

# SYMONS'S MONTHLY METEOROLOGICAL MAGAZINE.

---

CCCCV.]

OCTOBER, 1899.

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

---

## METEOROLOGICAL EXTREMES.—II.

WE are rather surprised that no criticisms on the first of these papers have reached us—we also regret it, because we cannot believe that our list was perfect, and we relied upon our readers to correct us and make it so.

### TEMPERATURE.

Difficult as it was to obtain comparable and accurate data as to barometric pressure, it is much more so to obtain trustworthy data as to temperature. Six's thermometer was not invented till the end of last century, and it is overstating the case rather than the reverse, to put the *general* use, throughout the world, of maximum and minimum thermometers much earlier than 1850; and, without registering thermometers the recorded extremes can be regarded only as approximations. Moreover, the positions in which thermometers were placed differed greatly. The Glaisher pattern thermometer stand dates only from 1840, the Lawson from 1845, the Stevenson only from June, 1864. The Montsouris, as its name implies, cannot have been introduced before that observatory was founded, which was about 1871. And even now, in 1899, no uniformity of exposure in different countries exists, and there are few comparative series enabling strict comparisons to be made. We shall not consciously quote any inaccurate or doubtful figures, but as in all cases we indicate whence the statements are derived, we can be held responsible only for their correct reprinting.

We have found that so much repetition and alteration of the wording of the various writers would be required to bring the statements into perfectly systematic arrangement, that we have thought it best to leave them all *verbatim*; but, *roughly*, statements as to high temperatures come first, and low ones follow. Also, as far as possible, records from neighbouring countries are put together.

### DR. BUCHAN'S ISOTHERMS.

The plate devoted to yearly mean temperature prepared by Dr. Buchan, F.R.S., and published in one of the "Challenger" volumes, gives no yearly isotherm higher than 85°, of these there are three,

the largest covering a large portion of Central Africa bounded on the N. by latitude  $18^{\circ}$  N., turning S.E.-wards near Suakin, including Massowah and Mocha but not Aden, and then running S.S.W. to about 150 miles S. of the Victoria Nyanza. This map therefore gives no support to the extreme temperature so often mentioned at the Southern end of the Persian Gulf; and on the monthly maps for the hot months also we fail to trace it. Dr. Buchan also gives two small areas of  $85^{\circ}$  one in Central India about Lat.  $15^{\circ}$  N., and the other in the Northern portion of South Australia in about Lat.  $15^{\circ}$  S. and Lon.  $130^{\circ}$  E.

As regards cold, Dr. Buchan assigns the lowest yearly mean temperature to an area surrounding the N. pole, but for the winter months he shows that far lower temperatures occur in Lat.  $65^{\circ}$  N. and Lon.  $132^{\circ}$  E., to which, for January, he assigns the frightful mean temperature of  $-60^{\circ}$  F., *i.e.*  $92^{\circ}$  below freezing point, and  $21^{\circ}$  below the temperature of frozen mercury.

#### EXTREMES OF TEMPERATURE.

The absolute range of the Northern Hemisphere, and doubtless of the world, is  $217^{\circ}8$ , depending on the absolute maximum of  $127^{\circ}4$  at Ouargla, Algeria, July 17th, 1879, and the absolute minimum of  $-90^{\circ}4$  at Werchojansk, on the Jana river, Siberia, lat.  $67^{\circ}34'$  N., long.  $133^{\circ}51'$  E., January 15th, 1885. It was once questioned if the human body could undergo, unharmed, such enormous temperature changes, and the question is now answered in the affirmative, although probably no person has ever experienced the entire range. The author, however, has closely approximated it, having experienced at Fort Conger, February, 1882, the very low temperature of  $-66^{\circ}2$ , and on the Maricopa Desert, Arizona, August 28th, 1877, he saw the temperature of the air at  $114^{\circ}$ , while the metal of his Aneroid barometer, beside him as he rode, assumed a steady temperature of  $144^{\circ}$ .—*American Weather*, by Gen. Greely, p. 121.

#### THE HOTTEST SPOT ON EARTH.

The hottest region on the earth is on the south-western coast of Persia, where Persia borders the gulf of the same name. For 40 consecutive days, in the months of July and August, the thermometer has been known not to fall lower than  $100^{\circ}$ , night or day, and often to run up as high as  $128^{\circ}$  in the afternoon. At Bahrin, in the centre of the torrid part of the torrid belt, as if it were Nature's intention to make the region as unbearable as possible, no water can be obtained from digging wells 100, 200 or even 500 ft. deep, yet a comparatively numerous population contrive to live there, thanks to copious springs which break forth from the bottom of the gulf, more than a mile from shore. The water from these springs is obtained by divers, who dive to the bottom and fill goatskin bags with the cooling liquid and sell it for a living. The source of these submarine fountains is thought to be in the green hill of Osman, about 500 or 600 miles away.—*Boston Herald*, 1890.

### HEAT IN WESTERN ASIA.

The heat probably reaches its maximum in the low-lying coast district of the Tehama on the Red Sea, and along the west coast of the Persian Gulf. From the bare rocky walls skirting both sides of these land-locked basins the sunbeams are reflected with redoubled strength on the glowing waters, thus producing an enormous evaporation, which converts the surrounding atmosphere into a vapour bath. For Europeans a trip across the Persian Gulf is considered at these times extremely perilous, and the unhealthy climate of the Tehama has become proverbial.—*Stanford's Asia*, p. 127.

#### A TEMPERATURE OF 122° AT NIGHT.

Advices from the Red Sea continue to describe the discomforts experienced at Suakin as very serious. The English soldiers it is said are "a pitiful sight," not one man is in fairly healthy condition; while even the Indian troops are grumbling bitterly and almost mutinous. The heat is tremendous, the frequent sandstorms are most distressing, and the deaths very numerous.

But if Suakin is bad, Massowah, which the Italians have occupied, is worse. A private letter says:—We called in at Massowah, and had to anchor for the night; and a more frightful, horrible night I never spent, not a breath of air, and the thermometer 122° Fahr. This is no exaggeration; we were panting about the deck, the heat seemed to choke you: sleep was out of the question. Some negroes seemed to feel the heat more than Europeans, and were groaning fearfully, and pouring buckets of water over their heads, which, however, was of very little use, as the water was between 95° and 100° Fahr. Five Italian Officers have committed suicide, and no wonder! Aden, after Suakin and Massowah, is a perfect paradise.—*British Medical Journal*, 1885.

#### HIGH TEMPERATURES.

The highest temperature is met with near the level of the sea in the Circars, and in the Great Western Desert.

The thermometer is recorded to have stood in 1799 in the northern Circars, at midnight, at 108°, and at 8 a.m. at 112° F. A land wind had blown for a fortnight. In the Arabian desert the temperature of the night is remarkably sultry,<sup>(1)</sup> being generally 100°, rising towards morning, and during the day being much higher. In the "suffocating pandemonium" of the great salt lake of Bahr Assal, in lat. 11° 37' 30" N., and long. 42° 33' 6" E., 570 ft. below the sea level, Major Harris<sup>(2)</sup> found the thermometer at 126° F., though covered up, and this suffocating heat continued throughout the day of his encampment. The physical features of the locality explain most satisfactorily this extraordinary heat, for this "unventilated and diabolical hollow" is engulfed between lofty and rugged

(1) Fraser's Journey into Korassan; ch. 1. Climate of Omán.

(2) Highlands of Ethiopia, vol. I.

mountains, being reached by a narrow defile. The station immediately adjoining is 1,700 ft. above the level of the sea, and consequently 2,270 ft. higher than the lake. It has been observed <sup>(3)</sup> that in Lower Egypt, during the hot season, the thermometer in the shade ranges at noon from 90° to 100°; in Upper Egypt, from 100° to 110°; in Nubia, from 110° to 120°, and even, though rarely, to 130°; exposed to sand and sun it has risen even to 150° in the latter country. Near the Euphrates, in the desert, Griffiths <sup>(4)</sup> observed the heat during the land winds amount to 132° in shade, and even 156° in the sun. Buckingham <sup>(5)</sup> records having seen the thermometer in the shade at 126° two hours after noon; and Burckhardt <sup>(6)</sup> at 117°·5 at Esné, in Upper Egypt.

Thomson's *Introduction to Meteorology*, p 55.

#### INDIAN STATIONS WITH SHADE MAXIMA EXCEEDING 120° F.

F.	Year.	STATION.	Lat.	Lon.	Altitude. feet.
120·3 ...	1878 ...	Agra .....	27 10 N. ...	78 5 E. ...	555
120·3 ...	1879 ...	Lahore .....	31 34 „ ...	74 20 „ ...	732
120·9 ..	1882 ...	Jacobabad .....	28 24 „ ...	68 18 „ ...	186
121·0 ...	1886 ...	Hyderabad .....	25 25 „ ...	68 27 „ ...	94
121·3 ...	1877 ...	Sialkote .....	32 29 „ ...	74 35 „ ...	830
121·5 ...	1882 ...	Dera Ishmail Khan..	32 0 „ ...	71 5 „ ...	573

Blanford's *Climates and Weather of India*.

[It will be seen that all these stations are in the N.W. of India, most of them in the Punjab.]

#### TEMPERATURE IN KUTCHEE.

At Bhag (Lat. 29° N. ; Lon. 68° E. ; Altitude 650 ft.) the Max. temp. in May, 1859, was 126°·0. [The difference between the dry and wet bulb averaged 23°·7 and often reached 35°].

Dr. Cook in *Quar. Jour. Met. Soc.*, Vol. ix. (1883) p. 137.

#### HEAT IN AUSTRALIA.

*Melbourne*.—The highest temperature on record for Melbourne is 111°·2, in January, 1862; in 1876 it reached 110°·7, and 110°·5 on January 19th, 1882.—P. Barachi.

*Sydney*.—The highest temperature on record for Sydney is 108°·5, on January 13th, 1896; previous to that, the highest (since 1859) was 106°·9, in January, 1863.

H. C. Russell, F.R.S., in *Met. Mag.*, March, 1896.

*Adelaide*.—The highest shade temperature during 39 years ending December 31st, 1896, was 116°·3 on January 26th, 1858.

(3) Lane's *Englishwoman in Egypt*, let. VI.

(4) *Travels in Arabia*, p. 384.

(5) *Travels in Mesopotamia*.

(6) *Travels*.

*Shade temperature in 1896.*

STATION.	JANUARY.												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Wilcannia...	100	93	98	—	113	116	111	110	112	109	—	111	115
Gundabooka	112	107	112	114	118	121	123	118	118	115	114	124	117
	14	15	16	17	18	19	20	21	22	23	24	25	
Wilcannia...	98	104	120	111	—	99	115	117	114	—	116	—	
Gundabooka	121	120	128	128	124	129	126	120	126	129	119	98	

A telegram in the South Australia papers on January 28th, 1896, from Wilcannia, says, "Reports from White Cliffs state that last week the record went as high as 125° in the shade by day, and 110° on one occasion in the middle of the night. Rabbits have succumbed by thousands from the heat. No feed anywhere, and stock cannot subsist beyond a month."

Wilcannia is in 31° 31' S. and 143° 23' E., on the Darling river, about 600 miles W. of Sydney; Gundabooka is also on the Darling, but further N.E., at its junction with the Warrego, in about 30° S., and 146° E.

The thermometer at Mildura, in the extreme north-west of Victoria, reached 120° F. on the 23rd of January, 1896, being the highest ever officially registered in any part of Victoria by properly tested instruments.—P. Barachi.

*Meteorological Observations, Adelaide, 1896, by Sir C. Todd, K.C.M.G.*

### EXTREME TEMPERATURES IN AUSTRALIA.

The following, given in Dr. Hann's *Klimatologie*, 1897, are additions to the foregoing:—

	Lat.		Lon.	Altitude.	Max. Temp.
				feet.	
Fort Bourke .....	30° 3' S.	...	145° 48' E.	361	121·5
Euston .....	34° 34' „	...	142° 24' „	—	124·5
Wolgett .....	30° 6' „	...	148° 12' „	525	123·8 (Dec., 1876.)

and Dr. Hann adds that Sturt, on his explorations on January 21st, 1845, reported the temperature as 131°.

### SURFACE TEMPERATURE OF THE SOIL.

It is no uncommon thing in dry and light (*i.e.*, badly conducting) soils, in hot climates, to find a superficial temperature of 120°, 140° F., and even more. We have ourselves observed it at 159° at the Cape of Good Hope. In the arid regions of Australia, Captain Sturt reports that a lucifer match dropped on the ground takes fire.

Herschel's *Meteorology* (1862), p. 41.

## INTENSITY OF FROST IN THE ARCTIC REGIONS.

PLACE.	Lat.	Lon.	Min.	Date.
Fort Simpson .....	62° 7' N	121° 33' W	-50°2	1851 Jan.
" Constance.....	66 40	119 0 W	-59·4	1848 Dec.
" " .....	"	"	-51·0	1849 Jan.
" " .....	"	"	-56·0	" Feb.
" " .....	"	"	-72·0	1851 Jan.
" " .....	"	"	-58·0	" Feb.
Cambridge Bay.....	69° 3' N	105° 12' W	-52·5	1853 Jan.
" " .....	"	"	-50·2	" March
Victoria Harbour, Boothia Felix	70° 8' N	91° 35' W	-56·5	1831 Jan.
Camden Bay .....	"	145 29 W	-51·0	1853 Dec.
" " .....	"	"	-51·0	1854 Feb.
Princess Royal Island .....	72 47 N	117° 35' W	-51·0	1851 Jan.
" " " .....	"	"	-51·0	" Feb.
" " " .....	"	"	-51·0	" March
Port Leopold.....	73 50 N	90° 12' W	-52·0	1849 Feb.
Mercy Bay .....	74 6 N	117 55 W	-51·0	1851 Jan.
" " .....	"	"	-51·0	" Feb.
" " .....	"	"	-51·0	" March
" " .....	"	"	-51·0	1852 Jan.
" " .....	"	"	-65·0	1853 "
" " .....	"	"	-57·0	" Feb.
" " .....	"	"	-58·0	" March
" " .....	74 42 N	101 22 W	-52·0	1854 Jan.
Melville Sound .....	"	"	-53·0	" Feb.
Beechey Island.....	74° 43' N	91° 54' W	-53·0	1853 Jan.
Dealy Island .....	74 56	108 49 W	-61·0	"
Wolstenholm Sound .....	76 34 N	68 45 W	-54·0	1850 Feb.
" " .....	"	"	-51·0	" March
Northumberland Sound.....	76 52 N	97° 0' W	-57·0	1853 Jan.
" " .....	"	"	-51·0	" March
Van Rensselaer Harbour .....	78 37 N	70° 53' W	-58·3	1854 Jan.
" " " .....	"	"	-66·4	" Feb.
" " " .....	"	"	-54·2	" March
" " " .....	"	"	-59·9	" Dec.
" " " .....	"	"	-65·5	1855 Jan.
Franz Josef Land .....	79 51 N	59° 0' E	-51·0	1873 Feb.
" " " .....	"	"	-50·6	1874 Jan.
" " " .....	"	"	-51·0	" March
Discovery Harbour .....	81 44 N	65° 0' W	-54·0	1875 Dec.
" " .....	"	"	-63·0	1876 Jan.
" " .....	"	"	-62·0	" Feb.
" " .....	"	"	-70·8	" March
Fort Conger .....	"	64 45 W	-52·2	1881 Dec.
" " .....	"	"	-58·2	1882 Jan.
" " .....	"	"	-62·1	" Feb.
" " .....	"	"	-50·6	1883 Jan.
" " .....	"	"	-56·5	" Feb.
Floeberg Beach.....	82 27 N	61° 22' W	-59·2	1876 Jan.
" " .....	"	"	-66·5	" Feb.
" " .....	"	"	-73·8	" March

\* "In January, 1853, the temperature fell lower than has ever been experienced by any former expedition, to 65° below zero, and in the interval of the usual period for taking the observations it fell to -67°, and the force of the wind likewise was greater. The mean temperature of the month was -43°·8, lower than we had known it during any former winter, and, I believe, surpassing in degree anything recorded in former Polar voyages. January 6th was the coldest day that has ever been known in these latitudes; the mean temperature for twenty-four hours was 61°·6 below zero; and in the twenty-four subsequent hours -56°·7, from which some idea may perhaps be formed of the intensity of the cold during this the coldest of the cold winter months."

We have compiled the preceding table from the excellent *Contributions to the knowledge of the Meteorology of the Arctic Regions*, prepared for the Meteorological Office by Mr. R. Strachan, and from General Greeley's *Three Years of Arctic Service*. The entries are of minima below  $-50^{\circ}\text{F}$ ., but it is not to be assumed that they are *all* the instances; they are mostly monthly minima, and evidently if on two days the temperature fell to  $-51^{\circ}\text{F}$ ., and on one to  $-53^{\circ}$  the latter alone would be entered.

There is also the great uncertainty as to the correctness of the thermometers shadowing almost all the entries; but we are sure that both authors did all that was possible, and that therefore no better data can be obtained for byegone years. Science has progressed, and the old difficulties will exist no longer.

#### FROST IN THE U.S.A.

At Poplar River, Montana, North America, the thermometer fell to  $-63^{\circ}\cdot 1$  in January, 1885.

*Meteorology*, by Dr. J. W. Moore (1894), p. 310.

#### INTENSE FROST IN SCOTLAND.

On December 4th, 1879, intense frost prevailed in the S. of Scotland,  $-16^{\circ}$  was reported from Kelso, and  $-23^{\circ}$  from Blackadder in Berwickshire. This was the reading of a Six's thermometer on a post 2 ft. above ground, and with a board above to keep off rain. The thermometer agreed closely with one which had been verified at Kew.

#### THE FROST OF 1895 IN SCOTLAND.

In valleys where the chilled air can accumulate and lie stagnant, temperatures were recorded below zero Fahrenheit, the lowest being  $-17^{\circ}$  at Braemar, and  $-11^{\circ}$  at Drumlanrig.

R. C. Mossman, in *Jour. Scot. Met. Soc.*

#### LONDON EXTREMES FOR 104 YEARS.

Somerset House,  $93^{\circ}\cdot 5$  in July, 1808, and  $4^{\circ}$  in December, 1796. R.O., Greenwich,  $97^{\circ}\cdot 1$  in July, 1881, and  $4^{\circ}$  in January, 1841. Camden Square,  $94^{\circ}\cdot 6$  in July, 1881, and  $6^{\circ}\cdot 7$  in December, 1860, and in January, 1867. *Met. Mag.*, March, 1899.

#### THE MOON IN RELATION TO AIR TEMPERATURE.

*To the Editor of the Meteorological Magazine.*

SIR,—I do not think that my position relative to the relation between the moon and our weather has been at all met by Mr. MacDowall on page 104 of the August issue. I still maintain, that there should be some possible reasoning by which such a relation may be premised, before pure coincidences can be regarded as of real value. It appears that Mr. MacDowall realizes this, for he suggests

that "a connection of the moon with temperature through barometric pressure is surely not very unthinkable." It seems to me that if Mr. MacDowall really advances this as a valid argument to support his contention, he has practically surrendered his position. The effect of the moon on pressure has been most carefully worked out, and has been found almost inappreciable; in fact, it has been found necessary to study records at St. Helena and other places where the atmosphere is but slightly disturbed, in order to get any effect at all. Now, are we to believe that a secondary effect on temperature from the moon through pressure is going to be appreciable when the direct effect on pressure is so slight; I trow not. It seems that such weak efforts to bolster up a doubtful theory, or at best a surmise, simply add weight to the crash which must come with its final downfall.

This matter reaches out much farther than appears at first sight. In a review of a paper by Hildebrandsson on page 106, it is remarked upon a comparison in which a supposed relation is presented between the spring rainfall in British Columbia and the autumn rainfall at the Azores, "The figures and diagram show an agreement between the records to which no word is so appropriate as marvellous."\* This agreement is more marvellous than it seems at first sight. On looking up the Canadian records, there are none for any one station in British Columbia, and this probably accounts for the omission of the name of a station. If the B.C. record is made up from several independent stations and without a continuous series of observations, this supposed agreement is all the more remarkable, but does it not also serve to overthrow the alleged relationship? Fortunately, the United States has a continuous record from 1870 to the present time at Portland, Oregon, just across the border from British Columbia, and most persons will admit that a record there, ought to very fairly represent the rainfall in B.C. It should be stated that, in the original comparison by Dr. Hildebrandsson, a curve is drawn, showing the rainfall by years in the *spring* in B.C. from 1878 to 1890 (evidently by far too short an interval to prove anything), and this is compared with a similar curve at Ponta Delgada, in the Azores, for the *autumn* rainfall. A similar comparison between the rainfall at Portland, Oregon, and Ponta Delgada shows slight similarity between the curves (the curves are not reproduced). If there is anything that can be asserted positively about rainfall, it seems to be that, the conditions for rain on the middle Pacific coast are so dissimilar from those in the mid-Atlantic, that any apparent similarity in such curves must be set down at once and without hesitation as purely fortuitous. The cause of rain at any point may be regarded as extremely obscure, but surely it can

---

\* If Prof. Hazen had quoted the whole sentence, instead of stopping at a comma, he would have seen that we did not accept the "marvellous agreement" as proof of interdependence.—ED.

be said without fear of contradiction, that by no possibility can the forces operative in producing rain in British Columbia in spring, have a like influence in the rainfall nearly half-way around the world, and six months later.

Surely we may conclude that in attempting to prove relationship between dissimilar phenomena in meteorology the three rules already formulated should be observed.

(1) There must be enough data, at least 50 coincidences.

(2) It should be possible to show by *a priori* reasoning, how such a relation can exist.

(3) The data used should be strictly homogeneous. Prof. Wild, of St. Petersburg, has well said : " Without exact and satisfactory (and we may add properly studied) data, meteorology cannot develop as a science, but will be, as heretofore, mainly a tumbling-ground for vague speculations and dilettante investigations."

H. A. HAZEN.

*Box 216, Washington, D.C., Aug. 30th, 1899.*

## TREES AND CHANGE OF TEMPERATURE.

*To the Editor of the Meteorological Magazine.*

SIR,—I note on p. 114 of the September number a paragraph on "Trees and Change of Temperature" that has interested me very much. It is stated that "Observation does not, it is true, show that the mean temperature is lower than it was a century ago, but the disappearance of many plants which formerly flourished on this island and in Central Europe seems to indicate that such a change is in progress." I am aware that the original of this quotation was a newspaper article, and can be judged accordingly ; but do you not give it too much authority, if not indeed endorse it, by this publication ? [Surely not. We inserted it in order to elicit opinions and explanations.—ED.] If the temperature has not changed, and certainly that fact has been established, then we cannot ascribe the disappearance of the trees and plants to such change. I think that the records show no appreciable change in climate since historic times. Plants from the mummy cases of 4,000 years ago do not show much difference, if any, from those of the Nile valley at the present time. Whether the effect of temperature or rainfall is different because of the cutting away of forests, or whether the soil has changed in its properties because of continual plant growth, or the plants and trees themselves have run out (a not unusual occurrence), it may be impossible definitely to state ; but surely we may say, without hesitation, that the climate or its changes have had nothing to do with this disappearance. Some have predicted the end of the world by a freezing to death of all life, still others by just the contrary effect, or by a burning up of every living thing ; but there is no evidence of any permanent change. Some have thought that Greenland, at one time,

must have had a much milder climate, else how came it by its name. The early voyagers from the ice-bound rocks of Iceland would be charmed by the spring-time green of this land, noted even at this later day, and would readily give the name by which it is known. In the United States, we have had great stories from old-timers of the very remarkable winters they used to experience when they were boys, and of their very mild character at present, but all such stories were given a death-blow last winter by a storm and blizzard which exceeded anything in the memory of man. In the fair city of Washington, where a snow of six inches is rare, there were 34 inches on a level. The question of a change in climate is an intensely interesting one, and merits the most careful study, but there is no evidence of such change within historic times. Of course, it is admitted, without question, that there have been marked changes since glacial times, or within 40,000 years or so.

H. A. HAZEN.

*September 25th, 1899.*

## METEOROLOGICAL NOTES AT TAI-YÜEN-FU, SHANSI, NORTH CHINA.

Lat. 37° 55' N. Lon. 112° 52' E.

	1896.				1897.				1898.			
	Average Max.	Average Min.	Mean.	Rain.	Average Max.	Average Min.	Mean.	Rain.	Average Max.	Average Min.	Mean.	Rain.
January ...	35	8	22	in.	29	8	19	in.	34	11	23	in.
February ..	39	15	27	—	36	10	23	—	40	19	28	·68
March .....	47	23	35	—	48	29	38	·51	47	26	37	·42
April .....	64	42	53	2·73	66	41	54	·83	66	40	53	·79
May .....	75	50	62	1·81	76	53	64	·53	82	56	69	·46
June .....	87	63	75	2·21	88	62	75	1·67	86	61	73	·36
July .....	94	67	81	1·71	90	70	80	3·94	90	68	79	5·81
August ...	84	64	74	5·73	87	66	76	2·95	82	62	72	3·16
September	74	52	63	·36	77	54	65	·50	69	55	62	·84
October ..	61	39	50	·18	65	38	52	·40	63	40	52	·71
November.	51	29	40	—	46	29	37	·89	46	30	38	—
December.	31	10	20	·30	29	9	19	—	34	12	23	—
Means or Totals }	62	38	50	15·03	61	39	50	12·47	62	40	51	13·33

Meteorological observations from the interior of China are always so difficult to obtain that we are much indebted to Mr. F. Jacomb Hood for sending us the abstract of observations by Mr. E. H. Edwards, M.B., C.M., which we have arranged in the above table.—  
ED.

## RESULTS OF METEOROLOGICAL OBSERVATIONS

 AT  
 CAMDEN SQUARE FOR 40 YEARS, 1858-97.

## SEPTEMBER.

YEAR.	RAINFALL.				TEMPERATURE.										CLOUD.
	Total.		Max. of Fall.	Falls of 1 in. or +	Dry. Mean, 9a.&9p.	Wet. Mean, 9a.&9p.	ShadeMax		Shade Min		Sun Max. Black.		Grass Min.		
	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..	.85	9	.32	0	60.1	57.0	85.0	70.7	44.0	53.5	..	..	..	..	6.1
1859..	4.04	18	1.66	1	57.1	54.1	76.6	66.6	41.6	49.6	..	..	..	..	5.9
1860..	2.92	14	.89	0	53.9	51.5	71.0	63.3	36.4	46.1	..	..	31.3	42.1	6.2
1861..	2.15	15	.49	0	56.9	53.9	82.0	71.9	36.0	47.3	..	..	29.0	42.9	5.7
1862..	2.19	13	.88	0	57.8	54.7	74.2	67.5	38.8	50.2	..	..	32.0	46.2	5.7
1863..	3.49	13	.63	0	54.2	51.1	71.8	63.7	33.8	45.6	..	..	27.7	41.3	5.8
1864..	2.55	12	.67	0	56.6	54.1	74.9	68.4	39.0	48.8	..	..	35.4	45.1	6.4
1865..	.55	4	.42	0	61.8	58.0	85.0	76.4	41.5	54.5	..	..	40.0	49.2	2.1
1866..	3.89	27	.47	0	56.4	54.7	74.0	65.5	39.0	50.1	..	..	28.5	41.9	7.0
1867..	2.23	11	.55	0	57.6	55.0	79.0	68.1	36.0	50.4	..	..	30.0	45.9	6.7
1868..	1.74	11	.33	0	60.0	56.3	91.0	71.8	43.0	50.0	..	..	42.6	48.8	5.8
1869..	3.56	14	.84	0	58.7	55.1	76.0	68.4	41.2	51.9	..	..	(30.2)	(45.9)	7.1
1870..	2.00	9	.41	0	55.1	52.8	74.0	67.7	37.6	47.6	119.7	104.6	36.2	43.2	5.1
1871..	5.28	13	1.22	1	57.2	53.9	81.0	67.8	38.1	50.6	122.0	102.6	37.4	49.2	5.5
1872..	1.64	13	.38	0	57.5	54.0	83.1	67.9	33.0	49.9	131.8	108.7	31.1	47.4	5.1
1873..	2.46	11	.93	0	54.0	51.3	72.0	64.9	40.3	46.3	120.0	105.9	35.7	41.8	4.9
1874..	2.62	15	.99	0	57.9	55.3	78.2	68.1	43.3	50.7	125.6	104.5	42.0	48.3	6.0
1875..	2.86	15	.77	0	59.9	57.3	80.8	70.8	44.2	52.3	123.0	107.0	40.2	49.1	4.8
1876..	2.86	22	.64	0	55.6	53.8	71.4	65.5	41.3	49.4	120.2	101.2	38.0	45.6	6.3
1877..	.82	10	.28	0	53.2	50.3	73.3	63.7	36.1	46.2	119.5	102.1	31.3	41.7	6.0
1878..	.83	12	.20	0	56.4	54.1	75.4	66.7	37.7	49.1	120.2	103.3	34.9	45.8	4.7
1879..	3.67	12	1.49	1	56.0	53.4	72.6	65.6	39.6	49.5	120.7	101.2	35.8	46.2	6.0
1880..	4.04	12	1.33	2	59.2	56.7	88.3	69.7	42.1	52.8	129.8	107.1	38.2	48.5	5.7
1881..	2.03	11	.85	0	55.4	53.4	73.7	65.4	41.7	49.7	119.3	100.9	36.3	46.5	6.7
1882..	2.39	9	.86	0	54.8	52.3	70.6	64.7	37.8	47.3	125.2	99.7	34.7	42.8	6.0
1883..	3.83	18	.65	0	56.1	54.2	75.3	66.7	41.4	50.2	120.7	100.4	35.4	45.8	6.1
1884..	1.77	15	.57	0	59.6	56.4	81.5	68.8	40.6	52.3	116.6	99.6	33.6	46.7	5.6
1885..	4.30	19	1.48	1	55.0	52.3	76.5	64.8	33.7	48.4	116.3	97.7	27.7	43.0	5.6
1886..	1.73	11	.42	0	58.3	54.9	84.2	68.7	42.2	52.5	117.7	101.4	33.8	47.1	4.6
1887..	1.81	19	.35	0	54.2	51.1	69.5	62.8	34.3	47.9	118.6	99.4	31.4	43.8	6.2
1888..	1.43	14	.37	0	55.6	53.4	72.7	65.2	42.4	50.0	116.3	98.7	36.3	45.3	6.0
1889..	1.77	10	.73	0	55.4	52.4	80.3	65.6	35.1	48.9	125.6	99.3	28.4	44.6	5.6
1890..	.64	5	.26	0	58.7	56.0	75.9	70.1	37.8	51.3	119.9	104.0	37.1	48.0	4.8
1891..	1.03	15	.17	0	58.0	55.3	80.4	68.5	43.3	51.4	116.9	102.5	39.4	47.1	4.6
1892..	2.12	13	.94	0	56.3	53.0	73.6	65.7	36.4	49.0	118.4	101.4	28.0	43.6	5.1
1893..	1.07	10	.22	0	56.7	53.0	81.6	67.9	35.3	49.1	123.4	105.4	30.9	45.0	4.7
1894..	1.04	11	.27	0	54.0	51.6	71.2	63.0	36.7	48.0	113.6	93.6	31.6	43.1	6.7
1895..	1.28	2	1.24	1	59.6	57.0	82.8	73.7	42.6	51.5	121.3	108.0	33.5	45.1	2.8
1896..	5.51	22	.73	0	56.8	54.6	71.9	64.9	39.6	51.5	114.1	96.2	35.3	47.5	6.9
1897..	2.75	13	.68	0	55.4	52.5	70.6	64.0	38.1	48.5	115.0	100.6	34.0	44.4	6.5
Mean ...	2.39	13	.69	0.2	56.8	54.0	77.1	67.3	39.1	49.7	120.4	102.0	34.1	45.4	5.6
Ex- tremes {	5.51	27	1.66	2	61.8	58.0	91.0	76.4	44.2	54.5	131.8	108.7	42.6	49.2	7.1
	.55	2	.17	0	53.2	50.3	69.5	62.8	33.0	45.6	113.6	93.6	27.7	41.3	2.1

## CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, APRIL, 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.									
London, Camden Square	65·6	1	32·1	12	55·9	41·3	40·1	0·100 76	106·4	27·1	2·64	20	6·8
Malta.....	77·0	16	48·4	3	67·8	54·8	52·2	77	136·6	42·5	·11	3	2·3
Cape of Good Hope ...	90·3	21	40·6	7	72·2	52·4	52·0	82	...	...	1·48	7	2·3
Mauritius.....	84·0	1	63·1	29	81·8	71·5	68·7	79	153·1	56·9	4·61	20	5·2
Calcutta.....	105·4	29	67·8	11	97·2	75·4	71·1	63	158·6	65·6	2·75	6	3·6
Bombay.....	92·2	17	74·7	22	88·6	77·8	73·1	72	141·3	66·9	1·57	4	2·2
Ceylon, Colombo .....	92·2	3a	73·2	2	89·5	76·3	75·0	83	151·5	71·5	6·66	19	5·7
Melbourne.....	84·1	1	40·0	27	69·3	51·3	50·9	75	137·0	33·9	2·52	9	5·5
Adelaide .....	90·9	21	45·8	26	74·0	55·6	49·0	59	142·9	37·3	2·07	9	4·9
Sydney .....	...	...	...	...	...	...	...	...	...	...	...	...	...
Wellington .....	73·0	2, 3	38·9	28	65·1	52·8	49·5	71	125·0	33·0	3·61	13	4·2
Auckland .....	...	...	...	...	...	...	...	...	...	...	...	...	...
Trinidad .....	92·0	Sev.	64·0	4	89·2	67·8	65·7	65	165·0	59·0	·75	3	...
Grenada.....	85·0	11b	69·0	2	82·3	72·8	66·9	70	154·2	...	1·05	6	1·3
Toronto.....	78·4	30	21·3	4	53·5	36·0	37·6	72	93·0	17·2	1·62	14	5·3
New Brunswick, Fredericton .....	81·7	30	14·8	7	53·1	28·8	24·5	46	...	...	·37	3	3·6
Manitoba, Winnipeg..	79·0	26	—12·8	2	48·4	25·1	...	81	...	...	2·17	8	5·3
British Columbia, Esquimalt.....	...	...	...	...	...	...	...	...	...	...	...	...	...

a—and 4, 28.

b—and 15.

## REMARKS.

MALTA.—Adopted mean temp. 60°·0, or 0°·4 above average. Mean hourly velocity of wind 12·0 miles, or 0·3 above average. Mean temp. of sea 63°·0. J. F. DOBSON.

Mauritius.—Mean temp. of air 0°·1 above, of dew point 0°·4 above, and rainfall ·84 in. below, their respective averages. Mean hourly velocity of wind 9·9 miles, or 0·8 below average; extremes, 26·2 on 18th and 1·8 on 25th; prevailing direction E.S.E. to E. by S. L on 23rd, and T on 25th. T. F. CLAXTON.

CEYLON, COLOMBO.—Mean temp. of air 82°·0, or 0°·5 below, of dew point 0°·7 above, and rainfall 4·81 in. below, their respective averages. Mean hourly velocity of wind 7·4 miles; prevailing direction S.W. TSS occurred on 8 days; L on 5 days. H. O. BARNARD.

Adelaide.—Mean temp. of air 0°·7, and rainfall ·28 in., above the average of 42 years. A warm spell occurred between the 14th and 22nd, which is quite exceptional for this time of the year. C. TODD, F.R.S.

Wellington.—Fine in the early part of the month, then showery, with intervals of very fine weather. Prevailing wind N.W.; generally moderate. Fog on 8th and 9th. Slight earthquake on 16th. Temp. 1°·9 above, and rainfall ·08 in. above, their respective averages. R. B. GORE.

TRINIDAD.—Rain 1·28 in. below the average of 30 years.

J. H. HART.

SUPPLEMENTARY TABLE OF RAINFALL,  
 SEPTEMBER, 1899.

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

Div	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			in.
I.	Uxbridge, Harefield Pk..	1·86	XI.	Builth, Abergwesyn Vic.	5·59
II.	Dorking, Abinger Hall .	2·93	„	Rhayader, Nantgwillt ...	4·83
„	Birchington, Thor .....	2·30	„	Lake Vyrnwy .....	4·25
„	Hailsham .....	4·46	„	Corwen, Rhug .....	3·13
„	Ryde, Thornbrough .....	2·34	„	Criccieth, Talarvor .....	3·26
„	Emsworth, Redlands ...	2·44	„	I. of Anglesey, Lligwy..	3·85
„	Alton, Ashdell .....	2·39	„	I. of Man, Douglas .....	3·07
III.	Oxford, Magdalen Coll..	2·18	XII.	Stoneykirk, Ardwell Ho.	4·17
„	Banbury, Bloxham .....	2·32	„	New Galloway, Glenlee	5·73
„	Northampton, Sedgbrook	4·73	„	Moniaive, Maxwellton Ho.	3·16
„	Stamford, Duddington..	...	„	Lilliesleaf, Riddell .....	3·39
„	Alconbury .....	3·59	XIII.	N. Esk Res. [Penicuik]	3·90
„	Wisbech, Bank House...	4·66	XIV.	Glasgow, Queen's Park...	4·04
IV.	Southend .....	2·17	XV.	Inverary, Newtown .....	10·38
„	Harlow, Sheering.....	...	„	Billachulish, Ardsheal...	8·59
„	Colchester, Lexden .....	2·31	„	Islay, Gruinart School ...	2·27
„	Rendlesham Hall .....	3·72	XVI.	Dollar .....	3·55
„	Scole Rectory .....	2·81	„	Balquhiddy, Stronvar...	7·30
„	Swaffham .....	4·95	„	Coupar Angus Station...	4·19
V.	Salisbury, Alderbury ...	2·09	„	Dalnaspidal H.R.S. ....	...
„	Bishop's Cannings .....	3·21	XVII.	Keith H.R.S. ....	4·27
„	Blandford, Whatcombe ..	2·67	„	Forres H.R.S. ...	3·33
„	Ashburton, Holne Vic...	3·49	XVIII.	Fearn, Lower Pitkerrie..	...
„	Okehampton, Oaklands.	4·04	„	S. Uist, Askernish .....	6·75
„	Hartland Abbey .....	3·36	„	Invergarry .....	5·81
„	Lynton, Glenthorne ...	4·58	„	Aviemore H.R.S. ....	5·16
„	Probus, Lamellyn .....	3·32	„	Loch Ness, Drumnadrochit	4·65
„	Wellington, The Avenue	1·49	XIX.	Invershin .....	5·33
„	North Cadbury Rectory	3·18	„	Durness .....	6·97
VI.	Clifton, Pembroke Road	3·79	„	Watten H.R.S. ....	5·09
„	Ross, The Graig .....	2·34	XX.	Dunmanway, Coolkelure	2·22
„	Wem, Clive Vicarage ...	2·74	„	Cork, Wellesley Terrace	1·21
„	Wolverhampton, Tettenhall	2·67	„	Killarney, Woodlawn ..	3·16
„	Cheadle, The Heath Ho.	4·14	„	Caher, Duneske .....	2·08
„	Coventry, Priory Row ..	4·64	„	Ballingarry, Hazelfort...	2·19
VII.	Grantham, Stainby .....	3·82	„	Limerick, Kilcornan ...	1·98
„	Horncastle, Bucknall ...	2·58	„	Miltown Malbay .....	4·47
„	Worksop, Hodsck Priory	2·50	XXI.	Gorey, Courtown House	1·94
VIII.	Neston, Hinderton .....	3·45	„	Moynalty, Westland ...	3·69
„	Southport, Hesketh Park	3·87	„	Athlone, Twyford .....	2·40
„	Chatburn, Middlewood.	7·11	„	Mullingar, Belvedere ...	3·04
„	Duddon Val., Seathwaite Vic.	8·98	XXII.	Woodlawn .....	2·91
IX.	Melmerby, Baldersby ...	3·28	„	Crossmolina, Enniscoe ...	4·66
„	Scarborough, Observat'y	3·39	„	Collooney, Markree Obs.	5·00
„	Middleton, Mickleton ...	5·18	„	Ballinamore, Lawderdale	...
X.	Haltwhistle, Unthank H.	4·13	XXIII.	Warrenpoint.....	3·41
„	Bamburgh .....	2·73	„	Seaforde.....	4·37
„	Keswick, The Bank .....	6·80	„	Belfast, Springfield .....	3·43
XI.	Llanfrechfa Grange .....	3·27	„	Bushmills, Dundarave..	6·55
„	Llandovery .....	3·14	„	Stewartstown .....	3·29
„	Castle Malgwyn .....	3·22	„	Killybegs .....	7·77
„	Brecknock, The Barracks	3·35	„	Horn Head .....	4·93

## SEPTEMBER, 1899.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL.			Days on which -01 or more fell.	TEMPERATURE.				No. of Nights below 32°.			
		Total Fall.	Differ- ence from average 1880-9.	Greatest Fall in 24 hours Dpth Date		Max.		Min.					
						Deg.	Date	Deg.	Date.				
		inches.	inches.	in.						In shade.	On grass.		
I.	London (Camden Square) ...	2·65	+	·14	·95	29	14	88·1	5	36·4	29	0	0
II.	Tenterden .....	2·39	—	·52	1·04	29	18	84·0	5	37·0	29	0	3
III.	Hartley Wintney .....	1·91	...	...	·74	29	15	88·0	5	32·0	29	1	2
IV.	Hitchin .....	2·09	—	·41	·67	29	18	85·0	5	35·0	28	0	...
V.	Winslow (Addington) .....	1·88	—	·79	·66	29	17	88·0	5	34·0	29	0	2
VI.	Bury St. Edmunds (Westley) .....	2·48	—	·22	·82	29	15	79·0	5	33·0	29	0	...
VII.	Norwich (Brundall) .....	3·29	...	...	1·14	29	19	87·0	5	33·6	29	0	2
VIII.	Winterbourne Steepleton ...	2·54	...	...	·81	30	14	77·3	5	34·4	29	0	3
IX.	Torquay (Cary Green) ...	2·57	...	...	·68	30	14	79·5	5	42·8	30	0	...
X.	Polapit Tamar [Launceston]..	3·99	+	·28	·67	30	20	82·4	5	39·8	30	0	0
XI.	Stroud (Upfield) .....	1·47	—	1·44	·36	29	16	79·0	5	41·0	27	0	...
XII.	Churchstretton (Woolstaston) .....	2·55	+	·05	·68	29	21	80·5	5	41·0	28b	0	0
XIII.	Worcester (Diglis Lock) .....	3·12	+	·68	·97	6	17	...	...	...	...	...	...
XIV.	Boston .....	2·18	—	·59	·58	30	13	87·0	5	34·0	29	0	...
XV.	Hesley Hall [Tickhill] .....	2·17	+	·01	·56	29	17	81·0	5	31·0	29	1	...
XVI.	Breadsall Priory .....	3·12	...	...	·87	29	15	82·0	5	33·0	29	0	2
XVII.	Manchester (Plymouth Grove) .....	5·10	+	1·63	·68	16	24	79·0	5	36·0	29	0	...
XVIII.	Wetherby (Ribston Hall) ...	3·46	+	1·00	1·25	21	16	...	...	...	...	...	...
XIX.	Skipton (Arnccliffe) .....	8·95	+	4·19	1·65	29	18	...	...	...	...	...	...
XX.	Hull (Pearson Park) .....	2·55	+	·11	·73	29	17	84·0	5	35·0	29	0	1
XXI.	Newcastle (Town Moor) .....	2·60	—	·18	·74	29	16	...	...	...	...	...	...
XXII.	Borrowdale (Seathwaite) .....	14·02	+	2·29	2·85	15	25	...	...	...	...	...	...
XXIII.	Cardiff (Ely) .....	3·94	+	·20	·77	1	19	...	...	...	...	...	...
XXIV.	Haverfordwest .....	1·99	—	2·41	·38	29	13	75·8	5	34·3	29	0	1
XXV.	Aberystwith (Gogerddan) ...	4·20	—	·07	·86	27	16	80·0	5	32·0	28	1	...
XXVI.	Llandudno .....	3·90	+	1·68	·79	29	20	76·0	4	43·0	29	0	...
XXVII.	Cargen [Dumfries] .....	4·07	+	·51	·52	15	15	79·0	6	34·0	28	0	...
XXVIII.	Edinburgh (Blacket Place) ...	3·78	...	...	1·38	30	23	69·1	4	37·2	28	0	...
XXIX.	Colmonell .....	6·30	...	...	1·75	26	25	77·0	7	30·0	14c	...	...
XXX.	Tighnabruaich .....	8·12	...	...	·93	15	25	64·0	1a	35·0	27	0	...
XXXI.	Mull (Quinish) .....	6·90	+	1·87	·79	15	28	...	...	...	...	...	...
XXXII.	Loch Leven Sluices .....	2·30	—	·49	·90	29	10	...	...	...	...	...	...
XXXIII.	Dundee (Eastern Necropolis) .....	3·80	+	1·29	1·75	30	18	73·0	11	35·6	28	0	...
XXXIV.	Braemar .....	4·92	+	2·06	1·91	30	25	65·2	11	32·6	29	0	10
XXXV.	Aberdeen (Cranford) .....	3·62	...	...	·57	30	28	71·0	12	35·0	21c	0	...
XXXVI.	Cawdor (Budgate) .....	4·72	+	1·97	·49	22	26	...	...	...	...	...	...
XXXVII.	Strathconan [Beaully] .....	8·30	+	4·62	1·02	23	15	...	...	...	...	...	...
XXXVIII.	Glencarron Lodge .....	14·92	...	...	2·00	26	30	66·0	4	34·5	29	0	...
XXXIX.	Dunrobin .....	4·81	+	2·22	·70	17	23	67·0	4	38·0	22	0	...
XL.	S. Ronaldshay (Roeberry) ...	5·14	+	2·48	·54	10	30	67·0	4	40·0	18d	0	...
XLI.	Darrynane Abbey .....	2·40	...	...	·65	12	23	...	...	...	...	...	...
XLII.	Waterford (Brook Lodge) ...	1·03	—	1·89	·25	21	12	74·5	5	34·0	29	0	...
XLIII.	Broadford (Hurdlestown) ...	2·93	...	...	·52	21	26	...	...	...	...	...	...
XLIV.	Carlow (Browne's Hill) .....	1·86	—	·96	·48	21	18	...	...	...	...	...	...
XLV.	Dublin (Fitz William Square) .....	2·75	+	·78	1·04	30	21	71·8	4	39·0	28	0	0
XLVI.	Ballinasloe .....	2·70	—	·09	·68	21	21	72·0	5	33·0	30	0	...
XLVII.	Clifden (Kylemore) .....	7·09	...	...	1·33	1	24	...	...	...	...	...	...
XLVIII.	Waringstown .....	3·09	—	·07	·48	25	19	73·0	6	35·0	28b	0	3
XLIX.	Londonderry (Creggan Res.) .....	4·90	+	1·12	·68	26	28	...	...	...	...	...	...
L.	Omagh (Edenfel) .....	4·84	+	1·46	·82	21	24	69·0	3	34·0	27	0	4

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

a—and 5, 6. b—and 29, 30. c—and 27. d—and 19.

# METEOROLOGICAL NOTES ON SEPTEMBER, 1899.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; TS for Thunderstorm; R for Rain; H for Hail; S for Snow.

## ENGLAND.

TENTERDEN.—The first week was very hot, and though there were slight showers after the middle of the month, the ground continued dry and parched till the rough and stormy weather set in at the end. L on 6th; T on seven days. Fog on 7th. Duration of sunshine 173 hours.

HARTLEY WINTNEY.—Continued heat and dryness still prevailed, and the great drought was not broken up till 19th, slight showers falling after that date until the end of the month. R only .02 in. below the average. TSS on 6th, 16th and 28th, and much L every night from 24th to 30th. Light S.W. winds prevailed till 16th, then more boisterous till the end. Ozone on fifteen days; mean 3.7.

WINSLOW, ADDINGTON.—Nice warm weather prevailed until quite the end. T and L on 2nd, and T on 6th and 28th. Vegetation touched by frost on 29th.

BURY ST. EDMUNDS, WESTLEY.—A normal September. The deep chalk wells were nearly dry at the close, and there were great complaints of want of water. The 5th was the hottest day of the year. TS on 6th; T on five days.

NORWICH, BRUNDALL.—Like last year the warmest day of the summer occurred in September. The latter part of the month was very unsettled. The heavy R of the 29th helped to make up the deficiency for the year, which was, at the end of the month, only 1.56 in., notwithstanding the dry summer. L on 2nd, 5th, 6th, 27th, 28th and 30th. T on 2nd, 6th and 27th.

WINTERBOURNE STEEPLETON.—The temp. kept up until the 18th, when a squally period set in, the mean for the fortnight ending 16th being 61°·0, and for the month 57°·1. Although R fell on 14 days, the fall was slight, except on 5th, 21st, 29th and 30th. T and L on 5th; T on 7th.

TORQUAY, CARY GREEN.—R .22 in. above the average. Mean temp. 60°·5, or 2°·4 above the average. Duration of sunshine 185 hours 35 mins., being 22 hours 50 mins. above the average. No sunless days. Mean amount of ozone 5°·8.

POLAPIT TAMAR [LAUNCESTON].—The first fortnight was hot and comparatively dry, the latter very wet, and rather stormy, with considerably reduced temp. R .67 in. above the average. Thick fog on three mornings. L on 6th; T on 7th; L and T on 29th.

WOOLSTASTON.—A seasonable month, with frequent showers. T on 6th. Mean temp. 55°·7.

BREADSALL PRIORY.—There were several hot days during the first week, but the latter half of the month was very cold for the time of year.

MANCHESTER, PLYMOUTH GROVE.—Very unsettled weather upon the whole. Fine in the first week. Mean temp. 51°·3. Very stormy, with T and L on 23rd.

## WALES.

HAVERFORDWEST.—September, 1899, was in strong contrast to that of 1898. Up to the 15th it was fine, warm, and practically rainless, but after that the temp. fell, the weather became unsettled, and R fell on most days, while from the 26th to the end was very stormy. The harvest was unprecedentedly fine.

ABERYSTWITH, GOGERDDAN.—Stormy throughout, with strong winds from N.W. and S.W.

LLANDUDNO.—T and L on 23rd. T on 27th and 30th. H on 22nd.

## SCOTLAND.

EDINBURGH, BLACKET PLACE.—Mean temp. and rainfall slightly above the average. The last week was stormy and unsettled. Heavy TS from 2.40 to 4 p.m. and L at night on 27th.

COLMONELL.—R 2.29 in., and mean temp.  $0^{\circ}\cdot 2$ , above the average of 23 years. T and L on 17th; T and very large H on 23rd.

TIGNABRUACH.—A bad harvest month; frequent strong winds from N., N.E. and E., with too much R. T and L on 17th.

ABERDEEN, CRANFORD.—A wet and cold month, with high winds and little sunshine.

S. RONALDSHAY, ROEBERRY.—A very wet and unsettled month, R falling every day. Mean temp.  $50^{\circ}\cdot 8$ , or  $0^{\circ}\cdot 9$  below the average of 9 years.

## IRELAND.

DARRYNANE ABBEY.—On the whole, a fairly fine month. The first three weeks were mild, the last ten days rather cold.

BROADFORD, HURDLESTOWN.—A cold and wet month. R 20 in., and rainy days 8, above the average of 14 years. T at 3.30 p.m. on 27th.

DUBLIN, FITZWILLIAM SQUARE.—A month of sharp contrasts as regards temp. At first it was decidedly warm, afterwards it became still more decidedly cold. Unsettled and very squally, and showery, with blustering W. and N.W. winds almost constantly from 15th to 26th. Mean temp.  $56^{\circ}\cdot 2$ , being  $0^{\circ}\cdot 4$  above the average. High winds on 13 days, reaching the force of a gale on 6. Fog on 3 days. TS on 30th; T and L on 29th; L on 5th.

OMAGH, EDENFEL.—The first ten days were reasonably fine and favourable for harvest purposes, but it is a long time since a more inclement period marked the month of September than that which prevailed from 10th to the end; strong winds, heavy R, and low temp. being persistent throughout.

## HEAVY RAINFALL ON OCTOBER 1st.

*To the Editor of the Meteorological Magazine.*

SIR,—On Monday last we recorded a torrential downpour, which fell on Sunday, October 1st, in a very short time, and I have since looked through our fifty years' record for falls of over 1.50 in.; they are as under, few and far between:—

	in.		in.		in.
1853. July 14	1.82	1875. July 3	2.06	1885. Sept. 10	1.56
1857. Oct. 23	3.09	1879. Aug. 2	1.94	1889. July 12	2.10
1865. Oct. 17	1.68	1880. Sept. 11	1.86	1890. July 17	1.88
1868. Aug. 19	2.22	1884. July 9	1.75	1899. Oct. 1	1.59
1874. July 10	1.62				

From 1890 to now is the longest interval without a heavy fall in late summer or early autumn.—Yours truly,

W. LUCAS.

*The Firs, Hitchin, October 9th, 1899.*