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MONTHLY
METEOROLOGICAL MAGAZINE.

CCC.]

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OUR THREE HUNDREDTH NUMBER.

To have been enabled to edit every one of three hundred consecutive monthly numbers is not given to many, and, looking back over the work of a quarter of a century, a feeling of thankfulness is naturally predominant.

We lay no claim to brilliancy or to financial success, or to a large circulation; but we are conscious of the friendliness of nearly all the leaders of Meteorological progress in both hemispheres. Perhaps because it is so small, but, be the reason what it may, we rejoice to know that the *Meteorological Magazine* has the highest honour which a book can have—that of being read. We know that this is so, because when we make a mistake (and of course the Editorial “we” is fallible), whether in dealing with Russia, America, or our Australian colonies, the very next mail is sure to tell us of it; and we rejoice that this is the case, for our whole aim has ever been to help forward the science which we love, and the best way to do that is to stamp out error wherever it can be found.

The 300th number tempts us much to draw up a resumé of the progress of the quarter of a century; but the temptation must be resisted, for irrespective of the impossibility of pronouncing judgment on the mass of facts and opinions contained in the 25 volumes, time and space are both wanting.

We have naturally had before us the question of preparing a general index. We believe that it would be very useful, but how the time and cost of preparing and printing it could be provided is not evident.

THE FROST OF 1890-91.

WE are very glad to announce that this subject will be brought before the Fellows of the Royal Meteorological Society by a paper by a member of its Council, Mr. Charles Harding. Therefore, in accordance with our usual hatred of duplicate work, we shall here offer only some very general remarks, and shall pass on to Mr. Harding the mass of data, with which we have been favoured.

In the first place, as regards intensity. At Camden Square, the lowest was, on December 22nd, on Glaisher $14^{\circ}\cdot 9$, in Stevenson $17^{\circ}\cdot 3$. In 1860 and in 1867 the min. on Glaisher fell to $6^{\circ}\cdot 7$, therefore the intensity at that station has not been excessive on the present occasion. Reference to the table for January, 1867, in the *Meteorological Magazine* will show that 13 stations (just half of the whole number reporting) had minima of 10° or less. Reference to the table in the present number gives only 7 such stations, and they are but one-fifth instead of half of all those reporting.

As regards snow, we have had much less than in 1881. Therefore there is nothing very exceptional either in the intensity of the frost, or the depth of the snow.

But there has been one very unusual feature—the persistency of low temperature.

We do not assume that we have looked up all the cold periods, or that the following notes are perfect, but offer them *ad interim* and *quant val.* They are, of course, almost all taken from Mr. Glaisher's tables.

MEAN TEMP. AT GREENWICH BELOW 32° .

		Consecutive days.
1814.	January, from 1 to 26, both inclusive	26
1823.	January, from 9 to 26	18
1838.	January, from 8 to 21	14
1855.	January and February ; from January 17 to 24, from January 27 to February 2, and from February 7 to 23	17
1860.	December, from 18 to 29	12
1866.	December { From December 31 to January 5 ; and from	
1867.	January { January 12 to 22	11
1870.	December { From December 21 to January 4.....	15
1871.	January {	
1881.	January, from 12 to 27.....	16
1890.	December { From December 10 to January 12, with the exception of December 26th and of January	
1891.	January { 1 and 4, on which days the mean temp. ex- ceeded 32° by $0^{\circ}\cdot 9$, $1^{\circ}\cdot 0$ and $3^{\circ}\cdot 0$ respec- tively. If these days be ignored, the total length of the frost would become.....	33

THERMOMETERS.

To the Editor of the Meteorological Magazine.

SIR,—In a note attached to a paragraph from the *Journal of Horticulture* in the December issue of your Magazine, reference is made to the doubtful accuracy of thermometers in gardens. I suspect

many are inaccurate. Several years ago, when I had charge of the gardens at Branston Hall, Lincoln, the present proprietor, A. S. Leslie Melville, Esq., induced me by his example, to take interest in meteorological observations. I found there nine thermometers in use, and had an opportunity of having them tested. Only one was correct. Some of the others were from two to five degrees too high, varying in different parts of the scale. A short time ago a Surrey gardener told me his thermometer registered 27° of frost (5° on the scale) and he had left the indicator in position to "show how cold it had been." Having a suspicion that something was wrong I made a journey to the garden in question. There, sure enough, was the indicator at 5° , the spirit then registering 34° . I particularly drew the attention of the gardener to that fact, because I saw what he had overlooked, some of the spirit towards the top of the tube. A few sharp jerks lowered it into position, and instead of the instrument registering 34° it registered a trifle more than 38° . He then saw that his "27 degrees of frost" ought to have been something less than "23 degrees," a little more than 9° above zero, instead of 5° . The frost, however, must have been unusually severe in Surrey, as at the Royal Horticultural Society's meeting, on December 9th, not only were aucubas shown blackened and soft, but leaves of the much hardier—ivy and rhododendron—were in a similar condition.

On asking for a shilling thermometer in an optician's shop in London, one was handed to me out of the drawer. I placed it on the counter and asked for another, then for a second and a third, and on seeing they all differed, the attendant willingly handed out more. Out of twenty-five, five were uniform, and one of these was chosen. I gave it to a neighbour for his little greenhouse, and it answers its purpose; but whether it is accurate or not I am not able to say, though it is probably nearer being correct than many are on which reports of frost are founded.

J. WRIGHT.

171, Fleet Street, London.

EARLY METEOROLOGY.

To the Editor of the Meteorological Magazine.

SIR,—You have dealt so often in the *Meteorological Magazine* with Pre-Instrumental Meteorology, that I am sure to awake your interest, and perhaps that of many of your readers, if I call your attention to the oldest regular record of weather of which I am aware.

Till now I was of the opinion that in Italy might be found the beginning of continuous weather observations (XV. century), without being able to say who first made such observations, only because the state of learning was then much higher in Italy than in all other European countries; and for the reason that more than one century later almost all meteorological instruments were invented in that country. But now I suppose this primacy is to Old England.

Reading in an early volume of the "Philosophical Transactions," I found in a paper published by Robert Plot, of Oxford (Number 169, 1685, March 23rd, page [931]), the following most interesting passage, which seems to be quite overlooked or forgotten :—

"The industrious *Walter Merle*, Fellow of *Merton Coll.* . . , observed the weather here at *Oxford* every day of the month, seven years together, viz., from *Jan.*, 1337, to *Jan.*, 1344; the MS. copy of which *Observations* are yet remaining in the *Bodleian Library*."

I suppose that it will be easy for you to ascertain if that MS. is still remaining there. If it is still existing, as I hope, efforts should be made by all means to have it published *in extenso*. It would be, without doubt, the most important historic document of meteorological observations. Tycho Brahe's *Meteorologiske Dagbog*, embracing the years 1582 till 1597, has been published by the Danish Academy of Sciences; how much more interesting would it be to have published observations made two centuries and a half earlier?

I remain, Sir, faithfully yours,

GUSTAVUS HELLMANN.

Berlin, December 9th, 1890.

[We tried to trace this MS. many years ago and failed. An Oxford friend has promised to make a fresh search in the course of a month, and we shall be happy to report the result.—ED.]

HAIL INSURANCE.

[Usually questions in which money is an essential feature are keenly debated, but it does not seem to be so with regard to the above. The only local notice which we have yet seen was a leader in the *Hunts County Guardian*; the writer seems to think that there is no justification for the extra charge, for he quotes the last sentence of our article introducing it by the following confirmatory words, "The Editor [of the *Met. Mag.*] comes to what appears to be a common-sense solution of the problem." If there existed any local impression that hailstorms in that district were extra frequent or extra violent, surely the leader writer of the county paper would know of it.

On the other hand we are very glad to have received the following letters, which may be regarded as evidence on the other side. That from the Secretary of the Insurance Company is most important, and we are much indebted to him for it. Unfortunately, it leaves us in as great a meteorological puzzle as ever; we thought that the injury was due to storms of exceptional violence; it appears that it is their exceptional frequency which creates the increased risk, but to what is this extra frequency due? After Mr. Vickers' statement we are not free to question the fact, although, as stated above, it does not seem to be known to the Editor of the local paper. But we have not the least wish to pry into the affairs of any company, and therefore should have preferred a statement of the percentages of loss in and outside the radius—or the ratio of one to

the other—either would give the data which we, as meteorologists, require, but would (fortunately) not give the slightest clue to the amount of business done by any company. Mr. Vickers may rest assured that we have no intention of trying to float a company, but we do intend to try to find out why hailstorms do twice as much damage in that part of the country as anywhere else.

As regards the second letter, bad as the storm was, it is only stated to have extended over $\frac{3}{4}$ mile by 3 miles; that is only about two square miles out of the 452 charged double, or less than $\frac{1}{2}$ per cent. We hope that the subject will be further elucidated.—ED.]

To the Editor of the Meteorological Magazine.

SIR,—Our attention has been drawn to the article on “Hail Insurance” in your November issue; and I beg to suggest that it is calculated to give—as it is evidently written under—a wrong impression. The article says, “Fourteen summers have passed, we have heard of no *exceptional storms* in the district singled out for double charges.” This, and one or two other expressions, seem to denote the idea that specially severe visitations are the cause of the extra rate in the Somersham radius. Such is not the case, however. It is simply that the district is peculiarly liable to hail storms.

While there have, perhaps, been no *peculiarly* disastrous hail storms in the Somersham radius during the period you mention—fourteen years—yet it would be erroneous to suppose that those which have occurred have been so slight as to cause no damage.

We have—since we derive a considerable amount of business from the area named—been at some trouble to ascertain the facts, so far as our experience goes, and the result of our investigations shows that but a poor prospect would await a “company of their own,” if the farmers of the neighbourhood adopted your suggestion, and formed one.

There has been a total profit, during the whole period, of about £500, and this is, of course, with the surcharge.—Yours faithfully,

B. VICKERS, *Secretary.*

The Midland Counties Insurance Co., Lincoln.

December 31st, 1890.

SIR,—I have just been reading in the *Meteorological Magazine* for November, the article on “Hail Insurance.” There was a very serious hailstorm about 1878, at Sawtry (which, as far as I can make out from the map, is just within 12 miles of Somersham) and extending in a narrow strip about three-quarters of a mile broad for two or three miles at least from Sawtry, in the direction of Somersham.

It occurred one Sunday in August, and the harvest was to commence generally in that district the next day; but on the land over which it passed no harvest was ever reaped, for the hail was so violent that it threshed the corn, and cut the straw to shreds, the root crops were also quite destroyed. I visited the place soon after and it was quite desolate, all the leaves were cut off the trees or

blackened on them, and the bark of the young shoots was cut and bruised. One farmer told me that he lost £1,700 worth of crops, and that he had not insured on account of the double rate. I did not see the storm myself, but a friend (since dead) told me that he measured several stones and found them 6 in. round, and that several tiles were broken on his house. All his poultry exposed to the storm were killed. I forget what year it happened, but, if it were of any use, fuller particulars could no doubt be obtained from persons living in the place.—Yours faithfully,

GEORGE KNOWLES.

Syrencot, Figheldean, Amesbury, S.O., Dec. 9th.

ROYAL METEOROLOGICAL SOCIETY.

The usual monthly meeting of this Society was held on Wednesday evening, December 17th, at the Institution of Civil Engineers, 25, Great George Street, Westminster; Mr. H. F. Blanford, F.R.S., Vice-president, in the chair. Dr. T. Fowler, Mr. A. Greg, and Mr. H. Woolcock, C.E., were elected Fellows of the Society.

The following papers were read :—

1. "Note on a Lightning Stroke, presenting some features of interest," by Mr. R. H. Scott, F.R.S. On January 5th, a house near Ballyglass, Co. Mayo, was struck by lightning, and some amount of damage done. A peculiar occurrence happened to a basket of eggs lying on the floor of one of the rooms. The shells were shattered so that they fell off when the eggs were put in boiling water, but the inner membrane was not broken. The eggs tasted quite sweet. The owner's account is that he boiled a few eggs from the top of the basket, the rest were "made into a mummy," "the lower ones all flattened, but not broken."

2. "Note on the effect of Lightning on a dwelling house," by Mr. A. Brewin, F.R.Met.Soc. This is an account of the damage done to the author's house at Twickenham, on September 23rd, 1890.

3. "Wind Systems and Trade Routes between the Cape of Good Hope and Australia," by Capt. M. W. C. Hepworth, F.R.Met.Soc. The author is of opinion that the best parallel on which commanders of vessels, navigating the South Indian Ocean between the Cape of Good Hope and the Australian Colonies, should run down the longitude is between the 41st and 42nd parallels during the winter months, and between the 45th and 46th parallels during the summer months.

4. "Report on the Phenological Observations for 1890," by Mr. E. Mawley, F.R.Met.Soc. Taking the year ending August, the weather of the autumn, winter, and spring, and of the first summer month, could scarcely have been more favourable for vegetation; while that of July and August proved altogether as unpropitious.

5. "The Climate of Hong-kong," by Dr. W. Doberck, F.R.Met. Soc. This is a discussion of the meteorological results at the Hong-kong Observatory, and at the Victoria Peak, during the five years, 1884-88.

REVIEW.

Klimaschwankungen seit 1700 nebst Bemerkungen über die Klimaschwankungen der Diluvialzeit. Von Dr. EDUARD BRÜCKNER, a.o., Professor der Geographie an der Universität zu Bern. [*Geographische Abhandlungen herausgegeben von Prof. Dr. ALBRECHT PENCK, Band IV., Heft 2.*] Wien, E. Hölzel, 1890. 8vo. viii.—324 pages, 13 diagrams, and one plate.

(Continued from our last.)

In concluding our notice of this important chapter, we give a tabular summary of the author's results for the whole globe. It should be mentioned that all his values are given for lustra, *i.e.*, five-year periods, *e.g.*, 1871-5 ; 1876-80, &c.; and he finds approximations to these periods in all parts of the world, although sometimes a dry period in one locality may last on while a wet one has set in elsewhere.

DRY PERIODS.			WET PERIODS.		
1716-1735	...	20 years.	1691-1715	.....	25 years.
1756-1770	.....	15 "	1736-1755	.....	20 "
1781-1805	.....	25 "	1771-1780	.....	10 "
1826-1840	.....	15 "	1806-1825	.....	20 "
1856-1870	.....	15 "	1841-1855	.....	15 "
			1871-1885	.....	15 "

The sixth chapter deals with variations of barometric pressure, and is largely based on Dr. Hann's work, published as an earlier volume of the same series; the seventh, with temperature; and the eighth, with the closing and opening of rivers, the time of vintage (based chiefly on Angot's work), the occurrence of severe winters, based chiefly on Pilgram's work* (which seems to be scarce). At the end of this chapter the author becomes definite as to the periodicity of the oscillations of climate, and fixes the average period to a tenth part of a year with a variability of about eight months, "eine Periode 34.8 ± 0.7 Jahren." Important, even extraordinary, as is the mass of data which the author has collected, we think that he is very courageous to express so definite an opinion.

We are too anxious to assist all who think that they can find a clue to the laws of weather changes to be hard upon anyone, and we are neither friends nor foes to sunspot theories, but we cannot help noting that 34.8 , divided by 3 , gives 11.6 , which does not differ much from a value one has heard of before.

However, be the verdict on the 34.8 years what it may, it is certain that by compiling this important work Dr. Brückner has done good service, and we regret that we know of no English publisher who would venture upon such a publication in our own language. The nearest that we have had to it, *Man and Nature*, by the Hon. G. P. Marsh, must, however, have been a success, as we have three editions of it.

* *Anton Pilgrams Untersuchungen über das Wahrscheinliche der Wetterkunde durch vielfährige Beobachtungen.* Zwei abtheilungen. Wien, 1788. 4to.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, JUNE, 1890.

STATIONS. (Those in <i>italics</i> are South of the Equator.)	Absolute.				Average.				Absolute.		Total Rain.		Aver. Cloud.
	Maximum.		Minimum.		Max.	Min.	Dew Point.	Humidity.	Max. in Sun.	Min. on Grass.	Depth.	Days.	
	Temp.	Date.	Temp.	Date.									
	°		°		°	°	°	0-100	°	°	inches		
England, London	78·2	25	40·8	1	69·0	50·9	49·3	73	124·8	36·9	2·82	17	6·5
Malta.....	86·2	25	58·1	3	79·1	63·4	61·4	74	140·2	49·8	·08	1	1·3
<i>Cape of Good Hope</i> ...	...	...	...	...	...	...	...	...	...	...	...	...	...
<i>Mauritius</i>	77·0	22	56·6	14	74·1	63·5	60·3	77	127·7	45·6	1·52	16	5·1
Calcutta.....	95·7	1	71·4	6	89·7	78·0	78·9	84	156·3	70·9	13·40	21	6·9
Bombay.....	90·1	8	74·5	19	85·4	77·6	76·8	85	141·0	72·0	24·55	28	9·2
Ceylon, Colombo	87·7	9	73·8	17	85·4	77·9	73·8	78	146·0	72·0	1·87	15	7·7
<i>Melbourne</i>	66·0	5	38·0	30	58·7	48·0	47·8	83	115·0	31·9	1·71	13	7·4
<i>Adelaide</i>	67·8	7	39·6	29	61·3	49·9	49·0	79	130·3	32·0	4·22	17	6·6
<i>Wellington</i>	63·0	15	37·3	28	56·6	45·1	43·6	77	105·0	30·0	2·28	18	4·0
<i>Auckland</i>	65·0	27	44·0	23	60·5	50·9	48·9	79	116·0	35·0	3·74	16	6·7
Jamaica, Kingston.....	91·6	13	70·3	18	89·1	73·0	69·8	68	...	...	·44	...	...
Trinidad	89·0	19	65·0	30	85·5	70·0	70·7	77	156·0	62·0	9·68	22	...
Toronto	86·6	25	42·1	8	...	...	57·2	75	...	...	4·87	13	5·0
New Brunswick, Fredericton	83·2	17	37·5	12	...	...	49·0	73	...	...	5·14	17	7·0
Manitoba, Winnipeg ...	96·5	26	36·3	7	...	...	...	...	...	...	2·15	10	5·0
British Columbia, Victoria	74·0	5, 6	36·0	13	...	...	...	...	...	...	2·10	12	...

REMARKS.

MALTA.—Mean temp. 70°·0 ; mean hourly velocity of wind 9·0 miles. Sea temp. rose from 72°·0 to 77°·0. Thunderstorm on 5th. J. SCOLES.

Mauritius.—Mean temp. of air 1°·8 below, mean dew point 0°·2 below, and rainfall ·36 in. below their respective averages. Mean hourly velocity of wind 10·9 miles, or 0·6 below average; extremes 25·8 on 26th, and 1·7 on 6th; prevailing direction S.E. Unusual skyglows before and after sunrise throughout. C. MELDRUM, F.R.S.

Melbourne.—Mean temp. of air 3°·4, of dew point 4°·5, humidity 3, amount of cloud 0·8, above their respective averages. R ·27 in. below average. Prevailing winds N., strong on 8 days. Heavy dew on 8 days. Fog on 6 days. Lightning on the 12th. R. L. J. ELLERY, F.R.S.

Adelaide.—The mean pressure was very low, 0·116 in. below the average; the mean pressure in June has been only four times lower during 33 years. The mean temp. 55°·6 was 2° above the average; the nights particularly being warm; the mean min. (49°·9) being 3°·1 above the average. Dew was registered on 14 nights, but there was an entire absence of frost. Although the number of rainy days was just the average, the total precipitation was 1·43 in. above the average. C. TODD, F.R.S.

Wellington.—Generally showery, but some fine pleasant weather at intervals; the rainfall below the average. Prevailing winds S.E. and N.W., strong from latter quarter on 7th and 17th. Hail on 1st. Mean temp. 1°·8 above the average. Rainfall less than half the average. R. B. GORE.

Auckland.—Warm and mild for the season, the mean temp. being 2 degrees above the average, and the rainfall only about half the average. T. F. CHEESEMAN.

SUPPLEMENTARY TABLE OF RAINFALL,
 DECEMBER, 1890.

[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 Hall.	·68	XI.	Castle Malgwyn .....	...
„	Margate, Birchington...	·73	„	Builth(Llanwrtyd Wells)	1·42
„	Littlehampton	·68	„	Rhayader, Nantgwillt..	1·60
„	Hailsham	·48	„	Carno, Tybrith ...	1·03
„	Ryde, Thornbrough	·88	„	Corwen, Rhug	·84
„	Alton, Ashdell.....	·80	„	I. of Man, Douglas	2·68
III.	Oxford, Magdalen Col...	·55	XII.	Stoneykirk, Ardwell Ho.	2·64
„	Banbury, Bloxham	·58	„	New Galloway, Glenlee	1·80
„	Northampton	·55	„	Melrose, Abbey Gate...	1·36
„	Cambridge, Fulbourne..	·48	XIII.	N. Esk Res. [Penicuik]	2·55
„	Wisbech, Bank House..	·45	XIV.	Ballantrae, Glendrisaig	2·53
IV.	Southend	·57	„	Glasgow, Queen's Park.	1·04
„	Harlow, Sheering ...	·41	XV.	Islay, Gruinart School..	1·47
„	Rendlesham Hall	·59	XVI.	Dollar.....	2·32
„	Diss	·78	„	Balquhider, Stronvar..	1·43
„	Swaffham	·48	„	Coupar Angus Station..	1·77
V.	Salisbury, Alderbury...	1·01	„	Dunkeld, Inver Braan..	1·29
„	Warminster	1·83	„	Dalnaspidal H.R.S. ...	1·54
„	Bishop's Cannings	1·16	XVII.	Keith H.R.S.	1·80
„	Ashburton, Holne Vic...	4·80	„	Forres H.R.S.	·51
„	Hatherleigh, Winsford.	2·31	XVIII.	Fearn, Lower Pitkerrie.	·39
„	Lymouth, Glenthorpe.	2·58	„	Loch Shiel, Glenaladale	...
„	Probus, Lamellyn	4·57	„	N. Uist. Loch Maddy ...	1·56
„	Launceston, S. Petherwin	4·44	„	Invergarry	·65
„	Wincanton, Stowell Rec.	2·07	„	Aviemore H.R.S.	1·09
„	Taunton, Lydeard Ho...	...	„	Loch Ness, Drumnadrochit	·62
„	Wells, Westbury.....	1·51	XIX.	Lairg H.R.S.	·77
VI.	Bristol, Clifton	1·30	„	Scourie	1·73
„	Ross	1·15	„	Watten H.R.S.	1·21
„	Wem, Clive Vicarage ...	·64	XX.	Dunmanway, Coolkelure	7·51
„	Cheadle, The Heath Ho.	·79	„	Fermoy, Gas Works ...	2·23
„	Worcester, Diglis Lock	·80	„	Tipperary, Henry Street	2·73
„	Coventry, Coundon	·80	„	Limerick, Kilcornan ...	2·41
VII.	Ketton Hall [Stamford]	·51	„	Miltown Malbay.....	2·35
„	Grantham, Stainby	1·58	XXI.	Gorey, Courtown House	2·68
„	Horncastle, Bucknall ...	·68	„	Navan, Balrath .....	...
„	Worksop, Hodsock Priory	·60	„	Mullingar, Belvedere ...	·94
VIII.	Neston, Hinderton	·80	„	Athlone, Twyford	2·06
„	Knutsford, Heathsides ...	·61	„	Longford, Currygrane...	1·82
„	Lancaster, Southfield ...	·15	XXII.	Galway, Queen's Coll...	2·20
„	Broughton-in-Furness ...	·96	„	Clifden, Kylemore	4·39
IX.	Wakefield Prison	·77	„	Crossmolina, Enniscoe..	1·59
„	Ripon, Mickley	·58	„	Collooney, Markree Obs.	2·52
„	Scarborough, West Bank	·99	„	Ballinamore, Lawderdale	2·45
„	East Layton [Darlington]	·93	XXIII.	Warrenpoint	3·00
„	Middleton, Mickleton...	·83	„	Seaforde	2·46
X.	Haltwhistle, Unthank..	·70	„	Belfast, New Barnsley..	2·44
„	Shap, Copy Hill	·44	„	Bushmills, Dundarave...	1·74
XI.	Llanfrehfa Grange	1·56	„	Stewartstown	1·66
„	Llandovery	1·01	„	Buncrana	2·16

DECEMBER, 1890.

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. 1880-9	Greatest Fall in 24 hours.			Max.		Min.				
				Dpth	Date.		Deg.	Date	Deg	Date	In shade.	On grass.	
		inches	inches.	in.									
I.	London (Camden Square) ...	·68	— 1·39	·21	18	9	43·7	4	14·9	22	25	27	
II.	Maidstone (Hunton Court)...	·59	— 1·65	·20	20	5	...	...	...	...	...	...
III.	Strathfield Turgiss	·85	— 1·16	·25	18	10	43·9	5	7·5	22	24	27	
	Hitchin	·67	— 1·36	·18	18	10	44·0	4	5·0	21	26	...	
IV.	Winslow (Addington)	·62	— 1·83	·23	18	10	42·0	3,4	1·0	22	26	28	
	Bury St. Edmunds (Westley) ..	·78	— 1·46	·16	19	10	42·0	4	6·0	21	...	...
V.	Norwich (Cossey)	·51	— 1·72	·15	3	6	...	...	...	...	...	...
	Weymouth (Langton Herring) ..	1·63	— 1·47	·85	18	12	43·0	1,3	18·0	31	24	...	
"	Barnstaple	1·04	— 3·65	·45	1	7	45·0	4,5	21·0	31	...	...
"	Bodmin (Fore Street)	5·81	+ ·47	1·55	18	20	...	...	...	...	...	...
VI.	Stroud (Upfield)	1·08	— 1·37	·43	18	11	41·0	1,4	17·0	14	27	...	
	Church Stretton (Woolstaston) ..	·81	— 2·24	·13	25	16	44·5	1	17·0	20b	28	29	
"	Tenbury (Orleton)	1·32	— 1·05	·41	18	13	45·0	1	1·5	22	25	26	
VII.	Leicester (Barkby)	·49	— 1·65	·13	4	12	44·0	1	3·0	21	27	31	
"	Boston	·49	— 1·36	·20	26	4	44·0	4	12·0	21c	25	...	
"	Hesley Hall [Tickhill]	·53	— 1·45	·14	4	12	44·0	4	10·0	21	28	...	
VIII.	Manchester (Plymouth Grove) ..	·37	— 3·07	·33	19	2	45·0	1,4	10·0	19	21	30	
IX.	Wetherby (Ribston Hall) ...	·67	— 1·77	·23	18	5	...	...	...	...	...	...
"	Skipton (Arncliffe)	1·05	— 5·76	·18	24	10	48·0	2	19·0	13	17	...	
"	Hull (Pearson Park)	·86	— 1·41	·21	4	11	...	...	...	...	...	...
X.	North Shields	1·30	— 1·04	·28	25	13	50·0	1	...	...	...	...
	Borrowdale (Seathwaite)	1·21	— 13·60	·32	25	9	...	...	...	...	...	...
XI.	Cardiff (Ely) .....	...	...	...	...	...	...	...	...	...	...	...
"	Haverfordwest	2·51	— 2·48	·83	18	11	50·0	1	19·0	31	22	30	
"	Plinlimmon (Cwmsymlog) ...	·86	...	·40	1	5	...	...	...	...	...	...
"	Llandudno	1·31	— 1·65	·20	1a	11	...	...	...	...	...	...
XII.	Cargen [Dumfries]	·95	— 3·07	·56	2	4	51·8	1	18·0	14	25	...	
	Jedburgh (Sunnyside)	1·71	— ·49	·70	26	10	48·0	2	12·0	13d	16	...	
XIV.	Old Cumnock	1·71	— 3·36	1·20	2	7	53·0	1	17·0	20	26	...	
XV.	Lochgilhead (Kilmory)	1·53	— 5·84	·40	1	10	...	...	...	...	...	...
"	Oban (Craigvarren)	1·37	...	·61	1	7	52·0	1	26·6	19	7	...	
"	Mull (Quinish)	1·51	— 6·06	·43	1	10	...	...	...	...	...	...
XVI.	Loch Leven Sluices	2·70	— ·61	1·10	3	10	...	...	...	...	...	...
XVII.	Dundee (Eastern Necropolis) ..	2·20	+ ·12	·90	2	13	52·5	1	22·7	22	13	...	
	Braemar	·43	— 2·04	·09	4	14	51·8	1	16·0	21	24	29	
XVIII.	Aberdeen (Cranford)	3·02	...	·83	2	25	56·0	1	18·0	21	10	...	
	Strome Ferry	1·58	— 6·21	·37	1	13	...	...	...	...	...	...
"	Inverness (Culloden)	·55	— 1·38	...	...	...	55·0	1	23·0	7, 18	22	29	
XIX.	Dunrobin	·71	— 2·66	·29	26	7	56·0	1	25·0	18	13	...	
	S. Ronaldsay (Roeberry)	1·47	— 2·19	·19	27	18	53·0	1	31·0	19	2	...	
XX.	Cork (Blackrock)	3·64	— ·52	·81	18	13	52·0	1	25·0	16	13	...	
"	Dromore Castle	4·89	— 1·74	·80	11	13	57·0	21	25·0	30	...	...
"	Waterford (Brook Lodge) ...	3·62	— ·02	·82	18	14	51·0	1	24·0	31	13	...	
"	O'Briensbridge (Ross)	2·48	...	1·53	10	8	51·0	1	24·0	e	24	...	
XXI.	Carlow (Browne's Hill)	2·56	— ·56	·75	18	13	...	...	...	...	...	...
	Dublin (Fitz William Square) ..	1·86	— ·30	·60	2	11	53·9	1	24·1	21	8	23	
XXII.	Ballinasloe	1·89	— 1·53	·90	11	10	49·0	1	18·0	21c	26	...	
XXIII.	Waringstown	2·68	— ·36	1·30	2	17	54·0	1	22·0	21c	18	23	
"	Londonderry (Creggan Res.) ..	1·82	— 2·39	·98	18	14	...	...	...	...	...	...
"	Omagh (Edenfel)	2·01	— 1·67	·66	18	16	52·0	1	18·0	20	17	23	

a And 18, 22. b And 31. c And 22. d And 14. e frequently.

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

METEOROLOGICAL NOTES ON DECEMBER, 1890.

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

ENGLAND.

STRATHFIELD TURGISS.—A month of unprecedented severity. With the exception of the interval from the 3rd to the 6th, there was uninterrupted frost, the maximum on 14 days not reaching the freezing point, while on the 22nd, the minimum in the Stevenson stand dropped to 7°·5, and on the grass (the snow having been swept away) fell to 4°·5 (both thermometers being in exact working order, and Kew corrections applied). The snow was not heavy, the greatest fall yielding ·25 inch on the 18th.

ADDINGTON.—Remarkable for the small amount of R and the long-continued frost, (lasting, without a single break, from the 7th until the end) often of great severity. From the 13th until the end, the max. shade temp. was never above 32°. The coldest December recorded here.

BURY ST. EDMUNDS, WESTLEY.—The month was remarkable for the high and very steady bar., the variation in the last ten days not exceeding a tenth of an inch. It was also extremely cold, with very severe frosts and wind, chiefly from the east.

LANGTON HERRING.—An exceptionally cold month, the absolute max. being only 43°, while the previous lowest max in December was 50° in 1879. The lowest max. in January has been 48° in 1881, and in February, 48° in 1873. Comparison with other cold months shows :—

	MEANS.			
	9 a.m.		Min.	Max.
December, 1878 ...	33°·5	.....	29°·8	38°·3
January, 1879 ...	32°·8	.....	30°·1	36°·7
January, 1880 ...	33°·6	.....	31°·5	38°·0
January, 1881 ...	29°·9	.....	27°·8	36°·0
December, 1890 ...	31°·0	.....	29°·0	34°·5

The mean max. was 10°·1, the mean min. 7°·7, the mean at 9 a.m. 8°·9 below the average.

BODMIN, FORE STREET.—A very cold month, with more than the average R and exceedingly hard frost, especially in the last week. Very little snow, but high cold N.E. winds; one of the old fashioned Decembers, and the coldest for many years.

STROUD, UPFIELD.—The max. temp. in shade, was above 32°, on only 11 days.

WOOLSTASTON.—A very severe month. The frost, which commenced on the 3rd, continued throughout with only some occasional slight thaws of an hour or two duration, but no exceptionally low temperature, was reached. S fell on 10 days, but not very heavily. Mean temp., 29°·4.

ORLETON.—The coldest December recorded here; the mean temp. 29°·8, being 8°·5 below the average of 29 years. On 13 days the temp. never reached 32°, and the max. for the month, 45° on the 1st, is the lowest max. registered in any month. On the night of the 21st, the thermometer on the grass fell to —1°·7, the lowest reading since January 3rd, 1867. The Teme and the Severn were both frozen over on 22nd. Deep S on 18th and 23rd. Fine S on 8th, 25th, 26th, 27th, 30th and 31st.

LEICESTER, BARKBY.—Mean temp. of month 28°·7. Min. temp. for the 13th, 14th, 20th, 21st, 22nd, and 29th respectively, 12°, 13°, 5°, 3°, 8°, 10°.

MANCHESTER, PLYMOUTH GROVE.—Mean temp. 32°. Dense fog on the 14th, 15th, 20th, and 21st. On the 19th and 21st the grass min. fell to 5°. S on the 19th.

HULL, PEARSON PARK.—The weather during the month was generally overcast, often with mist or fogs and frost, more or less severe every night, except the 1st, 4th, 5th, 8th, 9th and 10th. Slight falls of H or S occasionally on and after the 15th. Winds very cold, generally easterly.

WALES.

HAVERFORDWEST.—The month commenced rainy and mild, but on the 4th the wind shifted to the N. and N.E.; temp. fell rapidly, and persistent frost prevailed to the end of the month; severe at the middle, and especially so in the last week, when the temp. was uniformly low day and night, and did not exceed 32° on seven days. The night temp. was rather low at times, but did not approach the severity of 1870, '74, '78 and '79 Decembers. The temperature was, however, much below the mean. Winds from the 8th to 24th chiefly N. and N.E., while in the last seven days it blew with great bitterness and force from the E.

SCOTLAND.

CARGEN.—The mean temp. of the month is 5°·3 below the average. Easterly winds (N.E., E. and S.E.) prevailed for 23 days, generally with more or less fog, only 25 hours of sunshine being recorded; while the average is 57; & the smallest recorded in December. On several occasions the barometer fluctuated more than half an inch in 24 hours, but produced little change in the general character of the weather.

JEDBURGH.—The weather was still though cold, and although the degree of frost was considerable, country work was not delayed.

OBAN.—Immediately after the 2nd fair and cold weather set in, which lasted to the close, and has been very beneficial to the farmers.

CULLODEN.—Continued frost during the whole month, without, however, either snow or fog. Weather otherwise pleasant. Very little R.

IRELAND.

CORK.—A cold raw and damp month. S at night on 30th, and most of the 31st, but it all disappeared in the night. Mean temp. 39°·3.

DROMORE.—The beginning of the month was wet, and it continued so till the last week, when easterly winds set in and it became bitterly cold, with a hard frost till the 31st, when there was a slight sprinkling of snow.

WATERFORD, BROOK LODGE.—A good deal of easterly wind during the month. Mean temp. 38°·5. H showers on the 11th. Gale from S.W. on the 18th. S on the 27th and 30th.

O'BRIENSBRIDGE, ROSS.—Sharp frosts very frequent, and the mean temp. for 24 hours often below 32°. Prevailing wind, N.E., and very bitter in the last week.

DUBLIN.—A very cold, dull, foggy month, with much cloud (7·6) and prevalent E. winds. Mean temp 39°·2, 2°·1 below the average. In December, 1878, the coldest in the 25 years ending 1889, the mean temp. was 32°·8. High winds on 10 days, gales on 2. Fog on 10 days; S or sleet on 3; H on 6 days. Very dry piercing E. winds, from 28th to 31st.

WARINGSTOWN.—Frost, sharp and pretty continuous, but not remarkable here.

EDENFEL.—The mild wet weather of November extended in a modified degree to the 7th of this month, when it gave place to a cold period, that occupied with but little intermission the rest of the month. On the 18th and 19th a considerable quantity of S fell, but except on the nights of 19th, 20th and 21st, during which the temp. on the surface of the S reached 13°, there was no continuance of severe frost.