is small it is seldom that tremors are visible. 3, The stronger the wind the more likely it is that tremors should be observed. 4, When there has been a

strong wind and no tremors the wind has usually been local, of short duration, or else blowing inland from the ocean. 5, When there has been little or no wind in Tokio, and yet tremors have been observed, in most cases there has been a strong wind in other parts of Central Japan. 6, From 75 to 80 per cent. of the tremors observed in Tokio may be accounted for on the supposition that they have been produced either by local or distant winds. 7, The only connection between earth tremors and earthquakes in Central Japan is that they are both more frequent about the same season.

(4). "Pressure and Temperature in Cyclones and Anticyclones," by Prof. H. A. Hazen. The author has made a comparison of the observations at Burlington and on the summit of Mount Washington, U.S.A., and as the result of a study of about 4,000 observations from two days before till two days after the passage of cyclone and anti-cyclone centres, he has arrived at the following conclusions:—1, In both cyclones and anticyclones the pressure lags from ten to eleven hours at the summit of Mount Washington. 2, The temperature change at the base precedes very slightly the pressure change, but at the summit the change occurs nearly twenty-four hours earlier. 3, The temperature appears to be a very little earlier at the summit than at the base, and certainly varies much more rapidly at the former. 4, In a cyclone the difference in temperature between base and summit is less than the mean before the storm, but the difference rapidly increases after the centre has passed. Just the contrary is true in an anticyclone. 5, The total fall in pressure in a cyclone at the summit very nearly equals that at the base, and likewise the rise in an anticyclone. 6, The fluctuation of temperature, that is from the highest to the lowest, at the summit is double that at the base in a cyclone, but it is only a little greater in an anticyclone.

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#### ANOTHER QUEER EARTHQUAKE STORY.

We showed in our last that the reported earthquake of November 20th was not an earthquake shock, but the bursting of a bolide or meteor.

We have now tidings of another earthquake, but we are not prepared to vouch for its authenticity—we give the reports just as we have found them—but the writers' ideas of the transmission of earth tremors are very funny, especially the notion that a shock felt at Bolton at 6 a.m. took an hour to travel the twelve miles thence to Chorley and arrived there at 7 a.m.

EARTHQUAKE SHOCK IN LANCASHIRE.—On Thursday, December 1st, a slight shock of earthquake was felt in South-East and North-East Lancashire. It appeared to commence in the Bolton district, and was felt in the north end of the town about six in the morning, shaking crockery and slightly moving furniture. It then seemed to travel still further north, and was felt very severely at Chorley about seven o'clock, where the inhabitants were greatly alarmed, some rushing from their houses in their sleeping attire.

A Bolton correspondent, writing on Thursday, December 1st, says:—This morning, about six o'clock, a slight but unmistakable shock of earthquake was felt in Bolton and neighbourhood. It lasted for several seconds. Crockery was shaken, and in one case furniture was slightly moved. The disturbance seemed to be travelling in the direction of Preston, and this is borne out by reports from the Chorley district. No damage was done in the Bolton district.

Later accounts of the shock of earthquake at Chorley state that the earth tremor was of several seconds' duration, and appeared to move along a line from south-east to north-west. The shocks were accompanied by a peculiar rumbling sound something like the distant murmur of thunder. Several people who were in bed state that the room seemed to be moving round as if the building were about to collapse. Many people in Park-road and at Botany were so alarmed that they ran into the street in their night dresses, while in most of the houses the crockery rattled and in some the furniture was moved from its position. In two instances watches were thrown to the floor. Clocks were stopped, and the Town Hall chimes just before the hour of seven were noticed to chime erratically. Singular to say, persons in the street at the time did not feel the earth disturbance, but heard distinctly the accompanying rumbling sound.

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### WHITE FOG BOWS.

*To the Editor of the Meteorological Magazine.*

SIR,—From about 11 a.m. to 1 p.m. to-day there was visible a fine, colourless rainbow here, a phenomenon which I never before saw in my day, though now 46 years old. The reflection was also well marked with a dark band between. The sun was, of course, shining, but the sky where the bow appeared was thinly clouded; no rain fell. We had had a black frost last night, but a thaw set in about noon. The bow, when first observed, was about north, and moved round to north by east before it disappeared. The effect was very striking. It may interest you to know of it.

Yours truly, GEO. F. TRENCH.

*Abbeylands, Ardfert, Co. Kerry, December 22nd, 1887.*

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[Another was seen by Prof. Tyndall, F.R.S., and thus described by him.—*Ed.*]

*To the Editor of the Times.*

SIR,—Twice, on the elevated moorland of Hind Head I have noticed a very beautiful phenomenon, sometimes named after the Spanish traveller Ulloa, who, I believe, first described it. Its comparative rarity may, perhaps, render a brief reference to it interesting to your readers. A few years ago, while walking in the morning near the edge of the "Devil's Punch Bowl," I found the air around me swarming with extremely minute aqueous particles; and it immediately occurred to me that they must exert some peculiar action on the solar light. Turning my back to the sun, I was startled and delighted by the appearance of a majestic white bow—it could not

be called a rainbow—which spanned the Punch Bowl from side to side. Yesterday morning, on walking out, I found myself surrounded by a host of similar aqueous particles, and, turning to the part of the sky in which a rainbow, if rain were falling, would be seen, a white bow, not quite so well defined as that above mentioned, but in all other respects similar, was observed.

Your obedient servant,

JOHN TYNDALL.

*Hind Head, Haslemere, Jan. 10.*

### THE WEATHER AT CAMBRIDGE.

[It is the province of the Royal Meteorological Society, and of the Meteorological Council, rather than of a periodical, to deal with the general meteorology of England, but many years since Mr. Nutter sent us a table, so compact, that we printed it for that reason. As he has favoured us with another for the past three years, and as many of our readers may not have seen the previous one and may be glad of the pattern, we insert it below.—Ed.]

*The Weather at Cambridge in 1885, 1886 and 1887.*

	1885	1886	1887
Mean Temperature .....	46°·2	46°·4	45°·6
Hottest by Day .....	July 25 & 26	July 4 & 21	July 3
	78°	80°	80°
Coldest by Day.....	Dec. 10	Dec. 21	Jan. 1
	30°	29°	21°
Hottest by Night.....	July 26	Aug. 29	July 8 & 26
	61°	64°	62°
Coldest by Night ...	Dec. 10	Dec. 31	Jan. 1
	19°	16°	15°
Days on which the maximum was at or under 32°.....	6	13	9
Nights on which the minimum was at or under 32°.....	84	97	106
Mean of Barometer .....	29·85	29·82	29·94
Barometer highest .....	March 14	Feb. 8	Feb. 7
	30·50	30·60	30·62
Barometer lowest.....	Jan. 11	Dec. 8	Jan. 5
	28·70	28·10	28·79
Rainfall .....	24·36 in.	23·43 in.	15·35 in.
Rainy Days .....	168	168	162

J. NUTTER.

PAMPHLET EXCHANGE.

Copies of the following pamphlets can be had on application, provided the cost thereof be enclosed in the same cover. When all the copies have been distributed, the stamps (less postage) will be returned.

Author.	Title.	Price.
HANN, DR. J.	Bericht erstattet dem zweiten Internationalem Meteorologen-Congress ueber die Beobachtungen auf hohen Bergen und im Luftballon.....	2½d.
" "	Theorie des Psychrometers.....	2½d.
" "	Bemerkungen zur täglichen Oscillation des Barometers .....	2½d.
HELLMANN, DR. G.	Die täglichen Veränderungen der Temperatur der Atmosphäre in Norddeutschland.....	2½d.
" " "	Feuchtigkeit und Bewölkung auf der Iberischen Halbinsel .....	3½d.
" " "	Vorschläge an den Meteorologencongress.....	3d.
" " "	Der zweite internationale Meteorologencongress abgehalten zu Rom im April, 1879 .....	2½d.
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" " "	Ueber gewisse Gesetzmässigkeiten im Wechsel der Witterung aufeinanderfolgender Jahreszeiten.....	2½d.
" " "	Klima des Brocken.....	2½d.
JELINEK, DR. C.	Ueber die Reduction der Kappeller'schen sogenannten Stations-Barometer, d.h. Gefäss-Barometer mit unbeweglichem Boden .....	2½d.
ROTCH, A. L.	The Blue Hill Meteorological Observatory; an Account of its Foundation and Work .....	2½d.
" "	Results of Observations at the Blue Hill Meteorological Observatory in 1886 .....	3d.
SCOTT, R. H.	Notes on the Reports of Wind Force and Velocity during the Tay Bridge Storm, December 28th, 1879.....	2½d.
" "	On a Series of Barometrical Disturbances which passed over Europe between the 27th and the 31st of August, 1883 .....	2½d.
" "	On the History of Thermometers .....	2½d.
" "	Climatology of the Sea.....	2½d.
WALLIS, H. SOWERBY	The Snow Storm of January 18th and 19th, 1881	3d.

G. J. SYMONS.

62, Camden Square, N.W.

STORM REPORTS.

The Hydrographic Office of the United States calls special attention to a new form for reports of storms, fog, ice, and derelicts, issued for the use of trans-Atlantic steamers. This form replaces those hitherto issued by that Office and by the Signal Service, and the information thus collected is immediately utilised in preparing the telegrams sent daily to France by the United States Signal Service for the benefit of westward-bound vessels. Captains of trans-Atlantic steamships are requested, in the interest of navigation, to send in prompt and complete reports. No doubt British shipowners will instruct their officers to co-operate in this enterprising experiment, as this country has at least equal interest with others in the safety of Atlantic navigation.—*Nature*.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, JUNE, 1887.

STATIONS.  <i>(Those in italics are South of the Equator.)</i>	Absolute.				Average.				Absolute.		Total Rain.		Aver.
	Maximum.		Minimum.		Max.	Min.	Dew Point.	Humidity.	Max. in Sun.	Min. on Grass.	Depth.	Days	Cloud.
	Temp.	Date.	Temp.	Date.									
England, London .....	85·3	15	43·0	27	73·8	51·3	51·0	70	130·4	38·2	·91	3	0·10
Malta .....	92·3	2	60·2	9	82·6	66·3	63·1	70	144·7	53·7	·09	2	1·8
<i>Cape of Good Hope</i> ...	79·8	26	34·9	17	66·8	47·0	...	87	...	...	2·78	8	4·4
<i>Mauritius</i> .....	76·0	3a	58·2	11	73·9	64·0	59·1	72	124·4	47·8	1·68	12	4·6
Calcutta .....	94·0	7	72·6	6	89·8	78·5	77·6	76	159·5	69·6	6·45	16	7·6
Bombay .....	91·2	4	73·9	11c	85·2	77·6	75·9	83	147·6	70·7	24·07	23	8·4
Ceylon, Colombo .....	85·9	14	72·8	1	84·2	75·1	69·4	75	150·2	68·0	6·58	23	7·7
<i>Melbourne</i> .....	65·0	1	33·0	27	53·9	43·4	45·5	87	112·9	27·0	3·04	19	7·3
<i>Adelaide</i> .....	67·3	1	39·2	19	58·3	46·2	45·5	78	119·6	31·0	6·02	25	6·8
<i>Wellington</i> .....	...	...	...	...	...	...	...	...	...	...	...	...	...
<i>Auckland</i> .....	64·5	20	39·0	29b	59·9	49·4	48·0	79	115·0	27·0	6·32	25	7·0
<i>Falkland Isles</i> .....	...	...	17·0	7	...	30·9	32·9	93	91·1	18·7	3·89	25	7·4
Jamaica, Kingston .....	92·1	2	68·4	6	88·5	73·0	71·2	71	...	...	4·82	...	...
Barbados .....	85·0	30	70·0	var.	82·0	72·0	71·9	83	143·0	...	7·53	18	7·0
Toronto .....	89·5	16	47·4	25	72·9	54·0	56·3	77	...	43·0	2·65	11	5·9
New Brunswick, Fredericton .....	91·7	30	36·0	5	72·7	48·6	52·6	67	...	...	5·10	16	4·9
Manitoba, Winnipeg .....	88·0	14	33·3	23	77·4	51·5	56·2	74	...	...	2·94	12	5·0
British Columbia, Victoria .....	86·0	21	36·0	2	65·3	45·1	...	...	...	..	·48	7	...

a And 4, 5. b And 30. c And 12.

REMARKS, JUNE, 1887.

MALTA.—Mean temp. 73°·4. Mean hourly velocity of wind 6·7 miles. Sea temp. rose from 70°·5 to 79° 5. L on 28th. J. SCOLES.

Mauritius.—Mean temp. of air 1°·1, of dew point 1°·3, and rainfall ·33 in. below average; mean pressure 30·169 in., slightly above average; mean hourly velocity of wind 10·7 miles, 0·9 mile below average; extremes 30·3 miles on 12th, and 2·5 miles on 11th; prevailing direction S.E. by E. C. MELDRUM, F.R.S.

Melbourne.—Mean temp. of air 0°·2, and pressure ·119 in. below average; mean temp. of dew point 2°·2, humidity 7, amount of cloud 0·7, and rainfall 1·10 in. above average. Prevailing wind N.; strong on 7 days. Hoar frost on 20th and 27th. Ice on 27th. Dense fog on 7 days. R. L. J. ELLERY, F.R.S.

Adelaide.—The wettest June since the commencement of the Observatory records, the rainfall being more than double the average and nearly an inch in excess of any previous record. Pressure 30·051 in., ·082 in. below average, the lowest mean pressure for June since 1875. Mean temp. 1·2 below average. C. TODD.

AUCKLAND.—An exceedingly wet and stormy month, the rainfall being fully two inches above the average. Mean temp. above the average, pressure much below it. T. F. CHEESEMAN.

KINGSTON.—Rainfall 1·50 in. above average. At Boston, 13·50 in. of R fell in 24 hours on the 5th, 8 inches falling in 4 hours. MAXWELL HALL.

BARBADOS.—Pressure pretty steady. Mean temp. (76°·2) same as 30 years' average, wind velocity equal to 15 years' average. Rainfall considerably above average. TSS on 6th and 23rd. Eight days were overcast. R. BOWIE WALCOTT.

SUPPLEMENTARY TABLE OF RAINFALL,  
DECEMBER, 1887.

[For the Counties, Latitudes, and Longitudes of most of these Stations,  
see *Met. Mag.*, Vol. XIV., pp. 10 & 11.]

Div.	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			in.
II.	Dorking, Abinger .....	1·97	XI.	Castle Malgwyn .....	4·02
„	Margate, Birchington...	2·03	„	Rhayader, Nantgwillt..	6·68
„	Littlehampton .....	2·43	„	Carno, Tybrith .....	5·55
„	Hailsham .....	2·53	„	Corwen, Rhug .....	3·75
„	Ryde, Thornbrough .....	2·58	„	Port Madoc .....	4·85
„	Alton, Ashdell.....	2·45	„	I. of Man, Douglas .....	3·18
III.	Oxford, Magdalen Col...	1·37	XII.	Stoneykirk, ArdwellHo.	3·44
„	Banbury, Bloxham .....	1·90	„	New Galloway, Glenlee	7·13
„	Northampton .....	1·32	„	Melrose, Abbey Gate...	2·16
„	Cambridge, Beech Ho...	1·04	XIII.	N. Esk Res. [Penicuick]	2·50
„	Wisbech, Bank House..	·91	XIV.	Ballantrae, Glendrihaig	4·13
IV.	Southend .....	1·38	„	Glasgow, Queen's Park.	2·66
„	Harlow, Sheering .....	1·17	XV.	Islay, Gruinart School..	4·14
„	Rendlesham Hall .....	1·24	XVI.	St. Andrews, PilmourCot	1·59
„	Diss .....	1·37	„	Balquhider, Stronvar..	6·17
„	Swaffham .....	1·43	„	Dunkeld, Inver Braan..	...
V.	Salisbury, Alderbury ...	1·83	„	Dalnaspidal H.R.S. ...	4·32
„	Warminster .....	2·52	XVII.	Keith H.R.S. ....	2·74
„	Ashburton, Holne Vic..	6·99	„	Forres H.R.S. ....	1·98
„	Holsworthy, Clawton...	...	XVIII.	Strome Ferry H.R.S....	6·73
„	Hatherleigh, Winsford.	3·10	„	Tain, Springfield.....	...
„	Lynmouth, Glenthorne.	4·44	„	Loch Shiel, Glenaladale	11·08
„	Probus, Lamelyn .....	4·02	„	S. Uist. Ardkenneth ...	...
„	Wincanton, Stowell Rec.	2·81	„	Invergarry .....	3·95
„	Taunton, Lydeard Ho ...	2·79	XIX.	Lairg H.R.S. ....	4·69
„	Wells, Westbury.....	2·78	„	Forsinard H.R.S. ....	3·69
VI.	Bristol, Clifton .....	2·41	„	Watten H.R.S. ....	3·11
„	Ross .....	2·00	XX.	Dunmanway, Coolkelure	7·16
„	Wem, Clive Vicarage ...	2·17	„	Fermoy, Gas Works ...	3·12
„	Cheadle, The Heath Ho.	2·13	„	Tipperary, Henry Street	3·41
„	Worcester, Diglis Lock	1·77	„	Newcastle West .....	...
„	Coventry, Coundon ....	1·95	„	Miltown Malbay.....	4·46
VII.	Melton, Coston .....	1·23	XXI.	Gorey, Courtown House	2·56
„	Ketton Hall [Stamford]	1·12	„	Navan, Balrath .....	1·35
„	Horncastle, Bucknall ...	1·28	„	Mullingar, Belvedere...	2·45
„	Mansfield, St. John's St.	2·06	„	Athlone, Twyford .....	2·57
VIII.	Macclesfield, The Park.	...	„	Longford, Currygrane...	2·61
„	Walton-on-the-Hill.....	2·40	XXII.	Galway, Queen's Coll...	3·33
„	Lancaster, South Road.	2·94	„	Clifden, Kylemore .....	6·44
„	Broughton-in-Furness..	4·80	„	Crossmolina, Enniscoe..	5·80
IX.	Wakefield, Stanley Vic.	1·04	„	Collooney, Markree Obs.	4·67
„	Ripon, Mickley .....	2·47	XXIII.	Rockcorry .....	2·84
„	Scarborough, West Bank	2·14	„	Warrenpoint .....	2·90
„	EastLayton[Darlington]	1·74	„	Newtownards .....	...
„	Middleton, Mickleton..	2·43	„	Belfast, New Barnsley..	2·85
X.	Haltwhistle, Unthank..	3·36	„	Cushendun .....	4·51
„	Shap, Copy Hill .....	5·43	„	Bushmills .....	3·63
XI.	Llanfrechfa Grange ....	3·26	„	Stewartstown .....	3·14
„	Llandoverly .....	4·62	„	Buncrana .....	4·85

DECEMBER, 1887.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL.					TEMPERATURE.				No. of Nights below 32°.	
		Total Fall.	Difference from average. 1870-9	Greatest Fall in 24 hours.		Days on which .01 or more fell.	Max.		Min.		In shade.	On grass.
				Dpth	Date.		Deg.	Date	Deg.	Date		
		inches.	inches.	in.								
I.	London (Camden Square) ...	1.38	— .79	.30	14	13	53.8	8	24.3	27	16	24
II.	Maidstone (Hunton Court)...	1.93	— .47	.42	14	19	...	...	...	...	...	...
III.	Strathfield Turgiss .....	1.47	— .55	.32	8	14	53.8	8	19.9	29	18	27
IV.	Hitchin .....	1.23	— .82	.21	8	19	52.0	8	19.0	28	25	...
V.	Winslow (Addington) .....	1.25	— .86	.24	8	19	52.0	2,8b	17.0	29	22	27
VI.	Bury St. Edmunds (Culford) ..	...	...	...	...	...	...	...	...	...	...	...
VII.	Norwich (Cossey) .....	1.09	— 1.23	.35	21	...	...	...	...	...	...	...
VIII.	Weymouth(LangtonHerring)	2.69	...	.73	12	16	51.0	8,13	23.0	13	15	...
IX.	Barnstaple .....	3.74	— .02	.69	7	16	53.5	5	...	...	...	...
X.	Bodmin .....	3.78	— 1.67	.53	12	20	52.0	13	20.0	28	12	14
XI.	Stroud (Upfield) .....	1.88	— .55	.24	19	17	51.0	13b	20.0	28	...	...
XII.	ChurchStretton(Woolstaston)	2.93	+ .50	.75	14	21	51.0	8	23.0	27	20	27
XIII.	Tenbury (Orleton) .....	2.43	+ .14	.36	14	20	55.0	8	20.5	29	18	22
XIV.	Leicester .....	1.37	...	.24	12	18	54.0	9	23.2	20	15	...
XV.	Boston .....	.71	— 1.36	.21	12	11	52.0	8	19.0	27	21	...
XVI.	Hesley Hall [Tickhill].....	.92	...	.23	6	14	52.0	3	22.0	12	18	...
XVII.	Manchester (Ardwick).....	2.30	— .23	.39	6,18	16	49.0	1,13	25.0	27	19	...
XVIII.	Wetherby (Ribston Hall) ...	1.62	— .59	.42	14	13	...	...	...	...	...	...
XIX.	Skipton (Arneliffe) .....	5.33	+ .05	.76	8	19	49.0	4,13	20.0	11	...	...
XX.	Hull (Beverley Road) .....	...	...	...	...	...	...	...	...	...	...	...
XXI.	North Shields .....	3.50	+ .41	.54	21	23	53.0	3	22.0	22	21	23
XXII.	Borrowdale (Seathwaite).....	1.58	— 2.15	1.97	7	25	...	...	...	...	...	...
XXIII.	Carrdiff (Ely) .....	3.49	— .42	.62	12	18	...	...	...	...	...	...
XXIV.	Haverfordwest .....	4.70	— .43	.66	5	23	53.0	8	22.5	27	15	20
XXV.	Plinlimmon (Cwmsymlog) ...	4.44	...	.62	8	14	...	...	...	...	...	...
XXVI.	Llandudno .....	2.92	+ .07	.42	13	19	54.8	13	26.4	29	5	...
XXVII.	Cargen [Dumfries] .....	5.76	+ 1.23	1.16	6	17	50.4	1	19.2	22	16	...
XXVIII.	Jedburgh (Sunnyside).....	2.27	— .18	.36	23	13	54.0	2	13.0	13c	19	...
XXIX.	Old Cumnook .....	4.65	+ .77	.85	6	20	50.0	3	13.0	21	...	...
XXX.	Lochgilthead (Kilmory) .....	6.23	+ .05	.98	16	19	...	...	...	...	...	...
XXXI.	Oban (Craigvarren) .....	6.07	...	.78	5	20	52.8	1	25.0	22	12	...
XXXII.	Mull (Quinish) .....	6.16	...	.69	15	22	...	...	...	...	...	...
XXXIII.	Loch Leven Sluices .....	1.60	— 2.06	.50	9	6	...	...	...	...	...	...
XXXIV.	Arbroath .....	1.64	— 1.26	.40	8	9	52.0	3	23.0	31	17	...
XXXV.	Braemar .....	2.35	— 1.08	.38	20	17	50.0	3	8.5	22	25	28
XXXVI.	Aberdeen .....	3.20	...	.46	8	21	54.0	1,3	22.0	21d	19	...
XXXVII.	Lochbroom .....	5.39	...	1.12	3	25	...	...	...	...	...	...
XXXVIII.	Culloden .....	1.35	— .49	...	...	...	54.0	3	20.0	11	16	23
XXXIX.	Dunrobin .....	4.20	...	1.18	19	15	56.5	3	20.0	11	20	...
XL.	Kirkwall (Swanbister).....	4.39	...	.50	6	29	50.6	2	22.5	8	13	...
XLI.	Cork (Blackrock).....	3.27	— 1.49	.76	12	20	54.0	8	23.0	27	17	...
XLII.	Dromore Castle .....	6.30	...	1.25	7	18	55.0	1	28.0	29	...	...
XLIII.	Waterford (Brook Lodge) ...	2.58	...	.54	12	18	55.0	8	24.0	22	14	...
XLIV.	O'Briensbridge (Ross) .....	3.45	...	.57	15	17	52.0	1	23.0	28	11	...
XLV.	Carlow (Browne's Hill) .....	2.14	— 1.37	.30	5	18	...	...	...	...	...	...
XLVI.	Dublin (FitzWilliam Square)	1.22	— 1.36	.24	15	19	55.1	3	25.1	22	7	26
XLVII.	Ballinasloe .....	2.72	— .76	.40	5	21	48.0	3	22.0	28	21	...
XLVIII.	Waringstown .....	1.98	— .98	.30	8	20	52.0	1,3	19.0	21	21	23
XLIX.	Londonderry (Creggan Res.)..	4.51	...	.58	6	25	...	...	...	...	...	...
L.	Omagh (Edenfel) .....	3.42	+ .02	.52	15	23	51.0	3	23.0	11	20	...

a And 14. b And 16. c And 14. d And 22.

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

METEOROLOGICAL NOTES ON DECEMBER, 1887.

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.

STRATHFIELD TURGISS.—A fine winter month, without S, but with low temperature about the 11th and the 29th. L on 17th. TS on 18th.

ADDINGTON.—A fine month. Although R fell on a good many days, it was generally in small quantities, so that the land, for the time of year, was very firm and dry. A little S fell on 19th, and again on 27th. Sharp frost on 29th, the min. temp. on grass being 12°. Dense fog on 31st.

LANGTON HERRING.—Rainfall '54 in. below the average of 12 years, the total for the year being as much as 9'21 in. below that average. The weather till the 18th was very mild, unsettled and wet, but from the 19th to the close it was cold and dry. Mean temp. at 9 a.m., 1°'6 below average. The mean temp. for the year (48°'3) was 1°'9 below average, and the lowest in 16 years, with the exception of 1879, when it was 47°'3. Temp. fell to, or below, 32° on each of the last 13 days. A few flakes of S fell on 28th, but there was none to cover the ground.

WOOLSTASTON.—A cold month, with much frost. Mean temp. 36°'1. S on 6th, 18th, and 19th.

ORLETON.—The first three days were dry and warm for the season. The weather was then very unsettled, with R almost every day, and temperature variable, but above the average till the 16th, when it became cold and frosty, and the temperature for the remainder of the month was more than 4° below the average. The mean temp. was more than 1° below the average of 26 years. Rain was frequent, although it did not amount to the average for the month. Pressure was generally steady, but lower than the average. A little S fell on the 7th, 18th, and 19th, and remained on the hills for a few days.

MANCHESTER.—Not a very wintry month, although there was some skating, and on two or three occasions towards the close S gave a wintry appearance for a few days. T on 6th, fog on 22nd, 23rd, and 29th, S on 6 days.

WALES.

HAVERFORDWEST.—A very wet month, with scarcely a dry day till near the end, when a very cold period set in. There were many sharp night frosts throughout. Mean temp. rather below the average. Very stormy, with T, L, and H, about the 14th. The Precelly hills were white with S on the 20th.

SCOTLAND.

CARGEN.—The month was remarkable for sudden fluctuations of pressure and temperature, the pressure on several occasions varying from 6 to 8 tenths of an inch, and the temperature from 20° to 25° in 24 hours. Frost at night occurred frequently, but generally it did not continue during the day. A severe S storm occurred on the 7th, the S being 8 inches deep. S fell also on the 18th. Thirty-nine hours of sunshine were recorded, 20 hours below the average.

JEDBURGH.—The weather, on the whole, was marked by variableness, often changing several times a day; out-door work, however, was but little retarded. High winds prevailed at the beginning of the month. S fell on 4th, 6th, 18th, 19th, and 21st, but had almost disappeared at the close. The river Jed was frozen over on the 11th.

OBAN.—A very changeable month, stormy at the commencement; mean temp. high. H on 4th and 7th. Lunar rainbows on 21st and 27th. Gales on 7 days.

ABERDEEN.—Rainfall slightly below the average. S on 9th, 18th, 19th, and 21st. Aurora on 6th.

LOCHBROOM.—A very stormy month, as wintry as any remembered, with only six fair days.

CULLODEN.—Not a severe month. Out-door work was carried on without any interruption. Little S fell.

SWANBISTER.—Weather variable—raining, freezing, and thawing alternately. H and sleet on 7th, gale on 9th, aurora on 7th, 13th, and 16th.

#### IRELAND.

BLACKROCK.—With the exception of a few fine days, the month was damp, raw, and cold, and often misty, with a slight fall of S, and T and L at night on the 5th.

WATERFORD.—Snow on the Comeragh mountains on 18th. H on 13th; S on 6th and 26th.

O'BRIENSBRIDGE.—Ordinary winter weather, with frequent heavy showers and an occasional gale, marked December up to 18th. Dry, fine weather prevailed from that date to the close, with low temperature and steady pressure.

DUBLIN.—A damp and chilly month. In the earlier part both pressure and temp. were very unsteady. After the 16th temp. remained constantly low, never rising above 44°·3 in shade, and falling on the 22nd to 18° on grass. During this cold period the sky was sometimes densely overcast, indeed, after the 27th, the sun was scarcely seen. The mean temp. (39°·9) was again decidedly below the average (41°·3). T on 18th, faint aurora on 16th, H on 17th, 20th and 27th, S or sleet on 6 days, fog on 7 days, gales on 2 days. Mean humidity 86; mean amount of cloud 5·9.

EDENFEL.—Dark, wet and gloomy, with cold fogs. and daily alternating frosts and thaws. S on 6th and 20th.

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#### A GARDEN BAROMETER.

One of the simplest of barometers is a spider's web. When there is a prospect of rain or wind, the spider shortens the filaments from which its web is suspended, and leaves things in this state as long as the weather is variable. If the spider elongates its threads it is a sign of fine calm weather, the duration of which may be judged of by the length to which the threads are let out. If the spider remains inactive, it is a sign of rain; but if, on the contrary, it keeps at work during the rain, the latter will not last long, and will be followed by fine weather. Other observations have taught that the spider makes changes in its web every twenty-four hours, and that if such changes are made in the evening, just before sunset, the night will be clear and beautiful.—*La Nature*.