SYMONS'S
MONTHLY
METEOROLOGICAL MAGAZINE.

CCCCVIII.] JANUARY, 1900. [PRICE FOURPENCE, or 5s. per ann. post free.

LOW BAROMETRIC PRESSURE ON DECEMBER 29TH, 1899.

WE do not intend to give a complete or an exhaustive note upon the above subject—but merely to place upon record the principal facts which have been reported to us. The responsibility as to accuracy must rest with the authors, except that where they have not corrected their readings for altitude we have done so approximately, and given the equivalents in [ ].

Camden Square, London.—Min. S.L. pressure 28·427 in. at 5 p.m.; the only lower pressures since 1858 have been: 1872, January 24th, 4.47 a.m., 28·332 in.; 1876, December 4th, 11 a.m., 28·364 in.; and 1886, December 9th, 4.45 a.m., 28·295 in. G. J. SYMONS.

Edith Road, Kensington.—Min. S.L. pressure 28·420 in. G. VON U. SEARLE.

Speldhurst, Tunbridge Wells.—Min. bar. 28·30 in. [S.L. = ? 28·46 in.] E. W. WINTON.

Worthing.—Min. S.L. pressure 28·526 in., at 4.30 p.m. C. KELLY, M.D.

Crowborough.—At 7 p.m. bar. only 27·805 in. [S.L. = ? 28·51 in.]. J. J. S. DRIBERG.

Kempsey, Bournemouth.—Min. S.L. pressure 28·49 in. at 3.15 p.m. E. L. M. COLVILE.

West Dean, Hants.—Min. S.L. pressure 28·389 in. E. WELLS.

Redheath, Rickmansworth.—Min. by open scale glycerine bar. 28·325 in., at 6.30 p.m., at 285 ft. above sea level. W. NEWALL.

Upton, Slough.—Min. by open scale glycerine bar. 28·23 in., at 5.30 p.m., at 97 ft. above sea level. RICHARD BENTLEY.

St. Giles, Oxford.—Bar. 28·35 in. at 9 p.m., lowest since December 8th, 1886. Miss E. M. TAWNEY.

Writtle, Chelmsford.—The record of a Richard barograph gave a min. of 28·45 in., at 6.30 p.m. MISS USBORNE.

Brundall, Norwich.—Bar. 28·50 in., at 7 p.m. A. W. PRESTON.

Statsford, Whitchurch, Tavistock.—Min. S.L. pressure 28·271 in., at 1.40 p.m. E. E. GLYDE.

North Cadbury.—Bar. lowest between 3.30 and 4 p.m. Aneroid read 28·34 in. H. A. BOYS.

Orchardleigh, Frome.—My two aneroids both reached their lowest point (27·80 and 28·20 in.) at 11 a.m. They then rose a little and fell again, but not so low as at 11 a.m. W. A. DUCKWORTH.

Hampton Lodge, Bristol.—At 8 p.m. the bar. read 27·97 in. [S.L. = ? 28·16 in.], at 11 p.m. it had risen 0·43 in. J. H. DIX.

The Graig, Ross.—Min. S.L. pressure 28·285 in., at 5.40 p.m.; the only lower pressures since 1871 have been, 1872, January 24th, 3.45 a.m., 28·283 in.; and 1876, December 4th, 8.50 a.m., 28·232 in. H. SOUTHALL.

Underdown, Ledbury.—Lowest observed reading, 8 p.m., 28·096 in. [S.L. = 28·336 in.] SPENCER H. BICKHAM.

Highfield, Shrewsbury.—The record of a Richard barograph gives a min. of 28·60 in., at 6 p.m. T. M. HOWELLS.

The Firs, Bentley Heath, Knowle, Warwickshire.—Min., by Negretti standard, Kew verified, 27·914 in., at 6 p.m., giving S.L. pressure of 28·303 in. F. W. NASH.

Hodsock Priory, Worksop.—Min. S.L. pressure 28·362 in., at 9 p.m. H. MELLISH.

Queen's Park, Bolton.—Min. S.L. pressure 28·38 in., at 9 p.m. Lowest since 8th December, 1886. W. W. MIDGLEY.

Downham Hall, Clitheroe.—The record of a Richard barograph gave min. of 28·10 in., at 8 p.m. RALPH ASSHETON.

Llandefaelogfach, Brecon.—Bar. fell to 27·80 in., unprecedented here. W. WILLIAMS.

Douglas, Isle of Man.—Min. bar. 28·33 in., at 2 p.m. H. STORY.

Riddell, Lilliesleaf, N.B.—Min. bar. 28·05 in., in afternoon. No gale. J. SPROT (Gen.)

Blacket Place, Edinburgh.—Min. pressure 28·456 in., at 9 p.m. R. C. MOSSMAN.

Longraigue, New Ross, Wexford.—Min. at 6 p.m., 27·96 in. [S.L. = ? 28·10 in.], 0·22 in. lower than previously observed. J. W. DEANE.

Ban-aboo, Ardcolm, Wexford.—Min. bar. 28·18 in. [S.L. = ? 28·11 in.] J. MAGRATH (Col.).

Fitzwilliam Square, Dublin.—Min. of bar. 28·33 in. J. W. MOORE, M.D.

The above notes appear to agree very well with the remarkable path of the depression shown on the *Daily Weather Report* of the Met. Office—viz.: first an easterly track along the south of Ireland, and then a sudden change to a northerly one over the Isle of Man. The min. seems to have been about 28·1 inches, and the time of progress that shown by the D.W.R.,—some of the record times are inconsistent, because the curve was so flat that it was difficult to determine precisely when the min. occurred.

ROYAL METEOROLOGICAL SOCIETY.

THE monthly meeting of this Society was held on Wednesday evening, December 20th, at the Institution of Civil Engineers, Mr. F. C. Bayard, LL.M., President, in the chair. The following candidates were duly elected Fellows:—A. F. Beaufort, c/o W. M.

Beaufort, 18, Piccadilly, W.; H. S. Burbery, Trent House, Cowes, Isle of Wight; C. J. P. Cave, Binsted, Cambridge; R. Cheyne, D.P.H., Edgefield, York Road, West Norwood; E. Henshall, Assoc.M.Inst. C.E., Woolacombe, N. Devon; H. Heywood, J.P., Witla Court, Cardiff; D. McDouall, Logan, Stranraer, Wigtonshire; H. C. L. Morris, M.D., Gothic Cottage, Bognor; H. V. Prigg, Assoc.M.Inst. C.E., 63, Craven Avenue, Plymouth; Lt.-General J. Sprot, Riddell, Lilliesleaf, Roxburghshire; F. Taylor, J.P., Ash Lawn, Heaton, Bolton; W. K. Wilkinson, jun., Middlewood, Clitheroe; A. Wilson, 4, Eaton Road, Ilkley.

The Climatic Conditions necessary for the Propagation and Spread of Plague.

By Mr. Baldwin Latham, C.E.

The author said that the bubonic plague was primarily due to a specific organism or microbe of infinitesimal size, so small that probably 250 millions of them would be required to cover a square inch of surface. Plague was infectious and contagious, and was greatly influenced by pestilential emanations from polluted and waterlogged soils. Plague was undoubtedly a disease of the poor, and most readily attacked those living on a low diet. The conditions which were conducive to the spread of plague were identical with those which gave rise to the escape of malaria from the ground. That the ground itself exercised an enormous influence upon plague was shown by the fact that, in all the epidemics, persons living on the ground floors suffered much more than those who lived in the higher storeys. If the temperature of the air increased beyond the temperature of the ground, so that its dew point was above the temperature of the ground, condensation instead of evaporation took place. To this increased high temperature might be due the sudden stoppage of plague after a certain high temperature had been reached. A sudden fall of temperature caused plague to arise; for, a fall of temperature meant that the temperature of the dew point must fall, and the tensional difference between a low dew point and a high ground temperature would at once lead to exhalations escaping in large quantities from the ground, leading to the liberation of the plague bacillus from the ground, accompanied with the exhalations necessary for its development.

Another paper on a remarkable dust haze which was experienced at Teneriffe, Canary Islands, on February 16th to 19th, 1898, was communicated by Dr. R. H. Scott, F.R.S. The haze during this period was so exceptionally dense that a steamer was two days and three nights on a voyage from Teneriffe to Las Palmas, a distance she usually covered in five hours. The Tintagel Castle, of the Donald Currie Line, was delayed for 30 hours, and the Roslin Castle, homeward bound, had the dust so thick that for 900 miles the sun and stars were obscured, and the ship was delayed two days.

REVIEWS.

Sur les ascensions dans l'atmosphère d'enregistreurs météorologiques portés par des cerfs-volants.

Sur la température et ses variations dans l'atmosphère libre, d'aprés les observations de quatre-vingt-dix ballons-sondes. Par M. LÉON TEISSERENC DE BORT. Excerpts Comptes Rendus de l'Académie des Sciences. Paris, Gauthier-Villars, 1899. 4to, 4 and 2 pp.

M. L. TEISSERENC DE BORT is doing splendid work at his observatory at Trappes, and showing for the old world, as Mr. Rotch is showing for the new world, that in original research amateurs can beat State-subsidized establishments.

These two short papers indicate an amount of work and of expenditure, of which the author says nothing, but for which he ought to receive the hearty thanks of meteorologists of all countries.

The first paper opens with a recognition of Mr. Rotch's work at Blue Hill, it then states that similar work was started at Trappes in 1897, that 2,000 metres (6,562 ft.) was reached several times in 1898, and that in 1899 the following heights were reached :—

1899.	June 14th,	3,940 metres,	or 19,927 ft., or 3¾ miles.
,,	,, 15th,	3,590 ,,	,, 11,778 ft., ,, 2½ ,,
,,	July 3rd,	+3,300 ,,	,, over 10,827 ft., or 2 miles.

Experiments at Trappes on more than 100 days show that the decrease of temperature with height is very different in cyclones and in anti-cyclones. In the former the decrease is rapid; in the latter, soon after reaching 500 or 1,000 ft., the decrease becomes slow, and sometimes even an increase takes place.

As regards wind systems it appears—

(i.) With low pressure and an overcast sky, the velocity of the wind increases with height, especially in the neighbourhood of the lower cloud stratum.

(ii.) On the contrary, in fine weather, with high barometric pressure, the velocity of the wind decreases with height up to an altitude of between 1,500 and 2,000 metres (4,921 to 6,562 ft.).

The second paper deals with the results obtained by *ballons-sondes*, *i.e.*, small balloons carrying self-recording instruments but no passengers.

These are expensive, because there is not only risk of loss of the balloon, but also of breakage of the beautiful recording instruments. Our readers will therefore realize what M. L. Teisserenc de Bort is doing, when we mention that this paper contains the results of more than 100 such ascents.

We had not thought of it, but are glad to state upon the author's authority that *ballons-sondes* were started first by the French, in 1894.

In these pages we have always urged that kite work and balloon work should go on side by side, and we are glad to find that

experimenters are adopting our view, and using kites for the first mile or two of vertical height, and *ballons-sondes* for greater heights. One of the Trappes balloons reached 13,000 metres, or about 8 miles.

Systematic balloon work began at Trappes in April, 1898, and has been continued monthly (sometimes repeated at short intervals) ever since. In the present note M. Teisserenc de Bort epitomizes the results of the temperature observations in the following two paragraphs :—

(i.) The temperature at various altitudes at various seasons varies much more than old observations with passenger balloons had led us to expect.

(ii.) Apparently, even up to the altitude of 10 kilometres (6 miles) there is a tendency to a marked seasonal variation of temperature, with a maximum at the end of summer, and a minimum at the end of winter.

SEVERE FROST IN DECEMBER, 1899.

Two letters appeared in the *Hereford Times*, and one supported the other so remarkably that we have had to examine the facts. The following are the letters :—

A RECORD IN TEMPERATURE.

To the Editor of the Hereford Times.

SIR,—It may interest your readers to know the thermometer readings—constituting a record almost, I should think—outside this house, 750 feet above sea, and in a place sheltered from the North and East.

15th December, 1899, at 9.30 a.m. temperature was five degrees above zero.

FULLARTON JAMES.

Chief Constable's House, Pen-y-bont, Radnorshire, Dec. 20th, 1899.

LOW TEMPERATURE IN THE WYE VALLEY.

SIR,—The sudden falling of the temperature during the past week has been unusual indeed. On the morning of the 15th inst. Negretti and Zambra's thermometer, enclosed in a meteorological screen (Stevenson's pattern), and then put above the ground registered nearly 34° of frost.

As far as I can recollect this is the lowest reading we have had since the 16th January, 1879, when the instrument referred to indicated 36° of frost, or 4° below zero.

P. MACCABE.

Rotherwas Gardens, Hereford, December 21st, 1899.

As regards these stations there is nothing to show that the thermometers were perfect and in good order; and inspectors alone know how often spirit minimum thermometers read too low, because of the evaporation of the spirit and its condensation as a colourless liquid at the top of the tube. At Pen-y-bont it was apparently a wall exposure, and at Rotherwas the expression respecting the Stevenson hardly suggests that it was, at it should be, 4 ft. above the ground. However, the figures are +5° F. and —2° F., whereas in other parts of the country there are many stations at which the temperature did not fall so low by 20°.

We have taken out all the December shade minima which we have received, and which were below 15°, and give them in the following table :—

Shade Minima below 15° *in December*, 1899.

	°			°	
Chiddingfold, Surrey ...	13	on 14th	Hemingby, Lincoln	6·8	on 12th
Fair Hall, Lewes	13	,, 16th	Hodsock Priory, Worksop	6·4	,, 14th
Hartley Wintney, Hants	12	,, 14th	Hesley Hall, Notts	10	,, 14th
Welford Park, Newbury	9	,, 16th	Goldsborough Hall, York	4	,, 16th
Compton, Berks.....	3	,, 14th	Driffield, ,,	10	,, 16th
Addington, Bucks.....	11	,, 16th	Malton, Yorks	10°	on 12th & 15th
Swerford, Oxford	12	,, 16th	Thirsk, ,, ...	14	on 15th
Castle Ashby, Northants	13	,, 16th	Unthank Hall, Northumbd	12	,, 14th
Sedgebrook, ,,	12	,, 16th	Appleby, Westmoreland.	9·8	,, 15th
Rendlesham Hall, Suffolk	9	,, 12th	Llanvihangel Court, Mon.	10	,, 15th
Brundall, Norwich	13	,, 16th	Llandovery, Carmarthen.	13	,, 15th
North Cadbury, Somerset	14·5	,, 15th	Gogerddan, Aberystwith	11	,, 14th
Further Barton, Cirenc'st'r	10	,, 16th	Llandefaelog-fach, Brecon	10	,, 15th
The Graig, Ross, Hereford	9·4	,, 15th	Abergwesyn, ,,	3	,, 14th
Leominster, ,,	4	,, 15th	Riddell, Lilliesleaf, N.B.	9	,, 13th
Clunbury, Shropshire ...	0	,, 15th	Leith, Edinburgh	12	,, 14th
Woolstaston, ,, ...	14·5	,, 14th	Stronvar, Perth	7	,, 14th
The Clive Vic. ,, ...	7·5	,, 14th	Cupar Angus, Perth	3	,, 15th
Wrottesley, Wolverhmptn	13·8		E. Necropolis, Dundee...	14·9	,, 15th
Priory Row, Coventry ...	10	,, 16th	Braemar, Aberdeen	8·2	,, 15th
Loughborough	8	,, 14th	Cranford, ,, ...	10	,, 14th

From these we conclude (1) that there is no proof that the record of —2° F. near Hereford is wrong, although it seems improbable; (2) that the cold was felt in patches; (3) that it would be well when the next snow comes, to fill flower pots with it, and to bury all the thermometers in the snow packed closely round their bulbs, and to notice what they read. When the snow is just melting and running through the hole at the bottom of the pot, they ought to show 32°. It will be interesting to hear how many of them do so.

To the Editor of the Meteorological Magazine.

SIR,—The following phenomenon may be considered interesting enough for insertion in the *Met. Mag.*

During the recent cold weather some of us on the golf links opened for lunch two or three soda water bottles which had been kept in a cold place. To our astonishment they all *instantly* froze, so that we could only get out a small quantity of the water. Previous to being opened they were perfectly fluid and free from ice. Evidently the temperature was such that, though when closed the pressure of the gas kept them from freezing, on the removal of the pressure they congealed at once. The effect was very startling and curious. No doubt anyone wishing to perform the experiment could do so by leaving a bottle out in the shade on a very cold day till it was some degrees below freezing and then suddenly opening it. The instantaneousness of the result is, of course, the most noticeable feature.—Yours truly,

T. B. BLATHWAYT.

Lyme Regis, Dorset, Dec. 18th, 1899.

RESULTS OF METEOROLOGICAL OBSERVATIONS AT CAMDEN SQUARE FOR 40 YEARS, 1858–97.

DECEMBER.

YEAR.	RAINFALL.				TEMPERATURE.										CLOUD.
	Total.		Max. Fall.	Falls of 1 in. or +	Dry. Mean, 9a.&9p.	Wet. Mean, 9a.&9p.	Shade Max		Shade Min		Sun Max. Black.		Grass Min.		
	Depth	Days					Abs.	Aver	Abs.	Aver	Abs.	Aver	Abs.	Aver	Aver
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	in.		in.		°	°	°	°	°	°	°	°	°	°	0-10
1858..	1·75	16	·60	0	40·7	39·4	52·5	44·5	24·4	34·6	..	..	..	..	7·2
1859..	2·24	18	·40	0	36·7	35·6	56·4	40·8	14·4	31·6	..	..	..	..	6·5
1860..	2·51	18	·64	0	36·1	35·1	53·5	40·5	6·7	32·1	..	..	1·8	27·7	6·5
1861..	1·45	11	·58	0	40·0	38·8	53·2	45·7	21·6	35·1	..	..	16·1	30·7	6·1
1862..	1·71	14	·33	0	43·4	41·6	54·6	47·0	30·3	38·5	..	..	24·2	34·9	6·2
1863..	1·31	10	·65	0	42·8	41·2	53·9	48·7	26·4	36·9	..	..	22·6	33·2	6·2
1864..	·36	8	·12	0	38·5	37·4	51·5	42·3	17·8	34·4	..	..	14·7	30·4	7·2
1865..	1·35	14	·42	0	42·8	41·2	52·5	46·5	30·8	38·5	..	..	26·7	35·4	6·8
1866..	2·63	16	·53	0	43·4	42·0	56·5	48·1	27·3	37·9	..	..	20·2	34·7	6·3
1867..	1·59	13	·52	0	38·2	37·0	54·9	42·3	22·5	32·5	..	..	14·8	28·7	6·5
1868..	5·12	27	·52	0	46·2	44·9	58·2	50·7	31·5	41·0	..	..	28·4	38·3	7·6
1869..	2·94	14	·65	0	38·2	36·9	57·7	43·3	20·8	33·3	..	..	17·2	29·5	6·4
1870..	3·07	18	·55	0	34·2	33·2	57·2	38·3	14·0	29·9	78·2	50·5	10·4	28·0	7·6
1871..	1·13	16	·41	0	38·3	37·4	49·0	42·7	20·1	34·2	71·3	55·3	19·1	30·6	6·9
1872..	4·35	22	·81	0	42·7	41·4	54·6	47·0	26·6	38·2	77·2	57·1	22·8	35·4	6·5
1873..	·48	8	·17	0	40·5	39·3	56·7	45·8	22·9	35·8	82·0	53·9	19·4	33·6	7·2
1874..	1·58	14	·52	0	33·3	32·6	53·8	38·1	18·4	28·7	74·4	49·8	15·8	27·4	6·7
1875..	·94	15	·26	0	39·0	38·1	54·8	42·9	23·2	34·8	71·9	53·4	20·7	32·6	7·7
1876..	6·25	23	1·61	1	44·2	43·0	56·6	47·8	28·0	40·4	77·0	53·7	25·4	37·4	8·1
1877..	1·51	17	·57	0	40·1	39·0	54·2	45·6	28·3	35·5	76·8	56·4	23·2	31·2	5·8
1878..	1·46	15	·26	0	33·7	33·0	55·2	38·2	18·7	29·5	72·4	46·7	12·2	26·6	7·1
1879..	·86	9	·32	0	32·6	31·9	53·4	37·7	16·1	26·9	68·2	45·0	7·8	23·4	7·3
1880..	3·17	18	·53	0	42·7	41·3	56·5	48·2	28·2	38·0	87·0	59·1	24·7	34·8	7·0
1881..	2·47	15	·71	0	39·9	38·7	53·6	44·7	28·1	35·1	72·3	52·7	21·2	30·2	6·7
1882..	2·51	16	·52	0	40·3	39·4	57·2	44·3	24·5	35·5	73·6	49·9	21·4	33·8	8·0
1883..	·75	14	·45	0	40·3	38·8	54·9	44·9	28·3	36·4	72·3	54·5	23·7	33·7	7·4
1884..	2·57	17	·41	0	40·8	39·2	55·7	45·9	28·5	36·6	66·7	51·5	22·2	33·0	7·2
1885..	1·05	11	·35	0	38·4	37·2	50·8	44·0	22·3	33·8	72·2	52·5	15·4	28·8	6·2
1886..	4·34	18	1·82	1	36·2	34·9	53·9	41·3	19·7	31·3	66·4	52·1	12·2	26·0	5·2
1887..	1·38	13	·30	0	37·8	36·4	53·8	42·8	24·3	33·2	74·7	52·8	19·2	28·7	6·7
1888..	1·29	9	·43	0	40·6	39·8	58·9	46·2	25·9	36·2	69·9	53·3	19·2	31·1	5·6
1889..	1·23	15	·29	0	37·8	37·0	53·2	43·0	22·8	33·2	59·2	47·1	17·1	28·7	6·9
1890..	·68	9	·21	0	30·3	29·6	43·7	34·0	14·9	25·5	49·3	36·9	5·5	22·0	8·1
1891..	3·24	18	·70	0	40·9	39·7	57·2	46·3	16·8	35·3	71·1	54·3	12·6	30·2	6·7
1892..	1·37	11	·44	0	36·2	35·2	54·5	41·4	16·7	31·4	66·2	48·8	12·1	26·8	5·9
1893..	2·23	14	·44	0	40·2	38·8	57·8	45·8	20·1	34·4	68·9	54·2	20·5	30·7	5·4
1894..	2·28	16	·93	0	41·8	40·2	52·1	46·7	26·3	36·4	69·6	54·2	24·6	33·1	6·1
1895..	2·19	16	·34	0	40·0	38·8	56·4	44·9	26·1	35·2	78·7	51·0	25·9	32·1	7·0
1896..	3·61	21	·75	0	40·1	38·9	51·8	44·5	26·6	34·3	61·1	49·9	20·8	28·8	7·4
1897..	2·20	17	·64	0	40·9	39·6	55·9	45·5	23·7	35·7	66·9	52·6	21·2	31·7	6·3
Mean ...	2·13	15	·54	0·1	39·3	38·1	54·5	44·0	22·9	34·4	71·3	51·8	18·5	30·9	6·8
Extremes	6·25	27	1·82	1	46·2	44·9	58·9	50·7	31·5	41·0	87·0	59·1	28·4	38·3	8·1
	·36	8	·12	0	30·3	29·6	43·7	34·0	6·7	25·5	49·3	36·9	1·8	22·0	5·2

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, JULY, 1899.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Absolute. Maximum. Date.	Absolute. Minimum. Temp.	Absolute. Minimum. Date.	Average. Max.	Average. Min.	Average. Dew Point.	Average. Humidity.	Absolute. Max. in Sun.	Absolute. Min. on Grass.	TotalRain. Depth.	TotalRain. Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
London, CamdenSquare	89·2	20	50·9	5	79·2	57·3	54·8	66	134·4	47·5	1·45	10	4·8
Malta	94·6	25	59·0	3	84·4	68·1	63·2	67	147·5	57·7	·00	0	0·6
Cape of Good Hope	81·1	27	42·5	25	65·5	48·2	46·6	78	...	...	4·25	9	2·7
Mauritius	75·5	23	59·4	23	73·6	63·9	59·0	73	144·4	51·9	2·93	24	5·3
Calcutta	93·2	1	75·6	27	88·5	78·3	78·3	87	154·2	75·8	21·47	26	8·8
Bombay	87·0	31	76·0	9	85·3	78·7	75·9	81	134·5	74·2	4·72	22	8·5
Ceylon, Colombo	89·2	22	76·2	2	87·4	77·9	73·5	79	148·0	72·5	1·11	7	5·2
Melbourne	61·0	12	30·6	20	55·5	38·8	41·3	82	118·8	25·2	1·29	8	5·1
Adelaide	68·1	29	35·6	27	58·0	39·9	39·4	74	126·4	25·4	·37	7	3·6
Sydney	61·7	15	39·8	2	57·7	46·3	42·9	80	106·0	32·0	3·96	20	4·4
Wellington	57·3	18	31·0	15*a*	50·5	39·6	36·4	72	105·0	23·0	6·45	21	4·7
Auckland	61·0	20	37·0	26	55·7	43·2	39·3	60	107·0	31·0	5·32	17	5·0
Trinidad	91·0	31	69·0	25	88·8	70·5	72·5	82	165·0	67·0	4·44	17	...
Grenada	86·4	26	71·2	1	83·9	74·7	71·2	78	154·2	...	6·67	29	2·8
Toronto	87·2	21	50·2	31	79·8	57·7	58·8	71	107·5	46·2	1·02	11	3·9
New Brunswick, Fredericton	87·7	2	42·3	1	74·6	54·4	55·5	67	...	...	6·28	16	6·0
Manitoba, Winnipeg	89·4	22	43·0	29	79·1	54·2	...	76	...	...	1·96	10	5·2
British Columbia, Esquimalt	...	...	...	...	...	...	...	...	...	...	...	...	...

a—and 26.

REMARKS.

MALTA.—Adopted mean temp. 75°·2, or 2°·2 below the average. Mean hourly velocity of wind 9·3 miles, or 1·7 above the average. Mean temp. of sea 77°·0. TS on 14th. L on 15th. J. F. DOBSON.

Mauritius.—Mean temp. of air 0°·1, and of dew point 0°·4 below, rainfall ·66 in. above, the average. Mean hourly velocity of wind 13·9 miles, or 2·0 above average; extremes, 29·6 on 8th and 2·7 on 3rd; prevailing direction, E.S.E. A. WALTER.

CEYLON, COLOMBO.—Mean temp. of air 81°·7, or 1°·1 above, of dew point 0°·1 above, and rainfall 3·38 in. below, the average. Mean hourly velocity of wind 9·8 miles; prevailing direction S.W. TS on 4th. H. O. BARNARD.

Adelaide.—Mean temp. 2°·6 below, and rainfall 2·27 in. below, the average of 42 years. The coldest, sunniest, driest, and calmest July on record. C. TODD, F.R.S.

Sydney.—Mean temp 0°·4 below; humidity 3·2 above; and rainfall ·32 in. below, the average. H. C. RUSSELL, F.R.S.

Wellington.—Generally wet, with a few fine days at intervals. Prevailing S. and N.W. winds, generally moderate: some cold weather and frosty nights; light snow on 25th, and snow on the near hills. H on 5 days; fog on 4 days. Temp. 2°·6 below, and rainfall ·11 in. above, the average. R. B. GORE.

Auckland.—Cold and stormy most of the month. Mean temp. quite 2°·0 below the average. Rainfall slightly above the average. T. F. CHEESEMAN.

SUPPLEMENTARY TABLE OF RAINFALL, DECEMBER, 1899.

[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.
I.	Uxbridge, Harefield Pk..	1·34	XI.	Builth, Abergwesyn Vic.	5·03
II.	Dorking, Abinger Hall .	1·61	,,	Rhayader, Nantgwillt ...	5·04
,,	Birchington, Thor	2·09	,,	Lake Vyrnwy	4·09
,,	Hailsham	2·40	,,	Corwen, Rhug	2·77
,,	Ryde, Thornbrough	1·68	,,	Criccieth, Talarvor	2·37
,,	Emsworth, Redlands ...	1·84	,,	I. of Anglesey, Lligwy..	3·08
,,	Alton, Ashdell	1·89	,,	I. of Man, Douglas	4·96
III.	Oxford, Magdalen Coll..	1·21	XII.	Stoneykirk, Ardwell Ho.	4·71
,,	Banbury, Bloxham	1·68	,,	New Galloway, Glenlee	5·31
,,	Northampton, Sedgebrook	1·53	,,	Moniaive, Maxwelton Ho.	4·12
,,	Stamford, Duddington..	...	,,	Lilliesleaf, Riddell	2·60
,,	Alconbury	1·47	XIII.	N. Esk Res. [Penicuick]	3·35
,,	Wisbech, Bank House...	1·34	XIV.	Glasgow, Queen's Park..	2·69
IV.	Southend	1·47	XV.	Inverary, Newtown	6·06
,,	Harlow, Sheering..... ...	...	,,	Ballachulish, Ardsheal...	6·77
,,	Colchester, Lexden	1·37	,,	Islay, Gruinart School ...	2·00
,,	Rendlesham Hall	1·63	XVI.	Dollar.....	5·20
,,	Scole Rectory	1·38	,,	Balquhidder, Stronvar...	5·53
,,	Swaffham	1·66	,,	Coupar Angus Station...	4·10
V.	Salisbury, Alderbury ...	1·49	,,	Dalnaspidal H.R.S.....	...
,,	Bishop's Cannings	2·12	XVII.	Keith H.R.S.....	5·66
,,	Blandford, Whatcombe .	2·80	,,	Forres H.R.S.	4·59
,,	Ashburton, Holne Vic...	4·37	XVIII.	Fearn, Lower Pitkerrie..	2·81
,,	Okehampton, Oaklands.	5·37	,,	S. Uist, Askernish	7·03
,,	Hartland Abbey	3·67	,,	Invergarry.....	2·96
,,	Lynton, Glenthorne ...	4·89	,,	Aviemore H.R.S.	1·20
,,	Probus, Lamellyn	4·24	,,	Loch Ness, Drumnadrochit	3·15
,,	Wellington, The Avenue	3·95	XIX.	Inversbin	3·65
,,	North Cadbury Rectory	2·80	,,	Durness.....	4·15
VI.	Clifton, Pembroke Road	3·41	,,	Watten H.R.S.....	3·86
,,	Ross, The Graig	2·62	XX.	Dunmanway, Coolkelure	16·36
,,	Wem, Clive Vicarage ...	2·01	,,	Cork, Wellesley Terrace	...
,,	Wolverhampton, Tettenhall	2·31	,,	Killarney, Woodlawn ..	9·72
,,	Cheadle, The Heath Ho.	2·78	,,	Caher, Duneske	7·03
,,	Coventry, Priory Row...	2·03	,,	Ballingarry, Hazelfort...	4·22
VII.	Grantham, Stainby	1·65	,,	Limerick, Kilcornan ...	4·36
,,	Horncastle, Bucknall ...	1·89	,,	Miltown Malbay	6·63
,,	Worksop, Hodsck Priory	2·33	XXI.	Gorey, Courtown House	3·97
VIII.	Neston, Hinderton	2·58	,,	Moynalty, Westland ...	5·39
,,	Southport, Hesketh Park	2·71	,,	Athlone, Twyford	5·28
,,	Chatburn, Middlewood.	3·38	,,	Mullingar, Belvedere ...	5·86
,,	Duddon Val., Seathwaite Vic.	8·15	XXII.	Woodlawn	5·55
IX.	Melmerby, Baldersby ...	2·93	,,	Crossmolina, Enniscoe ..	7·87
,,	Scarborough, Observat'y	...	,,	Collooney, Markree Obs.	6·18
,,	Middleton, Mickleton ...	3·52	,,	Ballinamore, Lawderdale	...
X.	Haltwhistle, Unthank H.	2·71	XXIII.	Warrenpoint.....	7·40
,,	Bamburgh	3·61	,,	Seaforde.....	6·05
,,	Keswick, The Bank.....	3·12	,,	Belfast, Springfield	5·40
XI.	Llanfrechfa Grange	3·15	,,	Bushmills, Dundarave..	7·35
,,	Llandovery	3·05	,,	Stewartstown	5·32
,,	Castle Malgwyn	3·85	,,	Killybegs	6·68
,,	Brecknock, The Barracks	3·31	,,	Horn Head	5·80

DECEMBER, 1899.

Div.		STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL. Total Fall.	Difference from average 1880-9.	Greatest Fall in 24 hours. Dpth	Greatest Fall in 24 hours. Date	Days on which ·01 or more fell.	TEMPERATURE. Max. Deg.	Max. Date	Min. Deg.	Min. Date.	No. of Nights below 32°. In shade.	No. of Nights below 32°. On grass.
			inches.	inches.	in.								
I.	ENGLAND.	London (Camden Square) ...	1·05	— 1·02	·22	1	17	55·3	6	21·8	14	13	23
II.		Tenterden	2·22	— ·41	·67	29	19	54·0	6	16·0	16	19	23
,,		Hartley Wintney	1·52	...	·29	29	20	55·0	6	12·0	14	19	25
III.		Hitchin	1·59	— ·44	·25	28	18	53·0	1, 6	15·0	13	21	...
,,		Winslow (Addington)	1·51	— ·94	·20	1, 29	16	55·0	6	11·0	16	20	22
IV.		Bury St. Edmunds (Westley)	1·48	— ·76	·34	5	12	52·0	1, 6	21·0	16	...	...
,,		Norwich (Brundall)	1·76	...	·33	5	19	53·2	1	13·0	16	13	21
V.		Winterbourne Steepleton ...	4·20	...	1·10	28	20	55·0	6	19·0	15	16	21
,,		Torquay (Cary Green)	4·16	...	1·15	28	21	55·8	6, 7	25·2	15	7	14
,,		Polapit Tamar [Launceston]..	3·57	— ·66	·81	28	20	56·9	6	17·7	15	14	18
VI.		Stroud (Upfield)	2·43	— ·02	·60	28	18	54·0	6	19·0	14	20	...
,,		ChurchStretton(Woolstaston)	2·10	— ·95	·51	29	19	53·0	1, 6	14·5	14	21	26
,,		Worcester (Diglis Lock)	2·73	+ ·75	·70	29	15	...	...	...	...	...	...
VII.		Boston	1·48	— ·37	·37	28	12	50·0	1,4,6	19·0	16	17	...
,,		Hesley Hall [Tickhill].....	2·23	+ ·25	·48	28	17	55·0	4	10·0	14	21	...
,,		Breadsall Priory	2·49	...	·51	28	12	...	...	...	...	...	...
VIII.		Manchester(PlymouthGrove)	2·68	— ·76	·35	29	15	54·0	4	18·0	13	21	24
IX.		Wetherby (Ribston Hall) ...	3·57	+ 1·13	1·05	28	18	...	...	...	...	...	...
,,		Skipton (Arncliffe)	4·91	— 1·90	·86	30	16	...	...	...	...	...	...
,,		Hull (Pearson Park).	2·52	+ ·25	·52	28	18	53·0	4, 5	19·0	15*a*	19	24
X.		Newcastle (Town Moor)	3·50	+ 1·20	·95	28	17	...	...	...	...	...	...
,,		Borrowdale (Seathwaite).....	8·76	— 6·05	1·89	3	16	...	...	...	...	...	...
XI.	WALES.	Cardiff (Ely).....	3·43	— 1·12	·93	28	21	...	...	...	...	...	...
,,		Haverfordwest	4·42	— ·57	·82	28	21	56·0	6	23·8	15	9	22
,,		Aberystwith (Gogerddan) ...	3·58	— 1·30	1·18	4	15	55·0	6	...	...	...	...
,,		Llandudno.....	2·61	— ·35	·42	4	17	56·5	6	24·5	11*b*	11	...
XII.	SCOTLAND.	Cargen [Dumfries]	3·37	— ·65	·56	3	12	53·0	4	12·0	15	15	...
XIII.		Edinburgh (Blacket Place)...	2·13	...	·41	5	16	53·3	4	18·3	15	14	18
XIV.		Colmonell	5·30	...	·67	3	21	53·0	5	16·0	27	...	...
XV.		Tighnabruaich	6·88	...	1·20	19	17	48·0	3, 5	22·0	27	16	...
,,		Mull (Quinish).....	...	...	...	...	...	...	...	...	...	...	...
XVI.		Loch Leven Sluices	4·10	+ ·79	1·20	7	9	...	...	...	...	...	...
,,		Dundee (Eastern Necropolis)	4·60	+ 2·52	·90	6	19	55·7	4	14·9	15	16	...
XVII.		Braemar	3·06	+ ·59	·55	5	20	50·7	4	8·2	15	22	31
,,		Aberdeen (Cranford)	5·65	...	·95	6	27	55·0	3, 4	10·0	14	20	...
,,		Cawdor (Budgate)	4·14	+ 1·68	·78	4	19	...	...	...	...	...	...
XVIII		Strathconan [Beauly]	4·03	— 1·74	...	...	...	...	...	...	...	...	...
,,		Glencarron Lodge.....	6·33	...	1·71	3	20	52·0	4	17·5	27	20	...
XIX.		Dunrobin	3·68	+ ·31	·74	30	18	...	...	...	...	...	...
,,		S. Ronaldshay (Roeberry) ...	4·83	+ 1·17	·88	15	24	52·0	3	26·0	25	14	...
XX.	IRELAND.	Darrynane Abbey.....	8·16	...	1·35	19	28	...	...	...	...	...	...
,,		Waterford (Brook Lodge) ...	8·64	+ 5·00	1·66	28	22	55·0	6	21·5	27	6	...
,,		Broadford (Hurdlestown) ...	6·10	...	·86	13	28	...	...	...	...	...	...
XXI.		Carlow (Browne's Hill)	4·78	+ 1·66	·97	28	26	...	...	...	...	...	...
,,		Dublin (FitzWilliam Square)	3·29	+ 1·13	1·13	28	24	61·0	6	25·5	27	6	16
XXII.		Ballinasloe	3·59	+ ·17	·57	11	26	52·0	5, 6	23·0	28	14	...
,,		Clifden (Kylemore)	13·64	...	1·42	16	23	...	...	...	...	...	...
XXIII		Waringstown	4·94	+ 1·90	1·20	28	12	52·0	1	19·0	26	...	...
,,		Londonderry (Creggan Res.).	5·91	+ 1·70	·80	3	26	...	...	...	...	...	...
,,		Omagh (Edenfel)	4·99	+ 1·31	·75	19	18	53·0	5, 6	17·0	27	15	24

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

a—and 28. *b*—and 15.

METEOROLOGICAL NOTES ON DECEMBER, 1899.

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.

TENTERDEN.—The first week was showery, followed by 13 days of hard frost. One-and-a-half inches of S fell on the 11th. The water in the well was nearly as low as at the end of 1898, there being only 10 inches of water on 19th. The 25th and 31st were lovely days, but it was showery between, with a gale from S. on 29th. Fog on 4 days. Duration of sunshine 56 hours.

HARTLEY WINTNEY.—A cold, wintry month. The grass min. fell to 6° on the nights of 14th, 15th and 16th, and dense fogs occurred each day. From 20th to the end there were slight frosts nightly, with R during the days. S.W. gale on 29th and 30th. S on 11th and 12th. Ozone on 4 days, with a mean of 5. Duration of sunshine on 25th, 5 hours.

WINSLOW, ADDINGTON.—A dull, cold month, with several sharp frosts and very dense fogs. The least R in December since 1893. The 15th was intensely cold, the temp. not rising above 25°. Fog on 7th, 15th, 18th and 27th.

BURY ST. EDMUNDS, WESTLEY.—A cold month with very little S. S on 11th.

NORWICH, BRUNDALL.—The coldest December since 1892, but the absolute min. temp. was the same as in 1890, and the lowest since then. Mean 35°·9. Fog on 3 days. S on 10th, 11th and 14th.

WINTERBOURNE STEEPLETON.—A cold month, the mean temp. being only 37°·8, while for December, 1898, it was 45°·6. The greatest cold occurred in the week ending 16th, the mean for the week being only 31°·4. The last part of the month was squally, with very low pressure. Fog on 6th. T and L on 29th at 9 a.m. S on 11th.

TORQUAY, CARY GREEN.—R ·15 in. above the average. Mean temp. 42°·3, being 1°·0 below the average. Duration of sunshine 47 hours, being 8 hours 10 mins. below the average; 14 sunless days. Ozone, mean at 9 a.m., 4·9; greatest 8·5 on 26th, 29th and 30th; with S. and W. winds; least 0·5 on 19th and 20th, with N. and E. winds.

POLAPIT TAMAR [LAUNCESTON].—The first three weeks were comparatively dry and calm; the last ten days wet and stormy. S on 8th and 11th. T and L at 5.30 p.m. on 28th. S. gale on 29th.

CHURCH STRETTON, WOOLSTASTON.—A very cold month, with continued frost. S fell on 5 days. Mean temp. 34°·9.

WORCESTER, DIGLIS LOCK.—Four-and-a-half inches of S fell on 11th. Heavy S.E. gale on 29th.

HULL, PEARSON PARK.—Fog on 11 days. S on 8 days. H on 2 days.

SEATHWAITE.—S two-and-a-half inches deep on 12th; two inches on 26th.

WALES.

HAVERFORDWEST.—Generally mild and wet; the rainfall, though not large, being continuous. S on the ground only on 9th. The bar. (corr. and red.) read 28·263 in. at 2 p.m. on 29th, but was unaccompanied by any special feature except a distant peal of T and some L in the forenoon, with heavy R during the day and some soft H; on 28th the wind reached the force of a fresh gale. No lower reading of the bar. has occurred since 1886, when it fell to 28·209 in.

ABERYSTWITH, GOGERDDAN.—Low temp. throughout, and very little sunshine.

SCOTLAND.

CARGEN [DUMFRIES].—S five inches deep on 12th, four inches deep on 22nd.

EDINBURGH, BLACKET PLACE.—Mean temp. 2°·4 below, and R 22 per cent. below the average. S on 10th, 11th, 22nd and 28th ; about six inches deep on 11th. Bar. (cor. and red.) fell to 28·456 in. at 9 p.m. on 29th.

COLMONELL.—R ·17 in. above, and mean temp. 1°·2 below, the average of 23 years. S on 8th, 11th, 13th and 21st.

TIGHNABRUAICH, CRAIGANDARAICH.—A month of extremes. Very wet, windy, calm, frosty and snowy in rotation. Great thickness of cloud and darkness on 19th.

ABERDEEN, CRANFORD.—The month was cold and wet, with some light S showers from 11th to 15th, and wet S on 22nd and 23rd.

S. RONALDSHAY, ROEBERRY.—A cold, wet and windy month. Mean temp. 39°·9, being 1°·9 below the average of 9 years.

IRELAND.

DARRYNANE ABBEY.—The wettest month (except two, August and November, 1892) since January, 1890. A very heavy gale occurred on the night of 27th and morning of 28th, numbers of trees were blown down ; wind N.E. and cold R mixed with wet S or sleet.

WATERFORD, BROOK LODGE.—The wettest December since 1876. T on 7th ; T and L on 28th ; S on 27th.

BROADFORD, HURDLESTOWN.—A very wet and severe month, being the wettest December, and (with the exception of August, 1891) the wettest month on record. R 2·73 in., and rainy days 6, above the average of 15 years. S.E. gale with S on 27th and 28th.

DUBLIN, FITZWILLIAM SQUARE.—An unsettled, dull and wet month, of medium temp. but presenting sharp and sudden extremes of warmth and cold. Mean temp. 42°·0 or 0°·7 above the average. Lunar halos on 10th and 15th. Solar halos on 2nd and 13th. High winds occurred on 7 days attaining the force of a gale on 3. Fog on 11 days. S and sleet on 28th, 30th and 31st.

BALLINASLOE.—Heavy S all day on 28th and S on 31st. L on 3rd. Thick fog on 9th.

EDENFEL [OMAGH].—The mild and wet weather with which the month commenced, gave way on the 12th to a week of fine, generally dry, weather with frosty nights. The next week was again humid, followed from Christmas to the end by some very sharp frost and heavy though temporary S, all of which disappeared in the gale of 30th.

END OF VOL. XXXIV.