

SYMONS'S

MONTHLY

METEOROLOGICAL MAGAZINE.

CLVI.]

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ATLANTIC WEATHER.*

THE lapse of five years is rather apt to damp the interest in a storm, no matter how remarkable it may be, nor how excellently it may be discussed. That, however, is almost the only fault which we have to find with the present publication, which is a worthy companion to Capt. Toynbee's previous works.

We have read the preface with great pleasure, and re-produce part of it, because we wish to induce the Council to follow up their own convictions to their legitimate conclusion.

“The Meteorological Council have authorised the present publication as a remainder of the work of their predecessors. *It cannot be doubted that more work of the same nature as that here submitted would throw light on the atmospherical conditions which influence and determine the weather in the West of Europe.*”

Exactly so. We heartily agree with this, and we should like to know why we are not to have “more work of the same nature.” Everybody who knows anything of meteorology agrees that nearly all the weather changes of Western Europe come from the Atlantic. Le Verrier began to issue daily weather maps of the Atlantic and Western Europe in his *Atlas des mouvements généraux de l'Atmosphère* for 1864, but that broke down for want of adequate support; Hoffmeyer began his series of *Cartes synoptiques journalières* September 1st, 1873, but he gives no letter-press, and even of the charts we have received none of a later date than August, 1875; at the Vienna conference Brig. General Myers submitted his proposal for synchronous observations over the whole northern hemisphere, and the United States Government have printed masses of figures, but no maps and no discussion of the data; lastly, we have reason to believe that in

* *The Meteorology of the North Atlantic during August, 1873.* By Captain HENRY TOYNBEE. (Prepared under the authority of the late Meteorological Committee.) 4to, and atlas of plates. Stanford, 1878.

connection with their system of weather warnings to Europe, the meteorological staff of the *New York Herald* have very considerable stores of information.

Are questions of priority, of personal or national feeling, to prevent our doing that which is evidently both the wisest, the cheapest, and the most useful to all the nations of Western Europe, viz., concentrating every scrap of information in *one* office, charting it and thoroughly discussing it.

Of course, endless difficulties may be conjured up—some we have just glanced at, and plenty more may be imagined—cost, international jealousies, &c. Surely, when the proper course is clear, such questions ought to be swept away. Take the question of cost: the Meteorological Committee and Council have spent about £40,000* over their seven observatories. Which is more likely to help us to a knowledge of British weather, the continued maintenance of those observatories which have been at work for ten years, but from which we have seen woefully few *results*, or such a set of Atlantic charts as £40,000 would procure? Besides, it is not England alone which would benefit by this work, but the whole of Western Europe. Would the other nations leave us to bear all the cost, or would our Parliament object to voting the cost even of an ironclad in payment for a decisive effort to ascertain the laws of Atlantic weather?

And as to international jealousy—happily it is becoming a matter of history rather than of time present, and the *Bulletin Météorologique du Nord* is standing evidence that three European governments can bring out a joint publication; and if Norway, Sweden and Denmark can work together, why should not other countries?

The great importance of the question started by the preface has diverted our attention from the work itself, which is, we think, the best which Captain Toynbee has issued.

Years ago,† we asked, “Why have we not a daily weather map of the British Isles?” In less than twelve months the Meteorological Committee issued their first, and now they are not only published by them but also by nearly a dozen newspapers, so that tens of thousands of copies are published daily.

Now, relying upon the *ipsissima verba* of the Meteorological Council, we ask for daily records of Atlantic weather, because “it cannot be doubted that more work of the same nature as that here submitted would throw light on the atmospherical conditions which influence and determine the weather in the West of Europe.”

* We believe that this is below rather than above the truth; but the published accounts are now so complicated by the purchase and sale of instruments for third parties that it is impossible to ascertain what the observatories really cost.

† *Met. Mag.*, July, 1871.

THE FROST.

It was our intention to have given a table of the daily temperatures during the long frost which has characterized the close of 1878 and the beginning of 1879, but its distinguishing feature has been *persistency* rather than *intensity*, and the extremes would be so much less remarkable than those given in Vol. II. of this Magazine, that we have abandoned the intention. We, however, in support of the above remarks, give the minima for January, 1867, and for December, 1878, from the same stations, and in many cases from the same instruments:—

	Camden Square.	Selborne.	Hitchin.	Banbury.	Culford.	Orleton.	Arncliffe.	N. Shields.	Haverfordwest.	Culloden.	Waterford.	Portarlington.	Monkstown.	Galway.	Waringstown.
1867...	6·7	—2·0	9·0	12·0	0·0	1·6	8·0	14·0	8·0	14·6	16·0	8·0	12·0	15·0	2·0
1878...	18·7	11·0	15·0	8·0	10·0	7·7	9·0	9·0	9·0	13·8	14·5	8·0	11·0	11·0	5·0
1867..	12·0	13·0	6·0	...	10·0	6·1	1·0	...	1·0	...	...	...	...	...	3·0
1878...	...	...	...	4·0	...	...	...	5·0	...	0·8	1·5	...	1·0	4·0	...

The bottom lines show the number of degrees by which the intensity of cold was greatest in the respective years. From this it will at once be seen that in England generally, it was much colder in 1867, but that in Ireland the reverse was the case.

To the Editor of the Meteorological Magazine.

SIR,—The frost of the past month being remarkably severe for this place, I send you the following table, and some notes about it and the weather for the past month:—

Month.	Air Temperature.		At 9 p.m.		On grass.
	9 a.m.	9 p.m.	Max.	Min.	
1878.					
Dec. 8	33°·9	33°·9	38°·9	29°·1	20°·2
" 9	30°·0	31°·1	39°·9	26°·8	15°·2
" 10	27°·6	26°·9	31°·6	24°·1	17°·1
" 11	26°·6	29°·2	32°·4	20°·6	14°·1
" 12	26°·0	24°·3	31°·7	24°·3	16°·1
" 13	31°·9	37°·1	37°·4	23°·1	17°·6
" 14	31°·9	25°·0	37°·3	23°·9	19°·3
" 15	31°·2	35°·2	39°·3	20°·6	13°·4
" 16	36°·0	34°·2	43°·8	33°·3	28°·1
" 17	31°·4	28°·9	38°·9	28°·0	18°·2
" 18	39°·0	35°·8	41°·3	28°·0	21°·0
" 19	36°·9	31°·7	42°·6	31°·7	21°·9
" 20	27°·6	29°·8	41°·9	24°·7	16°·6
" 21	29°·0	30°·0	40°·9	27°·1	19°·1
" 22	35°·6	29°·3	43°·9	28°·9	18°·7
" 23	29°·3	31°·2	42°·2	26°·2	18°·3
" 24	30°·4	38°·8	38°·8	27°·8	18°·4
" 25	37°·9	42°·4	42°·4	34°·1	32°·2
" 26	47°·4	46°·9	49°·7	42°·2	39°·3
Means for					
Dec. ...	35°·8	36°·0	41°·9	31°·4	24°·4

The highest shade max. was $52^{\circ}8$, on Dec. 30th; the lowest shade min. $20^{\circ}6$ on Dec. 11th and 15th; and on the grass $13^{\circ}4$ on Dec. 15th.

The mean temp. (9 a.m., 9 p.m., max. and min.) $36^{\circ}3$, of December was very cold, being $6^{\circ}3$ below Dec., 1877, and $10^{\circ}0$ below Dec., 1876. Northerly winds, accompanied with intense cold and snow after the 9th, prevailed till the 25th, when an E. gale and thaw occurred, followed by strong S.W. winds, heavy rain, and mild weather to the end of the month. Snow fell on eleven days, it covered the ground from the 9th to the 15th, about 1.5 in. deep, and remained in the shade till the 25th, whilst the roads and paths were glazed with ice, rendering locomotion very dangerous, and causing many accidents. A strange phenomenon occurred on the 12th, the air temp. in the garden being $23^{\circ}1$ at 9.40 p.m. while it was 30° at the same time on the N. side of the house, 30 yards to the N.N.E., and on higher ground, the latter position feeling the influence of a light, warmer air from N.N.E., which had just set in from the sea, and which subsequently raised the garden temp. to $31^{\circ}1$ at 10 p.m., thus shewing the ameliorating effect of the sea on a sharp frost.

The barometer was generally low in December, but has oscillated considerably in the first ten days of January, 1879.

Rain fell abundantly from Dec. 15th to Jan. 7th (on every day except Jan. 4th and 5th), amounting to 6.06 in., the greatest falls being 1.46 in. on the 1st, 0.93 in. on the 2nd, 0.75 in. on the 6th, and 0.81 in. on 7th (much of the latter being snow). The 1st and 3rd inst. were warm, max. $49^{\circ}9$ and $52^{\circ}4$; but frost set in again on the 5th (min. $29^{\circ}2$), and is again becoming severe, 0.03 in. of snow having fallen last night, which is still remaining on the ground. A bitterly cold easterly gale blew from the 7th to the 10th; it was very violent on the 8th, and caused a very high sea and tides. The max. temp. to-day (11th) only rose to $27^{\circ}6$ after 9 a.m., and the min. occurred at 9 p.m., $21^{\circ}1$ in air, and $14^{\circ}1$ on grass.—Yours truly,

EDWIN E. GLYDE, F.M.S.

Kirkham, Babbacombe, Torquay, Jan. 11th, 1879.

P.S.—*Jan. 12th.* Last night was the coldest yet experienced this winter, the min. temp. falling to $19^{\circ}1$ in the air, and $12^{\circ}6$ on the grass; but at 9 a.m. to-day the temp. had risen to $25^{\circ}5$, and at 2 p.m. to $36^{\circ}2$, with a rapid thaw, falling barometer, S.S.W. wind, and overcast sky.

To the Editor of the Meteorological Magazine.

SIR,—As we are experiencing the severest weather we have had in this district since the winter of 1870-71, I send the low temperatures registered by my *minimum* thermometer (by Casella, on wooden stand, bulb 4 feet above ground) up to the present date. The frost set in on December 8th and continued until the 30th, when a thaw came on, and the max. reading reached 50° . On the 31st the mercury touched

53°·5, and snow and ice had almost totally disappeared. But on January 2nd the frost returned, and as yet shows no sign of again leaving us. I subjoin all the readings below 20°, with dates. The min. on December 24th is the lowest registered here since December 31st, 1870, when a temp. of 3°·6 was recorded.

		Min.			Min.
1878.	December 10th	... 17°·6	1878.	December 21st	... 14°·6
	„ 11th	.. 13°·5		„ 24th	... 5°·0
	„ 12th	... 14°·5		„ 25th	... 6°·7
	„ 15th	... 19°·3	1879.	January 4th	... 15°·6
	„ 17th	... 16°·5		„ 6th	... 15°·0

I am, Sir, yours faithfully,

B. T. GRIFFITH-BOSCAWEN.

Trecalyn Hall, Wrexham, Jan. 28th, 1879.

To the Editor of the Meteorological Magazine.

SIR,—I notice that the cold reported in the *Standard* of the last few days differs very much from that which we have experienced here ; therefore I fancy a much colder blast has passed over us than over London, particularly on the 23rd, 24th, and 25th. The temperature here was as follows :—

Date.	9 a.m.	Max.	Min.	Grass.
Dec. 23rd ...	19°	30°	16°	6°
„ 24th ...	12	27	12	4
„ 25th ...	27	36	5	0

A remarkable fact was the great fall of temperature on the 24th. By 9 o'clock in the evening the glass had fallen to 8°; by 11 o'clock to 6°; and later on it fell one more degree. When the change took place I do not know, but by 9 o'clock in the morning the ther. had risen to 27°, and it has been thawing ever since.—Yours truly,

JOHN MATHISON.

Addington, Winslow, 27th Dec., 1878.

To the Editor of the Meteorological Magazine.

SIR,—I beg to forward you the readings of the min. and max. thermometers daily during the protracted frost in Mid-Lincoln. It set in on the 5th at night and froze every day for three weeks :—

Date.		Min.		Max.	Date.		Min.		Max.
Dec. 6	...	28°·0	...	36°·0	Dec. 17	...	17°·0	...	30°·0
„ 7	...	30°·0	...	34°·0	„ 18	...	19°·0	...	34°·5
„ 8	...	29°·0	...	33°·5	„ 19	...	26°·5	...	35°·0
„ 9	...	24°·5	...	33°·0	„ 20	...	18°·0	...	27°·0
„ 10	...	19°·0	...	30°·0	„ 21	...	13°·0	...	31°·0
„ 11	...	20°·0	...	33°·5	„ 22	...	24°·0	...	34°·5
„ 12	...	22°·0	...	30°·0	„ 23	...	16°·0	...	29°·0
„ 13	...	24°·5	...	30°·5	„ 24	...	16°·0	...	28°·0
„ 14	...	19°·0	...	24°·5	„ 25	...	10°·0	...	32°·0
„ 15	...	16°·0	...	33°·0	„ 26	...	31°·0	...	36°·5
„ 16	...	27°·0	...	31°·5					

The thermometer was below 20° on the extraordinary number of 11 nights. Prior to the 26th there was never more than 2 inches of snow on the ground.—Faithfully yours,

W. CARTER.

Bucknall, Horncastle, Jan. 1st, 1879.

REVIEW.

Nederlandsch Meteorologisch Jaarboek voor, 1872. Tweede Deel.

Utrecht, Kemink en zoon, 1877.

THIS volume of Prof. Ballot's series is very late in appearing, but as regards the early portion which is devoted to barometric constants, the date is quite immaterial. In the pages 132–163 are given very full details respecting the rainfall of 1872 over the greater part of Europe. The first 24 pages of this article are devoted to giving the daily rainfall at 54 European stations. We are glad to see these tables, but we cannot help regretting the terribly long distances which so small a number as 54, spread over Europe from Nairn (by the bye, there is not one return from Ireland) to Constantinople, and from Madeira to the Gulf of Bothnia, necessarily involves. Looking at the extremely local and partial character of rain as compared with other meteorological elements, we are inclined to believe that if daily values are given they should be for stations tolerably close together.

After these come a series of tables, the design and object of which are admirable, and which are entitled to great praise.

One record appears to settle an enigma which has long puzzled us. Some old observations gave the rainfall at Coimbra, in the valley of the Mondego, as 224 inches; the same authority gave 23 inches for Lisbon; in 1872 the fall at Coimbra was 32·37 in., and at Lisbon 71·42 in. Hence there seems reason to believe that the old Coimbra record was fearfully wrong.

Lastly, there are tables of monthly rainfall in "Scotland and Elsewhere," which are unworthy of their companions. Not only are the stations in no kind of order, but misprints and puzzles seem plentiful, *e.g.*, the returns for Sillioth are printed twice over in one table, namely, on pages 162 and 163; but the return for February, 1872, is wrongly printed as 176·7^{mm} on one page, and rightly as 76·7^{mm} on the next. Then for Aberdeen we have three returns:—

Pages	1871.	1872.										
	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.
A 132–154...	45·2	69·3	108·4	48·6	70·7	74·9	125·5	49·0	53·6	155·6	117·6	148·0
B 156...	35·3	59·2	107·7	58·1	70·7	87·7	83·5	48·7	78·7	155·7	108·7	161·6
C 159...	42·4	78·2	129·2	57·9	76·2	95·5	97·5	50·6	85·4	176·8	111·2	182·3

It is, of course, possible that these discrepancies arise from three different records being employed; but even if so, we doubt the expediency, in an international work, of giving three records from one city when so many others are necessarily excluded for want of space, and, moreover, having reconverted these values into English measures, we find that A and B do not agree with any records for that year which we received from Aberdeen; C is evidently the return from Seafeld Cottage, Rnblislaw.

HAILSTORMS AT NIGHT.

To the Editor of the Meteorological Magazine.

SIR,—As I believe it is unusual for hail to fall during night, and not often in winter, I send you an account of two storms within the last week or two. I also add an account of a hailstorm on the 6th July, 1877, remarkable not only for its violence, but from the thin layer of cloud from which it fell.

I sent an account of it at the time to Prof. D. Colladin, of Geneva, who devotes much time to the subject of hailstorms, their origin, &c.

Yours truly,

MICHAEL FOSTER WARD,

Rossinière, Switzerland, 3rd Jan., 1878.

F.R.A.S., F.M.S.

December 21st, 1878.—Cloudless day till 5 p.m.; heavy snow afterwards; 8 inches 9 p.m.; yield in water, 0·300 inches. A thunderstorm from 11 to 11.40 p.m.; temperature during storm, 24°·0. Lightning brilliant blue colour; thunder loud and long, and at the same moment as the lightning. Stars shining brilliantly through breaks in the clouds, which seemed to be not very dense. Heavy snow during storm, and large conical hailstones. Snow continued till 4 a.m., when the sky became cloudless. The snow and hail measured at 9 a.m. 6 inches deep; yielded 0·600 inches. Total fall from 5 p.m. to 9 a.m., 14 inches; yield 0·900 inches.

January 1st, 1879.—Fine; cir.-cu. from N.W.; max. 40°·0 during day; at 9 p.m., dry bulb 37°·0, wet 34°·0; at 2 a.m., 2nd Jan., 54°·0, 3 a.m. 44°·0; violent gale 3 to 4.30 a.m., with snow, hail, and rain; thunder very loud, lightning red and yellow, hailstones solid and conical. Calm, with rain after storm; 0·530 inches 9 a.m.

Hailstorm, 6th July, 1877.—6.30 a.m., air dead calm; storm came slowly up the valley from W., the cloud being very thin, the sun shining through during the storm. At a height of about 500 feet above us the sky was cloudless, the air warm, and the cloud in question seemed low in the valley. The lower part of the cloud was nearly down to the roof of the house. The storm lasted less than 10 minutes, during which rain and hail fell violently, accompanied with thunder and lightning. The hailstones were perfectly round, solid, and transparent, and averaged $\frac{3}{4}$ -of-an-inch in diameter; they lay to the depth of 2 inches, and were not melted till past 1 o'clock, though the max. of the day was 72°·5; temperature during storm, 54°·0: at 9 a.m., 60°·0. The air seems to have been full of electricity, as there had been a thunderstorm the previous evening (without rain), brilliant lightning all night, and storms at 1.30, 3.0, and 4.45 a.m. Amount of rain collected during these three storms, and that at 6.30 a.m., was 1·080 inches. The sky was clear immediately before and after the hailstorm. There were storms again at 5 p.m. and 6 p.m., rainfall 0·900 inches. No hail fell except at 6.30, and none of the storms lasted more than a quarter-of-an-hour or 20 minutes. I have never seen round hailstones here before; they have invariably been conical.

THE WEATHER IN DECEMBER.

During the first week the weather was generally of an unsettled and inclement character, interspersed with short periods of improved conditions. Atmospheric pressure was for the most part highest to the westward of these islands, and depressions consequently passed in a southerly or south-easterly direction over the United Kingdom or the North Sea, accompanied by north-westerly to northerly breezes, low temperatures and frequent rain and snow showers. These disturbances appeared, the first on the 1st, the second on the 5th, and the third on the 6th, and though not important enough to cause general gales on our coasts, they nevertheless gave rise to considerable increase of wind on those days, and gales locally at the mouth of the Channel.

After the 7th a great change came over the weather, the week soon proving itself to be the coldest and most wintry of the season thus far. The area of highest pressure (with the exception of the 12th) was shown on each day to the N., N.W., or W. of these islands, while disturbances, generally of slight importance, appeared to the S.W. and E. of us from time to time. The wind was therefore chiefly from the N.W. and N.E., and usually light or moderate in force. Temperature was low throughout the week, but especially on the 12th, 13th, and 14th, when the thermometer fell very low over England, more particularly in the N.E. The greatest cold recorded during this week was 10° at Shields early on the morning of the 14th, while the maximum temperature at that place on the preceding day was only 20° . The thermometer began to rise on the night of the 14th, and it appeared on the following morning that the frost was beginning to break up. This increase continued and extended over a good part of England on the 16th, when readings varied from 45° at Scilly to 22° at Ardrossan.

During the next period (15th to 21st) pressure, though rather unsteady, was not subject to any very considerable changes. On the 15th the barometer was highest over the N.W. of Spain, and lowest near the Shetlands, and westerly breezes prevailed generally, but on the 16th a rapid decrease of pressure took place over the Bay of Biscay, and a large area of low readings was shown over western Europe with light variable airs. This area of low readings subsequently moved N.E. to the Channel, where it filled up. On the evening of the 17th a rapid fall of the barometer was intimated from the Hebrides, and during the night of that day and the following day a deep depression passed S.E. across Scotland, causing brisk N. to W. winds generally, and fresh gales at Mullaghmore and Stornoway. The disturbance subsequently passed S.E. and E. across the North Sea, the mercury recovered over these islands, and the N. to N.W. winds blew with less force. On the 20th the barometer was rising generally, readings were very uniform over the neighbourhood of Great Britain, and light variable airs again prevailed, but on the 21st a fresh fall occurred over our northern coasts, and spread over these islands, bringing a further increase of force in the N. wind in the north.

Temperature was very low and oscillated rather largely during this week, a general rise being reported on the 15th and 18th, whilst on other days falls were reported. The weather was for the most part fair, though snow showers were frequent.

From the 22nd till the 24th, an area of low pressure lay to the eastward of the North Sea, and a region of high pressure off our western coasts; northerly to north north-westerly breezes prevailed on our coasts, with occasional snow showers and very cold frosty weather.

On the 24th the anti-cyclone from the west advanced over us; a further fall of temperature occurred, with fine dry weather and light winds. Dense fog and severe cold weather were developed over Central England, the thermometer falling quickly at night, so that the lowest temperatures of this winter were recorded. But on the following morning (25th) the change began; the anti-cyclone had moved on to North Germany; the barometer fell half-an-inch in the S.W., produced rather steep gradients for south-easterly winds in that region, and a fresh to strong gale from the S.E. set in. From this time till the

close of the month pressure was lowest on our W. and N. coasts, and S.W. to westerly winds, with high temperature, prevailed. These conditions continued much the same down to the close of the year. On the 31st a rapid fall of the barometer was reported from Scandinavia, but a slight rise over France and the S. of England. Deep depressions lay over the N. of Scotland and W. of Norway, and steep gradients for S.W. winds were shown over the Channel, England and Ireland. Rain was general over western Europe. H. E. M.

HASTINGS, & ST. LAWRENCE (ISLE OF WIGHT).

WE accidentally omitted to mention in the last number that we issued therewith, as a supplement, a report on the climate of Hastings, with copies of which we had been furnished by Mr. A. E. Murray, F.M.S.

This month we are favoured by the Rev. Clifford Malden, with a table of the rainfall from St. Lawrence Undercliffe, in the Isle of Wight; and it is a rather curious coincidence that two consecutive insertions should come from localities so frequently associated as winter health-resorts.

SUPPLEMENTARY TABLE OF RAINFALL IN DEC., 1878.

[For the Counties, Latitudes, and Longitudes of most of these Stations, see Met. Mag., Vol. X., p. 28., but the list is under revision.]

Div.	Station.	Total Rain.	Div.	Station.	Total Rain.
		in.			in.
II.	Acol	2.43	XI.	Castle Malgwyn ...	3.77
„	Littlehampton	2.31	„	Nantgwilt, Rhayader ...	5.71
„	Hailsham	2.49	„	Carno	4.64
„	St. Lawrence, I. of W....	1.93	„	Rhug, Corwen	2.81
„	Strathfield Turgiss	1.42	„	Port Madoc	3.44
III.	Addington Manor	1.46	XII.	Carsphairn	2.94
„	Oxford	1.30	„	Melrose	3.03
„	Northampton	1.66	XV.	Gruinart	2.71
„	Cambridge	1.12	XVI.	Grandtully .....	...
IV.	Sheering	1.14	XVII.	Tomintoul	3.85
„	Diss	1.35	„	Keith	5.55
„	Swaffham	1.94	XVIII.	Dalwhinnie .....	.69
V.	Alderbury, Salisbury ...	1.65	„	Auchnasheen	2.53
„	Compton Bassett	1.80	„	Springfield, Tain	2.30
„	Dartmoor	6.67	„	Glenfinnan	4.95
„	Langtree, Torrington ...	...	XIX.	Watten	4.89
„	Cosgarne, St. Austell ...	5.55	XX.	Glenville, Fermoy	2.64
„	Taunton	2.20	„	Tralee	3.70
VI.	Bristol	2.05	„	Tipperary	1.72
„	Sansaw	1.54	„	Newcastle W., Limerick	1.91
„	Cheadle	2.55	„	Kilrush	2.08
„	Bickenhill Vicarage	2.04	XXI.	Kilkenny	1.57
VII.	Coston, Melton Mowbray	1.73	„	Kilsallaghan	1.69
„	Bucknall	1.49	„	Twyford, Athlone	1.72
VIII.	Walton, Liverpool	2.14	„	Belvedere, Mullingar ...	1.68
„	Broughton-in-Furness ..	2.58	XXII.	Ballinasloe	1.71
IX.	Stanley, Wakefield	1.02	„	Kylemore	4.68
„	Mickley, Ripon	2.41	„	Carriack on Shannon	1.65
X.	Gainford	2.46	XXIII.	Rockcorry	1.68
„	Unthank Hall	2.59	„	Warrenpoint	1.30
„	Shap	3.71	„	Newtownards	2.17
XI.	Llanfrechfa	3.88	„	Bushmills	4.08
„	Solva	5.23	„	Buncrana	3.96

DECEMBER, 1878.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL.					Days on which .01 or more fell.	TEMPERATURE.				No. of Nights below 32°.		
		Total Fall.	Differ- ence from average 1860-5	Greatest Fall in 24 hours.		Max.		Min.	In shade.	On grass.				
				Dpth	Date.						Deg.	Date.	Deg.	Date.
I.	Camden Town	inches 1.46	inches — .04	in. .26	31	15	55.2	30	18.7	25	21	27		
II.	Maidstone (Hunton Court)...	1.49	— .13	.26	16	13	...	...	...	...	...	...
III.	Selborne (The Wakes).....	1.84	— .91	.33	27	12	55.0	31	11.0	14	24	27		
IV.	Hitchin	1.19	— .12	.23	27	15	52.0	30*	15.0	24	26	...		
V.	Banbury	1.77	+ .10	.31	25	18	52.0	31	8.0	25	28	...		
VI.	Bury St. Edmunds (Culford)...	1.31	— .18	.28	27	14	54.0	31	10.0	13	26	28		
VII.	Norwich (Sprowston).....	2.15	...	.36	27	19	...	...	...	...	...	...
VIII.	Bridport	2.37	— 1.00	.56	25	14	...	...	...	...	...	...
IX.	Barnstaple	3.80	+ .68	.75	28	16	56.0	30	14.0	11	...	...
X.	Bodmin	5.30	+ .06	1.54	28	24	53.0	30	17.0	11	19	25		
XI.	Cirencester	1.77	— .52	.45	25	10	...	...	...	...	...	...
XII.	Shifnal (Haughton Hall) ...	2.16	+ .48	.32	1	13	51.0	31	11.0	25	29	30		
XIII.	Tenbury (Orleton)	2.08	— .38	.39	28	15	54.0	31	7.7	25	26	29		
XIV.	Leicester (Town Museum) ...	1.81	...	.42	26	15	52.5	31	6.9	25	22	29
XV.	Boston	1.68	+ .19	.65	25	12	53.0	31	14.0	25	23	...		
XVI.	Grimsby (Killingholme)	2.14	...	.40	25	21	51.0	31	11.5	21	21	...
XVII.	Mansfield	1.80	...	.62	31	13	51.7	31	7.8	25	24	24
XVIII.	Manchester (Ardwick).....	2.80	+ .70	.44	1	16	54.0	31	10.0	24	24	...		
XIX.	York	1.41	— .39	.40	27	11	...	...	...	...	...	...
XX.	Skipton (Arncliffe) ...	3.03	— 1.52	.64	28	12	46.0	30	9.0	24	23	...		
XXI.	North Shields	4.82	+ 2.62	1.32	8	23	48.5	31	9.0	14	25	...		
XXII.	Borrowdale (Seathwaite).....	5.74	— 11.21	1.18	28	11	...	...	...	...	...	...
XXIII.	Cardiff (Crockherbtown).....	2.70	...	.75	28	10	52.6	29	19.5	11	24	...
XXIV.	Haverfordwest	3.77	— 1.06	1.10	29	13	52.2	30*	9.0	11	22	28		
XXV.	Aberdovey .....	...	...	...	...	...	...	...	...	...	...	...
XXVI.	Llandudno	1.96	— .24	.30	19	19	53.0	31	20.7	13	17	...		
XXVII.	Dumfries (Crichton Asylum)...	...	...	...	...	...	...	...	...	...	...	...
XXVIII.	Hawick (Silverbut Hall)....	2.27	...	.38	28	19	...	...	...	...	...	...
XXIX.	Glasgow (Cessnock Park) ...	2.04	— 1.77	.47	11	9	...	...	...	...	...	...
XXX.	Mull (Quinish)	3.07	...	.62	30	14	...	...	...	...	...	...
XXXI.	Loch Leven	2.00	— 1.72	.60	31	9	...	...	...	...	...	...
XXXII.	Tyndrum (Ewick) .....	...	...	...	...	...	...	...	...	...	...	...
XXXIII.	Arbroath	2.49	— .25	.54	28	14	47.0	31	15.0	14	25	...		
XXXIV.	Braemar	2.01	— 1.76	.50	8	17	43.8	31	— 1.0	13	28	29		
XXXV.	Aberdeen .....	...	...	...	...	...	...	...	...	...	...	...
XXXVI.	Gairloch	6.43	...	1.18	30	20	...	...	...	...	...	...
XXXVII.	Portree	8.50	— 7.13	1.05	30	26	...	...	...	...	...	...
XXXVIII.	Inverness (Culloden)	1.30	— .63	...	...	18	45.0	31	13.8	28	23	31
XXXIX.	Dunrobin	4.07	+ 1.67	.73	11	22	46.0	2	18.5	28	26	...		
XL.	Sandwick	5.70	+ 1.73	.62	28	23	44.4	5	22.3	28	18	28		
XLI.	Caherciveen Darrynane Abbey	3.57	...	.65	24	20	...	...	...	...	...	...
XLII.	Cork	3.09	...	.57	26	13	...	...	...	...	...	...
XLIII.	Waterford	1.78	— 2.64	.43	25	10	52.5	30*	14.5	15	15	...		
XLIV.	Killaloe	2.63	— .86	.39	11	12	53.0	30	11.0	17	26	...		
XLV.	Portarlington	2.05	— 1.14	.30	12	19	50.5	30	8.0	24	29	...		
XLVI.	Monkstown, Dublin	1.53	— 1.09	.54	27	9	51.0	26	11.0	13	...	...
XLVII.	Galway	2.39	...	.60	27	16	54.0	30*	11.0	25	23	...
XLVIII.	Waringstown	1.89	...	.30	29	22	50.0	30	5.0	24	26	30
XLIX.	Edenfel (Omagh)	2.57	...	.37	28	16	49.0	31	0.0	24	30	...
L.	Ballyshannon	3.24	...	.75	29	7	...	...	...	...	...	...

* And 31. † And 23. ‡ And 24. § And 25.

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

METEOROLOGICAL NOTES ON DECEMBER.

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.

SELBORNE.—Prevailing winds N. and N.W. for three weeks, afterwards W. and S. A sudden change from intense cold to comparative mildness on the 27th. Much fog, very little S.

CULFORD.—Exceedingly cold up to the 25th, when a sudden change took place, the S rapidly disappeared, and the weather remained mild to the end of the month. Easterly winds on four days only. Mean temp. $31^{\circ}2$.

SHIFNAL.—By far the severest December for 44 years (and probably more). The min. temp. was below 32° every day till the 29th, and in spite of the last three mild days averaged 25° , while the max. averaged only 34° ; the nearest approach was in 1835 when the average min. was 26° . The frost was usually accompanied by fog or mist, which on the 12th produced a splendid rime lasting four days. Although S fell frequently, it never exceeded 3 in. in depth. R fell nightly from 25th to close (29th excepted), and a rapid thaw set in on the 30th. Bar. throughout unusually low for a frost.

ORLETON.—A very cold winterly month, with a mean temp. about $7^{\circ}5$ below the average. The first week was generally cloudy, dry and cold; on the 8th severe frost set in, and continued without intermission till the evening of the 28th, when a sudden rise of temp. took place, and a rapid thaw soon cleared the ground of S, and caused all the rivers to overflow. During the frost there were frequent fogs and rime, but only trifling falls of S till the 21st, after which date much S mixed with R and sleet fell, and the roads were very icy. The fluctuations of the bar. were great, and it was generally low and unsteady, but the wind was never very strong till the 31st.

BOSTON.—Severe frost set in on the 6th, and lasted till the 28th, the ponds and drains were frozen sufficiently hard to bear skaters by the 10th. On the 25th the river Witham was frozen from Boston to Lincoln. The severe weather brought a great many strange birds to these parts, and several swans were shot at the mouth of the river. Unfortunately barbarians whose chief delight appears to consist in the pleasure of killing exist here as elsewhere, any many beautiful birds have fallen victims to their brutality, not only black birds and thrushes, but even three or four kingfishers, whose bright cheery presence skimming about along the ditches will be more missed perhaps than if the persons who shot them had disappeared instead.

KILLINGHOLME.—A month of real winter, the trees in the middle of the month beautifully covered with rime owing to prevailing fog. High winds on the last three nights. Large lunar halo on 9th.

NORTH SHIELDS.—S very frequent. Lunar halo on 9th. L on 16th.

WALES.

HAVERFORDWEST.—The most severe December since 1870. Hardly anything but S fell till the 28th, after which date a good deal of R fell.

LLANDUDNO.—A very wintry month, nothing equal to it in the last 20 years. In 1871 the mean temp. was nearly as low, and the min. even 2° lower, but the duration was only 14 days instead of 17.

SCOTLAND.

HAWICK.—S fell on twelve days, and amounted to 1.24 in., and 1.03 in. of R fell on seven days. The thaw on the 28th, and the heavy R which accompanied it caused a high flood in the Teviot. The snowfall has been the severest and longest in duration experienced here for many years, but the S has protected the shrubs, so that they are not much worse for the low temp. of 5° which was frequently registered. The feathered tribe suffered very severely.

QUINISH.—Weather unusually severe. Frost on 17 days. S heavier than for several years past. The wind has been from the N. during the whole month with rare exceptions.

BRAEMAR.—A very heavy fall of S. The most intense frost since 1860.

PORTREE.—Unprecedented snowfall, with severe frost, from 7th to 28th inclusive. So much S has not been known since 1812, and, according to tradition, not for 200 years previously.

DUNROBIN.—Railway communication N. of this has been much impeded by snowdrifts. Very little progress has been made with out-door labour.

SANDWICK.—The most severe December for a great number of years. The frost, which began on November 23rd, continued (with partial thaws) till the end of December. The severe snowdrift on 21st, with the wind 55 miles an hour, and some drift also on the two following days, blocked up the roads, and the farmers have not been able to plough or get up any quantity of turnips for their cattle during the whole month. The only T and L we had during the whole year was on the 19th, between 8 and 9 a.m.

IRELAND.

DARRYNANE.—The coldest month for many years. Hard frost from 8th to 24th inclusive, and S at intervals. The most severe winter since 1854-5, and then, though there was more S, the frost was not so severe. Winds chiefly N.E. and moderate, but a fresh gale from N.W. on 31st.

KILLALOE.—A month of great severity, the temp. falling as low as 11° on two nights. Canals and parts of lake frozen hard enough for skating; ground covered with S from 13th to 28th.

MONKSTOWN.—The month of December was one of unprecedented severity. Frost commenced almost with the month, and continued with two very slight thaws till 25th, when a gradual but decided thaw set in, accompanied by considerable wind. Much S on 8th, 9th, 10th, 11th, and 22nd. Skating continued from 5th to 26th. Considerable and sudden fluctuations of the bar. during the whole month.

WARINGSTOWN.—Continuous frost and S. On the whole the most severe December since 1854, though the ther. was lower (2°) on the 2nd January, 1867, than it has been this month. A thaw set in on Christmas-day, and continued till end of month; however, before the new year was many hours old a sharp frost set in, and continues (January 3.)

EDENFEL, OMAGH.—With the exception of one night, frost prevailed during the entire month. The settled frost which commenced on 8th culminated in a temp. of zero in the night of the 24-25th, and was the most prolonged (considering its intensity) of which I can find any record in the present century.

HEAVY SNOW.

To the Editor of the Meteorological Magazine.

SIR,—I wrote to you about an unprecedented fall of snow on the night of Nov. 11; but that has been in some respects surpassed by a fall on the night of the 7th inst. On this occasion, however, the snow was a much longer time in reaching the same depth, and was also lighter. It commenced about 7 p.m., and though probably not a continuous fall, was 12 inches deep by 8 a.m. on the 8th! A good deal more fell after that, but without much increasing the depth; at 3 p.m. it was 12½ inches, which, when melted, produced about 1.5 in. of water. At night there was a further fall, making the depth 17 inches by the morning of the 9th, being deeper than has been reached for very many years. It looked magnificent on the trees, but was very injurious to many.—Yours truly,

T. W. BACKHOUSE.

Sunderland, December 13th, 1878.