

SYMONS'S

MONTHLY

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THE RECENT DROUGHT.

PROBABLY every one is prepared for the statement that the six months of the present year, already elapsed, have been unprecedentedly dry, and June especially so. But this is not the case as regards the British Isles generally, and for England we do not have to look far back to find a month as dry as or drier than June, and only about ten years to find the corresponding six months much drier.

To consider June first. The really remarkable—and, we believe, almost unprecedented—phenomenon is the long spell of absolutely rainless weather, for of the 150 stations whose results are printed in this magazine there are scarcely 20, at which the absolute drought did not extend for 14 days. This has been put into tabular form on the rules laid down in *British Rainfall*, 1884, p. [166], the “Absolute Droughts” being periods of 14 or more days absolutely without rain, and the “Partial Droughts” periods of 28 or more days with not more than .25 in. of rain.

STATION.	ABSOLUTE.			PARTIAL.		
	began	ended	days	began	ended	days.amt.
Camden Square	June 9	June 30	22	...	...	...
Abinger	6	30	25	...	...	...
Hunton	4	30	27	...	...	...
Birchington	4	30	27	...	...	...
Littlehampton	4	30	27	...	...	...
Hailsham	5	30	26	June 3	June 30	28 .15
Ryde, Thornbrough.....	7	30	24	...	...	...
Alton, Ashdell	4	30	27	3	30	28 .21
Strathfield Turgiss	4	18	15	...	...	...
Hitchen	4	24	21	June 3	June 30	28 .25
Addington	4	30	27	...	...	...
Oxford, Magd. Coll.....	4	30	27	...	...	...
Banbury, Bloxham Grove	4	30	27	...	...	...
Northampton, Hazlewood Road	4	30	27	...	...	...
Cambridge, Beech House	4	30	27	June 3	June 30	28 .16
Wisbech, Bank House	9	30	22	3	30	28 .03
Southend	4	30	27	3	30	28 .12
Sheering	9	30	22	3	30	28 .20
Rendlesham	4	30	27	3	30	28 .02
Culford	4	30	27	May 28	30	34 .17

STATION.	ABSOLUTE.			PARTIAL.			
	began.	ended.	days.	began.	ended.	days.	amt.
Diss	June 9	June 30	22	June 2	June 30	29	·18
Swaffham	9	23	15	May 28	30	34	·20
Cossey	9	30	22	June 3	30	28	·03
Alderbury	4	30	27	3	30	28	·17
Warminster	7	30	24	3	30	28	·10
Langton Herring	7	30	24	3	30	28	·02
Holne Vic.	8	30	23	1	30	30	·21
Holsworthy, Clawton	6	30	25	1	30	30	·11
Winsford	1	30	30	No daily	observations		
Barnstaple	10	30	21	June 2	June 30	29	·13
Lynmouth, Glenthorne ..	9	30	22	1	30	30	·17
Probus	May 30	30	32	May 30	30	32	·00
Bodmin	June 8	30	23	June 1	30	30	·10
Temple Combe, Stowell	9	30	22	3	30	28	·03
Taunton, Lydeard Ho.	4	30	27	3	30	28	·01
Wells, Westbury	9	30	22	3	30	28	·08
Clifton	9	30	22	3	30	28	·21
Stroud	7	30	24	3	30	28	·14
Ross, The Graig	7	30	24	3	30	28	·13
Woolstaston	9	30	22	...	...	...	...
Wem, Clive Vic.	9	30	22	...	...	...	...
Cheadle, Heath House	10	30	21	...	...	...	...
Worcester, Diglis	9	30	22	...	...	...	...
Orleton	9	30	22	...	...	...	...
Coventry, Coundon	4	30	27	...	...	...	...
Leicester	9	30	22	...	...	...	...
Melton, Coston	4	30	27	June 3	June 30	28	·17
Stamford, Ketton Hall	9	30	22	...	...	...	...
Boston	3	30	28	May 29	June 30	33	·18
Horncastle, Bucknall	4	30	27	28	30	34	·14
Mansfield	4	30	27	June 3	30	28	·17
Hesley Hall	4	30	27	May 28	30	34	·22
Macclesfield	10	30	21	...	...	...	...
Liverpool, Breeze Hill	9	30	22	...	...	...	...
Ardwick	8	30	23	...	...	...	...
Broughton-in-Furness	8	30	23	...	...	...	...
Wakefield, Stanley Vic.	12	30	19	May 26	June 30	36	·19
Wetherby, Ribston	11	30	20	26	30	36	·15
Arncliffe	8	30	23	26	30	36	·23
Ripon, Mickley	4	30	27	28	30	34	·23
Hull	4	30	27	25	30	37	·25
Scarborough	12	30	19	28	30	34	·19
East Layton	May 27	30	35	25	30	37	·07
Mickleton	June 14	30	17	...	...	...	...
Unthank Hall	13	30	18	...	...	...	...
Shap, Copy Hill	9	30	22	June 2	June 30	29	·24
Llanfrechfa	9	30	22	3	30	28	·17
Cardiff, Ely	9	30	22	3	30	28	·16
Llandovery	9	30	22	3	30	28	·21
Haverfordwest	8	30	23	...	...	...	...
Castle Malgwyn	13	30	18	...	...	...	...
Cwmsymlog	8	30	23	...	...	...	...
Rhayader, Nantgwillt	9	30	22	June 3	June 30	28	·25
Carno, Tybrith	9	30	22	...	...	...	...
Corwen, Rhug	4	30	27	...	...	...	...
Port Madoc	8	30	23	...	...	...	...
Llandudno	9	30	24	...	...	...	...
Douglas, Victoria Road	8	30	23	...	...	...	...

STATION.	ABSOLUTE.			PARTIAL.			
	began.	ended.	days.	began.	ended.	days.	amt.
Stoneykirk, Ardwell	June 8	June 30	23	May 22	June 30	40	12
Cargen	9	30	24	...	...	...	...
New Galloway, Glenlee	14	30	17	...	...	...	...
N. Esk Reservoir	14	30	17	...	...	...	...
Glendrishalg	14	30	17	...	...	...	...
Old Cummock	15	30	16	...	...	...	...
Glasgow, Queen's Park	15	30	16	...	...	...	...
Lochgilphead, Kilmory	15	30	16	...	...	...	...
Oban, Craigvarren	15	30	16	...	...	...	...
Islay, Gruinart	14	30	17	...	...	...	...
Loch Leven	15	30	16	...	...	...	...
Stronavar	15	30	16	...	...	...	...
Forres H. R. S.	15	30	16	...	...	...	...
Lochbroom	14	30	17	...	...	...	...
S. Uist, Ardkenneth	12	30	19	...	...	...	...
Invergarry	12	30	19	...	...	...	...
Dunrobin	14	30	17	...	...	...	...
Laing, H. R. S.	15	30	16	...	...	...	...
Dunmanway, Coolkelure	8	30	23	...	...	...	...
Cork, Blackrock	8	30	23	...	...	...	...
Fermoy	8	30	23	June 2	June 30	29	24
Dromore	8	30	23	...	...	...	...
Waterford	8	30	23	...	...	...	...
Tipperary	8	30	23	May 23	June 30	39	25
Newcastle West	11	30	20	...	...	...	...
Miltown Malbay	13	30	18	...	...	...	...
Gorey, Courtown	8	30	23	June 1	June 30	30	19
Carlow, Browne's Hill	10	30	21	2	30	29	25
Dublin	8	30	23	1	30	30	25
Navan, Balrath	6	30	25	May 23	30	39	21
Mullingar, Belvedere	8	30	23	June 1	30	30	21
Athlone, Twyford	9	30	22	2	30	29	24
Edgworthstown	8	30	23	May 23	June 30	39	19
Ballinasloe	9	30	22	...	...	...	...
Clifden, Kylemore	14	30	17	...	...	...	...
Markree	14	30	17	...	...	...	...
Rockcorry	14	30	17	May 23	June 30	39	19
Warrenpoint	4	30	27	...	...	...	...
Waringstown	7	30	24	...	...	...	...
New Barnsley	13	30	18	...	...	...	...
Bushmills, Dundarave	15	30	16	...	...	...	...
Londonderry, Creggan Res. ..	15	30	16	...	...	...	...
Stewartstown	14	30	17	...	...	...	...
Omagh, Edenfel	14	30	17	...	...	...	...
Buncrana	15	30	16	...	...	...	...

It will be seen that nearly all stations appear except some in Scotland—even Shap in the Lake district is there, and so are eight stations in Wales. Reference to the “Drought” tables in *British Rainfall*, 1884, 1880 and 1868, shows nothing to compare with this year, for we have for average duration—

	Absolute Droughts.	Partial Droughts.
1868	14 days	...
1880	18 „	32 days
1884	17 „	30 „
1887 June	22 „	31 „

This very clearly emphasizes our statement that the really remarkable feature was the length of the absolute drought, and it should be borne in mind that the period included is only to the end of June, and in many, if not most cases, one or two days at the beginning of July will have to be added.

As regards the total rainfall of the month, the usual table of rainfall and temperature exhibits the smallness of the amounts registered and the difference from the average in inches, but for the sake of greater clearness we have also worked them out as per centages and taken the mean, and they give the fall as—

England.....	·70 in. or 28 per cent. of the average.
Wales.....	·78 „ 28 „ „ „
Scotland ...	·79 „ 24 „ „ „
Ireland	·63 „ 17 „ „ „
Mean	·73 „ 24 „ „ „

To find a month so uniformly dry over the whole of the British Isles would, perhaps, be impossible, but as far as England is concerned, to find a near parallel, we have to go only to February of this year, and to July, 1885, when—omitting Seathwaite, whose gigantic rainfall distorts calculation—we have—

FEBRUARY, 1887.			JULY, 1885.		
England...	·68 in. or 30 per cent.		England...	·66 in. or 24 per cent.	
Wales.....	1·23 „ 27 „		Wales.....	1·73 „ 40 „	
Scotland..	2·73 „ 84 „		Scotland..	1·76 „ 43 „	
Ireland ...	1·50 „ 47 „		Ireland ...	1·85 „ 60 „	
Mean	1·54 „ 47 „		Mean	1·50 „ 42 „	

Scotland and Ireland show great excesses, and for those countries we have to go back to June, 1884, to find anything comparable to June last, and even then the excess is considerable.

To describe clearly the local distribution of the drought is not easy, but we may say that over Yorkshire, Lincolnshire, and part of Suffolk and Cornwall, the fall appears to have been less than 10 per cent. of the average, and over the Southern half of Ireland less than 20 per cent. The following table gives all falls of less than 25 per cent. of the average :—

Div.	Station.	Per cent. of average.	Div.	Station.	Per cent. of average.
IX.	Hull}	2	XI.	Haverfordwest	13
V.	Bodmin	3	X.	N. Shields	15
IX.	Wetherby, Ribston ...	5	XII.	Jedburgh	15
IV.	Culford	6	XX.	Cork, Blackrock	15
IX.	Skipton, Arncliffe	6	XVII.	Braemar	18
VII.	Boston	8	IV.	Norwich, Cossey	21
XXI.	Carlow, Browne's Hill..	10	XII.	Nargen [Dumfries]	21
„	Dublin	11	XXIII.	Omagh, Edenfel	21
XVIII.	Inverness, Culloden .	11	XVI.	Loch Leven	22
XXII.	Ballinasloe	13	XI.	Cardiff, Ely	24

Comparing the actual rainfalls with the amounts recorded in previous Junes, we find that of the following 27 stations, at which the observations extend over a long series of years, ten of the falls are unprecedented, while others are by no means exceptional.

RAINFALL IN JUNE, 1887, COMPARED WITH PREVIOUS DRY JUNES.

DIV.	STATION.	Fall in June 1887.	Smallest Fall in June.		No of Smaller Falls.	NextSmallest Fall.	
			Amount	Date.		Amt.	Date.
I.	London, Camden Square ...	·91	·42	1877	3		
III.	Hitchen	·87	·42	1868	6		
IV.	Bury St. Edmunds, Culford	·14				·73	1867
„	Norwich, Cossey	·46				·51	1884
V.	Bodmin.....	·10				·54	1869
VI.	Tenbury, Orleton	1·36	·45	1868	Many		
VII.	Boston	·18				·45	1868
VIII.	Manchester, Ardwick	1·24	·55	1868	Many		
IX.	Skipton, Arncliffe	·22				·60	1865
„	Hull, Beverley Road... ..	·04				·57	1874
X.	Borrowdale, Seathwaite ...	2·20	1·25	1865	3		
XI.	Haverfordwest	·38				·44	1884
„	Llandudno	·96	·15	1868	6		
XII.	Cargen [Dumfries]	·66	·46	1868 ^a	3		
„	Jedburgh, Sunnyside	·35	·07	1865	2		
XIV.	Old Cumnock	·95	·79	1884	1		
XV.	Lochgilthead, Kilmory.....	1·74	1·35	1884	3		
XVI.	Loch Leven Sluice	·60	·30	1884	4		
„	Arbroath	·72	·37	1884	4		
VII.	Braemar	·56	·24	1865	1		
XVII.	Culloden	·25	·08	1865	1		
XX.	Cork, Blackrock.. ..	·53	·05	1869	3		
XXI.	Carlow, Browne's Hill	·26				·80	1866
„	Dublin, FitzWilliam Square	·25				·40	1874
XXII.	Ballinasloe	·42				·63	1884
XXIII.	Waringstown	·76	·54	1865	1		
„	Omagh, Edenfel	·64	·40	1865	1		

^a and 1884.

We may, perhaps, summarise by saying that the absolute drought of June appears to be unprecedented, and perhaps the smallness of the rainfall over the whole of the United Kingdom is the same, but that, taking the countries individually, we can find for each, at no distant date, months with a rainfall almost as small.

This exceptionally dry month, coming after several others with a rainfall below the average, has naturally tried the resources of water-works all over the country; some of them have apparently failed, others are expected to do so, and there is a general cry of unprecedented drought. How far this cry is justified is open to question, though there is, no doubt that, in some districts, the deficiency of rainfall is considerable. There is, however, up to the present time no reason for supposing that July may not also be dry, we therefore purpose deferring the discussion of the question till our next issue.

We append one or two letters with which we have been favoured by our correspondents.

To the Editor of the Meteorological Magazine.

SIR, — The long continued drought of the past half year, and more especially of the month of June, seems worth recording. From the 4th of June to the 3rd of July inclusive, I have registered only 0·01 in. of rain ; this shower occurred on June 8th, thus giving an absolutely dry period twenty-five days, and a period of thirty days without any rain worth speaking of. The above facts would be unusual even in the driest part of the country ; but, occurring as they have done, in a district where the annual fall averages over forty inches, they are very remarkable. The total for June is only 0·37 in., the smallest amount I have registered for any month since I commenced, in December, 1880.

Further, from January 1st to June 30th, only 9·27 inches have fallen, each month having had less than the average of the preceeding six years, and some considerably so, as will be seen from the annexed table :—

	Average 1881-6.	1887.	Per cent. of average.
January	4·74	1·95	41
February	3·39	·96	28
March	3·06	2·40	78
April	2·70	1·25	46
May	2·66	2·34	88
June ..	3·21	·37	12
Total	19·76	9·27	47

The fall has thus been less than half the average. How long is it, since the amount in this district for the first half of the year, has been so small ?

Concurrently with this, the barometer has remained consistently high. The average at 9 a.m. has been above thirty inches for every month, except January, which was only slightly below. Out of the 181 days to the end of June it has stood above thirty inches on no fewer than 122 days.

Trusting that the above notes are of sufficient interest to warrant insertion in your magazine.

I remain, yours truly,

CHARLES L. BROOK.

Harewood Lodge, Meltham, July 5th 1887.

To the Editor of the Meteorological Magazine.

SIR,—The late long drought at Beckford lasted from Friday afternoon, June 3rd, to 12 o'clock on Monday night, July 4th, or for a period of thirty-one days without any rain at all.

From 12 o'clock midnight on July 4th to 2 a.m. July 5th 0·11 in. of rain fell, and no rain has fallen since.

Yours truly,

FREDERICK SLADE.

Beckford, Tewkesbury, July 6th, 1887.

ROYAL METEOROLOGICAL SOCIETY.

The concluding meeting of this Society for the present session was held on Wednesday evening, June 15th, at the Institution of Civil Engineers, 25, Great George Street, Westminster, Mr. W. Ellis, F.R.A.S., President, in the chair.

The following papers were read :—

(1) *Amount and Distribution of Monsoon Rainfall in Ceylon generally, with remarks upon the Rainfall in Dimbula.* By Mr. F. J. WARING, M.Inst.C.E. The principal feature in Ceylon which determines both the amount and the distribution of rainfall is a group of mountains situate in the south central portion of the island, equidistant from its eastern, western, and southern shores. The south-west and north-east Monsoons in Ceylon may be said respectively to blow steadily from May to August inclusive, and from November to February inclusive. In March and April, and in September and October, the weather is more or less unsettled, and no regular Monsoon or direction of the air current is usually experienced. After giving details of the rainfall at 25 stations, the author concludes by remarking upon—(1) The effect of the mountain zone in determining the amount and distribution of the rainfall. (2) The apparent gradual veering of the rain-bearing currents of air as each Monsoon progresses. (3) The relative insignificance of the south-west Monsoon as compared with the north-east Monsoon in inducing rainfall. (4) The cause of the large general rainfall of the north-east Monsoon throughout the island generally as compared with that of the south-west Monsoon. (5) The influence of the gaps in the external ring of the mountain zone, and of the central as well as the other ridges in it, in determining the amount of rainfall within the zone, and in the neighbouring districts outside it.

(2) *Note on a Display of Globular Lightning at Ringstead Bay, Dorset, on August 17th, 1876.* By Mr. H. S. EATON, M.A., F.R.Met.Soc. Between 4 and 5 p.m. two ladies who were out on the cliff saw, surrounding them on all sides, and extending from a few inches above the surface to two or three feet overhead, numerous globes of light, the size of billiard balls, which were moving independently and vertically up and down, sometimes within a few inches of the observers, but always eluding the grasp ; now gliding slowly upwards two or three feet, and as slowly falling again, resembling in their movements soap bubbles floating in the air. The balls were all aglow, but not dazzling, with a soft, superb iridescence, rich and warm of hue, and each of variable tints, their charming colours heightening the extreme beauty of the scene. The subdued magnificence of this fascinating spectacle is described as baffling description. Their numbers were continually fluctuating ; at times thousands of them enveloped the observers, and a few minutes afterwards the numbers would dwindle to perhaps as few as twenty, but soon they

would be swarming again as numerous as ever. Not the slightest noise accompanied the display.

(3) *Ball Lightning Seen during a Thunderstorm on July 11th, 1874*, by Dr. J. W. Tripe, F.R.Met.Soc. During this thunderstorm the author saw a ball of fire of a pale yellow colour rise from behind some houses, at first slowly, apparently about as fast as a cricket ball thrown into the air, then rapidly increasing its rate of motion until it reached an elevation of about 30° , when it started off so rapidly as to form a continuous line of light, proceeding first east then west, rising all the time. After describing several zigzags it disappeared in a large black cloud to the west, from which flashes of lightning had come. In about three minutes another ball ascended, and in about five minutes afterwards a third, both behaving as the first, and disappearing in the same cloud.

(4) *Appearance of Air Bubbles at Kemenham, Berkshire, January, 1871*, by Rev. A. BONNEY.—Between 11 a.m. and noon a group of air-bubbles of the shape and apparent size of the coloured india-rubber balls that are carried about the streets were seen to rise from the centre of a level space of snow within view of the house. The bubbles rose to a considerable height, and then began to move up and down within a limited area, and at equal distances from each other, some ascending, others descending. These lasted about two minutes, at the end of which they were borne away by a current of air towards the east and disappeared. Another group rose from the same spot, to the same height with precisely the same movements, and disappeared in the same direction and after the same manner.

Mr. H. C. Russell, F.R.S., of Sydney, described a fall of red rain which occurred in New South Wales, and exhibited under the microscope specimens of the deposit collected in the rain-gauges.

EAST WINDS IN SPRING.

To the Editor of the Meteorological Magazine.

SIR,—The author of the article in your June number on “East Winds in Spring” might like to have his attention drawn to what I have said in my “*Observations in Meteorology*,” pp. 113—119, on the subjects of Easterly winds and their relative frequency in the different months of the year.—Truly yours,

LEONARD BLOMEFIELD (LATE JENYNS.)

Bath, June 18.

SIR,—I send you a table of “East Winds in Spring,” observed here by me similar to that of Mr. Paget, published on p. 71 of the last number of your *Meteorological Magazine*. I believe a local excess of N.E. winds occurs here, as, owing to the configuration of the country, S.E. and E. winds in the English Channel often get deflected into N.E. winds here. The average duration of easterly winds in the first five months of the 10 complete years (ending May 31st, 1886), was just over 7 weeks, and was 12 days more than that observed in Nottinghamshire. The maximum was 68 days in 1880, the minimum 33 days in 1878. The average for 10 years—

N.E.	25.0
E.	19.1
S.E.	7.8

Total..... 51.9

If I had computed the winds at 9 a.m. only, instead of combining them with the 9 p.m. observations (as I have done), the days of easterly winds would have been many more than appear in the table, as such winds are more frequent here in the morning than in the evening.

Yours truly,

EDWIN E. GLYDE.

Kirkham, Babbacombe, Torquay, Devon, July 1st, 1887.

MEAN OF 9 A.M. AND 9 P.M., EASTERLY WIND DIRECTION AT BABBACOMBE, TORQUAY, DEVON. (NO. OF DAYS.)

Year.	January.			February.			March.			April.			May.			Total.		
	N.E.	E.	S.E.	N.E.	E.	S.E.	N.E.	E.	S.E.	N.E.	E.	S.E.	N.E.	E.	S.E.	N.E.	E.	S.E.
1877	1	1	1	1	...	...	2	1	2	6	6	4	5	5	3	15	13	10
1878	3	...	...	2	4	1	4	1	...	4	8	...	2	3	1	15	16	2
1879	8	8	3	2	3	2	8	3	...	7	2	1	7	1	2	32	17	8
1880	5	9	3	3	...	1	7	12	...	9	3	...	12	3	1	36	27	5
1881	7	8	2	6	4	1	3	6	2	10	6	1	9	2	...	35	26	6
1882	3	5	3	1	4	4	2	...	...	5	3	4	4	9	1	15	21	12
1883	1	5	4	1	1	2	7	5	1	5	6	2	9	2	...	23	19	9
1884	1	1	2	...	6	5	4	4	2	10	5	1	8	2	...	23	18	10
1885	4	5	4	2	...	1	9	4	2	5	3	3	2	2	...	22	14	10
1886	3	1	...	6	6	2	5	7	2	11	3	...	9	3	2	34	20	6
Mean	3.6	4.3	2.2	2.4	2.8	1.9	5.1	4.3	1.1	7.2	4.5	1.6	6.7	3.2	1.0	25.0	19.1	7.8
1887	3	2	2	6	6	2	7	5	1	6	5	1	10	3	1	32	21	7

HEAT IN JUNE.

To the Editor of the Meteorological Magazine.

SIR,—I append a record of the temperatures reaching 80 degrees and upwards in the shade during the recent hot weather here, the thermometers used are Negretti and Zambra's, and the readings were verified by a standard instrument by the same makers, with a Kew certificate.

					Max.		Min.
June	16th	...	...	...	80°	.....	57°
	17th	...	...	...	81	.....	58
	18th	...	...	...	83	.....	60
	19th	...	...	...	82	.....	56
	22nd	...	...	...	80	.....	54
	23rd	...	...	...	80	.....	56
	24th	...	...	...	84	.....	60
	25th	...	...	...	83	.....	50
	26th	...	...	...	81	.....	54

This record is remarkable for several reasons.

It seems to be above the average for the same period for all British stations to the south and east of this.

A shade temperature of 80 degrees has not been reached here in the month of June during the past 25 years, nor, as far as I can ascertain, for a very much longer period; nor even in the months of July nor August, except in the years 1867, once; 1868, nine times; 1869, once; 1870, once; 1876, once; 1878, twice; and 1880, once; yet it will be seen that it has been reached or exceeded nine times this year already.

The temperature of Friday, the 24th June—max. 84°, min. 60°, mean 72°—has I think hardly been reached here before; although, curiously enough, I have a record for the 24th June, 1826, of 87° in the shade, but it requires verification. Both in that year and in 1820 the greatest summer heat occurred here in June. They were both most prosperous years, as to which I am glad to say this year gives a like promise.—Yours faithfully,

L. M. BUCHANAN,

Lieut.-Col., F.R.Met.Sec.

Edenfel, Omagh, Co. Tyrone, July 4th, 1887.

SHOWER OF BLACK RAIN.

A very strange atmospherical phenomenon was witnessed at Castlecomer, Ireland, on April 30th. A general depression was felt all over the district in the afternoon, accompanied by lightning and thunder and a tremendous rainfall, which continued till about seven o'clock. At about 7.50 p.m., a thick black rain fell, sufficiently black to stain any white cloth, and apparently impregnated with an insoluble dust. The water of the local streams and cisterns was discoloured, and in many places could not be used for domestic purposes.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, JAN., 1887.

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		0-10
England, London	52·2	19	14·5	2	40·3	30·6	33·0	89	67·6	11·0	1·26	13	7·8
Malta.....	61·6	27	43·0	11	59·0	46·6	44·7	84	120·2	36·0	2·31	14	4·7
<i>Cape of Good Hope</i> ...	...	...	...	...	...	...	...	...	...	...	...	...	...
<i>Mauritius</i>	85·0	11	71·0	15	82·6	74·5	70·6	79	138·0	64·3	9·84	20	7·7
Calcutta.....	81·1	6, 7	47·1	24	75·2	55·2	54·8	72	140·9	36·4	1·49	3	1·3
Bombay.....	83·3	16	60·0	22	79·9	66·4	63·8	72	138·2	45·9	·00	0	1·2
Ceylon, Colombo	90·7	14	67·3	30	88·0	71·8	66·9	65	150·2	58·0	2·31	6	5·0
<i>Melbourne</i>	104·9	10	47·9	1	80·6	59·7	56·3	65	154·2	36·3	1·11	6	5·9
<i>Adelaide</i>	111·2	9	51·0	19	88·8	62·3	51·9	44	164·0	41·2	·69	3	2·7
<i>Wellington</i>	83·0	26	47·0	3	75·4	59·1	59·8	78	143·0	41·0	·18	3	3·0
<i>Auckland</i>	81·5	17	58·5	9	78·0	63·7	63·8	78	146·0	50·0	1·29	5	6·2
<i>Falkland Isles</i>.....	...	...	36·2	9	...	42·7	46·0	83	133·0	29·0	4·36	24	7·6
Jamaica, Kingston.....	90·8	23	61·2	16 ^a	87·5	65·9	67·9	79	...	...	·46	...	3·6
Barbados	80·0	11	67·0	15	78·0	69·0	66·9	76	141·0	...	3·32	18	6·0
Toronto	44·1	23	—16·6	3	26·7	8·5	17·3	83	...	—21·0	3·21	18	7·0
New Brunswick, Fredericton }	45·9	29	—34·1	9	22·4	—4·1	9·7	79	...	...	6·45	21	6·0
Manitoba, Winnipeg }	23·2	10	—42·7	7	—3·6	—26·7	—11·0	97	...	...	·71	12	4·0
British Columbia, Victoria }	52·0	4	30·0	19	46·3	35·8	...	...	...	...	6·68	21	...

^a And 25.

REMARKS, JANUARY, 1887.

MALTA.—Mean temp. 51°·5; mean hourly velocity of wind 8·3 miles. Sea temp. varied between 58°·5 and 60°·0. TS on 3rd; H on 1st and 3rd. J. SCOLES.

Mauritius.—Rainfall 3·81 in. and mean temp. of dew point 1°·1 above their averages; mean temp of air 0°·2, and mean pressure ·053 in. below their averages; mean hourly velocity of wind (10·4 miles) 0·9 mile below the average; extremes 23·8 on 28th and 2·7 on 14th; prevailing direction E.N.E. T and L on 9 days, L alone on 5 days. C. MELDRUM, F.R.S.

Melbourne.—Mean temp. of air 3°·0, of dew point 3°·7, mean humidity 1, and mean amount of cloud ·8 above their averages; rainfall ·57 in. below average. Prevailing winds S. and S.E., strong on 4 days. Very sultry and oppressive from 4th to 11th. T and L on 4th, 14th, and 18th; L alone on 7th. R. L. J. ELLERY, F.R.S.

Adelaide.—Pressure ·043 in., and rainfall slightly below their averages; mean temp. 1°·1 above the average. Very hot at the commencement of the month, colder in the latter half. C. TODD.

Wellington.—A very fine month, with very small rainfall, 3·33 below the average. Prevailing wind N.W., at times fresh, but on the whole moderate; strong cn 12th from N.E. Mean temp. (67°·2) 0°·6 above the average. T and L on 1st. slight earthquakes on 16th and 31st, fog on 29th. R. B. GORE.

AUCKLAND.—A hot and dry month, the mean temp being more than 2° above, and the rainfall hardly half the average; violent TS on 19th. T. F. CHEESEMAN.

BARBADOS.—Pressure not steady; mean temp. (77°·3) average; rainfall 25 per cent. below the 25 years average. Prevailing wind N.E.; mean hourly velocity 13 miles; extremes 17·3 miles and 6·5 miles; 6 days were overcast. R. BOWIE WALCOTT.

VICTORIA.—A very wet and stormy month.

SUPPLEMENTARY TABLE OF RAINFALL, JUNE, 1887.

[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	1·13	XI.	Castle Malgwyn	·48
"	Margate, Birchington...	·42	"	Rhayader, Nantgwillt..	·70
"	Littlehampton	1·20	"	Carno, Tybrith	·95
"	Hailsham	·94	"	Corwen, Rhug	1·16
"	Ryde, Thornbrough	1·24	"	Port Madoc	1·27
"	Alton, Ashdell	·82	"	I. of Man, Douglas	·57
III.	Oxford, Magdalen Col...	1·56	XII.	Stoneykirk, Ardwell Ho.	·11
"	Banbury, Bloxham	2·03	"	New Galloway, Glenlee	·74
"	Northampton	1·19	"	Melrose, Abbey Gate ...	·83
"	Cambridge, Beech Ho...	·62	XIII.	N. Esk Res. [Penicuik]	·70
"	Wisbech, Bank House..	·35	XIV.	Ballantrae, Glendrisaig	·73
IV.	Southend	·39	"	Glasgow, Queen's Park..	·72
"	Harlow, Sheering	·50	XV.	Islay, Gruinart School..	·77
"	Rendlesham Hall	·37	XVI.	St. Andrews, Pilmour Cot	·88
"	Diss	·28	"	Balquhiddier, Stronvar..	1·88
"	Swaffham	·15	"	Dunkeld, Inver Braan..	·50
V.	Salisbury, Alderbury ...	·96	"	Dalnaspidal H.R.S. ...	1·17
"	Warminster	·99	XVII.	Keith H.R.S.	·56
"	Calne, Compton Bassett	...	"	Forres H.R.S.	·44
"	Ashburton, Holne Vic..	·21	XVIII.	Strome Ferry H.R.S....	2·26
"	Holsworthy, Clawton...	·11	"	Tain, Springfield	·46
"	Hatherleigh, Winsford..	·00	"	Loch Shiel, Glenaladale	5·40
"	Lynmouth, Glenthorne..	·17	"	S. Uist, Ardkenneth ...	2·01
"	Probus, Lamellyn	·00	"	Invergarry	1·35
"	Wincanton, Stowell Rec.	1·01	XIX.	Lairg H.R.S.	·38
"	Taunton, Lydeard Ho ...	·27	"	Forsinard H.R.S.	·95
"	Wells, Westbury	·93	"	Watten H.R.S.	1·38
VI.	Bristol, Clifton	1·00	XX.	Dunmanway, Coolkelure	1·10
"	Ross	·95	"	Fermoy, Gas Works ...	·40
"	Wem, Clive Vicarage ...	1·67	"	Tralee, Castlemorris ...	...
"	Cheadle, The Heath Ho.	1·31	"	Tipperary, Henry Street	·25
"	Worcester, Diglis Lock	1·38	"	Newcastle West	·29
"	Coventry, Coundon	1·86	"	Miltown Malbay	·43
VII.	Melton, Coston	·61	XXI.	Gorey, Courtown House	·19
"	Ketton Hall [Stamford]	1·03	"	Navan, Balrath	·21
"	Horncastle, Bucknall ...	·06	"	Mullingar, Belvedere ...	·21
"	Mansfield, St. John's St.	·43	"	Athlone, Twyford	·32
VIII.	Macclesfield, The Park..	·91	"	Longford, Currygrane...	·17
"	Walton-on-the-Hill	1·17	XXII.	Galway, Queen's Coll...	·46
"	Lancaster, South Road..	...	"	Clifden, Kylemore	1·39
"	Broughton-in-Furness ..	·58	"	Crossmolina, Enniscoe..	·59
IX.	Wakefield, Stanley Vic.	·08	"	Collooney, Markree Obs..	·43
"	Ripon, Mickley	·23	XXIII.	Rockcorry	·19
"	Scarborough, West Bank	·18	"	Warrenpoint	·54
"	East Layton [Darlington]	·00	"	Newtownards .....	...
"	Middleton, Mickleton ..	·44	"	Belfast, New Barnsley ..	·78
X.	Haltwhistle, Unthank..	·36	"	Cushendun	1·19
"	Shap, Copy Hill	·28	"	Bushmills	1·12
XI.	Llanfrechfa Grange ...	·82	"	Stewartstown	·97
"	Llandovery	·36	"	Buncrana	·66

JUNE, 1887.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL.					TEMPERATURE.				No. of Nights below 32°.	
		Total Fall.	Difference from average 1870-9	Greatest Fall in 24 hours.		Days on which .01 or more fell.	Max.		Min.			
				Dpth.	Date.		Deg.	Date.	Deg.	Date.		
inches	inches.	in.								On grass.	In shade.	
I.	London (Camden Square) ...	.91	— 1.76	.51	3	3	85.3	15	43.0	27	0	0
II.	Maidstone (Hunton Court)...	1.06	— 1.01	.56	2	2	...	...	...	...	...	...
III.	Strathfield Turgiss	1.31	— .79	.95	2	2	85.3	15	40.6	21	0	0
IV.	Hitchin .....	.87	— 1.26	.32	1	4	80.0	15a	42.0	26	0	...
V.	Winslow (Addington)	1.16	— 1.35	.50	2	3	83.0	15	41.0	21a	0	0
VI.	Bury St. Edmunds (Culford) ...	.14	— 2.13	.12	2	2	88.0	13	36.0	20d	0	...
VII.	Norwich (Cossey) .....	.46	— 1.76	.26	2	3	...	...	...	...	...	...
VIII.	Weymouth (Langton Herring) ...	.36	...	.34	2	3	77.0	16	45.0	9	0	...
IX.	Barnstaple .....	.92	— 1.80	.79	1	6	88.0	17	44.0	11	0	...
X.	Bodmin .....	.10	— 3.11	.06	6	4	77.0	19	60.0	9	0	...
XI.	Stroud (Upfield)	1.14	— 1.24	1.00	2	3	85.0	16	47.0	2, 3	0	...
XII.	Churchstretton (Woolstaston) ...	1.17	— 1.70	.70	2	5	78.5	16	39.0	1	0	0
XIII.	Tenbury (Orleton)	1.36	— 1.38	.95	2	4	87.2	27	39.0	21	0	0
XIV.	Leicester	1.44	...	.66	2	4	83.6	15	40.6	1	0	...
XV.	Boston .....	.18	— 2.07	.12	2	2	91.0	15	37.0	21	0	...
XVI.	Hesley Hall [Tickhill] .....	.22	...	.11	3	3	81.0	18b	39.0	1, 22	0	...
XVII.	Manchester (Ardwick)	1.24	— 1.92	.60	3	4	80.0	17c	43.0	1	0	...
XVIII.	Wetherby (Ribston Hall) ...	.15	— 2.72	.10	10	2	...	...	...	...	...	...
XIX.	Skipton (Arncliffe) .....	.22	— 3.60	.11	3	6	92.0	18	38.0	9	0	...
XX.	Hull (Beverley Road) .....	.04	— 2.08	.03	3	2	84.0	21	42.0	28	0	0
XXI.	North Shields .....	.31	— 1.72	.16	4	7	78.8	13	40.5	21	0	0
XXII.	Borrowdale (Seathwaite)	2.20	— 5.61	.79	19	9	...	...	...	...	...	...
XXIII.	Cardiff (Ely) .....	.74	— 2.32	.58	2	5	...	...	...	...	...	...
XXIV.	Haverfordwest .....	.38	— 2.65	.20	7	5	83.0	19	40.0	...	0	...
XXV.	Plinlimmon (Cwmsymlog) ...	1.02	...	.39	7	3	...	...	...	...	...	...
XXVI.	Llandudno .....	.96	— 1.04	.61	3	6	80.0	17	45.0	1	0	...
XXVII.	Cargen [Dumfries] .....	.66	— 2.51	.36	3	5	83.4	25	36.4	1	0	...
XXVIII.	Jedburgh (Sunnyside) .....	.35	— 2.05	.17	5	4	83.0	18	34.0	21	0	...
XXIX.	Old Cumnock .....	.95	— 1.97	.20	7	11	85.0	18	36.0	20	0	...
XXX.	Lochgilthead (Kilmory)	1.74	— 2.10	.56	6	12	...	...	...	...	...	...
XXXI.	Oban (Craigvarren)	1.91	...	.40	6	12	79.8	24	46.2	3	0	0
XXXII.	Mull (Quinish)	2.65	...	.44	11	13	...	...	...	...	...	...
XXXIII.	Loch Leven Sluices .....	.60	— 2.17	.20	7, 8	4	...	...	...	...	...	...
XXXIV.	Arbroath .....	.72	— 1.89	.20	6	7	76.0	18	40.0	1	0	...
XXXV.	Braemar .....	.56	— 2.53	.25	13	8	81.5	22	33.0	2	0	7
XXXVI.	Aberdeen .....	.66	...	.26	13	10	80.0	18	41.0	3	0	0
XXXVII.	Lochbroom	1.40	...	.46	8	10	...	...	...	...	...	...
XXXVIII.	Culloden .....	.25	— 2.00	...	...	...	81.0	18	41.0	14e	0	I
XXXIX.	Dunrobin .....	.87	...	.33	4	7	76.5	18f	40.0	2	0	...
XL.	Kirkwall (Swanbister) .....	...	...	...	...	...	...	...	...	...	...	...
XLI.	Cork (Blackrock) .....	.53	— 3.02	.21	1	4	89.0	26	49.0	16	0	...
XLII.	Dromore Castle .....	.69	...	.23	7	4	90.0	27	43.0	9	0	...
XLIII.	Waterford (Brook Lodge) ...	.48	...	.24	7	3	87.0	27	40.0	4	0	...
XLIV.	O'Briensbridge (Ross)	1.37	...	.89	3	8	83.0	23	45.0	2	0	...
XLV.	Carlow (Browne's Hill) .....	.26	— 2.40	.11	7	7	...	...	...	...	...	...
XLVI.	Dublin (Fitz William Square) ...	.25	— 1.95	.09	3	5	78.4	17	47.4	10	0	0
XLVII.	Ballinasloe .....	.42	— 2.77	.11	6	6	78.0	23	39.0	3	0	...
XLVIII.	Waringstown .....	.76	— 1.90	.68	3	4	90.0	18	44.0	9, 29	0	0
XLIX.	Londonderry (Creggan Res.) ..	.91	...	.26	3	9	...	...	...	...	...	...
L.	Omagh (Edenfel) .....	.64	— 2.41	.28	6	7	84.0	24	45.0	9	0	0

α And 27, b and 19, 27, c and 18, d and 26, e and 21, f and 30.

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

METEOROLOGICAL NOTES ON JUNE, 1887.

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.—Brilliant, fine and hot weather prevailed throughout the month. The wheat crop was immensely improved by the sunshine. Roots and pulse crops wanted R at the close and the water supply was getting short. Hay was cut on the 23rd. Small copper and blue butterflies were seen on 11th and meadow brown butterfly on 14th.

HITCHEN.—The longest drought since July, 1868, and, with only five exceptions, the hottest June since our record began in 1849.

ADDINGTON.—A month of fine, dry weather, with no measurable quantity of R after the 3rd; 27 consecutive days without R in one month is by far the longest period I have any record of. With the drought there was much sunshine, and many things were suffering at the close in consequence. T on 1st; much R on the first three days, causing a large flood.

CULFORD.—Our register, which dates back 15 years, shows this to have been the driest June recorded in that period.

LANGTON HERRING.—The jubilee month will be remembered for its exceptionally bright, fine weather. The mean temp. at 9 a.m. was $1^{\circ}4$ above the average of 15 years. The mean max. temp. was $1^{\circ}5$ above the average. The 16th was a very hot day, the temp. at 9 a.m. being 70° and the max. 77° . There was more or less fog from 4th to 9th; from 13th to 28th the range of pressure was only $\cdot 10$ in.; from 16th to 26th the wind was N.E. No T was heard. For the first six months of the year the rainfall is only $8\cdot 21$ in. on 59 days, the deficiency being as much as $6\cdot 21$ in. and the number of rainy days 25 below the average.

STROUD.—Very hot sun prevailed on most days, but the nights generally were cool. R was much wanted at the close.

WOOLSTASTON.—A very dry month, with continued easterly winds and intense heat. Mean temp. $60^{\circ}0$.

ORLETON.—The first three days were cold and cloudy, with heavy R after noon on the 2nd, continuing all night. On the 4th the sky became clear and the temp. rose, the remainder of the month being characterised by brilliant sunshine without any measurable R except on the 8th, when $\cdot 12$ in. fell. The max. temp. was much higher than the average and the min. lower, the mean at 9 a.m. being about $2^{\circ}5$ higher than the average of the last 26 years, and only exceeded in 1865, 1868, and 1870. The prevailing wind was N.E. and the sky was generally cloudless but hazy. Pressure was generally much above the average and the fluctuations were very trifling. No T or L.

LEICESTER.—Very dry; no R after the 3rd, except $\cdot 07$ in. on the 8th. R much needed for gardens and fields at the close.

BOSTON.—The smallest rainfall, with one exception, and the longest period without R during 23 years. On the 15th the range of shade temp. was 42° . Lilac came into flower on 3rd, and May and Laburnum a few days afterwards. Wheat was in ear at the close.

MANCHESTER.—The temp. at the commencement of the month was rather low, and there were rather heavy showers during the first three days; the weather then cleared up and continued fine and dry to the end. R is much wanted; the reservoirs of waterworks in Lancashire are getting very low, and unless R comes speedily, a scarcity of water will be severely felt in the manufacturing districts.

ARNCLIFFE.—R on only six days, and the total fall less than a quarter of an inch. I never made such a return before. Everything suffering from drought, fishes dying from want of water in the beck; and pastures, and even meadows scorched up.

HULL.—A remarkably dry month, the driest since April, 1852, when only $\cdot 02$ in. fell. The days were generally fine, with cold nights. In the six months only $6\cdot 52$ in. of R fell, $4\cdot 97$ in. below the average of ten years.

WALES.

LLANDUDNO.—Judging by the heat of June, we appear to be entering on an old fashioned summer in succession to an old fashioned winter. The mean temp. ($60^{\circ}\cdot0$) was $2^{\circ}\cdot0$ above the average, and the highest registered at Llandudno in any year from 1861 to 1887 inclusive. The nearest approach to it occurred in 1877, when the mean June temperature was $59^{\circ}\cdot6$, but from 1878 to 1886 inclusive, our Junes were uniformly cold, averaging only $56^{\circ}\cdot0$. The mean daily range ($13^{\circ}\cdot8$) was $0^{\circ}\cdot6$ below, and the monthly range ($35^{\circ}\cdot0$) was $2^{\circ}\cdot2$ above the average. The rainfall was 51 per cent. below the average. In consequence of this and the large amount of sunshine (250 hours) the atmosphere was remarkably dry, the relative humidity being 68 in comparison with an average of 76. The greater part of the R fell on the first three days which were also cold, but from 4th to 30th, the max. temp. was always above 60° , and it exceeded 70° on no less than nine days. From 1861 to 1886 inclusive, a period of 26 years, there were seven different occasions in June, when the temp. rose to 80° or upwards, viz., 1865, 1867, 1868, 1876, 1877, 1878 and 1884, but on these occasions the heat was less persistent and the air was cooled from time to time by T and R. This year, however, we have had no T and no R from the 7th, while the earth, intensely heated by the solar rays during the day, gave off its accumulated heat from sunset to sunrise, and so maintained the night temperature at a high level, exceeding 60° on several occasions. But notwithstanding the persistently high temp. the air never felt close or oppressive, partly because of its extreme dryness, and partly because of a tempering breeze which more or less prevailed throughout. Though the month was unusually dry, it was by no means the driest since 1861. In 1868, R fell on one day only, and the amount was only $\cdot15$ in.; in 1869 it was $\cdot82$ in., in 1873 $\cdot66$ in., in 1874 $\cdot35$ in., and in 1885 $\cdot96$ in. It was altogether a most enjoyable month for the seaside.

SCOTLAND.

CARGEN.—The latter half of the month was unusually hot, the max. thermometer registering from $75^{\circ}\cdot0$ to $83^{\circ}\cdot4$ on 13 days. On two or three occasions the daily range was very great, as much as 36° or 37° . Rainfall very deficient. Sunshine 72 hours above the average; pressure $\cdot277$ in. above average. E. winds on 15 days. During the last five months only $6\cdot27$ in. of R has fallen, $8\cdot53$ in. less than the average. This long continuance of dry weather is telling most injuriously on all crops; many pasture fields in the district are quite burnt up, and in many places the failure of the usual water supply has led to serious inconvenience.

JEDBURGH.—Only twice during 23 years has the rainfall been less, viz., in 1865 and 1868. East winds for about a fortnight tended to keep the temperature down, and the night temperature was below the average. Crops on the whole looked well, but pastures were beginning to get brown at the close, and springs were getting low. T and L on 18th.

BRAEMAR.—A very dry, scorching month. Solar halo on 20th.

CULLODEN.—Rainfall almost nil. On many days the heat was very great. The crops and all pasture land suffered greatly. Distant T on 18th.

IRELAND.

BLACKROCK.—Slight showers fell on 1st, 5th, 6th and 7th, then fine, bright weather prevailed to the end; hot from 16th. Mean temp. ($63^{\circ}\cdot4$) $3^{\circ}\cdot2$ above the average of 11 years. The rainfall for the six months ($10\cdot27$ in.) was $11\cdot32$ in. less than the average of 22 years for the same period.

DROMORE.—Rivers running dry. We have not had such a June for years.

WATERFORD.—A very parching month with a good deal of E. wind. The driest June since 1869, when only $\cdot32$ in. was registered.

O'BRIENSBRIDGE.—Brilliant weather prevailed throughout, the shade temp. reaching 80° and upwards on several days, and the min. temp. being as high as 60° on several nights. The country was much parched and grass burned up, especially on limestone soils.

BROWNE'S HILL.—This neighbourhood is very much dried up; rivers are very low, and wells failing. We have had only 5 inches of R during the last five months.

DUBLIN.—June 1887, will be long remembered as one of the driest and warmest months on record in Dublin. Pressure was high almost throughout, and remarkably steady. As in May, there was a preponderance of polar (N.E. and E) winds which were, however, of little strength, and partook more of the nature of day-sea breezes than of real or very decided air currents. There were no electrical disturbances in Dublin, and after the 7th not a drop of R fell. The mean temp. ($62^{\circ} 3$) was much above the average ($57^{\circ} 7$). In the preceding 22 years, June was warmest in 1865 ($61^{\circ} 0$) and in 1868 ($60^{\circ} 5$). Lunar corona on 27th; solar halo on 5th; fog on 4th and 18th; high winds on three days. Temperature reached or exceeded 70° in screen on no fewer than 17 days. Mean humidity 72; mean amount of cloud 4.2; prevailing winds N.E. and E. The rainfall for the six months was only 6.74 in. on 67 days compared with an average of 12.50 in. on 96 days.

BALLINASLOE.—Very hot and dry; bogs on fire all round at the close.

WARINGSTOWN.—The most continuously hot month ever experienced here; no R after 6th; there was great scarcity of water at the close, and grass was much burnt up; but crops, except late turnips, were not much damaged.

EDENFEL.—The weather of June was very remarkable. With the smallest monthly rainfall since June 1865, there was a longer continuance of higher temperature than had been experienced here during the 25 years recorded, and, as far as I can ascertain, during a much longer period.

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