

# SYMONS'S MONTHLY METEOROLOGICAL MAGAZINE.

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XXV.]

FEBRUARY, 1868.

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

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## INTRODUCTORY.

IN the introduction to our first volume, we expressed the hope that the *Meteorological Magazine* would be judged not by its promises, but by its performance; and it is a source of great satisfaction to find, from the steadily-increasing circulation, that the performance has been considered equal, or superior, to the promises. As we said in the introduction above referred to, our maxim always is, "say everything in as few words as possible"—avoid verbiage; for whatever may be the rule in diplomacy, it is certainly not true in science that "language was given to man to conceal his thoughts." We believe that the true characteristics of scientific literature should be precision, clearness, and terseness; after that we strive, and we trust our correspondents will continue to do likewise. But, thanks to our many and valued contributors, in spite of all compression and condensation, the Magazine increases in bulk year by year, a most satisfactory state of things, and one which we trust our readers will perpetuate by the following methods:—(1) By prompt communication of intelligence likely to be of general interest to meteorologists; and (2) by taking steps still further to increase its circulation, and so enable us to be even more liberal with illustrations, &c., than in the last year.

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## IS THE ROYAL CHARTER GALE PERIODIC?

*To the Editor of the Meteorological Magazine.*

SIR,—In the January number of the *Meteorological Magazine*, you ask, "Is the Royal Charter Gale Periodic?" and you seem to anticipate an immediate negative reply to your query.

I, for one, have no hesitation whatever in giving the question an unqualified affirmative. I believe that there will be found a recurrence of stormy weather, and a low barometer, about the 25th October, in a considerably larger proportion of years than the "two out of three" that you suggest. Allow me to supply observations for some years not contained in your list. These observations were taken at Farnham, Surrey. The readings of the barometer are corrected for temperature, and reduced to sea level; and I believe they may be accepted as reliable to the tenth indicated:—

Year.			Barometer.	
1826.	October	25 ...	29.1	Thunder and lightning on the 22nd.
1827.	"	23 ...	29.0	Very great rain.
1828.	"	23 ...	29.5	
1829.	"	22 ...	29.5	{ This was the lowest reading of the month. Previous to the 26th, the barometer was always <i>above</i> 30.20.
1830.	"	28 ...	29.7	
1831.	"	26 ...	29.3	
1832.	No low barometer at this period.			
1833.	October	15 ...	28.7	After the 15th the barometer did not exceed 29.5 until the 30th.
1834.	"	25 ...	29.5	A fall of 1 in. in 24 hours. Severe gale.
1835.	"	26 ...	28.8	
1836.	"	29 ...	29.1	
1837.	"	25 ...	29.3	Much rain
1838.	"	29 ...	28.4	
1839.	No low barometer at this period.			
1840.	October	28 ...	28.9	
1841.	"	24 ...	28.7	
1857.	"	22, 23.	29.6	Nearly 4 in. of rain in 30 hours.

You observe that in October "gales generally occur in the first or last week." In point of fact, there is a *double* periodicity of disturbed weather in October, viz., about the 10th and 25th. In the above list, I have carefully avoided mixing up the two periods; for both are often strongly marked in the same year. I suspect that it very rarely happens that *both* are absent; the period of the 10th was most distinctly marked in the two years in my list, when there was fine and calm weather about the 25th. These two periodicities, further, have each a character of their own—that of the 10th is more often marked by rain than by wind; that of the 25th is *more* conspicuous for its gales than for its rain, though the latter is often considerable.

I am glad to take this opportunity of asking the attention of meteorologists to the subject of "periodicities." The fact is, that the many abortive attempts which have been made to construct a "cycle of seasons," have brought so much discredit upon the idea, that a man needs some boldness to venture a hint that there is, after all, such a thing as periodical recurrence of any kind in our climate. Nevertheless, I am convinced that the double October period is only one out of several similar recurrences. Some of these are more strongly marked than others; and I will just indicate two or three which seem to me sufficiently established; and I would earnestly invite all persons who possess reliable registers of weather for ten years or more, to examine them carefully from this point of view; and I believe that they will find that they can fully corroborate the suggestions I have made.

Feb. 10. About this day a low barometer and strong gales, or heavy snow, may be safely expected.

July 17. Thunderstorms probably 9 years out of 10.

August 10. In August there is a double period, similar to that of October. The 10th is marked by thunder or great rain; while the second, on August 20, usually has a gale.

December 25. A gale, *generally accompanied with lightning*, often recurs just about Christmas day. This, however, does not seem to be so regularly annual as the above periods.

The cold period of about the 10th May has long been known ; but the even more certain cold period of the 24th April—the true “black-thorn winter,” has escaped notice.

My letter is already too long ; but, if you wish it, I shall be happy to furnish you with particulars concerning some of the “periodicities” above referred to.

I am, Sir, faithfully yours,

P. H. NEWNHAM, M.A., F.M.S.

*Bournemouth, Feb. 4, 1868.*

*To the Editor of the Meteorological Magazine.*

SIR,—The following Meteorological Phenomena, &c., are taken from my notes, and may be of use to you :—

- 1737. Oct. 12.—Furious hurricane at the mouth of the Ganges.
- „ Oct. 18.—Great flood at Canterbury.
- 1739. Oct. 30.—Gale at Newcastle-on-Tyne.
- 1757. Oct. 29.—Terrible hurricane at Malta.
- 1758. Oct. 14.—Gale in Great Britain.
- 1759. Oct. 30.—Earthquake at Tripoli. 6,000 persons perished at Damascus.
- 1760. Oct. 16.—Flood on Rhine.
- „ Oct. 21 to 28.—Gales in Great Britain.
- 1761. Oct. 12.—Violent gale at Copenhagen.
- „ Oct. 14.—Great gale and thunderstorm at Malvern.
- „ Oct. 16 to 21.—Violent N.E. gales in Ireland.
- „ Oct. 17.—Great flood at Newcastle-on-Tyne.
- „ Oct. 19.—Gale at Aberdeen.
- „ Oct. 21.—Great floods in Ireland.
- „ Oct. 22.—Violent Gales in Hispaniola.
- „ Oct. 23.—Most violent N.E. gale (for last 30 years) at Boston, U.S.
- 1762. Oct. 26.—Fearful gale and flood about London ; at Norwich great gale, and 3,000 houses laid under water ; very great flood at Cambridge.
- 1763. Oct. 1.—Violent gale in England and Scotland.
- „ Oct. 7.—Great flood in Lincolnshire.
- „ Oct. 12.—Large meteor at St. Neots.
- „ Oct. 16.—Gale in Irish Channel ; and earthquake in Algiers.
- „ Oct. 17.—Large meteor in Great Britain.
- 1767. Oct. 8.—Tremendous flood in Great Britain.
- „ Oct. 16.—Gale in Orkney.
- „ Oct. 19.—Eruption of Vesuvius (and earthquake), worst this century.
- 1768. Oct. 9.—Great flood, after 5 months drought, at Porto Ferraro, Rio.
- „ Oct. 15.—Hurricane in Havannah—nearly 1,000 persons killed, and 4,840 houses destroyed.
- 1769. Oct. 24, 25, and 26.—Aurora Borealis brighter than for 50 years.

1770. Oct. 17.—Great gale and thunderstorm in Great Britain.  
 „ Oct. 20.—Most violent thunderstorm at Canterbury.  
 1772. Oct. 6.—Thunderstorm at Harrowgate.  
 „ Oct. 25.—N.E. gale at Borrowstanness.  
 „ Oct. 29.—Gale at Yarmouth.  
 „ Oct. 30.—Greatest flood known at Monmouth.  
 1773. Oct. 10.—Hurricane, with fearful thunderstorm, at Bawtry.  
 Gale at York.  
 „ Oct. 12.—Gale at Thurlestow.  
 „ Oct. 15.—Thunderstorm in Great Britain.  
 „ Oct. 16.—Thunderstorm in London.  
 „ Oct. 17.—Thunderstorm at Bristol.  
 „ Oct. 18.—Thunderstorm at Cambridge and London.  
 „ Oct. 25.—Eruption of Volcano of Gamma Courra—thunder  
 and lightning. 80 shocks of earthquake in 24 hours.  
 1774. Oct. 10.—Earthquake in Switzerland.  
 1775. Oct. 19 and 20.—Great gale at Nottingham, and great floods in  
 Yorkshire and Cheshire.  
 1776. Oct. 27.—Large meteor in London.  
 1777. Oct. 16.—Violent thunderstorm in Yorkshire.  
 1778. Oct. 8 and 16.—Earthquake shocks in Smyrna.  
 1780. Oct. 2 and 3.—Hurricane and earthquake in Jamaica.  
 „ Oct. 10.—Hurricane in Barbadoes.  
 „ Oct. 11.—Hurricane at Martinico.  
 „ Oct. 15 (8 p.m.).—Fearful gale about London, with thunder-  
 storm.  
 1781. Oct. 9.—A great overflowing of the sea.  
 1786. Oct. 13.—Earthquake at Aquila.  
 1787. Oct. 26 and 30.—Great floods at Frankfort.  
 1788. Oct. 12.—Hurricane at Martinico, and earthquake at St. Lucia.  
 1789. Oct. 17.—Thunderstorm in England.  
 „ Oct. 31.—Gale at Yarmouth.  
 1791. Oct. 22.—Thunderstorm, and sheets of ice at Tunbridge-wells.  
 „ Oct. 26, 27, and 28.—Gale and thunderstorm at Canterbury  
 and other places; great damage by hail at Tunbridge-wells.  
 1793. Oct. 5.—Earthquake at Shaftesbury.  
 1795. Oct. 29.—Highest flood in memory of man at Bristol.  
 1796. Oct. 16.—Earthquake at Ripon.  
 „ Oct. 23.—Gale at Ilfracombe.  
 1800. Oct. 19.—Earthquake and gale at Ongola.  
 „ Oct. 28.—Fearful hurricane at Ongola, India.  
 1801. Oct. 4.—Earthquake in Turkey.  
 „ Oct. 26.—Earthquake at Constantinople.  
 1803. Oct. 15.—Great floods in Madeira.  
 1804. Oct. 22.—Aurora Borealis at Nottingham.  
 „ Oct. 25.—Gale, with thunderstorm, at Truro.  
 „ Oct. 30.—Gale at Portsmouth.  
 1805. Oct. 22 and again in Oct. 23.—Meteor at York.

1808. Oct. 13.—Gale at Nottingham.  
 „ Oct. 20.—Gale in Great Britain.  
 „ Oct. 25.—Violent gale at Nottingham.  
 1809. Oct. 5.—Earthquake at Lisbon.  
 1810. Oct. 10, 19, and 21.—Gales at Nottingham.  
 „ Oct. 24, 25, and 26.—Fearful hurricane in Havannah, and earthquake.  
 1811. Oct. 13.—Great flood of Elbe.  
 1812. Oct. 13.—Gale, with lightning, in Norfolk —Yours truly,  
 E. J. LOWE, F.R.S.

*To the Editor of the Meteorological Magazine.*

SIR,—I have no notes between 1847 and 1861, but the following are at your service :—

1847. Oct. 24.—Brilliant aurora.  
 1861. Oct. 28.—Aurora.  
 1862. Oct. 20 — 23.—Barometer low ; high winds.  
 1863. Oct. 29 — 31.—Rain, hail, lightning, and high wind.  
 1864. Nothing remarkable.  
 1865. Oct. 24 — 26.—Hail, rain, high wind, lightning, aurora.  
 1866. Nothing.  
 1867. Oct. 27.—High wind, rain, and hail.

T. BEESLEY, F.C.S.

5, High Street, Banbury.

### THE FROST OF JANUARY ON THE CONTINENT.\*

ALTHOUGH the mildness of the British Isles, as compared with the Continent, has long been known to those who have studied the subject, it is well occasionally to collect proofs thereof, in order that we may not forget how much we owe to that ocean-banked river, which brings to these northern shores some of the products, and some of the heat, of the Mexican Gulf.

MONTPELLIER.—Temperature steady at 18° ; the thick layer of snow which fell at the beginning of the month, is frozen hard, and covers the streets and roofs of the houses.

TOULOUSE.—The basin of the Garonne is one sheet of ice.

LYONS.—Nearly half the Rhone is frozen over.

At Dijon, Lons le Saulnier, and Bourg, the temperature fell to 5° ; at Grenoble to 15°. At Rouen all the maritime dock is frozen. The ships are immoveable, and the seamen perform much of their work on the ice. The general aspect, says the *Nouvelliste*, resembling on a small scale a scene of winter quarters in the Arctic regions.

At Honfleur the temperature fell to 14°, the docks and part of the outer harbour were frozen over, and enormous ice blocks floated about the bay.

At Orleans the Loire was frozen on the left bank, but flowed sluggishly on the right ; but higher up, at Tours, it was blocked for several days.

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\* All temperatures are in Fahrenheit's scale.

As for the Seine, it has not been so completely tied up for the last 20 years as it now is. A person curious in dates has found that the first mention of the Paris river being frozen over was in 821, when it remained like a solid mass for nearly a month. The same occurred during the winters of 1044, 1067, 1124, 1125, 1205, 1210, and 1325. In 1407 the cold was so severe that the greater part of the vines and fruit trees were completely destroyed. It was still more intense in 1420, when numbers of the population perished, and the wolves prowled about the streets in search of food. In 1434 it began to freeze on the 31st December, and continued with little intermission till the middle of March, and snow fell during 45 days without ceasing. In 1570 intense cold prevailed for three months. In 1608 the winter was so severe from the 21st of December, and fuel so scarce, that the smallest faggot of wood cost 35 sols. The cattle perished, and every species of game disappeared in the fields and forests. The ice was so thick on the Seine that waggons heavily laden passed over. In 1683 the cold was so intense during three weeks that numbers died. In 1709 the extreme cold caused a dearth of provisions, and in Paris and Versailles coarse oaten cakes were considered a luxury at the tables of princes and of the wealthiest inhabitants. In 1740 a scarcity occurred by the same cause, and was so great that, by order of the Parliament of Paris, public prayers were offered up in the churches, and the relics of St. Geneviève, the patron saint of the city and of St. Marcel, were carried in procession through the streets. In 1768 the large bells of many of the churches cracked from the cold. The winter of 1784 completely changed the aspect of Paris, and masses of snow and ice in the streets made them impassable. At the corner of the Rue Coq-St. Honoré a pyramid of snow was raised in honour of Louis XVI., who died on the scaffold nine years afterwards. On the 30th of December, 1786, the thermometer fell to zero, and the ice on the Seine was twelve inches thick. The other winters when the cold was most severe, and the river pretty nearly as it is now, were those of 1799, 1810, 1811, 1812, 1814, 1829, and 1846.

A letter from St. Petersburg of the 29th January, in the *Nord*, says:—"The severity of the winter increases. We have touched  $-30^{\circ}$  Réaumur ( $-35^{\circ} \cdot 5$  F.). At Moscow the temperature has suddenly descended to  $-38^{\circ}$  R. ( $53^{\circ} \cdot 5$  F.). The day before yesterday, at Valdai, between that city and this, the thermometer marked  $42^{\circ}$  below zero ( $-62^{\circ} \cdot 5$  F.). Mercury freezes, and only the instruments with alcohol show the temperature. You may imagine what is taking place on the railway between this capital and Moscow. Only by the most inconceivable efforts is the traffic carried on. The goods trains, when they stop at a station for any length of time, have the greatest difficulty in starting again. The frost attaches the wheels to the rails. Four or five locomotives are required to break them away, and sometimes this cannot be done; the engines or the coupling chains break. In short, there is a violent struggle with nature, in which man and iron have the worst of it."

FINE METEOR ON JANUARY 1, 1868.

At 7.25, or 7.30 a.m., a very fine meteor passed south-east of England, in a course from N.E. to S.W., as may be inferred from the following notes, epitomized from various sources :—

HAMPSHIRE—ISLE OF WIGHT—*Freshwater*.—A most glorious meteor, of the size of the full moon, passed (at 7.30 a.m.) rather slowly from N.E. to S.W., left a trail of broad white light over 60° long, which was visible for more than half an hour. This band, originally straight, became wavy and zig-zag. The meteor did not burst, but disappeared behind clouds.—H. M. W.

HAMPSHIRE—SOUTHAMPTON—*Shirley Warren*.—A meteor, about the size of, and very like, a common rocket, seen at a quarter of a mile off, leaving a trail, but with a whiter nucleus, passed from E.S.E. to S.S.E. at 7.30 a.m., in a nearly horizontal course, about 10° or 15° above the horizon. The greater part of the train disappeared in about three minutes, but portions, gradually fading, remained, assuming the appearance of very narrow, thin, white clouds. One very short part—say about one-thirtieth of the whole course—was visible until 8.10—that is, for 40 minutes; and, even then, was only obscured by the light of the rising sun. This fragment had been very slowly moving to E., and, therefore, against the surface wind current.—F. L. WOLLASTON.

SUSSEX—NEWICK—*Ketches*.—At 7.30 a.m., a fine meteor, like a large cannon ball, passed from N. to S., showering down sparks as it passed along.—M. SHIFFNER.

SUSSEX—UCKFIELD.—About half-past seven in the morning of 1st a very brilliant and unusually large meteor was observed here. It first appeared from a point a little S. of E., and, passing nearly horizontally, at an elevation of 30°, disappeared behind a group of cumuli, situated a little W. of the meridian. What happened at its dispersion was not seen, but I am informed that it illuminated the clouds for nearly three minutes. It left a silvery line of phosphorescent light along its path, which remained visible for nearly *half an hour*. In size it was described to me as being about half the apparent size of the moon, and of a reddish colour. I was able to estimate the apparent height from its passage near the top of a tree, from the point where the person described to me its path. It was seen very generally in this immediate neighbourhood.—C. L. PRINCE.

KENT—ASHFORD—*Bethersden*.—At 7.25 a.m., a remarkable meteor travelled slowly from E. to W., its diameter about 8 in. [!] a globe of fire, followed by a bright light, and leaving a line of brilliant white smoke or vapour behind it, that could be plainly seen for 15 minutes. The meteor, which was accompanied by a fizzing sound [?], appeared about 45° above the horizon, traversed more than one-third of the heavens, and then burst into three pieces near the earth.—A. C. HILLS.

## METEOR ON JANUARY 26TH.

*To the Editor of the Meteorological Magazine.*

A brilliant meteor was seen here about 8 p.m., on the 26th. Appeared to start from near "Alpha Cygni," and went in a N.E. direction, ending near the last star in the tail of Ursa Major. It consisted of a broad train of light, thicker than that left by an ordinary rocket, of a blue colour at first; but dying out in a deep red at last. Another small meteor was seen about five minutes afterwards traversing from S. to N.

W. WYNN WILLIAMS.

*Menaifron, near Caernarvon.*

## ANOTHER SILVER THAW.

*To the Editor of the Meteorological Magazine.*

SIR,—We experienced a most beautiful sight here on Saturday 11th—one of the most splendid "silver thaws" I ever beheld. The morning broke dull and dark, with a sleety mist, wind S.W.S., thermometer, 30°, barometer, 29·78. The air felt raw and damp; and as the day proceeded, the rain increased, and was changed into ice immediately it found a lodgment on the ground, on walls, houses, fences, and on trees—which latter produced a most extraordinary effect, the branches being coated completely, and the leaves of all evergreens also, and both presenting at the points icicles an inch and a half to two inches long, resembling exactly the little crystal drops pendant around the bonnets of the present day, and bending the branches most gracefully; the weeping willows, and those shrubs with thin and tender branches, were especially handsome. At noon, the temperature rose one degree, and the rain returned to a mist, with the wind southerly; and, as the afternoon advanced, the mist became fog, and the ice began to drop off the objects it had so affectionately embraced, and had completely disappeared on the morning of Sunday, when the thermometers marked 35°, and I measured ·33 of rain.

Noon, to-day, is exceedingly fine—clear bright sun, with strong wind, and thermometer 52°; rain, at 9 a.m., ·10.—Yours faithfully,

HENRY ST. JOHN JOYNER.

*Shortwood House, Staines, Jan. 13, 1868,*

## GALE OF JANUARY 18th.

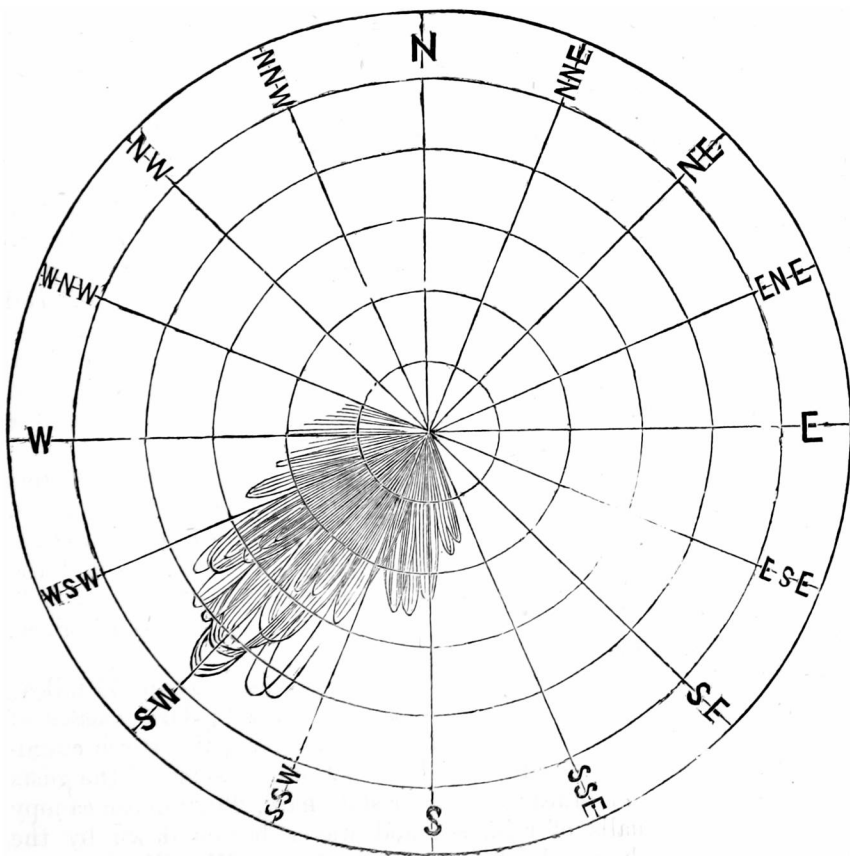
A RATHER severe gale occurred in the vicinity of London on the 18th of January. The most remarkable feature in connection therewith was the rate of fall of the barometer. The readings at Camden Town, reduced to sea level, were:—

				Rate of fall per hour.	
				in.	in.
January 18th,	9·0 a.m.	.....	29·645	.....	—
" "	11.15 a.m.	.....	·511	.....	·060
" "	1.25 p.m.	.....	·307	.....	·094
" "	1.30 "	.....	·296	.....	·132
" "	1.45 "	.....	·252	.....	·176
" "	2.0 "	.....	·238	.....	·056
" "	4.0 "	.....	·176	.....	·031

Thus, at 1.45 p.m., the rate of fall was very nearly 0·18 per hour,

The pressure of the wind, recorded by Mr. Cator's anemometer, at Beckenham, was 25 lbs. per square foot at 2.55 p.m. At the Royal Observatory, Greenwich, the reported pressure was 30 lbs. At Wisbech the greatest pressure was 16 lbs. Barometer very low in many places. The following are examples: Boston, 28.88; Deanston, 28.30; Aberdeen, "Barometer fell to 28.32, we had no gale, but over half an inch of rain;" Dublin, violent storm from S. about 2 p.m., bar. fell from 29.56 at 11.30 p.m. on 17th to 28.42 at 0.15 p.m. on 18th, which was the lowest point reached; at 9 a.m. the bar. was falling at the rate of 0.10 per hour.

By the courtesy of Mr. Segrave, we add copy of the diagram produced by Howlett's anemograph at his residence, in Dorset Square. The quadrant wherein the tracings are seen is that whence the wind blew, and the concentric circles denote each 4 lb. pressure; thus 4 lbs., 8 lbs., 12 lbs., 16 lbs., and 20 lbs., are the values of the several rings, whereby it will be seen that the maximum pressure recorded by it was 19 lbs. per square foot, the direction being S.W.



## RECORD OF OSLER'S ANEMOMETER AT GUERNSEY.

*To the Editor of the Meteorological Magazine.*

SIR,—The new year was ushered in with cold and bitter N.E. wind, blowing until the 3rd, with a mean pressure of  $1\frac{1}{2}$  lbs. on the square foot, a daily movement of the air of about 400 miles. Calm and light breezes from the same quarter, with continued cold, to the 10th. On Saturday, 11th, the wind veered from E., through S., as far as W., and since then has oscillated between W. and S.E., with a succession of gales of the cyclonic type, as is usual in this island with these winds.

Saturday, 11th.—A gale from S.E., veering to W., blew for 24 hours, greatest pressure 5 lbs. = 32 miles. Movement of air in 24 hours, 550 miles.

Monday, 13th.—After a calm of 36 hours, the wind again backed from W. to S.E., and a second gale veering through S. to W., blew for 24 hours—greatest force 8 lbs. = 40 miles. Movement of air in 24 hours, 670 miles.

14th and 15th.—After a lull of six hours, a third gale from S.W., for 48 hours; greatest pressure 7 lbs. = 38 miles; daily movement of air, 650 miles.

Thursday, 16th.—During an interval of six hours' calm, the wind again backed to S.E., and, veering to S.S.W., blew fresh for 48 hours; greatest pressure, 4 to 5 lbs., about 30 miles; daily movement of air, 400 miles.

Saturday, 18th.—During a lull of 3 to 4 hours the wind backed from S.W. to S.S.E. At 2 a.m., a fierce gale set in from S.S.W. to W., continuing until 5 p.m. on Sunday, about 40 hours; mean pressure, 7.5 lbs. = 38 miles, giving a daily movement of air of 750 miles. Rainfall .70. Much lightning on Sunday night.

Monday, 20th.—1 a.m. calm, wind backed from W. through S. and E., reaching N. at 2 p.m., a retrograde circuit of 270 degrees. Barometer, at 9 a.m., 28.9 sea level, having fallen 1 in. during the previous 48 hours. Rainfall .60.

Tuesday, 21st.—Calm. At 1 a.m. the wind suddenly shifted from N. to S., and through S.W., as far as N.W., direct arc of 315 degrees. Barometer risen, at 9 a.m., 7-tenths to 29.6. These wild oscillations of the barometer, and complication of the aerial currents, indicated the coming storm, and at 5 p.m. the wind, as usual, having backed to S.S.E., a furious gale set in. 9 p.m., S., pressure, 7 lbs. = 38 miles; midnight S.W., 10 lbs. = 45 miles; vivid lightning.

Wednesday, 22nd.—7 a.m., force, 16 to 20 lbs. = 57 to 63 miles; at 9 a.m. barometer fallen 4-tenths, 29.2 sea level; dark masses of cumulus, and gleams of sunlight; from 1 to 4 p.m., the storm culminated S.W., blowing steadily 25 lbs. = 72 miles, some of the gusts rising to 30 lbs. = 77 miles; barometer stationary, 29.2; dense canopy of low cloud, squalls of rain, sea and waves beaten down by the wind, covered with clouds of foam; 4 to 7 p.m., W.S.W., 14 lbs. = 53 miles; 7 to 8 p.m., 13 lbs. = 51 miles. At 8 p.m., the wind

shifted suddenly to W.N.W., when the gale immediately broke, and at 9 p.m. there was a perfect calm, which continued all night.

Thursday, 23rd.—At 6 a.m. the wind veered to N.E., light breeze ; 9 a.m. barometer risen 4-tenths, 29·6 sea level.

Yours very truly,

T. L. MANSELL, M.D.

Guernsey, Jan. 23rd, 1868.

## EXAMINATION OF THERMOMETERS.

*To the Editor of the Meteorological Magazine.*

SIR,—Permit me to draw the attention of the readers of your valuable magazine to the desirability of occasionally verifying the zero points of their thermometers. It has long been known that the capacity of the bulbs of many thermometers undergoes a slow change, which, after the lapse of several years, produces errors in their readings amounting often to one, and sometimes even to *two*, degrees. I have lately tested five thermometers I have in my possession, and have found that, at a temperature of 32°, their readings require the following corrections :—

No.	1.—A spirit min. ther., by Negretti and Zambra.....	— 0·5
„	2.—A Phillips's max. ther. ....	— 1·7
„	3.—An ordinary ther., by Mr. Dancer .....	— 1·0
„	4.— do. do. ....	+ 0·2
„	5.—A solar radiation ther., by Negretti and Zambra .....	+ 0·2

It would be very interesting if some of your correspondents would test the thermometers they have in use, and favour your readers with an account of their results.

I may take this opportunity to point out a source of error in spirit minimum thermometers, which, I believe, is not generally known to meteorologists. It arises from the condensation of the vapour of the spirit in the extremity of the bore of the tube ; and, in a case which lately came under my notice, this condensation had gone on unchecked, until the error produced by it amounted to *five* degrees ! The spirit thus condensed was driven off by *heating* the end of the tube, and *cooling* the bulb ; but, fifteen days afterwards a fresh condensation had taken place, equivalent to *seven-tenths* of a degree. It is probable that this tendency of the alcoholic vapour to condense will be most apparent in a thermometer having a bore with a sharply-pointed extremity ; and, therefore, in selecting a spirit thermometer, it will be advisable to choose one in which the end of the bore is well rounded.

I am, dear Sir,

Yours very truly,

JOSH. BAXENDELL,

Cheetham Hill, Manchester,  
Jan. 20, 1868,

## REVIEW.

*Results of Meteorological Observations taken at Christchurch and Hokitika, Canterbury, New Zealand, for the year ending 31st December, 1866.* 6 pages, folio and plate.

THE observations at Canterbury are being steadily continued, under the care of Mr. Holmes, the Government observer. Those at Christchurch (lat.  $43^{\circ} 32' 16''$  S.; lon.  $172^{\circ} 38' 59''$  E.; distance from sea, 5 miles, and height above it, 25 ft.) for three years are epitomized in the report under notice; and, as the yearly results agree fairly with one another, it will be of interest to compare a few of the leading features with those of London:—

	Christchurch.	London.	Diff.
Mean Barometer reduced to $32^{\circ}$ , and sea level	29·878 ...	29·953 ...	— ·075
Mean Temperature in shade .....	53·0 ...	50·0 ...	+ 3·0
"    max.    "    .....	61·9 ...	57·9 ...	+ 4·0
"    min.    "    .....	44·1 ...	42·3 ...	+ 1·8
Maximum    "    "    .....	89·4 ...	92·0 ...	— 2·6
Minimum    "    "    .....	25·3 ...	7·0 ...	+18·3
Maximum    "    in sun .....	143·9 ...	— ...	—
Minimum    "    on grass .....	17·3 ...	2·8 ...	—14·5
Mean Humidity .....	77 ...	83 ...	— 6
Total Rainfall (on ground).....	21·96 ...	24·20 ..	— 2·24
Days of Rain .....	102 ...	150 ...	—48

At Hokitika (lat.  $42^{\circ} 41' 30''$  S.; lon.  $170^{\circ} 59'$  E.), on the west coast, the air is damper, thunderstorms are rather more frequent, and the total rainfall at the level of the sea, in 1866, was 129·12 in. At Waikati, the total rainfall in 1866 was 20·52 inches.

From the above, the similarity of the climate of Christchurch to that of the British Isles is clearly shown, the principal difference being, that the temperature is more equable than that of London—resembling, perhaps, the climate of the Isle of Wight rather than that of the metropolis. Very many details are yet required, but, in the interim, the broad outline is very acceptable; and we hope Mr. Holmes will go on with the work he has well begun, and that no false economy on the part of the Colonial Government will prevent his pushing his stations into the interior. Irrespective of the immense practical utility of accurate knowledge of the climate of the province, we believe that in the vicinity of the southern Alps, results of high scientific interest are within Mr. Holmes' reach.

## EARTHQUAKE IN SOMERSET.

ON January 4th, at 5.10 a.m., a slight shock of earthquake was felt throughout the southern part of Somersetshire—Taunton, Wellington, Langport, and other places. Beds and houses were shaken, lamps and windows rattled. A farmer armed himself, and searched for thieves, &c.

JANUARY, 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°.
		Total Fall.	Difference from average 1860-5	Greatest Fall in 24 hours.		Max.		Min.				
				Dpth	Date.			Deg.	Date.	Deg.	Date.	
inches	inches.	in.			Deg.	Date.	Deg.	Date.				
I.	Camden Town .....	3·89	+ 1·94	·79	18	19	53·0	17	23·4	3	16	
II.	Staplehurst (Linton Park) ...	3·65	+ 1·59	·50	18	21	50·0	15	17·0	7	18	
	Selborne (The Wakes).....	5·73	+ 2·46	·99	18	18	49·0	28	17·0	3	18	
III.	Hitchen .....	2·98	+ ·84	·39	21	20	51·0	14†	21·0	2	17	
	Banbury .....	2·75	+ ·66	·43	18	20	52·0	17	22·0	2	15	
IV.	Bury St. Edmunds (Culford).	2·69	+ ·82	·49	24	14	53·0	17	23·0	2	15	
V.	Calne .....	4·27	...	·88	18	18	53·0	31	18·0	4	17	
"	Barnstaple.....	6·10	+ 2·58	1·63	11	19	...	...	...	...	...	
"	Bodmin .....	6·48	+ 1·29	1·10	21	23	54·0	17	22·0	4	8	
VI.	Cirencester .....	4·68	+ 1·68	·75	11	13	50·0	16	25·0	3	6	
"	Shifnall .....	1·84	+ ·06	·34	11	13	53·0	16	22·0	2, 4	12	
"	Tenbury (Orleton) .....	3·07	+ ·54	·47	24	21	57·0	14	21·8	2	15	
VII.	Leicester (Wigston) .....	1·71	+ ·27	·39	13	8	53·0	17	20·0	1, 2	16	
"	Boston .....	2·27	+ ·56	·40	19	20	54·5	17	25·5	4	12	
"	Gainsborough .....	2·76	+ 1·34	·81	7	13	57·0	17	20·0	2	5	
"	Derby .....	1·81	+ ·02	·30	31	21	54·0	14	25·0	3, 4	11	
VIII.	Manchester .....	2·75	+ ·23	·45	31	21	55·0	14*	24·0	4	9	
IX.	York .....	1·86	+ ·28	·41	31	18	53·5	16†	24·0	4	11	
X.	Skipton (Arncliffe) .....	8·03	+ 2·39	2·02	31	24	...	...	...	...	...	
X.	North Shields .....	2·04	+ ·08	·36	31	22	55·0	31	28·2	22	10	
XI.	Borrowdale (Seathwaite).....	13·54	+ 2·82	2·23	19	18	...	...	...	...	...	
XI.	Abercarn .....	8·47	...	1·36	25	13	...	...	...	...	...	
"	Haverfordwest .....	5·72	+ ·67	1·25	11	15	51·9	16	17·5	3	2	
"	Rhayader (Cefnfaes).....	...	...	...	...	...	...	...	...	...	...	
"	Llandudno... ..	3·81	+ 1·27	·72	27	18	57·8	16	26·7	10	8	
XII.	Dumfries .....	3·64	+ ·96	·58	18	15	52·0	16	24·5	4	11	
"	Hawick (Silverbut Hall) ...	4·00	...	1·18	31	23	...	...	...	...	14	
XIV.	Ayr (Auchendrane House) ...	5·63	+ 1·11	1·20	24	17	55·0	14	22·0	1, 4	11	
XV.	Castle Toward .....	9·31	+ 3·02	1·52	25	19	52·0	16	25·0	22	12	
XVI.	Leven (Nookton) .....	3·68	+ ·71	·85	31	18	52·0	14	23·0	21	10	
"	Stirling (Deanston) .....	8·37	+ 3·65	1·48	24	23	52·2	17	18·0	21	12	
"	Logierait .....	5·35	...	1·20	31	19	...	...	...	...	...	
XVII.	Ballater .....	4·09	...	·92	24	20	52·8	17	9·0	24	17	
"	Aberdeen .....	2·94	...	·60	18	18	53·2	14	22·0	21	10	
XVIII.	Inverness (Culloden) .....	5·58	...	2·64	31	...	50·0	14	24·4	4	12	
"	Fort William .....	18·69	...	2·81	30	20	...	...	...	...	...	
"	Portree .....	12·82	+ ·27	2·40	24	14	53·0	16	25·0	23	10	
"	Loch Broom .....	10·02	...	1·85	30	20	...	...	...	...	...	
XIX.	Helmsdale .....	5·72	...	1·17	30	18	...	...	...	...	...	
"	Sandwick .....	4·50	+ 1·21	·61	29	21	51·0	17	28·2	5	12	
XX.	Cork .....	6·82	...	1·40	21	20	...	...	...	...	...	
"	Waterford .....	5·52	+ ·66	1·72	10	21	55·0	27	28·0	4	6	
"	Killaloe .....	3·93	+ ·93	·40	24	18	53·0	31	22·0	4	10	
XXI.	Portarlinton .....	2·25	+ 1·76	·31	11	22	51·5	13	22·0	3	12	
"	Monkstown .....	3·76	+ ·37	·93	10	20	58·3	16	26·5	4	7	
XXII.	Galway .....	5·29	...	1·08	31	21	54·0	17	21·0	3, 4	11	
"	Bunninadden (Doo Castle) ...	5·11	...	·53	31	17	51·0	31	17·0	4	12	
XXIII.	Bawnboy (Owendoon) .....	6·65	...	·93	10	21	54·0	13‡	25·0	2, 3, 4	6	
"	Waringstown .....	2·81	...	·52	24	19	55·0	16	21·0	4	12	
"	Strabane (Leckpatrick) .....	4·66	...	·83	24	21	53·0	16	18·0	4	20	

\* And 31st. † And 17th. ‡ And 14th & 16th. || And 24th.

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

## METEOROLOGICAL NOTES ON THE MONTH.

[A few alterations will be noticed in the stations whence the monthly returns are published in the preceding table. The causes have been twofold—the death of observers and our desire, as far as possible, to exclude all stations which do not possess the returns of the six years whereof the averages are taken as standards of comparison. We may here, perhaps, tender our thanks for the promptitude and care with which the returns are forwarded to us, from which the tables and following remarks are formed. A corrected list of the latitude and longitude of the stations, and height of the gauges, shall appear next month.—ED.]

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

## ENGLAND.

**LINTON PARK.**—First twelve days frosty, with S on ground; remainder mostly wet and dirty. Fog on 12th, 15th and 28th. High winds on 13th and 18th. Bar. very unsteady; max. at noon on 29th; min. on 22nd.

**SELBORNE.**—Bar. and ther. very unsteady; on the whole a tempestuous month.

**BANBURY.**—Frequent S and high winds.

**CULFORD.**—S every day in the first week; the latter part of the month very mild, but with high winds, chiefly from the S.W. Gales on the 18th, 24th, and 31st.

**BODMIN.**—Gales on 18th, 23rd and 31st.

**CIRENCESTER.**—From 1st to 10th thick serene weather, sun and moon scarcely seen. Rain, sleet and snow on 11th; trees cased thickly in ice, which melted slowly in a S. wind for the first 24 hours, but all disappeared by 5 p.m. on 12th. Gorgeous sunrise on 24th; fresh cold wind, R commencing at 8 p.m. Wind chiefly N.E. to E. for first 10 days, then S. to S.W. to the 20th; fresh to a gale on 31st. Aconites and snowdrops show bloom; the quiet weather from the middle of December broke up on the 11th of January; an extraordinary rainfall with wind continued to the end of the month; the water rose rapidly in wells; the valley wells sunk in a gravel bed rose 2 ft. 10 in.; in a deep well on the hill, 100 ft. deep, the water rose 17 ft. 6 in., being nearly to its maximum winter height.

**HAUGHTON HALL, SHIFFNAL.**—Exceedingly variable in temp.; cold E. and N. and S.E. winds. Gorgeous sunset on 31st; a severe S storm commenced at 10 p.m., and lasted with little intermission till 5.30 p.m. on 1st of February. Wind W.N.W. Aconites up on 23rd; snowdrops on 27th; throstles begin to sing on 30th.

**ORLETON.**—Great wind on night of 31st. The first half of the month very cold, and remarkably cloudy from 3rd to 15th; very changeable afterwards, but generally warm, with much R and wind. Bar. very low on 18th, 19th, and 22nd. Violent winds on the 14th, 18th, 24th, and 31st.

**WIGSTON.**—Temp. very variable.

**BOSTON.**—Great fluctuations in the barometric pressure; remarkable depression on the 18th, when it fell as low as 28.878 corrected; temp. was low to the 12th; from then to the 19th it was much milder; from 19th to 25th the weather was cold and stormy, and during the last week the temp. was much higher, although the atmospheric disturbances were very great. Severe gales on 18th, 24th and 31st. L on 17th.

**GAINSBOROUGH.**—Weather unsettled throughout the month. Snow, rain, drizzle and fog, with an occasional fine day, were the characteristics of the month.

**DERBY.**—A dull, unpleasant month; very little S, and not one fine crispy day. The month ended with a gale of unusual force and duration.

**ARNcliffe.**—TS at 7 a.m. on 15th.

**NORTH SHIELDS.**—Dull, cloudy month. Plants in flower on 1st January: chrysanthemum, yarrow, pansy, stock, and wallflower; middle of month, furze

in bloom, polianthus in flower, Christmas rose, and white rock cress ; yellow primrose on 23rd, and lilac primrose on 28th.

SEATHWAITE.—Six days on which the fall exceeded an inch, though the total fall was nearly three inches below the average.

# W A L E S.

HAVERFORDWEST.—January commenced with great cold and severe frosts, which lasted to the 11th ; from that date to the end of the month stormy, wet and wild. Severe storms on the 18th, 19th and 31st.

ABERCARN.—Severe weather, cold and frosty, from the 1st to the 11th ; afterwards wet and tempestuous.

# S C O T L A N D.

DUMFRIES.—The first ten days frosty ; from 11th to 19th wet and stormy ; then four days frosty and fine ; the last eight days very stormy and wet. Violent gales on 18th, 24th and 31st. Snowdrops in bloom on 26th.

SILVERBUT HALL.—Heavy gales from the west in the middle and latter end of the month. TS on the night of the 15th ; dreadful hurricane, accompanied with H, S, and R on the 24th. Beautiful fleecy-like sky on 26th ; lunar rainbow on the morning of the 30th ; rivers overflowing on 31st.

AUCHENDRANE.—Generally it may be said that the mean bar. of this January is above the mean of the same month for the last three years, but the temp. is below the mean. In force of wind, however, this January has been more stormy than its predecessors. On the 18th a severe equatorial gale prevailed with great force ; also on the 24th ; and on the 31st a third began, and continued into February with great violence and heavy rainfall.

NOOKTON.—With the exception of 19th to 23rd, and 26th to 28th, the month was a continuation of storms of wind, and with little R to the 30th ; light R on 30th ; heavy during the night and 31st.

DEANSTON.—First part of the month dry, but very damp and dull ; after the 10th much R and heavy storms, but little S and frost. Bar. 28·92 on 14th ; gale of wind with S showers ; bar. 28·30 on 18th ; gale in London ; wet here, though not much wind ; bar. 29·0 on 24th ; very heavy gale from S., with S, sleet and R ; 2,500 trees uprooted at Lanrick Castle ; great floods in river on 31st ; none so heavy since 1834.

LOGIERAIT.—Stormy month ; with one exception the greatest rainfall in any one month for the last three years ; several heavy gales ; severe storm on 24th ; intense frost some days preceding ; month closed with heavy R, a low bar. and high temp. ; on 1st February the Tay was more swollen than it has been for 21 years previously.

BALLATER.—A month of very unsettled weather ; the range of temp. 43°, and bar. 2 inches ; very violent gale, with blinding S drift on 24th, merging into sleet and R towards night ; the month closed with a low bar, cloudy and wet, with a fresh westerly breeze.

ABERDEEN.—A month of very unsteady weather, with remarkable oscillations of bar. ; the remarkably low bar. of 18th (28·32) was attended by no gale, only a fall of 0·60 of R ; hurricane of 24th not so disastrous as either that of February 13th, 1864, or October 3rd, 1860, but scarcely less in pressure. Dee down in a spate on 1st February, 6 ft. above the average depth, probably heavy R in the hilly country on 31st January. L on 14th to 17th, and 27th. Auroræ on 13th, 19th, 23rd to 25th, and 29th.

CULLODEN.—L on 15th, 16th, 17th, and 29th ; aurora on 21st ; gales on 24th ; H and R all day on 31st, and boisterous weather on 25th and 30th.

ROSSE PARSONAGE.—The wettest month since observations were commenced here ; it began with clear frosty weather, but a change came before the month was half over, and the latter part was unprecedented for wind and R. In October last year the fact was recorded that the 26th of that month was the wettest day remembered, 2·57 in. fell ; in this January that amount was exceeded on the 30th, when 2·81 in. fell, and also on the 31st, when 2·67 in. fell, and upwards of 2 in. fell on 16th and 24th ; the total fall of the month 18·69, against 5·84 in

1867, 14·19 in 1866, and 9·18 in 1865. The hurricane of the 24th was frightful, and the last night of the month was very violent. TS on 14th, 15th, and 16th.

PORTREE.—The first ten days fine, clear and frosty, from which time to the end of the month it has been very stormy, S, sleet and H, and almost continual gales.

LOCH BROOM.—The beginning of the month was all that could be desired; until the 13th it was beautiful; from that date until the 18th it was stormy and wet; thence to the 23rd very fine, but the last nine days are not to be forgotten, and such days as the 24th and 25th, as well as the last three days of the month, are not in the memory of any living man; on five days we had more than 1 in., and the total fall for the month was the greatest I have ever recorded.

SANDWICK.—Auroræ on 13th and 23rd; TS on 14th, 15th, and 16th. January has been wetter and rather colder than the mean; the first 11 days, also with the last nine days of December, were particularly fine, dry, and moderate; during the last eight days there was a succession of gales; that of the 24th was particularly violent, blowing about 70 miles an hour from 10 a.m. till 3 p.m.; ground white with S on 19th and 20th.

#### IRELAND.

KILLALOE.—Frequent storms during the month.

MONKSTOWN.—This month has been a very wild one, and for a long time we have not experienced such a constant succession of fearful gales; on the 13th a stiff gale, which increased to a perfect hurricane from the W. on the morning of the 14th; again on 18th very wild at 9 a.m., wind S.; it gradually increased until 2 p.m., when it was blowing a fearful storm, such as we have not had for a long time. The bar. fell from 29·562 at 11.30 p.m. on 17th to 28·420 at 12.15 p.m. on 18th; this was the lowest point reached; at 9 a.m. on 18th it was alling at the rate of 100 per hour; so severe was the gale, that the mail steamer which usually leaves Holyhead at two p.m., was detained till about 6 p.m. On the 24th and 31st two more almost equally severe gales.

GALWAY.—L on 17th and 24th. Heavy storms prevalent during the month.

DOO CASTLE.—Hard frosts to the 10th, with very fine sunny weather; remainder, a few days excepted, wet, cold, and stormy; TS on night of 13th and morning of 17th; strong gales on 18th and 31st, latter culminating at night. Bar. lowest I have ever noticed on morning of 18th; several trees snapped on this day; in fact two-thirds of this month well deserves the name of tempestuous.

OWENDOON.—The long continued fine weather broke up on the 10th, with a fall of ·93, from which date every day, with the exception of the 22nd, has been wet. Gale at noon on 18th; bar. fell to 28·24.

WARINGTOWN.—The early part of the month very fine and unusually dry, so much so that water was scarce in some places. In the latter half we experienced a succession of violent gales, exceeding anything since 1839, though from their direction they did not do as much damage here as that memorable storm. On the 18th, at 1.30 p.m., the bar. fell to 28·202 (uncorrected), and though it never read so low again, the gales of the 24th and 31st were little less severe. L on 14th.

LECKPATRICK.—After nine days of frost at beginning of month, there was very stormy and wet weather; from 19th to 27th hard frost, which suddenly came to an end with a gale from S.W.; a perfect hurricane on 31st, trees blown down, &c. Range of bar. during the month nearly two inches.

#### LATEST INTELLIGENCE.

A violent gale occurred on February 1st, concerning which we purpose giving a few particulars in our next. Observers will oblige by communicating observations for January 31st, and February 1st & 2nd.

We are glad to see by the *Times* that the Senatus Academicus of St. Andrew's have conferred the degree of LL.D. on our esteemed Orcadian correspondent, the Rev. Charles Clouston, of Sandwick, in recognition of his valuable contributions to meteorology.