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DEFINITION OF A PROTRACTED DROUGHT.

THE dry period through which we are now passing has drawn attention to the above subject, and we have had more correspondence respecting it, than we have been able to deal with individually. The subject is therefore presumably one upon which some statement should be made.

Our first remark may seem rather uncourteous, but it is by no means so meant. Few persons have time to read up a subject thoroughly, and it is very much more easy to write a suggestive letter, than to weigh carefully what has been printed previously. We do not like reprinting what we have already written, but eight pages of *British Rainfall*, 1887, were devoted to considering "What is a Drought?" and yet not one of our correspondents refers to, or deals with, the difficulties pointed out in that paper.

The definitions of "Absolute" and of "Partial" Droughts have been accepted, there is therefore no need to refer to them.

Three others were mentioned, and of them the third was considered the best.

(1). *Long Droughts*. Periods of not less than 60 days with a total rainfall of less than 2.00 in."

This was rejected as being merely a modified form of the "Partial Drought," and partly also because of the tautology involved in speaking of "a long drought of 68 days."

(2) *Dry Periods*. This was an attempt to reduce to strict definition what is meant by a Hydraulic Engineer when he says that he must provide "for a drought of 160 or 180 days." He does not mean a rainless period of that duration, nothing of the kind ever occurred in this country, what then does he mean? We devoted about a page to pointing out the difficulties of deciding upon any satisfactory definition, and finally submitted

(3) "*Engineer's Drought*. A period of three or more consecutive months of which the rainfall is less than half the average."

On the following page we give the rainfall at Camden Square for 41 years, all those monthly totals which are less than half the mean fall for the month being printed in black type. It will be seen that this occurs about once in five months, but with extreme irregularity, e.g., from October, 1865, to October, 1867, 25 months,

Total Rainfall at Camden Square, Middlesex, in each month of the Years 1858-99.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
1858	88	1.80	69	2.90	2.76	92	3.01	1.10	85	1.58	53	1.75	18.77
1859	72	1.23	1.33	2.61	2.13	2.90	2.93	2.65	4.04	2.53	2.90	2.24	28.21
1860	1.97	1.25	1.87	1.45	3.57	5.47	2.26	4.48	2.92	1.77	2.72	2.51	32.24
1861	43	1.93	2.43	1.30	1.39	2.13	2.42	94	2.15	1.05	4.65	1.45	22.27
1862	1.92	31	3.69	2.30	3.06	2.43	2.61	2.74	2.19	3.50	1.13	1.71	27.59
1863	2.80	67	85	52	1.27	4.86	92	1.44	3.49	1.62	1.84	1.31	21.59
1864	1.02	85	2.62	82	1.86	1.28	62	1.33	2.55	1.13	2.49	36	16.93
1865	3.90	2.01	1.12	33	3.40	2.21	2.33	4.10	55	6.22	1.96	1.35	29.48
1866	3.90	3.72	1.69	1.76	2.03	3.98	1.19	2.76	3.89	2.32	1.73	2.63	31.60
1867	2.81	1.44	2.48	2.36	2.45	1.22	4.30	2.63	2.23	1.92	86	1.59	26.29
1868	3.89	1.21	1.28	1.50	1.58	78	45	2.28	1.74	2.54	1.03	5.12	23.40
1869	2.76	2.48	1.97	1.28	3.27	1.03	62	1.26	3.56	1.87	2.38	2.94	25.42
1870	1.38	1.21	2.31	47	70	83	1.22	2.69	2.00	3.68	1.76	3.07	21.32
1871	1.99	1.27	1.19	2.84	92	3.49	4.12	85	5.28	1.34	60	1.13	25.02
1872	3.46	96	2.66	1.39	3.05	2.55	2.57	2.05	1.64	5.20	3.98	4.35	33.86
1873	2.44	1.96	1.46	55	1.56	2.24	1.81	2.87	2.46	2.97	1.87	48	22.67
1874	1.18	91	39	1.26	1.14	2.05	82	1.32	2.62	3.34	2.21	1.58	18.82
1875	3.22	1.06	69	1.53	1.61	2.40	4.63	1.79	2.86	4.35	3.36	94	28.44
1876	94	1.97	2.96	1.90	94	1.27	81	1.79	2.86	1.40	3.07	6.25	26.16
1877	4.74	1.78	2.38	2.59	1.91	42	3.94	2.23	82	1.97	3.88	1.51	28.17
1878	1.31	1.49	1.12	4.97	3.89	6.71	64	6.72	83	1.99	2.95	1.46	34.08
1879	2.87	3.77	91	2.72	3.46	4.76	4.17	5.11	3.67	80	72	86	33.82
1880	31	2.33	79	2.15	26	4.04	5.11	45	4.04	5.78	1.85	3.17	30.28
1881	1.85	3.09	2.30	46	1.52	1.72	1.85	4.89	2.03	2.99	2.75	2.47	27.92
1882	1.30	1.30	1.35	2.33	1.20	2.30	2.95	1.48	2.39	4.96	2.57	2.51	27.14
1883	2.08	3.62	86	1.56	1.97	1.35	2.92	93	3.83	1.75	2.78	75	24.40
1884	2.30	1.40	1.41	1.02	78	2.84	2.46	89	1.77	99	1.92	2.57	20.35
1885	1.43	2.86	1.65	2.32	2.63	1.99	52	85	4.30	3.73	3.31	1.05	26.64
1886	4.02	63	1.38	1.22	4.79	63	2.37	76	1.73	2.43	2.71	4.34	27.01
1887	1.26	48	1.65	1.41	1.45	91	1.07	3.15	1.81	1.24	3.40	1.38	19.21
1888	90	78	3.34	2.37	1.18	2.31	4.91	3.61	1.43	1.23	4.38	1.29	27.73
1889	81	2.28	1.36	2.06	3.22	2.03	2.64	1.80	1.77	3.75	89	1.23	23.84
1890	2.46	1.04	1.76	2.02	1.25	2.82	4.19	1.55	64	1.20	1.62	68	21.23
1891	1.80	01	2.01	1.13	2.72	86	3.82	4.75	1.03	4.80	1.98	3.24	28.15
1892	50	1.62	1.04	99	1.51	2.46	1.62	3.06	2.12	3.78	2.53	1.37	22.60
1893	1.44	2.87	32	24	80	73	2.46	1.61	1.07	3.87	2.16	2.23	19.80
1894	2.87	1.74	1.18	1.74	1.85	1.84	3.25	2.85	1.04	4.45	2.85	2.28	27.94
1895	1.96	12	1.42	1.34	34	30	3.42	3.09	1.28	2.84	3.17	2.19	21.47
1896	78	29	3.20	55	14	2.27	1.03	1.92	5.51	3.05	1.17	3.61	23.52
1897	2.05	2.75	3.42	1.57	1.08	1.87	64	2.92	2.75	56	1.05	2.20	22.86
1898	73	1.08	1.46	1.01	2.26	1.11	1.09	1.18	33	2.96	1.94	2.54	17.69
1899	2.52	2.00	50	2.64	1.38	1.49	1.45	...	...	...	...	...	...
Mean, 1858-97	2.02	1.61	1.71	1.66	1.92	2.23	2.39	2.39	2.39	2.71	2.30	2.13	25.46

there was no such month, and from May, 1881, to July, 1883, there were 27 consecutive months without such a month; on the contrary during the 36 months ending with December, 1898, instead of the average of 7, there were 13.

The yearly numbers have been—

1858...	6	1868...	3	1878...	2	1888...	3	1898...	5
9...	1	9...	2	9...	3	9...	2	9...	1
1860...	0	1870...	3	1880...	4	1890...	3		
1...	3	1...	4	1...	1	1...	3		
2...	2	2...	0	2...	0	2...	1		
3...	4	3...	2	3...	2	3...	5		
4...	4	4...	2	4...	3	4...	1		
5...	2	5...	2	5...	3	5...	3		
6...	1	6...	3	6...	3	6...	5		
7...	1	7...	2	7...	4	7...	3		
Total.	24		23		25		29		

The distribution of these less-than-half-the-average-months throughout the year is very equable, the only inequality being that (as the result of TS rains) they are rather more frequent than usual in June and July.

Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
10	8	7	8	8	11	13	9	9	9	8	7

We have examined the table for instances fulfilling the definition (3) quoted above, and have obtained the following "Engineer's Droughts"—

PERIOD.		Duration in Months.	Total Rain.	Half-Mean Rain.
			in.	in.
1858.	Aug.—Nov.	4	4·06	4·90
1863.	Feb.—May	4	3·31	3·45
1868.	May—July	3	2·81	3·27
1869.	June—Aug.	3	2·91	3·51
1870.	Apr.—July	4	3·22	4·10
1871.	Oct.—Dec.	3	3·07	3·57
1873-4.	Dec.—Mar. ...	4	2·96	3·73
1879-80.	Oct.—Mar....	6	5·81	6·24
1884.	Aug.—Oct.	3	3·65	3·75
1885.	June—Aug.	3	3·36	3·51
1890-1.	Sept.—Feb. ...	6	5·95	6·58
1893.	Mar.—July	5	4·55	4·95
1895.	Jan.—June	6	5·48	5·58
1896.	Apr.—July	4	3·99	4·10
1897-8.	Oct.—Jan. ...	4	4·54	4·58
1898.	June—Sept.	4	3·71	4·70

In computing the above we have come upon a fact which we do not like, and which seems to show that this definition will not do *as it stands*. We had better illustrate this by an actual case—

1893.	Total Rain.	Mean. 2	Deficiency Monthly.	Cumulative.
	in.	in.	in.	in.
March.....	·32	·85	— ·53	— ·53
April	·24	·83	— ·59	— 1·12
May	·80	·96	— ·16	— 1·28
June	·73	1·12	— ·39	— 1·67
July	2·46	1·19	+ 1·27	— ·40
	4·55	4·95		

The drought had evidently ceased after June, but the total of the *five* months is less than half the mean for the five months, and therefore a month is included which apparently would be better out, though after such a dry period it is doubtful whether the excess of 1·27 in. would be of use.

This evil might be cured by specifying that *all* the months must have less than half the mean ; but this would give only two droughts of 4 months in 41 years, in 1893 and in 1898, and three others of 3 months, viz., in 1863, 1870, and 1879.

Another objection to this definition is that until you have accumulated at least twenty or thirty years observations, you cannot tell precisely what your monthly mean is, and therefore cannot tell whether you have a drought or not.

But on the other hand if the definition specifies any fraction of an inch per week or month, droughts would never be recorded in wet districts, or else would occur every month or two in dry ones.

That is one objection to the suggestion made by the Rev. H. A. Boys in the interesting letter which we append. There are two others—(1) Individual observers can easily work up a drought at one station, but if they are to be worked out at headquarters (and we should certainly not print them without checking) it will imply that we must have another assistant—there must be some limit to the work thrown upon us. (2) The effect of droughts is so very different according to the season at which it occurs that it would be much better if this could be recognised.

We agree with Mr. Boys that the subject “bristles with difficulties.”

WANTED—A DEFINITION OF A PROTRACTED DROUGHT.

To the Editor of the Meteorological Magazine.

SIR,—During the 156 days from February 16th to July 21st inclusive, *i.e.*, for more than 5 months, the rainfall here was only 5·77 in. in all, or not quite ·037 in. per diem.

During the 87 days from April 26th to July 21st inclusive, that is, during the time when rain is most wanted in at least fair quantity, I measured only 2·57 in., or just over ·029 in. per diem.

The state of my garden, my pond, and my well, impels me to ask whether we do not need a definition of a “Protracted Drought ?”

For all practical purposes a protracted drought concerns us much more than an "absolute" and a "partial" drought which just come within their respective definitions. This July has seen a far more injurious drought than June or March, though it can chronicle neither "absolute" nor "partial" drought by the definition.

I am well aware of the difficulty of framing a satisfactory definition of a protracted drought, for regard should be had to the season of the year—the spring and early summer months being those when a long drought is most serious—and to the average rainfall of the station concerned; but I offer the following as a fairly suitable basis for a definition where the average annual rainfall is not above 35 ins.

Let a protracted drought be claimed for—

60 days, or 2 months, with not more than	·02 in. per diem.
90 " " 3 " " " " "	·03 "
120 " " 4 " " " " "	·04 "

and intermediate numbers of days in proportion.

The allowance per diem must clearly be on a sliding scale; and the above scale can hardly be called too lax, seeing that it would allow me only 2·52 in. for my 87 days of drought. The subject bristles with difficulties, but they should not be beyond solution.

Yours truly,

H. A. BOYS.

North Cadbury Rectory, Somerset, August 1st, 1899.

NOTES ON THE THUNDERSTORMS OF JULY 22ND–23RD.

CITY ROAD, LONDON, E.C.—TS in early hours of 23rd; R ·97 in.
J. Bigwood.

TENTERDEN.—TS 10 p.m., 22nd, till 1 a.m. on 23rd; R ·81 in.
J. E. Mace.

RIVERHEAD VICARAGE, SEVENOAKS.—Heavy R 10.30 to 11.45 a.m. on 23rd, probably 1·30 in.; the total for the day was 1·48 in.
J. Burn Murdoch.

REDLANDS, EMSWORTH.—TS passed from S.W. to N.W. between 1.50 and 4.10 p.m., 23rd, yielding 1·58 in. of R. *F. Jacob Hood.*

BROOMFIELD HALL, CHELMSFORD.—Very heavy TS from 5.30 to 7.0 a.m., R about 2·00 in., the total up to 9 a.m., 23rd, 2·78 in.
W. Impey.

BEECH HOLME, BOCKING, BRAINTREE.—TS from 2.30 to 9.0 a.m., 23rd, with 2·24 in. of R. During the previous ten years the greatest fall on one day had been 1·87 in. on July 26th, 1894. *T. Taylor.*

SUDBURY.—Heavy R from 3 to 8 a.m., total ·88 in., and in the 24 hours (mostly before 6 p.m., 23rd) the total was 2·31 in.
J. Alexander.

GELDESTON, BECCLES.—R for 23rd 0·78 in., and for 24th 1·26 in.
E. T. Dowson.

STEEPLETON MANOR, DORCHESTER.—TS and heavy R, 6 to 9 a.m., 23rd ; total (entered to the 22nd), 1·39 in. *H. Stilwell.*

SOUTHTOWN HOUSE, KENTON, EXETER.—The R on the night of July 22nd–23rd was unprecedented during the 21 years I have lived here. A TS began at 7.45 p.m. on 22nd, with jagged H. Although no drains were choked, they were insufficient to carry the water, which consequently flowed through the house. Several chickens were drowned in their coops. In less than an hour 1·10 in. of R fell, and during the rest of the night there was a further fall of ·11 in., making the total 1·21 in. *G. H. Courtenay.*

A HOT MORNING IN CHELTENHAM.

To the Editor of the Meteorological Magazine.

SIR,—The abnormal heat at 9 a.m. on 20th July, 79°·7, has never been surpassed here during the past twenty-two years, and was reached once only on June 26th, 1878. On August 18th, 1893, it was 79°·2, and on July 20th, 1878, it was 78°·7. These are the only dates on which the shade temperature at 9 a.m. during the above period was within at least two degrees so high.

The maximum temperature was by no means so high as would be expected, as it reached only 86°·0.

Faithfully yours,

RICHARD TYRER, B.A.

The Observatory, Cheltenham, July 22nd, 1899.

ERRATA IN METEOROLOGICAL MAGAZINE, 1898.

REGULAR TABLE.

Glencarron	July ...	Total rain should be 6·66 in. not 5·66 in.
Wetherby, Ribston ...	February...	„ „ „ 1·09 „ „ 1·04 „
Carlow, Browne's Hill	Nov. Diff. from average	„ +1·35 „ „ —1·35 „

SUPPLEMENTARY TABLE.

Ballinamore, Lawderdale...	Jan....	Total rain should be 2·61 in. not 6·55 in.
North Cadbury Rectory ...	April..	„ „ „ 2·01 „ „ 1·85 „
New Galloway, Glenlee ...	Nov... ..	„ „ „ 6·66 „ „ 6·96 „

DRYNESS AT PARKSTONE, DORSET.

To the Editor of the Meteorological Magazine.

SIR,—Perhaps the enclosed record of another very dry day (July 30th) may be of sufficient interest for a place in the Monthly Magazine :—

Year. Month, Day.	Time.	Dry Bulb.	Wet Bulb.	Dew point.	R. H.	
1886. July 4	2. 5 p.	85.2	63.1	48.7	28	The R. H. was 34 and below from noon to 6 p.
	3. 5 p.	85.6	63.3	48.8	28	
1887. July 4	3. 5 p.	83.6	62.5	48.5	30	The R. H. was 35 and below from noon to 4 p.
1892. April 2	3. 0 p.	69.7	49.9	34.6	27	The R. H. was 30 and below from 2.30 p. to 5.30 p.
	3.15 p.	69.5	49.3	33.6	27	
April 3	2. 0 p.	67.9	49.5	35.0	29	The R. H. was 36 and below from noon to 4 p.
	3. 0 p.	67.7	49.1	34.4	29	
1893. May 11	3. 0 p.	71.9	52.7	38.2	29	The R. H. was 31 and below from 3 to 5 p., and 40 and below from 9.15 a. to 6 p.
June 16	1. 0 p.	85.1	64.1	50.3	30	The R. H. was 35 and below from 0.15 p. to 3 p.
1899. July 30	1.20 p.	84.2	64.3	51.2	32	The R. H. was 40 at noon, and 39 at 6 p.
	2. 0 p.	86.7	66.1	52.8	31	
	2.30 p.	85.0	64.5	51.0	31	
	3. 0 p.	87.0	65.5	51.6	30	
	3.15 p.	86.8	65.1	51.2	29	
	3.30 p.	86.7	65.9	52.5	31	
	3.45 p.	86.5	66.2	53.1	32	

With a max. temp. of $87^{\circ}6$, July 30th was the hottest day since June 19th, 1893, when the max. was $87^{\circ}9$, and the driest day since June 16th of same year. I give all the days on which the R. H. was 30 and under since April, 1882, when I began observations, and some of which I believe you have had before in detail. It will be seen that the greatest difference between dry and wet was $22^{\circ}3$ on July 4th, 1886, but the lowest R. H. was 27, with a difference of $20^{\circ}2$ on April 2nd, 1892, the temperature being 16° lower.

I remain, yours very truly,

R. H. BARNES.

P.S.—July rainfall here 0.51 in.

Heatherlands House, Parkstone, Dorset, August 1st, 1899.

THE MOON IN RELATION TO AIR TEMPERATURE.

To the Editor of the Meteorological Magazine.

SIR,—Those who read my letter, "On a recent recurrence in weather," and Mr. Helm Clayton's a little later, may have found it difficult, I think, to account for the vigour, not to say vehemence, of Prof. Hazen's onslaught! For myself, I distinctly said that "I do not affirm lunar influence in the case;" pointed out that the recurrence noticed in those eight months was not met with some time, at least, previous; and hinted that it might disappear in future (which it has apparently done). This "extremely wild" letter merely suggested a matter that seemed worth investigating. The striking relations brought out by Mr. Helm Clayton, and, I may add, the researches of Herr Barthe in Germany,* further show the interest of the subject.

It seems to me that there are some weak points in Prof. Hazen's argument. He sets out with a remarkable "established fact," got by "*a priori* reasoning," viz., that "the moon can have no effect on temperature." Are we really in possession of such a fact, so gained? Then we may at once close our book of records. For not only is this recurrence in eight months inadequate to prove lunar influence (it is admittedly so in any case), but any amount of such recurrence, with the utmost regularity, if we found such, would obviously have no weight whatever. We have a true doctrine about the moon which cannot be disturbed.

One is prompted, however, to ask, Is this science? Does it not rather savour of obscurantism? If we grant (as we may) that the moon gives too little heat to materially affect air temperature, are there not other ways in which she might do so? The chain of causation in nature is sometimes "far to seek," as where Huxley connected the fertilisation of red clover with the number of old maids in the country (through bees, field-mice and cats). But here we need not, I think, be greatly at a loss, if explanation were required; for, a connection of the moon with temperature through barometric pressure is surely not very unthinkable. Not only is it *a priori* very probable that the moon influences air-pressure, but we have some good evidence of such action (through the researches of Garrigou Lagrange, Poincaré and others). Prof. Hazen says that "changes of temperature are due entirely to the progress of high and low pressure areas, &c." These are, no doubt, proximate causes, but what of more remote ones? Do we know enough about these things to be able to say that the moon has nothing to do with the course of such areas? No thoughtful meteorologist, I feel sure, will say so. And even if the conditions of that progress were clearly understood, might not the moon be concerned in the "several other conditions, not clearly

* *Das Wetter*, March. Taking the lunations of 1896-98, he finds, on an average, a maximum of temperature shortly before new moon, and a minimum shortly before full moon.

understood?" In short, it seems important to keep an open mind in view of the countless possibilities in Nature.

The figures given by Prof. Hazen I cannot regard as necessarily fatal to the view in question, considering the possibility of a meteorological influence being at one time apparent, at another masked. If this be a sound principle (as I believe it is, though it must be applied with care and judgment), then the mere "massing of statistics" (those of times of "apparent" and "masked" influence alike) may lead to obscurity rather than to the eliciting of truth.

I am not prepared, however, to say that this principle applies with satisfactory results in the present case; and, what little further study I have given to the matter has not, thus far, I think, yielded such evidence as to put the lunar relation beyond doubt.

The following notes may, perhaps, save some labour of inquiry on the part of others. The total length of the "recent recurrence" appears to be *ten* lunations (June, 1898, to March, 1899). Having gone through the lunations since 1880, I am able to say something about the frequency of those long spells. Each case with the new-moon week (relatively to the average) *warmer* than the full-moon week before, is represented by a *plus* quantity (call them A cases); and each with new-moon week *cooler*, by a *minus* (B cases). In 1894 came a long spell of 8 A cases (February to September), and in 1896-97 two spells of 6 A cases each, divided by one B case (February, 1896—February, 1897). These are the only spells of this class coming up to *six* lunations. It is a curious fact that while A cases preponderate in the nineties (64 against 46), B cases preponderate in the eighties (70 against 53). A cumulative curve, got through algebraic addition, step by step, of the successive items, goes steadily down (on the whole) in the eighties, but mounts in the nineties, at least from about 1892 (pointing, perhaps, to some slow secular change?) In the eighties the longest spells are those of B cases, and they do not exceed six lunations. There are three groups of six—one in March to October, 1882; another, December, 1883, to May, 1884; the third, July to December, 1887. These facts may be left for the consideration of your readers; and I would merely note the practical, as well as theoretical, interest of these long spells in our weather.

With regard to another point in Prof. Hazen's letter, I would invite attention to the section on "lunar periods" in M. Angot's excellent "*Traité élémentaire de Météorologie*" (1899). As to lunar influence on weather, he considers that we cannot at present affirm it; but also we cannot deny its possible existence. "En tous cas," he remarks (p. 400), "elle se manifesterait par des phénomènes complexes, tels que le déplacement des zones de hautes et de basses pressions, et pourrait ainsi se traduire par des résultats immédiats très différents d'une région à l'autre" (a view which seems more philosophical than that of our present critic).—Yours faithfully,

ALEX. B. MACDOWALL.

R E V I E W .

Quelques Recherches sur les centres d'action de l'Atmosphère. II. La Pluie par H. Hildebrand Hildebrandsson. K. Svenska Vetenskaps-Akad. Hand. Band 32 No. 4. 4to., Stockholm, 1899, 22 pages, 4 plates.

ON receiving this paper we glanced rapidly through it, noticing chiefly the lines printed in *Italics*—for instance on page 5, “The diagram shows that the depth of rain during the cold season of different years is almost always opposite” at each of certain pairs of stations.

On page 6, “Now the rainfall of Siberia from October to March is generally inverse to that which falls during the subsequent wet season in India.”

Lastly, on page 9, “During 15 consecutive seasons there exists a satisfactory concordance between the winter rainfall of British Columbia and that of the following autumn at the Azores.”

Needless to say that we resolved upon reading the whole memoir, and examining the curves—for there are few things more tempting to the meteorologist than the chance of knowing what is to happen six months hence. We may say at once that with regard to the third of the above extracts the figures and diagram show an agreement between the records at British Columbia and at the Azores to which no word is so appropriate as “marvellous,” but the demonstration would be immensely strengthened if a chain of stations on the line joining these widely separated localities showed analogous or even opposite features. We admit the similarity of the curves, and we hope that they prove interdependence and relation, but we should like confirmatory evidence.

The three curves which form Diagram No. 29 fit very well and quite justify Dr. Hildebrandsson's remarks “With only one or two exceptions they show that the winter rains at Thorshaven have the same character as the *previous* summer at St. John's, Newfoundland and as the *following* summer at Berlin.”

There can be no question as to the interest, or the importance, of the research upon which Dr. Hildebrandsson has entered, everybody will wish him success. We notice his complaint respecting the difficulty of obtaining in Continental cities the publications of British Colonies, and his offer to exchange publications. Until statesmen learn a little meteorology, we have no hope that Directors will be allowed a free hand in the distribution of their reports; but our opinion is that (1) the number of copies authorised is too small, (2) that the Directors are so short-handed that they have to do clerical work of which they ought to be relieved, so as to give them more time to keep in touch, and in correspondence, with workers in the Northern Hemisphere. It is not economy to make a man do so much routine that he has not time to think.

RESULTS OF METEOROLOGICAL OBSERVATIONS

AT

CAMDEN SQUARE FOR 40 YEARS, 1858-97.

JULY.

YEAR.	RAINFALL.				TEMPERATURE.												CLOUD.
	Total.		Max. Fall.	Falls of 1 in. or +	Dry. Mean, 9a.&9p.	Wet. Mean, 9a.&9p.	ShadeMax		Shade Min		Sun Max. Black.		Grass Min.		Aver		
	Depth	Days					Abs.	Aver	Abs.	Aver	Abs.	Aver	Abs.	Aver			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
	in.		in.												0-10		
1858..	3.01	10	.77	0	61.2	56.4	87.4	73.3	44.7	51.9	..	..	..	..	5.6
1859..	2.93	8	.96	0	68.0	62.9	91.9	81.2	47.5	58.4	..	..	..	..	4.4
1860..	2.26	12	.76	0	58.7	55.3	75.9	69.9	41.4	51.2	..	..	38.1	48.5	6.6
1861..	2.42	18	.40	0	61.5	57.2	76.8	71.9	48.2	53.8	..	..	40.8	48.8	5.7
1862..	2.61	15	.59	0	59.6	55.4	80.2	70.3	43.3	50.7	..	..	38.8	47.3	6.1
1863..	.92	3	.49	0	61.2	56.7	85.0	74.2	40.3	50.2	..	..	32.8	45.4	4.1
1864..	.62	6	.18	0	62.5	58.9	86.6	76.2	45.5	51.9	..	..	38.5	48.6	6.2
1865..	2.33	15	.87	0	64.2	59.8	85.3	77.6	46.8	55.4	..	..	43.6	51.0	4.7
1866..	1.19	11	.24	0	61.4	57.5	87.2	72.9	46.8	53.3	..	..	36.3	45.9	5.3
1867..	4.30	14	1.82	1	60.5	55.9	76.9	70.9	44.0	52.0	..	..	38.7	48.6	5.4
1868..	.45	3	.22	0	68.1	61.1	93.3	82.4	48.0	56.5	..	..	45.2	53.8	4.1
1869..	.62	5	.38	0	64.5	60.0	91.0	77.8	47.5	54.8	..	..	43.8	51.8	5.1
1870..	1.22	11	.31	0	65.7	59.6	90.8	78.3	44.6	56.6	136.8	119.6	41.9	53.1	5.5		
1871..	4.12	18	1.23	1	61.5	57.2	82.2	72.6	45.8	54.4	131.0	117.1	45.2	53.5	6.2		
1872..	2.57	13	.89	0	65.5	60.6	92.3	78.5	47.2	56.6	132.9	123.2	45.2	54.6	5.4		
1873..	1.81	12	.97	0	63.7	58.5	90.1	76.1	45.8	54.1	135.2	123.1	43.1	51.4	5.5		
1874..	.82	11	.22	0	64.6	59.8	90.8	78.4	47.3	54.6	134.0	123.4	42.6	52.4	4.3		
1875..	4.63	17	1.29	1	59.6	56.3	80.4	69.8	42.5	52.2	129.0	107.7	36.6	49.8	5.8		
1876..	.81	7	.27	0	65.9	60.2	92.6	78.7	47.3	56.7	134.2	121.9	40.8	53.5	4.9		
1877..	3.94	14	.70	0	62.1	57.6	87.1	71.9	43.6	53.0	133.9	115.6	32.0	49.5	6.0		
1878..	.64	7	.28	0	63.7	59.3	86.2	75.1	43.5	55.2	135.2	121.6	41.1	52.5	5.4		
1879..	4.17	20	.91	0	58.3	55.5	80.2	67.7	45.6	52.1	130.3	107.7	41.6	49.7	7.9		
1880..	5.10	23	.85	0	61.6	57.6	79.2	72.5	47.5	54.5	132.0	118.8	45.0	51.7	6.5		
1881..	1.85	14	.55	0	65.5	59.1	94.6	77.9	44.3	55.8	137.7	119.8	38.3	52.0	4.9		
1882..	2.95	18	.95	0	60.4	56.2	77.8	71.5	46.0	53.0	128.8	116.4	44.1	50.3	6.1		
1883..	2.92	14	1.43	1	60.0	55.5	84.7	70.5	42.1	52.1	127.6	112.9	38.6	48.1	6.3		
1884..	2.46	17	.60	0	63.2	59.1	86.9	74.1	42.2	54.4	125.0	111.8	35.7	50.0	6.3		
1885..	.52	6	.25	0	63.3	57.6	90.4	76.6	47.6	54.7	129.3	117.0	40.5	49.6	5.3		
1886..	2.37	11	.66	0	63.0	57.8	87.5	74.4	44.4	54.4	133.4	117.0	40.0	50.0	5.5		
1887..	1.07	9	.29	0	66.0	59.8	88.8	78.9	45.6	55.6	133.4	123.1	43.8	51.9	4.0		
1888..	4.91	26	.90	0	58.1	55.3	72.7	67.1	42.8	52.3	120.2	105.9	41.6	50.3	7.6		
1889..	2.64	17	.86	0	61.0	56.6	80.9	71.0	46.1	54.0	126.3	111.7	41.4	50.7	6.8		
1890..	4.19	14	1.67	1	59.9	55.6	76.2	69.3	42.4	52.6	126.9	111.5	40.6	51.0	6.3		
1891..	3.82	17	.76	0	60.4	56.2	84.3	70.6	44.6	52.8	127.1	113.4	40.3	48.6	5.8		
1892..	1.62	9	.68	0	59.9	55.3	81.7	70.5	46.3	52.2	129.0	113.4	41.6	48.1	6.5		
1893..	2.46	17	.46	0	62.9	57.7	90.7	74.5	47.3	55.2	130.3	115.6	43.0	51.8	5.9		
1894..	3.25	17	1.12	1	62.2	58.0	88.2	73.0	48.9	54.8	128.2	114.1	42.6	50.9	6.8		
1895..	3.42	12	.57	0	62.0	56.5	82.0	72.7	47.7	54.6	125.2	114.1	43.1	50.7	6.0		
1896..	1.03	7	.49	0	64.6	58.3	88.7	77.5	47.7	55.2	133.0	119.3	41.1	49.4	5.7		
1897..	.64	8	.38	0	64.1	58.3	83.6	75.8	44.0	55.3	130.1	117.8	36.1	49.9	4.0		
Mean ...	2.39	13	.71	0.2	62.5	57.8	85.2	74.1	45.4	54.0	130.6	116.2	40.6	50.4	5.7		
Ex- tremes {	5.10	26	1.82	1	68.1	62.9	94.6	82.4	48.9	58.4	137.7	123.4	45.2	54.6	7.9		
	.45	3	.18	0	58.1	55.3	72.7	67.1	40.3	50.2	120.2	105.9	32.0	45.4	4.0		

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, FEBRUARY, 1899.

STATIONS. (Those in italics are South of the Equator.)	Absolute.				Average.				Absolute.		Total Rain.		Aver.
	Maximum.		Minimum.		Max.	Min.	Dew Point.	Humidity.	Max. in Sun.	Min. on Grass.	Depth.	Days.	
	Temp.	Date.	Temp.	Date.									
	°		°		°	°	°	0-100	°	°	inches		
England, London	64·8	10	24·9	27	48·6	35·8	36·4	82	95·6	22·1	2·00	11	5·2
Malta.....	66·1	1	44·0	6	61·5	50·6	49·4	85	129·6	40·0	1·52	9	3·3
Cape of Good Hope ...	94·6	23	49·7	7	78·9	59·5	57·0	73	...	...	·22	1	2·6
Mauritius.....	87·4	9	69·1	6	84·3	74·1	71·5	81	162·3	63·4	7·24	20	6·6
Calcutta.....	87·6	26	50·4	2	82·5	60·8	57·6	63	144·0	40·5	·06	2	2·0
Bombay.....	88·4	3	65·9	19	82·8	69·0	64·9	69	136·0	56·4	·00	0	1·2
Ceylon, Colombo	93·7	28	68·5	5	89·2	71·9	70·0	76	153·0	65·6	2·78	4	0·8
Melbourne.....	101·8	14	48·2	2	82·4	58·3	53·5	57	153·8	41·9	1·44	2	3·4
Adelaide	113·6	12	50·0	28	91·5	65·5	52·0	41	167·8	44·6	1·50	7	3·1
Sydney	83·1	27	56·6	1	76·4	64·6	64·8	67	146·9	52·6	1·04	13	5·4
Wellington	73·0	16	44·0	10	66·9	53·7	49·6	68	135·0	36·0	8·42	7	4·1
Auckland	84·5	17	50·0	9	74·4	59·1	55·0	67	141·0	43·0	1·86	7	3·8
Jamaica, Kingston.....	88·6	24	63·9	24	85·9	67·8	64·8	74	...	...	·49	4	3·2
Trinidad	89·0	1	63·0	4	86·1	67·3	67·9	76	161·0	60·0	1·82	11	...
Grenada.....	84·0	7	67·8	16	80·1	70·6	68·7	76	150·4	...	7·16	20	2·0
Toronto	46·2	26	—12·6	11	25·5	11·9	18·0	80	66·2	—16·5	1·73	11	5·7
New Brunswick, Fredericton	43·9	18	16·3	8	24·1	4·0	4·7	66	...	...	3·63	11	4·9
Manitoba, Winnipeg ...	35·8	20	—16·5	8	3·7	—17·4	...	...	...	...	·84	7	4·5
British Columbia, Esquimalt.....	52·9	19	12·1	4	41·8	33·7	...	...	...	...	5·36	20	7·9

REMARKS.

MALTA.—Adopted mean temp. $55^{\circ}\cdot 2$, or $1^{\circ}\cdot 3$ above average. Mean hourly velocity of wind 10·3 miles, or 1·6 miles below average. Mean temp. of sea $61^{\circ}\cdot 2$. L on 22nd and 23rd. J. F. DOBSON.

MAURITIUS.—Mean temp. of air $0^{\circ}\cdot 3$ below, of dew point $1^{\circ}\cdot 4$ above, and rainfall ·38 in. above, their respective averages. Mean hourly velocity of wind 9·7 miles, or 1·7 below average; extremes, 24·8 on 1st, and 2·6 on 5th and 18th; prevailing direction E. by N. and variable. L and T on 4th, 9th and 21st, and T on 10th, 18th to 20th and 28th. T. F. CLAXTON.

CEYLON, COLOMBO.—Mean temp. of air $79^{\circ}\cdot 6$, or $0^{\circ}\cdot 5$ below, of dew point $0^{\circ}\cdot 3$ below, and rainfall ·38 in. above, average. Mean hourly velocity of wind 7·1 miles; prevailing directions, N.E., S.W. and W. TSS on 3 days. H. O. BARNARD.

ADELAIDE.—A very hot and dry month, the mean max. temp. being $5^{\circ}\cdot 5$ above the average of 42 years. C. TODD, F.R.S.

SYDNEY.—Mean temp. $0^{\circ}\cdot 5$ below, humidity 9·9 below, and rainfall 4·21 in. below, average. Weather still very dry over all western districts. H. C. RUSSELL, F.R.S.

WELLINGTON.—Very wet during the early part of the month, especially between 5th and 9th, the max. fall being 3·53 in. on 6th, which caused heavy floods. The remainder of the month was fine. Prevailing N.W. and S.E. winds, generally moderate. H on 8th. Temp. $2^{\circ}\cdot 2$ below, and rain 4·88 in. above, their respective averages. R. B. GORE.

AUCKLAND.—A fine warm and dry month. Mean temp. slightly below the average; rainfall little more than half the average. T. F. CHEESEMAN.

JAMAICA, KINGSTON.—Rainfall two-thirds of the average. Mean hourly velocity of wind 3·2 miles. Island rainfall one-third over the average. R. JOHNSTONE.

TRINIDAD.—Rainfall ·13 in. above the average of 30 years. J. H. HART.

SUPPLEMENTARY TABLE OF RAINFALL,
 JULY, 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..	·79	XI.	Builth, Abergwesyn Vic.	3·22
II.	Dorking, Abinger Hall .	·93	„	Rhayader, Nantgwillt ...	2·65
„	Birchington, Thor	1·42	„	Lake Vyrnwy	2·04
„	Hailsham	1·41	„	Corwen, Rhug	3·82
„	Ryde, Thornbrough	·40	„	Criccieth, Talarvor	2·59
„	Emsworth, Redlands ...	2·26	„	I. of Anglesey, Lligwy..	3·78
„	Alton, Ashdell	·94	„	I. of Man, Douglas	4·04
III.	Oxford, Magdalen Coll..	1·18	XII.	Stoneykirk, Ardwell Ho.	2·49
„	Banbury, Bloxham	·92	„	New Galloway, Glenlee	2·34
„	Northampton, Sedgebrook	1·78	„	Moniaive, Maxwellton Ho.	2·97
„	Stamford, Duddington..	1·04	„	Lilliesleaf, Riddell	3·15
„	Alconbury	1·25	XIII.	N. Esk Res. [Penicuik]	4·95
„	Wisbech, Bank House...	1·95	XIV.	Glasgow, Queen's Park..	3·69
IV.	Southend	1·30	XV.	Inverary, Newtown	5·27
„	Harlow, Sheering.....	...	„	Ballachulish, Ardsheal...	5·54
„	Colchester, Lexden	2·55	„	Islay, Gruinart School...	2·14
„	Rendlesham Hall	2·87	XVI.	Dollar.....	3·20
„	Scole Rectory	1·96	„	Balquhider, Stronvar...	4·58
„	Swaffham	1·89	„	Coupar Angus Station...	2·09
V.	Salisbury, Alderbury ...	·37	„	Dalnaspidal H.R.S.....	...
„	Bishop's Cannings	·53	XVII.	Keith H.R.S.....	2·82
„	Blandford, Whatcombe..	·90	„	Forres H.R.S. ...	2·82
„	Ashburton, Holne Vic...	·83	XVIII.	Fearn, Lower Pitkerrie..	2·50
„	Okehampton, Oaklands..	1·25	„	S. Uist, Askernish	1·86
„	Hartland Abbey	1·00	„	Invergarry	1·69
„	Lynton, Glenthorne ...	·78	„	Aviemore H.R.S.	2·90
„	Probus, Lamellyn	1·01	„	Loch Ness, Drumnadrochit	2·47
„	Wellington, The Avenue	·60	XIX.	Invershin	4·12
„	North Cadbury Rectory	1·25	„	Durness	3·30
VI.	Clifton, Pembroke Road	·68	„	Watten H.R.S.....	2·15
„	Ross, The Graig	·49	XX.	Dunmanway, Coolkelure	4·00
„	Wem, Clive Vicarage ...	1·58	„	Cork, Wellesley Terrace	1·62
„	Wolverhampton, Tettenhall	...	„	Killarney, Woodlawn ..	3·47
„	Cheadle, The Heath Ho.	2·03	„	Caher, Duneske	3·72
„	Coventry, Priory Row ...	1·14	„	Ballingarry, Hazelfort...	...
VII.	Grantham, Stainby	1·29	„	Limerick, Kilcornan ...	...
„	Horncastle, Bucknall ...	1·24	„	Miltown Malbay	1·71
„	Worksop, Hodsack Priory	1·70	XXI.	Gorey, Courtown House	3·77
VIII.	Neston, Hinderton	2·14	„	Moynalty, Westland ...	2·67
„	Southport, Hesketh Park	1·55	„	Athlone, Twyford	1·78
„	Chatburn, Middlewood..	2·05	„	Mullingar, Belvedere ...	2·71
„	Duddon Val., Seathwaite Vic.	4·50	XXII.	Woodlawn	1·52
IX.	Melmerby, Baldersby ...	1·85	„	Crossmolina, Enniscroe ..	1·29
„	Scarborough, Observat'y	2·07	„	Collooney, Markree Obs.	2·01
„	Middleton, Mickleton ...	3·80	„	Ballinamore, Lawderdale	...
X.	Haltwhistle, Unthank H.	3·23	XXIII.	Warrenpoint.....	2·80
„	Bamburgh	4·01	„	Seaforde.....	3·17
„	Keswick, The Bank	3·21	„	Belfast, Springfield	2·88
XI.	Llanfrechfa Grange	·27	„	Bushmills, Dundarave..	2·84
„	Llandoverly	2·60	„	Stewartstown	2·79
„	Castle Malgwyn	1·75	„	Killybegs	4·29
„	Brecknock, The Barracks	·82	„	Horn Head	2·28

JULY, 1899.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL.					Days on which 1/10 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		
		inches.	inches.	in.				Deg.	Date	Deg.	Date	In shade.	On grass.
I.	London (Camden Square) ...	1.45	— 1.23	.89	22	10	89.2	20	50.9	5	0	0	0
II.	Tenterden	1.42	— .93	.81	22	7	85.0	20 _a	49.0	5, 14	0	0	0
„	Hartley Wintney .....	.42	...	.16	22	6	89.0	20	45.0	5, 28	0	0	0
III.	Hitchin	1.53	— 1.19	.55	23	10	88.0	19 _b	48.0	4, 27	0	0	0
„	Winslow (Addington)	1.17	— 2.12	.61	22	8	88.0	19 _b	45.0	28	0	0	0
IV.	Bury St. Edmunds (Westley) ..	2.72	+ .15	.83	22	7	79.0	20	49.0	5	0	...	...
„	Norwich (Brundall)	1.87	...	1.06	23	6	85.0	20	48.6	18	0	0	0
V.	Winterbourne Steepleton ...	2.01	...	1.39	22	7	81.4	20	45.8	15	0	0	0
„	Torquay (Cary Green) .....	.34	...	.12	22	6	79.5	30	51.7	16	0	0	0
„	Polapit Tamar [Launceston]..	.99	— 2.42	.22	23	11	...	...	...	...	...	...	...
VI.	Stroud (Upfield)	1.03	— 2.54	.30	22	6	86.0	20	50.0	4	0	...	...
„	Churchstretton (Woolstaston)	1.29	— 1.68	.50	1	12	77.5	31	48.0	2	0	0	0
„	Worcester (Diglis Lock)	1.44	— 1.43	.42	11	7	...	...	...	...	...	...	...
VII.	Boston	1.21	— 1.58	.36	23	9	87.0	12	48.0	5, 27	0	...	...
„	Hesley Hall [Tickhill] .....	.92	— 1.75	.27	12	9	85.0	31	46.0	16 _e	0	...	...
„	Breadsall Priory	1.89	...	1.14	1	9	79.0	<i>f</i>	46.0	5, 25	0	...	...
VIII.	Manchester (Plymouth Grove)	...	...	...	...	...	...	...	...	...	...	...	...
IX.	Wetherby (Ribston Hall) ...	1.20	— 1.98	.32	3	9	...	...	...	...	...	...	...
„	Skipton (Arncliffe)	3.42	— 2.22	.87	12	11	...	...	...	...	...	...	...
„	Hull (Pearson Park) ...	1.59	— 1.00	1.14	12	7	81.0	11 _c	46.0	5	0	0	0
X.	Newcastle (Town Moor) .....	...	...	...	...	...	...	...	...	...	...	...	...
„	Borrowdale (Seathwaite)	6.57	— 4.42	1.73	9	19	...	...	...	...	...	...	...
XI.	Cardiff (Ely) .....	.81	— 3.25	.20	1	11	...	...	...	...	...	...	...
„	Haverfordwest	2.31	— 1.90	1.19	10	9	81.5	31	43.6	29	0	0	0
„	Aberystwith (Gogerddan) ...	3.25	...	1.08	1	8	86.0	20	...	...	...	...	...
„	Llandudno	1.85	— 1.15	.39	20	10	...	...	...	...	...	...	...
XII.	Cargen [Dumfries]	1.99	— 1.94	.76	11	9	80.0	31	45.0	5	0	...	...
XIII.	Edinburgh (Blacket Place)...	3.98	...	1.24	1	15	78.0	31	48.0	5	0	0	0
XIV.	Colmonell	3.68	...	1.50	11	13	79.0	5	47.0	4, 23	0	...	...
XV.	Tighnabruaich	5.05	...	.66	12	16	67.0	6	47.0	9	0	...	...
„	Mull (Quinish)	4.00	— .05	.84	25	22	...	...	...	...	...	...	...
XVI.	Loch Leven Sluices .....	...	...	...	...	...	...	...	...	...	...	...	...
„	Dundee (Eastern Necropolis)	2.05	— 1.41	.45	12	14	82.8	30	47.7	9	0	...	...
XVII.	Braemar	2.39	— .82	.45	1	15	76.0	30 _d	37.0	5	0	1	0
„	Aberdeen (Cranford)	2.97	...	.55	18	16	77.0	29	46.0	4, 14	0	...	...
„	Cawdor (Budgate)	3.35	+ .05	.63	1	17	...	...	...	...	...	...	...
XVIII.	Strathconan [Beaul]	4.06	+ .56	.65	28	11	...	...	...	...	...	...	...
„	Glencarron Lodge	6.57	...	1.26	28	23	70.1	31	45.4	9	0	...	...
XIX.	Dunrobin	3.18	+ .33	.80	2	18	73.0	30	45.0	24	0	...	...
„	S. Ronaldshay (Roeberry) ...	2.59	+ .23	.50	25	18	67.0	6	47.0	8	0	...	...
XX.	Darrynane Abbey	2.25	...	.41	10	22	...	...	...	...	...	...	...
„	Waterford (Brook Lodge) ...	3.00	— .53	1.19	11	11	77.5	30	43.0	13	0	...	...
„	Broadford (Hurdlestown) ...	2.12	...	.63	10	18	...	...	...	...	...	...	...
XXI.	Carlow (Browne's Hill)	5.13	+ 1.61	1.89	6	15	...	...	...	...	...	...	...
„	Dublin (Fitz William Square)	3.12	+ .44	1.40	11	12	74.9	5	49.1	13	0	0	0
XXII.	Ballinasloe	1.87	— 1.68	.44	10	17	78.0	31	47.0	2	0	...	...
„	Clifden (Kylemore)	3.07	...	1.31	8	15	...	...	...	...	...	...	...
XXIII.	Waringstown	2.82	— .70	.78	11	11	73.0	29	43.0	3	0	0	0
„	Londonderry (Creggan Res.) ..	2.23	— 1.89	.38	18	20	...	...	...	...	...	...	...
„	Omagh (Edenfel)	2.54	— 1.18	.59	1	17	77.0	31	43.0	12	0	0	0

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

a—and 21. b—and 20. c—and 19. d—and 31. e—and 17. f several days.

METEOROLOGICAL NOTES ON JULY, 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.—Very dry and hot after the first week. Duration of sunshine 270 hours. Sharp TS on 6th from 0.28 to 1.30 p.m.; trees and buildings struck. Severe TS on evening of 22nd, with very heavy R; at Little Westwell, $\frac{1}{2}$ -mile S.W. of Tenterden, 1.44 in. fell. L in evening on 21st; distant thunder on 23rd.

HARTLEY WINTNEY.—A very hot, dry month, with plenty of sunshine. The driest July recorded, the rainfall being .07 in. less than in 1898 and 1.85 in. below the average. There were TSS to the S. or S.W. on the 20th, 21st, 22nd and 23rd, but the fringe of the cloud reached here on only 2 days. L on the 6th, 7th, 10th, 21st, 22nd and 23rd. Ozone on 9 days, with a mean of 3.2.

HITCHIN.—There have been only two hotter Julys in the last 50 years—1859, mean temp. $65^{\circ}3$, and 1868, $64^{\circ}8$. Mean for this month, $64^{\circ}7$.

WINSLOW, ADDINGTON.—A very fine month, hot and dry. The max. temp. was 80° or above on 12 days, the greatest number ever registered here, the next greatest being 11 in 1887; the min. being above 60° on five nights. T on 7th, 17th and 23rd. The temp. at night was often high.

BURY ST. EDMUNDS, WESTLEY.—A very hot month. TSS on 1st, 7th and 23rd; distant T on 12th and 22nd.

NORWICH, BRUNDALL.—Mean temp. $63^{\circ}9$, being the highest recorded in July since 1887. TS 11.30 a.m. on 1st, and severe from 4 to 5 a.m. on 23rd. T on 8th.

WINTERBOURNE STEEPLTON.—The temp. during the month was very high, and, with the exception of the rain, which fell principally on the 23rd, the weather was very dry. The mean temp. is $61^{\circ}6$, which is the highest monthly mean recorded since observations began in 1893. The previous highest is $60^{\circ}8$ in August, 1893. Fog on 10th, 11th and 14th; T in afternoon and L at night on 21st; slight TS between 3 and 6 a.m. on 22nd; T and L about 6 a.m. on 23rd.

TORQUAY, CARY GREEN.—R $2^{\circ}20$ in. below the average. Mean temp. $64^{\circ}4$, being $3^{\circ}0$ above the average. Duration of sunshine 306 hours 55 mins., being 106 hours 10 mins. above average; one sunless day. Mean amount of ozone at 9 a.m. 3.5; greatest 6.5 on 1st, least 1.0 on 12th, 19th, 27th, 28th and 31st.

POLAPIT TAMAR [LAUNCESTON].—A hot, dry, generally calm month, the total R being 2.07 in. less than the average for 18 years. Fog on 5th, 6th, 7th, 16th and 29th; T and L from 3.30 till midnight on 22nd; distant T on 23rd.

WOOLSTASTON.—An extremely hot and sultry month, with very little R after the first 11 days, which were showery. T on the 7th and 17th. Mean temp. $61^{\circ}9$.

HULL, PEARSON PARK.—TS with heavy R and H in the evening on 12th, 1.14 in. fell in 40 mins.; T also on 7th, 8th and 17th.

WALES.

HAVERFORDWEST.—The month commenced cool and rainy, but was warmer from the 5th to the 9th. A very wet period then occurred up to the 14th, followed by fine summer weather, which continued to the end.

GOGERDDAN.—Very hot and sultry, with much bright sunshine throughout. A few thunder-showers.

SCOTLAND.

CARGEN [DUMFRIES].—The mean bar., 30·013 in., was unusually high, and was accompanied by fine warm weather; the mean temp. for the month, 60°·5, being the highest since 1877, while only in ten out of the last 40 years has the mean for July exceeded 60°. Considerably over the half of the total rainfall occurred in the three days 11th to 13th; on the first of these days a violent TS took place lasting several hours. A continuance of fog during the third quarter of the month accounts for sunshine showing a total of 27 hours less than the average. Splendid weather for haymaking was experienced, but the rye grass crop proved light.

EDINBURGH, BLACKET PLACE.—Mean pressure ·148 in. above, and mean temp. 1°·1 above, the average. Sunshine below the normal. The mean minimum temp., 53°·7, is the highest since 1855, when the mean was 53°·8. Distant thunder on 2nd; TSS on 12th and 17th.

COLMONELL.—R ·23 in. above, and mean temp. 2°·8 above, the averages of 23 years.

TIGHNABRUAICH.—A month of high bar. pressure, the reading on only four days being below 30 inches, yet there was an average rainfall.

MULL, QUINISH.—A very warm and sultry month. Both pressure and temp. were unusually high throughout, the former never falling below 30·00 in. after the 2nd. R about the average, with a great many days of mist and fog. A difficult month for haymaking, but the growth of vegetation was wonderful.

ABERDEEN, CRANFORD.—Warm, with light winds and little sunshine, the sky often overcast. Strong winds from 26th to 29th.

S. RONALDSHAY, ROEBERRY.—A very fine month up till the last week, which was very rough and stormy. Mean temp. 56°·3, or 1°·8 above the average of 9 years.

IRELAND.

DARRYNANE ABBEY.—Rather wet at the beginning of the month; very hot during the last few days. T on 20th and 22nd.

WATERFORD, BROOK LODGE.—Sea fog on 4th, 19th and 21st. T on 5th, 20th and 22nd. H on 5th. Lunar halo on 22nd.

BROADFORD, HURDLESTOWN.—R 1·04 in., and rainy days 1, less than the average of 14 years. On the 22nd, between 4 and 5 p.m., there were two distinct TSS going on at the same time; one to S.W., the other to S.E.

CARLOW, BROWNE'S HILL.—On the 11th, 1·75 in. of R fell in an hour-and-a-half.

DUBLIN, FITZWILLIAM SQUARE.—A warm but changeable month, with very cloudy skies and occasional heavy rains. Winds from westerly points largely predominated. Mean temp. 61°·8, or 1°·6 above the average. High winds on 5 days, and a moderate gale on 26th. Temp. reached or exceeded 70° in the screen on 11 days, while in July, 1887, it reached or exceeded 70° on no fewer than 17 days. TS on 6th; T on 17th. Solar halo on 8th. Fogs on 19th, 20th, 21st, 22nd and 31st.

OMAGH, EDENFEL.—Until the last week the weather of the month was fitful and uncertain, with but little sunshine, a warm humid atmosphere and occasional heavy rains, favourable for growth but rendering hay saving difficult. The last week was fine and dry and progressively warmer until the last day, which was the beginning of a hot spell running into August.