

# SYMONS'S

## MONTHLY

# METEOROLOGICAL MAGAZINE.

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### THE SPRING DROUGHT OF 1893.

ALTHOUGH not yet of nearly so long duration as some of the partial droughts which occurred in the early part of this century, the drought of 1893 is a very remarkable one, but at the date at which this article has to go to press the drought is unbroken, and therefore it is impossible to treat of it properly. On the other hand it would be wrong to let this number appear without some reference to a drought which has had no equal for more than thirty years. The severity and extent of the April portion of the drought is well shown by the regular and by the supplementary tables, and to keep our readers as fully informed as practicable we add some letters selected from the many with which we have been favoured. They are arranged in the sequence in which the stations occur in *British Rainfall*.

*To the Editor of the Meteorological Magazine.*

Sir,—I have to report the driest month for the 30 years during which I have observed rainfall.

	Old Gauge. in.		Snowdon. in.
April 6th .....	·01	Dew .....	—
„ 16th .....	·03	„ .....	·03
	—		—
Total.....	·04		·03

The next driest are September, 1865, with ·06 in., February, 1891, with ·10 in., May, 1880, with ·18 in., and April, 1865, with ·24 in.  
—Yours truly,

J. ELLIS MACE.

*Tenterden, Kent, May 1, 1893.*

SIR,—The drought of the last two months has been of an extraordinary character. On the 1st and 2nd of March rain fell, but only to the extent of ·06 in. From then to the 16th absolute drought prevailed, on the 17th ·01 in. fell, and from then till the 15th April absolute drought prevailed again. On the 16th of April ·15 in. fell, and rain fell on three other days in April. The total fall in March being ·07 in., and in April ·32 in. Thus there were two periods of absolute drought, the first being 14 days and the second 29 days in

length. There was partial drought for the whole two months, the number of days being 61, and the total rainfall  $\cdot 39$  in. During the latter part of March and the beginning of April there were continuous heavy dews, which no doubt helped vegetation much.—I am, sir, your obedient servant,

C. A. MARKHAM, F.R.Met.Soc.

*Sedgebrook, Northampton, May 5th, 1893.*

SIR,—Seeing from the *Met. Mag.* that this neighbourhood stands about first for dryness in March, I think perhaps you may like a few details from me. My register tells as follows :—

Mar.	1	...	<sup>in.</sup> ·05	...	Small showers of rain.
"	2	...	·03	..	" " "
"	3	...	·01	...	" " "
"	7	...	—	...	A very few drops of rain.
"	15	...	—	...	Drops at 8.30 a.m. on 16th.
"	16	...	·02	...	Very short shower of rain at 10 a.m.; and of snow at 8 a.m. on 17th.
"	17	...	·01	...	Smart snow shower at 4 p.m. NONE in gauge next morning; but I felt that it <i>ought</i> to go down as $\cdot 01$ in.
			—		
	Total		·12		
Apr.	12	...	—	...	Few drops; so few, that it was a question if any of them fell into the gauge. This was about 8.30 a.m. on 13th.
"	16	...	·10	...	This fall began with odd drops on afternoon of 16th, and most fell during small hours of the night following.
"	17	...	·01	...	Just enough to measure—mostly in evening of 17th.
"	20	...	·01	...	Just enough to measure; but very vivid lightning between 5 and 7 p.m. A horse killed about 6 miles away; and smart rain reported.
"	29	...	·02	...	Shower at 6.30 p.m.
			—		
	Total		·14		

Thus our absolute drought might be reckoned from 9 a.m. on March 17th till 4 p.m. on April 16th, and counting the snow of March 17th as rainfall, as I think I must do, the absolute drought extends from March 17th 4 p.m. to April 16th 4 p.m., *i.e.*, 30 full days.

The eight weeks ending 9 a.m., April 29th, gave only  $\cdot 15$  in. in all, and the two complete months yielded  $\cdot 26$  in.

One swallow does not make a summer, but have you noticed the very remarkable fulfilment for this year of the saying quoted in the *Standard* of February 3rd or 4th :—

“If Candlemas Day brings clouds and rain,  
Winter is gone, and won't come again”!!!

Now February 2nd was in a special sense cloudy as well as rainy, low warm clouds from S.W.

My father, aged 84, remembers a spring like this, he is not sure whether it was 1825, 1826 or 1827, though he also remembers distinctly the hot dry summer of 1826. I infer from what I see in the papers that the hot dry spring was in 1826, and that, *quantum valeat*, the presumption is that the dry spring will lead to a dry summer,

instead of, as Professor Falb says, to an abnormally wet summer (only he doesn't say where).

But let me call your attention to these parallels within our own memory :—1868, very hot and dry ; 1872, very wet ; 1874, hot and dry. And then 19 years later :—1887, very hot and dry ; 1891, very wet ; 1893 should be hot and dry.

I remember the dry spring of 1880, and the floods of the summer and autumn.

I remember also the November floods of 1852, but not the spring of that year.

What is to be the end of it ? At any rate there can hardly be any hay in the midland counties.

I noticed ash trees and oaks distinctly in leaf on April 22, whereas in 1891, on June 1st, I could see none.—Yours very sincerely,

H. A. BOYS.

*Easton Mauduit Vicarage, Northampton, May 1, 1893.*

SIR,—This is so exceptional a year as regards rainfall that you may feel interested in the result of my measurements up to date :—

		in.	in.
Rainfall for	JANUARY .....		1·30
„ „	FEBRUARY ..		2·62
„ „	March 1st .....	0·17	
„ „	„ 3rd .....	0·05	
„ „	„ 13th .....	0·04	
„ „	„ 17th .....	0·04	
„ „	MARCH .....	—	0·30
„ „	April 16th .....	0·05	
„ „	„ 29th .....	0·03	
„ „	APRIL .....	—	0·08
Total for 4 months...			4·30

Yours faithfully,

FRED. CHANCELLOR.

*Chelmsford, Essex, May 1st, 1893.*

SIR,—I presume that some account of the drought which has been experienced here with little break since March 2nd will not be unacceptable to you. On 2nd March the fall was 0·21 in., and as the total for the month was exactly 0·40 in. only 0·19 fell during the 30 days of that month. However, I give you the details, such as they are, and they will show the whole matter :—

		Rain. in.			Rain. in.
March 1st .....	0·21		April 4th.....	0·02	
„ 3rd .....	0·03		„ 12th.....	0·01	
„ 13th .....	0·05		„ 16th.....	0·05	
„ 17th .....	0·07				
„ 18th .....	0·04		Total.....	0·08	
Total.....		0·40			
The Monthly Gauge = 0·44			The Monthly Gauge = 0·08		

There was a slight shower at 7.30 p.m. on the 29th, but not enough "to wet the stones." The amount of evaporation from my sand gauge was

	in.	in.
March .....	—	1·60
Mean for March in previous 7 years ...	1·22	—
April .....	—	2·75
Mean for April in previous 7 years.. ...	1·81	—

May 1. The depression of 29th seems to have passed over here without leaving any rain or prospect of any at present, and the barometer is just 30 inches.—Yours sincerely,

SAMUEL H. MILLER.

*Lowestoft, Suffolk, April 1893.*

SIR,—I send you account of the partial drought which set in on March 2nd, and has continued to the present time:—

	Rainfall. in.		Rainfall. in.
March 1st .....	·28	April 5th .....	·01
„ 3rd .....	·03	„ 12th .....	·02
„ 7th .....	·01	„ 13th .....	·01
„ 13th .....	·03	„ 16th .....	·08
„ 16th .....	·05		
„ 17th .....	·04	Total...	·12
„ 18th .....	·02		
	—		
Total...	·46		

Total for the two months ..... 58 in.

Thus for the period of 60 days (March 2nd to April 30th inclusive) the fall was 30 in.

Total Drought, for 17 days..... March 19th to April 4th.

„ „ „ 14 „ ..... April 17th to 30th.

The fall for April is the smallest I have registered here, the previous smallest being in February, 1891, with a fall of 0·14 in. The weather for both months has been sunny in the extreme, but the temperature has not been excessive, as in most parts of England. The highest was only 61° on the 1st and 15th. On the 23rd the thermometer at Cambridge registered 84°, and in London 82°: but at Yarmouth it did not exceed 56°; and so on many days, owing to searching E. winds.—Very truly yours,

W. C. STEWARD.

*Hall Plain Chambers, Great Yarmouth, May 1st, 1893.*

*Unprecedented drought:—*

March 16th to April 29th, on which day 05in. of rain fell; 43 days.

*Unprecedented heat:—*

	Max. in shade.		Max. in shade.
April 20th .....	72	April 24th .....	65
„ 21st .....	75	„ 25th .....	72
„ 22nd .....	76	„ 26th .....	72
„ 23rd .....	70	„ 27th .....	68
In 1870, one day .....	75°.		

C. SOAMES.

*Mildenhall Rectory, Marlborough, Wilts, May 1st, 1893.*

SIR,—The last two months have been so remarkably dry that I think that you would be glad to see the amounts registered by me.

Date.	March. in.	April. in.
1st .....	·14	—
2nd .....	·07	—
3rd .....	·07	—
6th .....	·03	—
15th .....	·04	—
16th .....	·11	—
24th .....	—	·03
29th .....	—	·06
Total.....	<u>·46</u>	<u>·09</u>

I am, yours faithfully,

*Sturminster Newton, Dorset.*

A. R. HALLETT.

SIR,—You will be interested to know that the drought seems broken at last :—March 1st, ·41 in. ; 3rd, ·18 in. ; 6th, ·05 in. ; 14th, ·02 in. ; 15th, ·14 in. ; 16th, ·16 in. ; 17th, ·01 in. ; no more in March. April 1st, 0·08 in. ; 16th, ·22 in. ; 17th, ·08 in. ; 29th, ·12 in. (a heavy shower which was snow on hills) ; 30th, ·03 in. (light showers all drying up as fast as it fell) ; May 1st, ·01 in., but to-day it has really been raining steadily all afternoon. The severity of the drought was owing to the great dryness of the air. Even the ·22 in. and ·08 in. in the middle of April wetted only the surface, and till this morning the drought did not seem broken.

F. W. S.

*The Vicarage, Aysgarth R.S.O., Yorks, May 2.*

## RAINFALL AT RODRIGUEZ AND SEYCHELLES.

*To the Editor of the Meteorological Magazine.*

SIR,—In 1883 you inserted in vol. xviii. of the *Meteorological Magazine*, p. 169, the rainfall observations made up to 1881 in the above-named islands. As Dr. Meldrum has published the continuation of the records to the end of 1890, I think that the following summary may be acceptable.

The seasonal and annual means are :—

	D.J.F. in.	M.A.M. in.	J.J.A. in.	S.O.N. in.	Year. in.	System.
Seychelles (10½ yrs.) ...	38·44	28·85	8·59	22·71	98·59	I.
Rodriguez (15½ yrs.) ...	14·09	13·70	10·99	5·56	44·34	VII.

Yours very truly,

V. RAULIN.

## ROYAL METEOROLOGICAL SOCIETY.

The monthly meeting of this Society was held on Wednesday evening, April 19th, at the Institution of Civil Engineers, 25, Great George-street, Westminster, Dr. C. Theodore Williams (President) in the chair.

Dr. R. L. Bowles, Miss E. Brown, Dr. W. C. Falls, Mr. R. Lamont, and Mr. A. R. M. Simkins were elected Fellows of the Society.

The following papers were read :—

1. "The Direction of the Wind over the British Isles, 1876-80," by Mr. F. C. Bayard, F.R.Met.Soc. This is a reduction on a uniform plan of the observations made twice a day, mostly at 9 a.m. and 9 p.m., at 70 stations during the lustrum 1876-80; and the results are given in tables of monthly and yearly percentages.

The paper was illustrated by diagrams thrown on the screen, but their scale being rather small, and the paper not being in type, it was difficult to follow the author. The President, Rev. Clement Ley, Dr. Buchan, Messrs. Jackson, C. Harding, Inwards, and Dr. Ewart took part in the discussion, the latter referring to the marked effect of a sudden shift of wind from N.E. to S.W. on patients suffering from bronchial attacks.

2. "Notes on two Photographs of Lightning taken at Sydney Observatory, December 7th, 1892," by Mr. H. C. Russell, F.R.S., These photographs were taken with a half-plate view lens, mounted in a whole plate camera, and as a matter of course, there is some distortion at the edges. One of the flashes went down into the harbour, and the place is thereby so clearly marked that it was possible by the aid of the trigonometrical map to tell within 3 or 4 feet how far this point was from the observatory, viz., 2,100 feet, hence with the known focal length of the lens it was found that the length of this flash, as far as shown on this plate (probably not all of it), was 1,540 feet.

In the landscape there are white specks which represent the gas lamps in the streets. An examination of these points in the negative shows more clearly than can be seen in the print, that these images are distorted towards the centre of the plate; and it should be mentioned that the centre of these prints is not the centre of the field of view of the lens. The distortion can be clearly seen on the right hand side of No. 1, and it is very marked in the lightning flashes. When examined with a lens these streaks have all the appearance of the so-called ribbon flashes, and an important point which is clearly seen in the negative, but is not visible in the print, is that on the side towards the centre of the plate the deposit of silver is not so great as it is on the other side of the ribbon flash. In fact, it would appear that the distortion in thickness of the flash is due to the same cause as the extension of the gas lamps, and it is on the same side. It seems obvious from these photographs that at least some ribbon-like flashes as shown in photographs have no objective existence.

3. "Notes on Lightning Discharges in the neighbourhood of Bristol, 1892," by Dr. E. H. Cook. The author gives some particulars concerning two trees in Tyntesfield Park which were struck by lightning, one on June 1st and the other on July 18th, and also some notes concerning a flagstaff on the summit of Brandon Hill, which was struck on October 6th.

4. "Constructive Errors in some Hygrometers," by Mr. W. W. Midgley, F.R.Met.Soc. The author, in making an investigation into the hygrometrical condition of the air in a number of cotton mills in the Bolton district, found that the mounting of the dry and wet bulb thermometers and the position of the water receptacle did not by any means conform to the regulations of the Royal Meteorological Society, and were so arranged that they gave the humidity results much too high. The "Cotton Factories Act" of 1889 prescribes the maximum weight of vapour per cubic foot of air at certain temperatures as indicated by the dry and wet bulb hygrometer which is permissible; and the author alleges that many of the instruments at present used in the mills give indications having an error of 20 per cent. against the interests of the manufacturer.

Mr. Scott, Mr. Gaster, Mr. Marriott, and Mr. Symons took part in the discussion. Mr. Scott called attention to the fact that the Kew certificates referred to the thermometers before mounting, and not as made up into hygrometers. Mr. Gaster referred to some experiments he had made which showed that the proximity of the water vessel had no effect on the dry bulb, and which, therefore, were not in accord with Mr. Midgley's results.

## REVIEW.

*Observations in Meteorology. . . . being the result of a meteorological register kept for ten years (1883-92) at Newton Reigny, Cumberland*  
*. . . by T. G. BENN, F.R.Met.Soc. 8vo., Simpkin and Co.,*  
*London (1893), 48 pages.*

Mr. Haviland has lately been writing a big book dealing with the prevalence of certain diseases in some parts of the Lake district. The pamphlet before us suggests another investigation, viz., why the climate of Carlisle induces observers to make long and accurate series of meteorological observations. We are not sure that we could find any other part of England to compare with a twelve mile radius round Carlisle for good and long-continued observations. Taking only the present century, we have valuable records in Carlisle itself from Mr. Pitt, Dr. Elliot, Mr. Atkinson (the maker of the first English map of the fall of rain) the Rev. Mr. Rees and Dr. T. Barnes, while well within the limit we have had Silloth, and still have Scaleby and Newton Reigny. It is not due (as might be imagined) to its being exceptionally wet, for there is nothing exceptional about the rainfall, and strangely enough, although in the

tremendously long title to the pamphlet Mr. Benn describes it as "serving as a guide to the climate of that part of England," he does not make the slightest reference to the great rainfalls of the Lake District. As he is within 12 miles of Seathwaite we must hold either (1) that the phrase "that part of England" must be confined to three or four miles round Newton Reigny, or (2) that on this subject the book is a bad guide; in almost all respects, however, it is extremely trustworthy. Mr. Benn provided the best instruments, had them all verified, placed them in a position which can be truly described as perfect, observed them well and punctually, and has apparently reduced and published them accurately. As far as we have tested the tables they appear to be perfect, though there is one that we should not have taken the trouble to prepare or print, viz., Table IV., Mean Daily Temperature, *i.e.*, mean temperature of each day of the year. Ten years is much too short a period to afford useful figures on this subject, and if Mr. Benn had plotted them as a diagram he would have seen it at once. Obviously in the autumn months, when the temperature is falling, the first of each month should on an average be the hottest, but the dates are July 31, August 8, September 13, October 4, November 2, December 3; or, on the average, ten days away from their proper date. With only ten years it is evident that there could not be more than three records for February 29, and the result is that it comes out as one of the coldest days in the year, and nearly 7° colder than the corresponding date in January.

As regards rainfall the most curious fact is that with an average of 35·85 inches yearly, the greatest daily fall was 1·61 inches on September 30, 1890. We do not in the least degree doubt this fact, although we are certain that a much larger fall will some day take place there. Apparently there are few thunderstorms, for the word does not occur in the whole book.

Mr. Benn gives his barometric values corrected for index error and temperature, but not reduced to sea level, the altitude being 577 feet, and assuming an air temperature of 50° we have:—

Absolute max., Oct. 5th, 1884 .....	inches. 30·726
Mean .....	29·904
Absolute min., Dec. 8th, 1886 .....	27·566
Absolute max. of black bulb in sun, June 22nd, 1887 .....	140·5°
„ „ in shade, June 26th, 1888 .....	82·0
Mean temperature .....	45·2
Absolute coldest in air, February 19th, 1892 ... ..	— 2·0
„ „ on grass, „ „ „ „ .....	— 11·2
Average number of days with rain .....	202
Longest rainless period, June 15th–July 6th, 1889 ...	22 days.
Average daily sunshine .....	3 hours 36 minutes.

Mr. Benn had twokinds of earth thermometers; in the introduction he gives a comparison, which shows differences reaching 0°·3.



In Table X. he gives the mean of those of the old pattern as under:—

Mean temp.	{	at 3 in.	...	1 ft.	...	2 ft.	...	3 ft.	...	4 ft.
		45°·1		45°·9		46°·1		46°·2		45°·8

This indicates a maximum at about 3 feet and a decrease both above and below, but if we correct these readings according to the comparisons in the introduction we obtain a nearly steady rise:—

	{	at 3 in.	...	1 ft.	...	2 ft.	...	3 ft.	...	4 ft.
		45°·1		45°·8		45°·8		46°·2		46°·1

The pamphlet is one which records good work, and will be useful for future generations.

### RAINFALL AT CHICHESTER.

*To the Editor of the Meteorological Magazine.*

SIR,—You are aware that I have recorded the rainfall at Chichester during more than 50 years, but as you intimate in your *Meteorological Magazine* for April, 1893, that information relating to Sussex records would be acceptable, I beg to send a few particulars as to that in my possession. It was begun by Mr. Hills, the Curator of the Chichester Literary and Philosophical Society, with January, 1835, the gauge being at Kingsham until August, 1837. Then there was no record for five months, and from March, 1838, till December, 1873, he kept the record of a gauge on the lawn of the Infirmary. I was elected as physician to the Infirmary in 1840, and from 1841 till 1854 copied Mr. Hill's record. With 1854 I began to register from a gauge of my own at Westgate, which record has been uninterrupted up to this date.

Perhaps some notes drawn from my register by my son, G. Ashley Tyacke, might be of some interest to you.

The average annual rainfall at Chichester, calculated on 50 years, from 1839 to 1888 inclusive, is 28·57 inches.

The rainfall for each month is:—

Oct.	Nov.	Sept.	Jan.	Dec.	Aug.	July.	Feb.	June	May.	Mar.	April
3·60+	3·01	2·93	2·67	2·54	2·39	2·28	1·97	1·91	1·87	1·81	1·59—
+ Wettest.						— Driest.					

Table showing average rainfall up to end of each succeeding month:—

Jan.	Feb.	Mar.	April	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
2·67	4·64	6·45	8·04	9·91	11·82	14·10	16·49	19·42	23·02	26·03	28·57 in.

The above calculations will give a general idea of the monthly and annual rainfall at Chichester.

Yours sincerely,  
N. TYACKE, M.D.

*Westgate, Chichester, April 29, 1893.*

## RAINFALL IN BRISBANE.

*To the Editor of the Meteorological Magazine.*

SIR,—In connection with your article on "The Queensland Floods," I have pleasure in sending you the actual rainfall in Brisbane itself from the 1st to the 18th February, the period which covered the three disastrous recurring floods. The reason why so much prominence was given to the fall at Crohamhurst in the *British Australasian* newspaper was because Mr. Clement Wragge, the Queensland Meteorological Officer, ascribes the terrible flood in the Brisbane River on Sunday, February 5th, mainly to this rainfall in the Blackall Ranges, which drains into the Stanley River, a tributary of the Brisbane. Mr. Jones emptied his gauges every three hours. Communication between his station and Brisbane was cut off, or he would have been able to warn Mr. Wragge what was coming, and so have enabled the Brisbane people to save their furniture and goods to a greater degree than was the case. During the period I have named above, the city of Brisbane and the town of Ipswich were visited by three distinct floods, the highest of which rose about 15 feet above the records. In Gundagai, New South Wales, one of the "lions" is the skeleton of a bullock high up in a gum tree, to which the inhabitants point with a just pride as giving an idea of the capacity of their local river in flood time, but the details from poor Queensland beat the bullock. There are vague traditions amongst the blacks of fearful floods in the dim past, and I have always thought that Australia, especially that most interesting and valuable portion, the eastern coast line, has something in reserve for us in the matter of climatic phenomena. It is but a matter of a few years that exact weather observations have been taken. I now proceed to give the rainfall at Mrs. Coxen's station, Omega, Bulimba, Brisbane:—

	in.		in.		in.		in.
Feb. 1 .....	11·60	Feb. 6.....	3·33	Feb. 11.....	4·36	Feb. 16.....	2·15
„ 2.....	4·80	„ 7.....	·86	„ 12.....	·73	„ 17.....	10·20
„ 3.....	5·20	„ 8.....	·27	„ 13.....	·10	„ 18.....	4·92
„ 4.. ...	4·35	„ 9.....	·06	„ 14.....	1·62		
„ 5.. ...	4·22	„ 10.....	·03	„ 15.....	·20	Total ...	59·00

Yours faithfully,

J. TROUBRIDGE CRITCHELL.

9, Cardigan Road, Richmond Hill.

April 22, 1893.

[We are much obliged to Mr. Critchell for making some of the facts plain; but we are surprised that Mr. Wragge has not issued the daily fall at all stations in the district affected. The Crohamhurst record may be correct, but it would be none the worse for support from other stations.—ED.]

## CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, NOVEMBER, 1892.

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 .....	60·8	14	30·8	2	50·2	40·6	42·5	90	86·8	25·6	2·53	15	8·0
Malta.....	81·6	2	47·6	30	69·4	58·7	55·0	80	131·3	41·0	7·33	13	5·2
Cape of Good Hope ...	91·9	24	46·6	17	71·0	55·3	...	...	...	...	1·99	4	4·5
Mauritius.....	84·4	14a	65·0	18	81·9	68·6	64·9	73	140·0	57·1	1·84	18	5·4
Calcutta.....	84·8	5	54·2	27	80·0	61·2	61·8	77	144·7	44·5	1·74	2	1·2
Bombay.....	88·3	6	69·0	30	86·2	71·8	66·1	66	134·6	56·3	·67	1	0·7
Ceylon, Colombo ...	89·0	29	71·0	6	85·9	73·9	71·3	80	156·0	65·0	5·86	20	5·7
Melbourne.....	90·8	19	45·0	3	70·6	51·7	52·7	73	143·1	36·4	2·74	11	5·9
Adelaide .....	97·6	18	44·6	11	80·2	57·9	50·5	52	162·4	37·2	·68	8	4·4
Tasmania, Hobart.....	...	...	...	...	...	...	...	...	...	...	...	...	...
Wellington .....	73·0	23	48·0	1c	66·5	54·9	52·7	75	130·0	40·0	1·65	14	4·3
Auckland .....	75·0	14b	53·0	2	70·3	57·5	58·2	83	139·0	42·0	4·65	15	5·5
Jamaica, Kingston.....	89·9	6	66·3	29	86·4	70·1	69·7	78	...	...	2·99	7	...
Trinidad .....	...	...	...	...	...	...	...	...	...	...	...	...	...
Toronto.....	52·4	16	14·3	23	40·3	29·9	30·9	80	...	...	2·18	27	8·9
New Brunswick, Fredericton }	61·7	19	12·2	12	41·1	26·9	32·1	82	...	...	4·84	15	7·6
Manitoba, Winnipeg... }	43·9	2	—18·5	23	25·4	4·8	...	...	...	...	2·26	11	6·6
British Columbia, Esquimalt }	53·1	3, 5	30·3	25	45·9	38·5	41·4	93	...	...	10·34	28	8·4

a And 29.    b And 26.    c And 17, 18.

## REMARKS.

MALTA.—Mean temp. 62°·5. Mean hourly velocity of wind 9·1 miles. The sea temp. fell from 73°·0 to 66°·4. Thunderstorms on 10th, 11th, and 15th; lightning on 18th. Rainfall double the average. J. SCOLES.

Mauritius.—Mean temp. of air 0°·1 above, dew point 0°·6 above, and rainfall 10 in. below, their respective averages. Mean hourly velocity of wind 10·6 miles, or 0·3 miles below average; extremes, 26·3 on 14th and 2·1 on 27th; prevailing direction E.S.E. to E. by N. C. MELDRUM, F.R.S.

CEYLON, COLOMBO.—Thunderstorms occurred on 13 days; lightning alone was seen on 9 days. In the interior of the island a distinct shock of earthquake for about 15 or 20 seconds was felt on the evening of 8th at Holmwood, Queensland, Maussagala, Hakgala, Udahena, &c., and a second slighter one was felt on the morning of the 23rd at the first three stations only. J. C. H. CLARKE, Lt.-Col. R.E.

Melbourne.—Thunder and lightning on the 4th and 5th; lightning in N. and S. on 21st, S.W. on 23rd. R. L. J. ELLERY, F.R.S.

Adelaide.—Mean temp. 2°·2 above average of 35 years. R 34 in. below average. C. TODD, F.R.S.

Wellington.—On the whole fine weather during the month; frequent light showers, but small total rainfall. Prevailing N.W. winds, frequently strong. Earthquake on 9th at 8.30 a.m., slight, and on 30th, very slight. Mean temp. 4°·2 above the average; R 2·52 in. below average. R. B. GORE.

Auckland.—A wet and disagreeable month, the rainfall being nearly two inches above the average, and, with one exception, the highest recorded for the month. Mean temp. and barometrical pressure close to the average. T. F. CHEESEMAN.

# SUPPLEMENTARY TABLE OF RAINFALL, APRIL, 1893.

[For the Counties, Latitudes, and Longitudes of most of these Stations,  
see *Met. Mag.*, Vol. XIV., pp. 10 & 11.]

Div.	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			in.
II.	Dorking, Abinger Hall.	·10	XI.	Builth, Abergwessin Vic.	·27
„	Birchington, Thor .....	·00	„	Rhayader, Nantgwillt..	·26
„	Brighton, Prestonville Rd	·06	„	Corwen, Rhug .....	·63
„	Hailsham .....	·06	„	Carnarvon, Cocksidia ...	·86
„	Ryde, Thornbrough .....	·04	„	I. of Man, Douglas .....	1·44
„	Alton, Ashdell .....	·06	XII.	Stoneykirk, Ardwell Ho.	1·65
III.	Oxford, Magdalen Col...	·05	„	New Galloway, Glenlee	1·39
„	Banbury, Bloxham .....	·21	„	Melrose, Abbey Gate ...	·76
„	Northampton, Sedgebrook	·32	XIII.	N. Esk Res. [Penicuik]	·90
„	Alconbury .....	·13	„	Edinburgh, Blacket Pl..	1·64
„	Wisbech, Bank House..	·17	XIV.	Glasgow, Queen's Park.	1·11
IV.	Southend .....	·00	XV.	Islay, Gruinart School..	3·18
„	Harlow, Sheering ... ..	·08	XVI.	Dollar .....	1·03
„	Colchester, Lexden .....	·07	„	Balquhider, Stronvar..	1·44
„	Rendlesham Hall .....	·04	„	Coupar Angus Station..	·72
„	Diss .....	·09	„	Dunkeld, Inver Braan..	1·34
„	Swaffham .....	·06	„	Dalnaspidal H.R.S. ...	2·11
V.	Salisbury, Alderbury ...	·10	XVII.	Keith H.R.S. ....	1·19
„	Bishop's Cannings .....	·00	„	Forres H.R.S. ....	·95
„	Blandford, Whatcombe .	·08	XVIII.	Fearn, Lower Pitkerrie.	1·06
„	Ashburton, Holne Vic....	·52	„	Loch Shiel, Glenaladale	3·59
„	Okehampton, Oaklands.	·54	„	N. Uist, Loch Maddy ...	1·39
„	Hartland Abbey .....	·51	„	Invergarry .....	1·55
„	Lynmouth, Glenthorne.	·14	„	Aviemore H.R.S. ....	1·16
„	Probus, Lamellyn .....	·07	„	Loch Ness, Drumnadrochit	1·61
„	Wincanton, Stowell Rec.	·14	XIX.	Invershin .....	1·59
„	Weston-super-Mare .....	·07	„	Scourie .....	1·36
VI.	Clifton, Pembroke Road	·07	„	Watten H.R.S. ....	·47
„	Ross, The Graig .....	·20	XX.	Dunmanway, Coolkelure	1·85
„	Wem, Clive Vicarage ...	·45	„	Fermoy, Gas Works ...	1·07
„	Cheadle, The Heath Ho.	·53	„	Killarney, Woodlawn ...	1·27
„	Worcester, Diglis Lock	·27	„	Tipperary, Henry Street	·80
„	Coventry, Coundon ....	·43	„	Limerick, Kilcornan ...	·89
VII.	Ketton Hall [Stamford]	·43	„	Ennis .....	1·16
„	Grantham, Stainby .....	·39	„	Miltown Malbay .....	2·12
„	Horncastle, Bucknall ...	·15	XXI.	Gorey, Courtown House	·34
„	Worksop, Hodsck Priory	·34	„	Mullingar, Belvedere ...	1·10
VIII.	Neston, Hinderton .....	·75	„	Athlone, Twyford .....	·86
„	Knutsford, Heathside...	·58	„	Longford, Currygrane...	·93
„	Lancaster, Rose Bank...	·35	XXII.	Galway, Queen's Coll...	2·13
„	Broughton-in-Furness...	1·56	„	Crossmolina, Enniscoe...	2·14
IX.	Ripon, Mickley .....	·61	„	Collooney, Markree Obs.	1·58
„	Scarborough, South Cliff	·61	„	Ballinamore, Lawderdale	1·72
„	EastLayton [Darlington]	·53	XXIII.	Lough Sheelin, Arley ..	1·04
„	Middleton, Mickleton..	·67	„	Warrenpoint .....	·95
X.	Haltwhistle, Unthank..	·78	„	Seaforde .....	1·49
„	Bamburgh .....	·76	„	Belfast, Springfield ....	1·97
„	Newton Reigny .....	·43	„	Bushmills, Dundarave...	1·47
XI.	Llanfrechfa Grange ....	·33	„	Stewartstown .....	1·50
„	Llandovery .....	·11	„	Buncrana .....	1·16
„	Castle Malgwyn .....	·34	„	LoughSwilly, Carrablagh	1·48

APRIL, 1893.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL.					Days on which 41 or more fell.	TEMPERATURE.				No. of Nights below 32°	
		Total Fall.	Difference from average 1880-9.	Greatest Fall in 24 hours		Deg.		Date	Deg.	Date	In shade.	On grass.	
				Dpth	Date								
		inches.	inches.	in.									
I.	London (Camden Square) ...	·24	— 1·50	·20	19	3	78·2	20	30·9	13	1	4	
II.	Maidstone (Hunton Court) ...	·02	— 1·63	·02	16	1	...	...	...	...	...	...	
III.	Strathfield Turgiss .....	·12	— 1·48	·09	16	2	84·2	18	24·1	14	5	15	
IV.	Hitchin .....	·25	— 1·54	·10	21	4	79·0	20	24·0	13	5	...	
V.	Winslow (Addington) .....	·11	— 1·81	·08	16	3	80·0	20	21·0	14	6	12	
VI.	Bury St. Edmunds (Westley)	·08	— 1·58	·07	16	2	73·0	20	25·0	4	...	...	
VII.	Norwich (Cossey) .....	·10	— 1·61	·10	16	1	...	...	...	...	...	...	
VIII.	Weymouth (Langton Herring)	·15	— 1·73	·11	29	2	70·5	26	33·0	14	0	...	
IX.	Torquay, Babbacombe ...	...	...	...	...	...	...	...	...	...	...	...	
X.	Bodmin (Fore Street) .....	·28	— 2·79	·10	16	4	...	...	...	...	...	...	
XI.	Stroud (Upfield) .....	·04	— 2·11	·02	1, 16	2	80·0	21	33·0	13	0	...	
XII.	Church Stretton (Woolstaston)	·34	— 2·00	·18	16	5	77·0	20a	32·0	12	1	13	
XIII.	Tenbury (Orleton) .....	·69	— 1·39	·42	1	5	79·8	21	26·0	14	5	11	
XIV.	Leicester (Barkby) .....	·30	— 1·80	·18	16	5	83·0	19	20·0	13	9	21	
XV.	Boston .....	·15	— 1·56	·11	16	3	83·0	23	26·0	14	3	...	
XVI.	Hesley Hall [Tickhill] .....	·30	— 1·41	·18	16	4	78·0	20b	26·0	3	9	...	
XVII.	Manchester (Plymouth Grove)	·47	— 1·24	·21	16	5	79·0	21	30·0	2	1	8	
XVIII.	Wetherby (Ribston Hall) ...	·67	— 1·18	·22	2	5	...	...	...	...	...	...	
XIX.	Skipton (Arncliffe) .....	·61	— 2·82	·16	16	5	...	...	...	...	...	...	
XX.	Hull (Pearson Park) .....	·38	— 1·54	·12	16	5	65·0	19c	10·0	10d	6	14	
XXI.	Newcastle (Town Moor) .....	·46	— 1·37	·27	16	7	...	...	...	...	...	...	
XXII.	Borrowdale (Seathwaite) .....	1·59	— 5·55	·56	29	7	...	...	...	...	...	...	
XXIII.	Cardiff (Ely) .....	·20	— 2·21	·11	1	3	...	...	...	...	...	...	
XXIV.	Haverfordwest .....	·40	— 2·23	·11	1	6	76·1	22	27·0	13	5	13	
XXV.	Aberystwith, Gogerddan .....	·53	— 2·03	·40	1	3	82·0	21	22·0	12	...	...	
XXVI.	Llandudno .....	·87	— ·94	·47	16	5	...	...	...	...	...	...	
XXVII.	Cargen [Dumfries] .....	1·07	— 1·16	·49	16	7	76·4	24	28·4	12	4	...	
XXVIII.	Jedburgh (Sunnyside) .....	·62	— 1·08	·17	15	7	71·0	20	26·0	12	5	...	
XXIX.	Old Cumnock .....	1·26	— ·87	·38	16	9	...	...	...	...	...	...	
XXX.	Lochgilhead (Kilmory) .....	2·77	— ·04	1·30	15	8	...	...	28·0	11	5	...	
XXXI.	Oban (Craigvarren) .....	...	...	...	...	...	...	...	...	...	...	...	
XXXII.	Mull (Quinish) .....	1·80	— 1·18	·49	15	11	...	...	...	...	...	...	
XXXIII.	Loch Leven Sluices .....	1·00	— 1·22	·60	16	4	...	...	...	...	...	...	
XXXIV.	Dundee (Eastern Necropolis)	1·45	— ·60	·50	20	9	65·2	20	28·1	9	3	...	
XXXV.	Braemar .....	1·26	— 1·16	·40	15	10	71·0	24	23·0	9	12	23	
XXXVI.	Aberdeen (Cranford) .....	·66	...	·17	17	12	63·0	18	29·0	11	2	...	
XXXVII.	Strome Ferry .....	1·90	— 1·02	·35	29	12	...	...	...	...	...	...	
XXXVIII.	Cawdor [Nairn] .....	1·59	+ ·07	·58	15	13	...	...	...	...	...	...	
XXXIX.	Dunrobin .....	1·45	— ·28	·53	29	10	61·0	23	31·0	16	...	...	
XL.	S. Ronaldsay (Roeberry) .....	·66	— ·95	·22	2	12	63·0	19	32·0	10	1	...	
XLI.	Darrynane Abbey .....	1·26	...	·39	15	10	...	...	...	...	...	...	
XLII.	Waterford (Brook Lodge) ...	·62	— 1·85	·40	17	4	70·0	25	28·0	14	4	...	
XLIII.	O'Briensbridge (Ross) .....	·96	...	·33	16	9	72·0	21b	32·0	2	1	...	
XLIV.	Carlow (Browne's Hill) .....	·61	— 1·67	·23	17	8	...	...	...	...	...	...	
XLV.	Dublin (Fitz William Square)	1·05	— 1·07	·37	17	7	66·8	22	36·2	14	0	5	
XLVI.	Ballinasloe .....	·81	— 1·53	·22	30	9	68·0	22	31·0	3	2	...	
XLVII.	Clifden (Kylemore) .....	2·35	...	·74	17	9	...	...	...	...	...	...	
XLVIII.	Waringstown .....	1·15	— 1·27	·68	16	5	74·0	24	29·0	9	6	9	
XLIX.	Londonderry (Creggan Res.) ..	1·30	— ·94	·29	15	10	...	...	...	...	...	...	
L.	Omagh (Edenfel) .....	1·59	— ·64	·77	16	7	70·0	22	30·0	9	2	5	

a And 21. b And 24. c And 20, 27. d And 14.

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

## METEOROLOGICAL NOTES ON APRIL, 1893.

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.

STRATHFIELD TURGISS.—The driest April ever recorded at this station, with uninterrupted sunshine, but frost at night to the very end of the month. First swallow seen on the 2nd, cuckoo heard on the 12th, nightingale on the 16th. Horse chesnut in flower on 18th, and lilac on 21st.

ADDINGTON.—This month has been not only remarkable for its small rainfall, but also for the very high readings of the ther. during the latter part, the max. in shade reaching or exceeding  $70^{\circ}$  on seven consecutive days, and giving an average for that period of  $76^{\circ}$ . Between 1871 and 1892, both years inclusive, a max. of  $70^{\circ}$  and upwards has been recorded 13 times, and five out of the 13 occurred in 1874. This alone shows the exceptional heat. R was very much needed at the close, only one quarter of an inch having fallen during 61 days, that is since the end of February.

BURY ST. EDMUNDS.—The driest April registered since observations commenced in 1857; 1865 is next with  $\cdot 37$  in. The drought is most serious in this part of Suffolk, the more so as vegetation is about a month more forward than usual. Lilacs in full bloom on the 19th. The hay crop must be very short, much barley is not sown, and a great deal that is, cannot come up.

LANGTON HERRING.—The absolute drought which began on March 18th extended to April 21st inclusive, 35 days; a few drops of R fell on April 16th, but so few, that none fell in either of my rain gauges. The longest absolute droughts previously were, 29 days from June 7th to July 5th, 1887, and 26 days from August 9th to September 4th, 1880. The total fall in March and April was only  $\cdot 47$  in., the previous smallest fall in two successive months being  $\cdot 82$  in. in November and December, 1879. It was the hottest as well as the driest April since observations commenced in 1874, the mean 9 a.m. temp. being  $5^{\circ}$  above the average of 21 years, and about equal to the average of May. High winds from E. on 21st and 22nd.

BODMIN, FORE STREET.—A very hot and dry month; only four wet days, and very little R on those days. A record month. Showers are much needed for every crop. Swallows plentiful. Only  $\cdot 67$  in. of R registered in March and April.

WOOLSTASTON.—The drought continued throughout the month, R falling slightly on only five days. Till the 15th, the nights were very cold, with frost on the grass nearly every night. In the latter part of the month the temp. was that of summer. The blossom on the fruit trees was exceptionally fine, and the oaks were in full leaf and the hawthorn in blossom by the 3rd week. Cuckoo heard on 21st. Mean temp.  $50^{\circ} \cdot 7$ .

ORLETON.—Another remarkably fine, dry month; the driest April since 1854. The mean temp. of the month was  $3^{\circ} \cdot 7$  above the average, and although April, 1865, '68 and '74 were all rather warmer, the mean of the maxima was far higher than in either of those years. The absolute max.,  $79^{\circ} \cdot 8$  on the 21st, was the highest ever recorded here in April. A very heavy and partial storm of R occurred on the evening of the 1st, but it only extended a very little distance on either side of this place. The earliest spring ever known here, apple trees in full bloom on 21st, cuckoo heard on 13th.

BARKBY.—Temp. for the month: Mean max.  $65^{\circ} \cdot 5$ ; mean min.  $34^{\circ} \cdot 7$ ; mean,  $50^{\circ} \cdot 1$ . Swallow seen on 10th, nightingale heard on 22nd, cuckoo on 20th. Heavy T and L on the 20th.

MANCHESTER.—The hottest and driest April in my record of 27 years. The whole month was fine summer weather, with the exception of the last three days, which were cold and windy.

# WALES.

HAVERFORDWEST.—With the exception of April, 1854, when the total rainfall was '30 in. (in that April '01 in. fell on the 1st, absolute drought lasted till the 20th, when '26 in. fell, and on the 28th '03 in. fell), this is the driest April, and certainly the finest and warmest, in my record of 44 years. The temp. rose above 70° on five days, and on the night of the 22nd did not fall lower than 55°·1. During the period of great heat from the 21st to 27th, the air was very dry, the difference between wet and dry bulbs ranging from 9° to 12°. Fruit very forward, gooseberries as large as seen usually at the end of May. May in blossom on the 24th in conjunction with the gorse, a phenomenon never before seen here. Oak and ash in full leaf on the 25th, all other trees and shrubs fully one month earlier than usual. My currant trees laden with fully-formed fruit. No such April in living memory.

GOGERDDAN.—Bright and very dry throughout the month, with N.E. winds.

# SCOTLAND.

CARGEN.—The mean temp., 49°·9, is 4°·2 above the average, and the highest recorded here since observations commenced 34 years ago. The max. temp. of the month, 76°·4, is the highest in April during the same period. There were 246 hours of sunshine (13 hours more than the average for June and July), the average for the month being 166 hours. The only April that offers a comparison with this month was in 1865, the mean temp. being 49°·4, the max. temp. 72°·9; hours of sunshine, 241; rainfall, '71 in. The oaks and a few ashes were in leaf at the close, horse chesnuts, lilacs, laburnums, &c., at least four weeks earlier than usual, and a *Westeria* on the garden wall was in full bloom at the end of the month. E. winds prevailed for 20 days. L on the evening of the 19th.

JEDBURGH.—The dryness has been great. Old men accustomed to notice peculiarities of weather are unanimous in the opinion that the like of this has not been within their recollection. The cereals have been sown in land highly favourable, and this has allowed the land to be thoroughly cleaned. The lands look well, and grass is far advanced. The tree and bush fruits look well, the bloom is far advanced, and promises an abundant crop. The swallow arrived on 23rd.

OLD CUMNOCK.—During the early part of the month heavy dews prevailed in the early morning, sometimes inclining to frost. Vegetation about three weeks earlier than last year. H on 29th and 30th.

MULL, QUINISH.—The earliest spring for many years. Cuckoo heard on 16th. Hawthorn in blossom on 29th, grass in abundance.

ROEBERRY.—A very fine month throughout; the finest April since 1878. R 1·13 in. less than the average of 26 years.

# IRELAND.

DARRYNANE ABBEY.—Very fine and hot, especially the first three weeks, which were more like July than April. Vegetation very forward, hawthorn in flower fully a month earlier than usual, and roses which usually flower in June already in bloom.

WATERFORD, BROOK LODGE.—The driest April since 1854, when only '30 in. was registered. Mean temp., 50°·5.

O'BRIENSBRIDGE, ROSS.—Quite a summer month of brilliant sunshine and rapid vegetation. The oak was in full leaf before the end of the month, and all bulbous plants and flowering shrubs were fully 15 days in advance of an average season. Orchards and bush fruit very promising. Vivid L and some T on the 21st.

DUBLIN.—April proved a fitting sequel to the record-breaking March of 1893. Like its predecessor, it was characterised by drought, bright sunshine

and a high temp. The mean amount of cloud was only 4·0, falling at 9 p.m. to 3·3. So powerful was the heating power of the sun by day that, notwithstanding free radiation by night, the temp. did not fall below 36°·2 in the screen, and 28°·9 on the grass. The drought was happily interrupted in Ireland by copious falls of E on the 16th and 17th, and again on the 29th and 30th. In the matter of temp., April, 1893, breaks the record, the mean being 3°·7 above the average, and 1°·0 above the mean of the Aprils of 1865 and 1874, which had been the warmest since the present records began. Lunar halo on the 26th; fogs on the 6th and 17th; high wind on four days. No S or sleet, but H on the 29th. The temp. exceeded 50° in the screen on every day; it rose above 60° on 11 days, but never fell to 32°. The min. on the grass was 32° or less, on five nights.

EDENFEL.—Another month of marvellous serenity, and prevalence of warm, bright sunshine, and although the wind was from a polar or easterly quarter for 24 days, the amount of frost was insignificant. These conditions, coupled with a sudden and heavy rainfall on the 17th and 18th, produced a vegetation of extraordinary precocity and luxuriance, even ash and oak bursting into leaf at the close. All summer migrants about 14 days, and ordinary vegetation a full month, earlier than the average.

### THE MAXIMUM SHADE TEMPERATURE IN APRIL, 1893.

I HAVE seen several statements as to the unprecedented heat of April 20th. It may have been without precedent at other stations, but was not so at Camden-square, as the following list of higher maxima in shade, in April, in previous years will show.

In 1893 the max. on April 20th was	78°2
„ 1859 „ „ „ „ 7th „	78·5
„ 1865 „ „ „ „ 27th „	81·4
„ 1866 „ „ „ „ 27th „	79·4
„ 1869 „ „ „ „ 14th „	78·5
„ 1870 „ „ „ „ 20th „	79·4
„ 1874 „ „ „ „ 23rd „	79·2

It has therefore been exceeded six times in the last 34 years, but as the most recent case occurred twenty years since it is not surprising that these instances have been forgotten.

Very much the same tale is told by the mean temperature at 9 a.m. in April. The mean in 1893 was 50°·8, the higher means have been :—

1865	.....	53°5		1869	.....	52°5
1866	.....	54·1		1870	.....	51·1
1867	.....	51·3		1874	.....	51·9

there being again six Aprils with higher mean temperatures at 9 a.m.