SYMONS'S

MONTHLY

METEOROLOGICAL MAGAZINE.

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METEOROLOGICAL OBSERVATIONS AT CAMDEN SQUARE, LONDON, N.W.

Lat. 51° 32′ 40″ N.; Lon. 0° 8′ 0″ W. Altitude 111 ft.

I WOULD always rather refer to the work of someone else than to my own, but there are few records of meteorological observations day and night for forty years without a break, absolutely uniform in system, nearly so as to instruments and locality, and mostly made by one person. Moreover, rightly or wrongly, special interest attaches to the climate of the million-peopled metropolis, and there is no station with suitable exposure in or near London which has been at work nearly so long as that at Camden Square.

For these reasons I have had the records worked up, and intend to give during the present year a series of tables for each month similar to that for January on p. 4.

In this long period there have, of course, been more than 14,000 days, giving considerably more than 500,000 entries, and to compress the results of one-twelfth of these into a single-page table has not been easy; hence considerable care must be used in quoting from the table, and the following explanations, which will apply to all the series, should be read carefully.

EXPLANATIONS.

Each table refers to the 40 months of that *name*, and is entirely independent of any other month or months.

The values refer to the 40 years beginning with January 1st, 1858, *except as under*:—

Grass minimum (38 years)	begun Jan. 1st, 1860
Solar Radiation, Black Bulb (28 years)...	,, ,, ,, 1870
Temp. of Soil at 1 foot (27 years) ...	,, ,, ,, 1871
Solar Radiation, Bright Bulb (20 years)	,, ,, ,, 1878

The barometer has always been within a few feet of 110 ft. above

mean sea level (111 ft. from 1868–97), but all readings have been corrected for index error and temperature and reduced to sea level.

The shade thermometers have always been on a Glaisher pattern (*Met. Mag.*, Vol. III., p. 155) thermometer stand, duly turned so as to keep the thermometers in perfect shade.

The solar radiation thermometers have been on a post 4 ft. above ground.

The rain gauge quoted has always been an 8-inch one, with its rim 1 foot (or a little less) above the ground.

As regards rainfall, it will be understood that though the word at the top of column is "means," the values in columns 1, 2, 3, 5, 6, 8 are totals.

Col. 1 gives the mean of all the readings in the whole period; twice a day as regards barometer, shade temp., cloud and rainfall, the other elements once a day. For instance, 29·982, 38·1 and 7·0 are the means of the corresponding two entries in Col. 5, and 2·02 is the sum of the two entries in that column.

Col. 2 gives the highest mean for any one of the 40 Januaries and the year in which it occurred. This must not be confused with the absolute highest, which will be found in Cols. 10 and 11.

Col. 3 gives the lowest mean for any one of the 40 Januaries and the year in which it occurred.

Col. 4 gives the hours of observation.

Col. 5 gives the mean at each hour of observation for the 40 years. As regards rainfall, the rainfall values show the mean of the total amount measured at 9 a.m. having fallen during the 12 previous (night) hours; and the total measured at 9 p.m. having fallen during the 12 previous (day) hours.

Col. 6 gives the highest mean at each hour of observation.

Col. 7 gives the date of ditto.

Col. 8 gives the lowest mean at each hour of observation.

Col. 9 gives the date of ditto.

Beyond the double rule the table deals with extremes.

Col. 10 gives the actual highest reading for each element at each hour of observation.

Col. 11 gives the date of ditto. The name of the month is not given, because, as already explained, each table deals with only the month named at the top; therefore, in Col. 11 the second entry, which does not look clear, states that the 30·934 mentioned in Col. 10 occurred on the 17th and 18th of January, 1882, and on the 9th of January, 1896.

Col. 12 gives the actual lowest reading for each element at each hour of observation.

Col. 13 gives the date of ditto.

Col. 14 gives the mean of the highest readings in each of the 40 months.

Col. 15 gives the mean of the lowest readings in each of the 40 months.

Remarks.

I do not intend to offer any comments upon the tables; the facts are there, and I leave them for the consideration of my readers. But there is one item, to which attention is often given, which does not appear in the table, and it may be well to explain why it is not given. It is mean temperature, and I do not give it because meteorologists are not in complete accord as to how it is to be determined; and probably the method depends somewhat on the pattern of thermometer stand adopted. I do not intend to refer to this subject again, so shall consider it fully now, using the January values to show the different results obtainable according to the method adopted.

Mean temperature is often taken (where a Stevenson pattern thermometer screen is used) as the mean of the mean maximum and of the mean minimum; if so, we should have :—

$$\frac{43{\cdot}0 + 33{\cdot}3}{2} = 38°{\cdot}15$$

Sometimes the mean of the 9 a.m. and 9 p.m. dry is incorporated with it; then we should have :—

$$\frac{43{\cdot}0 + 33{\cdot}3 + 37{\cdot}7 + 38{\cdot}4}{4} = 38{\cdot}10$$

But, as already stated, the thermometer readings used in these tables are from thermometers mounted on a Glaisher pattern stand, and then, perhaps, the corrections given in Mr. Glaisher's *Diurnal Range Tables* (4th ed., Taylor & Francis, 1867) should be used, and they would give :—

			Correction.		True mean.	
Max. 43·0 Min. 33·3	Mean	38·15	—0·2	...	37·95	= 38°·43
9 a.m. 37·7		...	+1·2	...	38·9	
9 p.m. 38·4		...	+0·5	...	38·9	

However, their applicability and other subjects must be considered when the tables are all published.

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

JANUARY.

ELEMENTS.	MONTHLY MEANS OR TOTALS.									ABSOLUTE READINGS.					
				MEANS 9 A.M. AND 9 P.M.						EXTREMES AT 9 A.M. AND 9 P.M.					
						Highest Month.		Lowest Month.		Highest.		Lowest.		Mean of all Highest	Mean of all Lowest.
	Mean, 40 years	Highest Month and Date.	Lowest Month and Date.		Mean.	Value.	Date.	Value.	Date.	Value.	Date.	Value.	Date.		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Barometer (cor. & red.)	29·982	30·378	29·573	9 a.m.	29·983	30·378	1880	29·583	1865	30·950	18th, 1882	28·528	20th, 1873	30·533	29·163
		1880	1865	9 p.m.	29·981	30·378	1880	29·564	1865	30·934	17, 18 '82; 9, '96	28·476	20th, 1873	30·525	29·246
Shade Temp. Dry Bulb	38·1	43·8	31·2	9 a.m.	37·7	43·4	1875	30·2	1881	53·9	1st, 1883	7·2	4th, 1867	50·2	25·0
		1884	1881	9 p.m.	38·4	44·3	1884	31·8	1879	54·6	1st, 1883	12·8	4th, 1867	50·3	27·4
Shade Temp. Max.	43·0	..	...	...	...	48·9	1890	35·8	1879	56·4	19th, 1877	16·9	4th, 1867	53·1	31·7
Shade Temp. Min.	33·3	...	...	...	...	39·2	'75, '84	26·1	1881	52·3	1st, 1860	6·7	4th, 1867	45·8	21·8
Shade Temp. Wet Bulb	36·9	42·8	30·6	9 a.m.	36·6	42·4	1875	29·6	1881	53·0	1st, 1883	7·2	4th, 1867	48·8	24·6
		1875	1881	9 p.m.	37·3	43·1	1875	30·9	1879	52·8	9th, 1862	12·8	4th, 1867	49·3	26·6
Solar Rad., black	53·7	.:.	...	...	...	61·8	1877	44·1	1879	87·3	30th, 1877	26·5	2, '71; 1, '87	75·5	34·7
Solar Rad., bright	43·9	...	...	...	...	52·1	1890	35·4	1881	60·3	29th, 1884	22·5	15th, 1881	55·5	31·6
Grass Minimum	30·1	...	...	...	...	36·4	1875	21·9	1881	50·9	1st, 1860	0·5	5th, 1867	43·3	17·0
Soil, 1 foot	38·3	...	...	...	...	42·8	1873	33·8	1891	47·6	2nd, 1883	32·0	29th, 31st, '80	42·4	35·1
Cloud	7·0	8·4	4·8	9 a.m.	7·1	8 9	1885	5·7	1860	10	Every year	0	Various	10·0	0·6
		1871	1858	9 p.m.	6·8	8·6	'68, '71	3·7	1858	10	Every year	0	Various	10·0	0·2
Rainfall	2·02	4·74	·31	9 a.m.	1·12	2·59	1865	·01	1880	1·20	11th, 1866	·00	Every year	·33	·00
		1877	1880	9 p.m.	·90	2·81	1879	·09	1864	·85	18th, 1881	·00	Every year	·31	·00

Max. Rainfall in 24 hours, 1·20 in., 10th, 1866. Mean max. daily fall, ·47 in.

WARMTH, DRYNESS AND HIGH BAROMETER IN JAN., 1898.

WE have been favoured with so many notes upon the above subjects, that we have to insert only a selection—preferably those with long averages.

Camden Square, London.—Compared with the table on page 4, the features of 1898 are: barometer almost unprecedentedly high; mean temperature by dry bulb 0°·05 above 1884, and therefore the highest on record; min. in air and min. on grass 0°·6 and 0°·5 respectively above the highest previous records, which were in 1875 and in 1884; rain only about a third of the average, but more than twice that of 1880.

To the Editor of the Meteorological Magazine.

SIR,—I enclose you a bean in blossom, one of many self-sown, in a field about 470 feet above the sea-level near my house. I have never before seen anything so early. It is a thermometric reading of Nature's, worthy perhaps of note.—Yours truly,

W. C. PLENDERLEATH.

Mamhead Rectory, Exeter, Jan. 24th, 1898.

SIR,—We must go back a great many years to find such a minimum as we recorded last week, viz., 51°; in 1852, on December 27th, we recoded 52°, and in 1851, on January 2nd, 51°. This time last year our roads were all blocked with snow, and they were literally quarrying it out.—Yours very truly,

W. LUCAS.

The Firs, Hitchen, Jan. 24th, 1898.

SIR,—January has here been remarkable as regards both dryness and warmth; an unusual coincidence. Less rain has fallen in Herefordshire than in any previous January as far back as 1818. The following are the instances in which less than an inch has fallen during 81 years. (*My own register covers the* 40 *years,* 1859–98.)

	in.		in.		in.
1822	·72	1848	·54	1888	·69
1824	·45	1855	·29	1889	·84
1825	·94	1858	·44	1896	·37
1829	·74	1861	·75	1898	·28
1833	·67	1880	·66		

It will be seen that 1855 closely approximates to 1898, but the temperature was some eight degrees lower in the former year. In other years, too, such as 1829, 1861 and 1880, the month of January was very severe. Almost the whole of the rain in the past month fell in one day, viz., the 4th; the rest being a mere sprinkle.

Taking the month of January by itself, that of 1884 is a shade

warmer than 1898; but the following comparison shows that for the 38 days ending Feb. 1st, 1898 has the highest mean temperature :—

	Max.	Min.	Combined.	Rainfall. in.
Dec. 26, 1897, to Feb. 1, 1898 ...	48°·7	39°·4	44°·0	1·55
,, ,, 1883, ,, ,, ,, 1884 ...	48·1	39·7	43·9	3·58
,, ,, 1876, ,, ,, ,, 1877 ...	49·6	37·5	43·6	7·20

For the three months of November, December and January :—

	Max.	Min.	Combined.	
1876-7 ...	49°·4	38°·1	43°·8	7 warmest winters, 1859–1898.
1897-8 ...	48·4	38·5	43·5	
1881-2 ...	48·2	38·2	43·2	
1883-4 ...	48·0	37·8	42·9	
1877-8 ...	48·5	37·2	42·9	
1868-9 ...	48·4	37·3	42·9	
1889-90 ...	48·1	36·6	42·4	

By way of contrast :—

1878-9 ...	39·3	28·3	33·8

Vegetation is more forward than I remember it at the same time, notwithstanding that the sky was covered with clouds, mean 8·0. The barometer was nearly as high as in 1880 and in 1882.—Yours, &c.,

H. SOUTHALL.

The Graig, Ross, Herefordshire, Feb. 2nd, 1898.

SIR,—In case you should deal with the high temperature of January, 1898, I send you the following, viz. :—

Mean of Max. and Min.

	Old Stand.	Stevenson Screen.
1898	42°·9	43°·0

And for comparison :—

1890	40·9		
1884	42·0		
1882	39·7		
Maximum temp.	on 30th Jan.	.....	55·0
Minimum ,, ...	,, 17th ,,	.....	28·7
Highest Minimum temp..	,, 20th ,,	.....	50·0

Only two days with frost in the screen at 4 ft.

This January was most like 1882, being fine in the middle of the month, with high barometer, and wet at the beginning and end; but 1882 was decidedly colder. All thermometers are verified.

I am, yours truly,

CHARLES L. BROOK.

Harewood Lodge, Meltham, Huddersfield, Feb. 4th, 1898.

P.S.—Snowdrops out on Jan. 20th, the earliest by far since and including 1885.

SIR,—The following may interest your readers :—

1890, Jan. 5th..... ..... Max. recorded Temp..... 63°

Means.

Max.... 49°·0 Min.... 37° 2 Mean of Means ... 43°·1

1898, Jan. 20th and 30th..... Max. Temp. ..... 56°

Means.

Max.... 48°·1 Min.... 34°·3 Mean of Means ... 41°·2

3 nights over 50°
14 ,, ,, 40°
9 ,, under 32° or upon it.

Averages for previous ten years.

Max... 42°·8 Min.... 31°·7 Mean of Means ... 37°·2

I found geraniums in blossom out of doors in the Conway Valley last month, also hydrangea 600 ft. above sea.

Yours faithfully,

R. J. ROBERTS.

Pool Quay Vicarage, Welshpool, Feb. 2nd, 1898.

REVIEWS.

The Meteorology of Edinburgh. Parts I. and II., by R. C. MOSSMAN, F.R.S.E., F.R.Met.Soc. [Excerpts *Trans. Roy. Soc. Edin.*] 4to, 1896 and 1897, 224 pages and 7 plates.

IF asked to name the man who in the British Isles is working the hardest at meteorology, we think that we should name Mr. Mossman. It does not seem to matter whether it be taking duty on Ben Nevis, working up the non-instrumental meteorology of London, or—as in the work before us—dealing with the climate of his own beautiful city, Mr. Mossman is always ready ; and what he does, he does well, regardless of the work it may entail. We may illustrate this, which we know to be a fact, by quoting the first line which we read in his paper, after we had written the preceding words :—"The tables which accompany the text have been derived by immense condensation from over one million observations, the re-tabulation of which was required as a necessary preliminary."

What a pæan of triumph would have announced the completion of such a work by the combined strength of a Government department ! —but Mr. Mossman is only an amateur.

It is quite impossible to give in a notice like this a complete account of these memoirs. We cut from a Glasgow newspaper the opening paragraph of its notice of Mr. Mossman's work, and it puts the matter so clearly that we reprint it, instead of saying anything ourselves on that part of the subject :—

EDINBURGH WEATHER.

Edinburgh deserves credit for having presented to the world so full and accurate an account of her weather as that which is given in the elaborate statistics and charts just published from the Transactions of the Royal Society

of Edinburgh. Mr. Mossman, the compiler of the statistics, has spared no pains to make his record perfect. Every possible source of information from 1731, when there is the first known record of weather at Edinburgh, down to the present year, has been carefully examined; and as from 1764 onwards there are almost continuous records of weather from more than one observer, we may take it that the essential facts are known continuously for the long period of 132 years.—*North British Daily Mail, Nov. 16th*, 1896.

Having expressed, but certainly not too strongly, our great admiration of the work as a whole, we may as well mention points in which we should not have done as Mr. Mossman has. (It does not follow that Mr. M. was wrong.)

We do not believe in $\frac{1}{100}$ths of a degree Fahrenheit, and in all the temperature tables in Part I. we should have given one place of decimals, not two, and this we see that the author has done in Part II.

Table XVII., Daily Rainfall.—We should have divided the entries by the number of years, so as to give the mean daily fall, instead of the total in the 88 years.

These are the only criticisms which we have to make; their triviality is perhaps the strongest praise that we could give.

We do not see that Mr. Mossman has anywhere thrown together the principal results which he has obtained, we therefore have tried to do so:--

Data respecting the Climate of Edinburgh.

Column ...	1	2	3	4	5	6	7	8	9	10	11	12
	Mean Pressure at Sea Level	Temperature.					Humidity.	Rain.				
		Mean	Highest.		Lowest.		Mean.	Mean	Greatest.		Least.	
	in.	°	°	Date.	°	Date.	per cent	in.	in.	Date	in.	Date.
Jan.	29·818	36·8	59·0	30 '46	5·0	31 '45 29 '48	87	1·95	5·62	1867	·14	1787
Feb.	·813	38·3	64·0	28 '46	11·9	8 '95	86	1·70	6·38	1894	·13	1891
Mar.	·864	40·3	68·0	31 '44	15·0	2 '81	84	1·53	4·84	1827	·03	1781
April	·895	44·8	76·0	28 '40	23·0	17 '49	81	1·49	4·55	1871	·15	1842
May	·940	49·9	79·2	31 '81	26·0	9 '50	78	1·90	4·77	1847	·15	1844
June	·932	55·7	85·9	18 '93	32·0	4 '51	77	2·17	6·90	1853	·20	1801 1806
July	·876	58·6	86·7	16 '76	38·0	16 '45 2 '48 4 '51	79	2·81	6·57	1830	·15	1825
Aug.	·875	57·8	87·7	5 '68	35·0	30 '69	82	2·80	8·33	1877	·40	1880
Sept.	·874	53·6	81·7	6 '68	31·0	22 '44 23 '45 27 '47	83	2·40	10·69	1785	·22	1810
Oct.	·810	47·2	71·0	14 '45	24·3	20 '80	86	2·52	6·90	1864	·16	1830
Nov.	·801	40·9	62·0	17 '44	19·8	18 '85	87	2·38	6·78	1770	·38	1805
Dec.	·800	38·3	62·0	25 '43	6·4	15 '82	86	2·21	8·42	1787	·34	1843
Year	29·858	46·8	87·7	...	5·0	...	83·0	25·86	38·96	1872	15·27	1826

In the foregoing table the values in the several columns are based upon the following number of years :—

Col. 1	...	127 years,	1770–1896	Col. 7 ...	35 years, 1862–1896
,, 2	...	133 ,,	1764–1896	,, 8 to 12	120 ,, 1770–1896
,, 3 to 6		57 ,,	1840-1896		

The entries in columns 4 and 6 being rather abbreviated, it may be well to explain that the first is the day of the month on which the extreme occurred, and the latter the year, the figures 18 being omitted; therefore, the first entry shows that the highest temperature recorded in Edinburgh in January between 1840 and 1896 was 59°·0, on January 30th, 1846.

Of course, there are endless interesting details which we have not given; for instance, the extremes of barometric pressure at sea level —highest, 31·071 inches on January 9th, 1896; and lowest, 27·451 inches on January 26th, 1884. Maximum rainfall in one day, 4·20 inches, on December 9th, 1787. Then Mr. Mossman gives the mean values of pressure, temperature, &c., for each day of the year, the comparison of which with similar data for other stations offers a tempting field for study; so do the long sets of annual means, which afford excellent material for those devoted to cycles—not the two-wheeled ones, but those of x years—in more senses than one.

Ueber Moorausbrüche, von JAKOB FRÜH. [Excerpt *Vierteljahrsschrift der Naturforschenden Gesellschaft in Zurich.* Zurich, 1897, 8vo, 34 pages.

OUR readers will remember that about five square miles of bog in Killarney slipped away in December, 1896, considerable damage being caused, and several lives lost. The paper before us is not merely an epitome of the facts, but it quotes 30 other instances of a somewhat similar nature in the previous 350 years, giving, as far as practicable, localities, dates and authorities.

Herr Früh concludes his paper by stating his views as to the cause of these occurrences, and illustrating them by reference to the thirty instances of which he has given details. He discusses the subject thoroughly, and his paper is well worth reading; but it seems to us that a little further consideration as to the *daily* rainfall, rather than its total amount, and to season of the year as affecting the proportion evaporating and that penetrating, would have been desirable; and we feel nearly sure that a watchful man would always know *when* a bog was likely to "slide," and that very little engineering knowledge or expenditure would be required to prevent such an occurrence. Whether the risk is sufficiently great to justify any regular expenditure for this object is, we think, extremely doubtful, seeing that all over the world there seems to be only about one instance in six years.

Neudrucke von Schriften und Karten . . . . . von PROF. DR. HELLMANN. No. 10, Rara Magnetica, 1269–1599. No. 11, Winkler, Franklin, Dalibard, LeMonnier. Ueber Luftelektricität 1746–1753. 4to Asher & Co., Berlin, 1898.

DR. HELLMANN is going steadily on with his splendid series of reprints, and is by their publication conferring a lasting benefit upon all who care anything about the early history of Meteorology and Terrestrial Magnetism. The "Introduction" and "Remarks" to the above parts are of the same high class as in all the previous ones, and those persons who possess the complete set have facsimiles so good that we would rather have them (*with* Dr. Hellmann's notes) than the originals, practically unattainable as they nearly all are. Some idea of the scarcity may be gathered from the fact that, as Dr. Hellmann points out, the title of No. 10 might very well have been "Rara Magnetica ante Gilbertiana."

No. 11 is the more interesting to Meteorologists, and indeed it is intensely so. There is Winkler's paper (1746) on how far the sparks from electrical apparatus are to be considered analogous to lightning and thunder; this is followed by Franklin's note (1749), "Opinions and Conjectures concerning the Properties and Effects of the Electrical Matter," the account of his kite, lightning conductors, &c. —Next we expected to find Barberet's Dijon Prize Essay (1750), but Dr. Hellmann evidently considers the reference to it on page 6 sufficient, for he passes on to (1752) Dalibard's experiments at Marly-la-Ville, near Paris, and Le Monnier's (1752) *Observations sur l'Electricité de l'Air.*

ROYAL METEOROLOGICAL SOCIETY.

AN Ordinary Meeting of this Society was held on Wednesday the 19th January at the Institution of Civil Engineers. Mr. E. Mawley, F.R.H.S., President in the chair, at which the following Fellows were elected.

Samuel Barker, F.R.A.S., 9, Hanover Terrace, Regent's Park, N.W.
Robert Thomas Ford, Sunbeam, Windermere.
Leon Franklin, 19, Gower Street, W.C.
George Goût, Mem. San Inst. Beilby House, Cleethorpes.
Tom G. Longstaff, B.A. Christchurch College, Oxford.
Mrs. E. Rylands, Longford Hall, Stretford, Manchester.

At the Annual Meeting (which immediately followed) the Secretary read the Report of the Council for the year 1897, showing that there had been an increase in the number of Fellows and that the finances were satisfactory, the total income having been £1465, and the expenditure £1180.

The President, Mr. Edward Mawley, then gave an address on "Weather influences on farm and garden crops" in which he pointed out the intimate connection between Meteorology, Agriculture and

Horticulture. He explained the special characteristics of the Climate of the British Isles as regards temperature, rainfall, &c. Of all the influences brought to bear on vegetable life by the atmosphere, he considered temperature to be the most powerful and far reaching, and only second to this came rainfall. The leading effects of snow, wind, and sunshine, as well as of prolonged droughts, severe frosts and persistent rains, also were described. He then dealt with the influence of different important weather changes on such farm crops as wheat, roots, grass, &c., as well as on fruit trees, vegetables, and flowering plants in the garden. In his concluding remarks he called attention to the great want of experimental farms in conjunction with meteorological stations being established in this and other countries in Europe. For it was only by the examination of meteorological observations, together with weekly records of the extent and character of the growth made by our leading crops, that the close connection existing between weather changes and their influences on such crops could be clearly traced.

The President was accorded a hearty vote of thanks for his address and for his services during the year.

The scrutineers (Major King and Major Lamorock Flower) announced that as the result of the ballot the council for the ensuing year would be :—

President.

F. CAMPBELL BAYARD, LL.M.

Vice-Presidents.

G. CHATTERTON, M.A. M.Inst.C.E. | W. H. DINES, B.A.
R. H. CURTIS | H. R. MILL, D.Sc., F.R.S.E., F.R.G.S.

Treasurer.

H. PERIGAL, F.R.A.S., F.R.M.S.

Secretaries.

E. MAWLEY, F.R.H.S. | G. J. SYMONS, F.R.S.

Foreign Secretary.

R. H. SCOTT, M.A., F.R.S.

Council.

R. BENTLEY, F.L.S., F.R.G.S.
F. J. BRODIE
Capt. A. CARPENTER, RN., D.S.O., FZS.
O. CHADWICK, CMG., Assoc. M. Inst CE.
H. N. DICKSON, F.R.S.E.
W. ELLIS, F.R.S., F.R.A.S.
W. B. HEBERDEN, C.B.
R. INWARDS, F.R.A.S.
BALDWIN LATHAM, M.Inst. CE., FGS.
Vice-Adml. J. P. MACLEAR, RN., FRGS
C. THEODORE WILLIAMS, M.A., M.D. F.R.C.P.
Capt. D. WILSON-BARKER, F.R.S.E., F.R.G.S.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, AUGUST, 1897.

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.	Total Rain. Depth.	Total Rain. Days.	Aver. Cloud
	°		°		°	°	°	0-100	°	°	inches		
England, London	88·4	5	48·1	13	73·6	54·8	54·1	73	130·1	42·4	2·92	16	5·3
Malta	90·2	25	66·2	2*c*	86·3	70·5	67·2	73	157·9	61·8	...	...	1·2
Mauritius	78·0	21*a*	59·0	2	76·4	65·1	60·1	73	124·6	52·1	1·72	20	5·8
Calcutta	89·4	10	74·2	21*a*	86·3	78·0	77·7	89	155·9	73·4	11·74	22	8·9
Bombay	87·4	24	76·1	11	85·3	77·8	76·7	85	137·7	72·8	13·82	28	8·7
Ceylon, Colombo	88·2	...	74·2	10	86·1	78·0	74·1	82	142·0	71·0	9·09	25	7·2
Melbourne	68·1	12	34·0	10	56·0	41·8	42·9	80	116·3	24·0	2·03	15	6·7
Adelaide	66·4	27	37·7	23	60·2	44·9	44·6	76	130·4	28·4	3·45	20	6·0
Sydney	72·0	31	42·3	5	60·7	48·3	45·2	78	119·0	30·2	3·97	17	4·2
Wellington	61·5	31	35·0	13	53·5	42·7	39·6	73	115·0	24·0	4·01	21	5·0
Auckland	63·0	7	42·5	13	58·2	46·3	42·9	71	118·0	38·0	4·61	18	6·3
Jamaica, Kingston	94·0	8	71·0	26	89·5	74·0	71·7	73	...	...	2·13	8	1·9
Trinidad	92·0	3*b*	68·6	6	88·0	71·6	74·3	83	166·0	67·0	7·90	21	...
Grenada	88·2	15	72·0	11	84·0	75·4	71·5	78	157·4	...	8·16	23	3·4
Toronto	82·8	14	44·2	21	74·5	55·2	56·2	76	101·5	41·0	2·26	8	4·0
New Brunswick, Fredericton	83·2	8	42·0	24	73·1	52·2	52·9	64	...	...	3·16	9	5·0
Manitoba, Winnipeg	84·4	12	35·8	30	73·4	49·8	...	...	...	...	1·00	11	4·6
British Columbia, Esquimalt	85·5	3	45·2	1	71·9	51·7	52·8	79	...	...	·29	3	5·1

a—and 22. *b*—and 4, 8. *c*—and 31.

REMARKS.

MALTA.—Adopted mean temp. 77°·0, or 1°·2 below the average. Mean hourly velocity of wind 6·9 miles. Average sea temp. 80°·0. L on 4th, 16th and 20th.
J. F. DOBSON.

Mauritius.—Mean temp. of air 1°·0 above, of dew point 0°·9 above, and rainfall ·52 in. below, their respective averages. Mean hourly velocity of wind 14·2 miles, or 1·8 above average; extremes, 28·1 on 11th and 17th, and 2·7 on 2nd; prevailing direction E.S.E.
T. F. CLAXTON.

CEYLON, COLOMBO.—Mean temp. of air 81°·1, or 0°·6 above, of dew point 74°·1, or 1°·1 above, and rainfall 9·09 in., or 5·41 in. above, their respective averages. Mean hourly velocity of wind 11·5 miles; prevailing direction S.W. TSS on 9 days.
H. O. BARNARD.

Adelaide.—Mean temp. 1°·4 below, rainfall 1·11 in. in excess of, the average.
C. TODD, F.R.S.

Wellington.—Generally showery, with pleasant intervals. Prevailing S.E. winds, and at times cold weather. Rainfall 1·19 in. below, and mean temp. 0°·1 above, the average. Slight earthquake on 30th.
R. B. GORE.

Auckland.—The early part was fine and dry, but from the 15th to the close stormy, wet and disagreeable. Rainfall about half-an-inch over the average of 30 years. Mean temp. close to the average.
T. F. CHEESEMAN.

TRINIDAD.—Rainfall 2·42 in. below the average of 30 years.
J. H. HART.

SUPPLEMENTARY TABLE OF RAINFALL, JANUARY, 1898.

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.)	·84	XI.	Builth, Abergwesyn Vic.	4·84
II.	Dorking, Abinger Hall .	·77	,,	Rhayader, Nantgwillt ...	3·31
,,	Birchington, Thor	·67	,,	Lake Vyrnwy	6·17
,,	Hailsham	·84	,,	Corwen, Rhug	2·12
,,	Ryde, Thornbrough	·59	,,	Criccieth, Talarvor	5·04
,,	Emsworth, Redlands ...	·72	,,	I. of Man, Douglas	2·90
,,	Alton, Ashdell	·57	XII.	Stoneykirk, Ardwell Ho.	1·58
III.	Oxford, Magdalen Col..	·52	,,	New Galloway, Glenlee	4·81
,,	Banbury, Bloxham	·71	,,	Moniaive, Maxwelton Ho.	3·25
,,	Northampton, Sedgebrook	1·05	,,	Lilliesleaf, Riddell	1·10
,,	Duddington [Stamford].	·88	XIII.	N. Esk Res. [Penicuick]	2·05
,,	Alconbury	·82	XIV.	Glasgow, Queen's Park..	2·42
,,	Wisbech, Bank House...	1·29	XV.	Inverary, Newtown	8·48
IV.	Southend	·50	,,	Oban, The Corran	...
,,	Harlow, Sheering..... ...	·89	,,	Islay, Gruinart School ...	2·15
,,	Colchester, Lexden	·72	XVI.	Dollar.....	2·81
,,	Rendlesham Hall	·80	,,	Balquhidder, Stronvar...	7·64
,,	Rushall Vicarage	1·29	,,	Ballinluig	1·37
,,	Swaffham	1·26	,,	Dalnaspidal H.R.S.....	5·86
V.	Salisbury, Alderbury ...	·39	XVII.	Keith H.R.S.....	1·72
,,	Bishop's Cannings	·49	,,	Forres H.R.S.	1·65
,,	Blandford, Whatcombe .	·74	XVIII.	Fearn, Lower Pitkerrie..	1·55
,,	Ashburton, Holne Vic...	1·50	,,	N. Uist, Loch Maddy ...	5·42
,,	Okehampton, Oaklands.	1·46	,,	Invergarry.....	11·86
,,	Hartland Abbey	2·05	,,	Aviemore H.R.S.	2·37
,,	Lynton, Glenthorne ...	1·03	,,	Loch Ness, Drumnadrochit	3·07
,,	Probus, Lamellyn	1·04	XIX.	Invershin	2·81
,,	Wellington, The Avenue	·64	,,	Durness	6·67
,,	North Cadbury Rectory	1·23	,,	Watten H.R.S.....	1·43
VI.	Clifton, Pembroke Road	1·03	XX.	Dunmanway, Coolkelure	7·56
,,	Ross, The Graig	·28	,,	Cork, Wellesley Terrace	2·27
,,	Wem, Clive Vicarage ...	·71	,,	Killarney, Woodlawn ...	2·91
,,	Wolverhampton, Tettenhall	1·16	,,	Caher, Duneske	3·10
,,	Cheadle, The Heath Ho.	1·65	,,	Ballingarry, Hazelfort...	1·97
,,	Coventry, Priory Row ..	·89	,,	Limerick, Kilcornan ...	1·96
VII.	Grantham, Stainby	·90	,,	Broadford, Hurdlestown	2·01
,,	Horncastle, Bucknall ...	1·03	,,	Miltown Malbay	4·30
,,	Worksop, Hodsck Priory	·45	XXI.	Gorey, Courtown House	3·12
VIII.	Neston, Hinderton	1·18	,,	Athlone, Twyford	2·96
,,	Southport, Hesketh Park	2·62	,,	Mullingar, Belvedere ...	2·80
,,	Chatburn, Middlewood.	5·11	,,	Longford, Currygrane...	2·13
IX.	Melmerby, Baldersby ...	·52	XXII.	Woodlawn	3·68
,,	Scarborough, Observat'y	·62	,,	Crossmolina, Enniscoe ..	3·53
,,	Middleton, Mickleton ...	2·87	,,	Collooney, Markree Obs.	2·64
X.	Haltwhistle, Unthank...	2·36	,,	Ballinamore, Lawderdale	6·55
,,	Bamburgh	·49	XXIII.	Warrenpoint.....	2·13
,,	Duddon Valley, Ulpha School	7·89	,,	Seaforde..	1·32
,,	Keswick, The Bank	4·48	,,	Belfast, Springfield	2·24
XI.	Llanfrechfa Grange	·79	,,	Bushmills, Dundarave..	1·43
,,	Llandovery	4·18	,,	Stewartstown	2·07
,,	Castle Malgwyn	2·72	,,	Killybegs	4·24
,,	Brecknock, The Barracks	·96	,,	Horn Head	2·55

JANUARY, 1898.

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	Date	Days on which ·01 or more fell.	TEMPERATURE. Max. Deg.	Max. Date	Min. Deg.	Min. Date.	No. of Nights below 32°. In shade.	On grass.
			inches.	inches.	in.								
I.	ENGLAND.	London (Camden Square) ...	·73	— ·89	·30	5	9	55·0	30	29·2	11	2	8
II.		Tenterden ...	·69	— 1·21	·22	5	13	54·0	30	29·0	11	2	7
,,		Hartley Wintney ...	·73	...	·17	5	10	58·0	30	22·0	11	13	16
III.		Hitchin ...	·54	— 1·00	·17	4	10	54·0	20	26·0	10	8	...
,,		Winslow (Addington) ...	·68	— 1·13	·31	5	8	55·0	6, 21	28·0	11*c*	9	11
IV.		Bury St. Edmunds (Westley)	1·14	— ·33	·40	4	8	55·0	30	32·0	11	1	..
,,		Norwich (Brundall) ...	1·07	...	·35	4	14	56·0	5*b*	29·0	11	4	13
V.		Winterbourne Steepleton ...	1·06	...	·55	5	9	53·1	21	26·6	8	5	8
,,		Torquay (Cary Green)	·88	...	·35	20	6	55·9	21	35·6	8	0	2
,,		Polapit Tamar [Launceston]..	·90	— 2·12	·34	5	14	55·0	19*c*	24·4	14	4	7
VI.		Stroud (Upfield)	·32	— 1·88	·16	4	7	53·0	22	32·0	7*g*	3	...
,,		ChurchStretton(Woolstaston)	·69	— 1·47	·23	4	11	56·0	20	30·0	17	3	11
,,		Worcester (Diglis Lock) ...	·54	— 1·26	·25	4	11	...	..	...	...	...	...
VII.		Leicester (Rotherby Hall) ...	·97	...	·41	4	15	57·0	19	26·0	4*h*	7	18
,,		Boston	1·05	— ·34	·45	4	7	55·0	20	30·0	10	6	...
,,		Hesley Hall [Tickhill]...	·47	— 1·30	·21	4	7	57·0	30	29·0	10	5	...
VIII.		Manchester(PlymouthGrove)	1·84	— ·62	·50	4	11	55·0	20*d*	32·0	29	1	4
IX.		Wetherby (Ribston Hall) ..	·52	— 1·37	·20	2, 5	5	...	...	...	...	...	...
,,		Skipton (Arncliffe) ...	7·66	+ 2·02	1·26	30	16	...	...	...	...	...	...
,,		Hull (Pearson Park).	·73	— 1·04	·25	4	8	56·0	30*a*	29·0	10	6	10
X.		Newcastle (Town Moor) ...	·87	— ·94	·24	3	8	...	..	...	...	...	...
,,		Borrowdale (Seathwaite)...	16·08	+ 3·90	2·09	30	20	...	...	...	...	...	...
XI.	WALES.	Cardiff (Ely)...	2·07	— 1·22	·60	5	15	...	...	...	...	...	...
,,		Haverfordwest	3·69	— ·73	·83	4	20	53·4	31	28·8	10	1	11
,,		Aberystwith (Gogerddan) ...	6·36	+ 2·83	2·04	5	12	50·0	12*d*	...	...	...	...
,,		Llandudno... ...	2·32	+ ·04	·61	29	13	57·0	30	33·0	15	0	...
XII.	SCOTLAND.	Cargen [Dumfries]	3·99	+ ·22	·56	18	16	55·0	19	29·0	23	2	...
XIII.		Edinburgh (Blacket Place)...	·84	...	·19	5	13	56·5	19	32·3	5	0	8
XIV.		Colmonell	2·51	...	·60	3	13	55·0	18*e*	32·0	1*i*	3	...
XV.		Lochgilphead (Kilmory).....	...	...	...	...	...	...	...	...	...	...	...
,,		Mull (Quinish)...	5·41	— ·26	·65	7	22	...	...	...	...	...	...
XVI.		Loch Leven Sluices ...	1·90	— 1·00	·60	22	9	...	...	...	...	...	..
,,		Dundee (Eastern Necropolis)	·70	— 1·27	·30	21	15	57·0	19	29·1	5	5	...
XVII.		Braemar	1·76	— ·93	·54	21*a*	14	54·2	19	23·3	5	9	21
,,		Aberdeen (Cranford)	1·07	...	·56	21	17	59·0	19	28·0	4, 9	9	...
,,		Cawdor (Budgate) ...	2·28	+ ·11	·78	21	18	...	...	...	...	...	...
XVIII		Strathconan [Beauly] ...	4·72	— ·16	·92	22	14	...	...	...	...	...	...
,,		Glencarron Lodge...	12·97	...	1·44	26	29	53·6	19	29·0	5	4	...
XIX.		Dunrobin ...	1·90	— ·56	·30	21	13	57·0	19	30·0	3	7	...
,,		S. Ronaldshay (Roeberry) ...	4·03	+ 1·08	·50	27	23	53·0	19	34·0	3, 5*f*	0	...
XX.	IRELAND.	Darrynane Abbey...	4·58	...	1·80	4	20	...	...	...	...	...	...
,,		Waterford (Brook Lodge) ...	3·35	— ·21	·98	2	15	54·5	12*f*	28·0	10	3	...
,,		O'Briensbridge (Ross) ...	3·85	...	1·33	4	12	..	...	...	...	...	...
XXI.		Carlow (Browne's Hill) ...	3·04	+ ·14	1·12	2	12	...	...	...	...	...	...
,,		Dublin (FitzWilliam Square)	1·79	— ·07	·50	2	14	60·8	30	31·9	1	1	3
XXII.		Ballinasloe	3·52	+ ·44	·59	4	19	54·0	30	32·0	2, 5	2	...
,,		Clifden (Kylemore)	6·67	...	·94	7	19	...	...	...	...	...	...
XXIII		Waringstown ...	1·70	— ·95	·34	4	14	56·0	19	33·0	1	0	7
,,		Londonderry (Creggan Res.).	1·95	— 1·47	·23	4	20	...	...	...	...	...	...
,,		Omagh (Edenfel) ...	2·64	— ·38	·40	3	20	55·0	30	30·0	1	2	6

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

a—and 31. *b*—and 6, 19. *c*—and 23. *d*—and 30. *e*—and 19. *f*—and 21. *g*—and 9, 28. *h*—and 8, 23. *i*—and 3, 22.

METEOROLOGICAL NOTES ON JANUARY, 1898.

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.—Wells lower than ever, January having only twice been drier since 1864 (·31 in. in 1880 and ·59 in. in 1892). No snow and fewer frosts than even in 1884. Nine days with temp. over 50°. Mean max. 46°·6, or 2°·8 higher than in the similar mild, dry January of 1896; mean grass min. 36°·1, or 5°·8 higher. A remarkably calm month, with high barometer after 2nd and especially so from 10th to 30th. W. and N.W. gale on 30th and 31st. Duration of sunshine 37 hours 40 minutes; 15 days having none, and four more only a few minutes. Fog on 16th and 17th.

HARTLEY WINTNEY.—Remarkable for abnormal mildness, dryness and absence of rough weather. Mean max. temp. 47°·2. So mild was the month that the early spring flowers were in full bloom. Ozone registered on 12 days. Rainfall 1·72 in. below the average.

ADDINGTON.—With the exception of January, 1880, when only ·45 in. fell, the least January fall in 28 years. The temp. rose to, or above, 50° on ten days; no severe frost occurred, and there was no snow. On the 16th very thick fog all day and an intensely dark night. Vegetation in a very advanced state.

BURY ST. EDMUNDS, WESTLEY.—Very mild, but little sunshine. Vegetation very forward. High barometer from the 10th to 29th.

NORWICH, BRUNDALL.—Mean temp. 43°·1, being the highest recorded in January; 56° was reached three times and 55°·8 once, which value had only once before been recorded in January, viz., in 1884. Practically no R fell between the 5th and 29th. Garden flowers very forward. Foggy on 7 days. Gale from N.W. on 31st. Lunar halo on 31st.

WINTERBOURNE STEEPLETON.—Bar. very high from the 10th to the end of the month. Temp. also unusually high, the mean for the month, 44°·1, being the highest in six years. Mean relative humidity at 9 a.m., 92. Average amount of cloud at the same hour, 9·7. Fog on 6 days.

POLAPIT TAMAR.—Remarkable for extreme mildness and general absence of sunshine, rain and wind. The driest January recorded in 18 years. Fog on 13th and 14th.

WOOLSTASTON.—A month of most unusual mildness, with very little rain and not much frost. Many spring flowers blooming. Mean temp. 42°·6.

ROTHERBY HALL.—There has been no other January since 1888 with a rainfall of less than one inch. The mean temp. of the month (43°) is exceedingly high for January, and the greater part of the month was dull and foggy, with very little sunshine. What little wind there was was from the S.W., but on the evening of 30th there was almost a gale. A slight flood on the 5th.

BOSTON.—Mean temp. 5°·7 above the average for 30 years.

MANCHESTER, PLYMOUTH GROVE.—Mean temp. 43°·4, the highest January temp. in the last 31 years. No snow, and slight frost on 4 days only. The weather very mild for the season.

WALES.

HAVERFORDWEST.—January was remarkable for persistent damp foggy air, gloom and mildness, and remarkably high bar. readings. On December 31st

the bar. corrected stood at 29·139 in., it then rather rapidly rose, and although it varied, undulating like an ocean swell, it always kept at a great height, reaching its maximum, 30·647 in., on January 23rd. During the whole time R or mist and excessive damp prevailed. Primroses and other spring flowers in bloom. Prevailing wind S.W.

ABERYSTWITH, GOGERDDAN.—Very damp and mild throughout, with very little sunshine.

LLANDUDNO.—Lunar halos on 9th and 31st. Hoar frost on 10th and 15th. Stormy on 18th.

SCOTLAND.

CARGEN [DUMFRIES].—The exceptional mildness of the winter continued through January, the mean temp., 44°·5, being the highest ever recorded at this station; on only two days did the temp. fall below freezing-point, while the maximum exceeded 50° on 14; 55°, the highest ever reached here in January, being registered on 19th. The mildest Januaries during 39 years are—1866, 41°·2; 1874, 42°·1; 1875, 41°·5; 1882, 43°·1; 1884, 42°·6; 1890 42°·0; January, 1898, exceeding the highest previously recorded by 1°·4. The bar. pressure was very high; only in five years has the mean been higher since 1860. Notwithstanding this, the month was unusually gloomy, only 30 hours of sunshine being recorded, while 18 days were sunless. Light westerly winds prevailed on 20 days. Vegetation is unusually forward.

EDINBURGH, BLACKET PLACE.—Mean temp. 44°·6, being the highest January mean recorded since the commencement of temp. observations in 1764. The previous mildest January was in 1796, mean temp. 43°·8. The shade temp. never descended to 32°, which is absolutely unprecedented, while the mean on 30th, 52°·0, is the highest during 100 years. No snow fell. Mean pressure ·290 in. above average. Rainfall barely one-third of the mean. Rather strong winds during the second half of the month; S.W. gale on the 18th.

COLMONELL.—Rain 2·05 in. below, and mean temp. 8°·5 above, the average of 22 years.

S. RONALDSHAY, ROEBERRY.—A wet, mild month. Mean temp. 43°·0, or 5°·4 above the average.

IRELAND.

DARRYNANE ABBEY.—A very mild month, and on the whole dry.

WATERFORD, BROOK LODGE.—Mean temp. 8°·3 above that of January, 1897.

O'BRIENSBRIDGE, ROSS.—No frost. Mean temp. unusually high. Premature vegetation and March flowers in bloom at the end.

DUBLIN, FITZWILLIAM SQUARE.—January, 1898, establishes a record for high temperature; the mean, 47°·8, being 1°·2 above the value for the warm January of 1875, and 6°·4 above the average. The atmosphere was foggy on 8 days. High winds occurred on 8 days, reaching the force of a gale on 4. There was no snow, sleet, or hail. Temp. exceeded 50° in the screen on 21 days; while it fell to or below 32° on only one night, compared with 13 nights in 1897, 3 in 1896, 18 in 1895, 7 in 1894, 4 in 1893, 15 in 1892, 7 in 1891, 1 in 1890, and 3 in 1889. Solar halos were seen on the 1st and 2nd; lunar halos on the 1st, 3rd, 9th and 31st.

WARINGSTOWN.—The mildest January remembered, but, strange to say, snowdrops, crocuses, &c., were not as early as usual.