

# Symons's Meteorological Magazine.

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## THE RAINFALL OF AUGUST AND THE SUMMER OF 1917.

THE unusual rainfall of the past summer, and more especially of the month that has just closed, are of sufficient interest to justify a much more detailed summary than the exigencies of our space at present allow, so we must ask the consideration of the numerous Observers who have favoured us with ample details, which will be fully utilized later. Since the termination of the long partial drought in the middle of June the south and south-east of England has been the theatre of several rainstorms of the first magnitude varying in duration from about two hours—the period covered by the great London thunderstorm rain of June 16th, to the exceptionally rainy week covering the seven days ending with August 4th. These falls were completely eclipsed by the great Wessex rain of June 28th, so that in whatever direction the “time element” is considered new records have been established which will in all probability remain unchallenged for the districts in question for many years to come. Although not specially noteworthy for any great daily fall August has in many districts, particularly in Ireland, established a new record, which accentuates the unique character of the unstable atmospheric conditions of the past summer. In the present notice we can only summarize briefly the salient features of the periods under consideration.

In August in England and Wales a few isolated areas had less than four inches of rain, these being located in the vicinity of Oxford, Cambridge, Chelmsford and Coventry. A considerable area, near the coast, from Lowestoft to Harwich, had also less than four inches, as also had another coastal area, from Hunstanton to Cromer. Large portions of the country had more than six inches, the rainfall exceeding ten inches over the elevated portions of Devon and Somerset. In the normally rainy portions of Wales, and Cumberland, various stations in Snowdonia, and the Lake District, had more than 20 inches in the month, an amount closely approached in parts of Glamorgan and exceeded in Denbigh. In Ireland the rainfall varied from about five inches in Co. Antrim, to over ten inches in Connemara and Killarney, and

at many places the amount recorded constituted an extreme record for the month over a long series of years. In Dublin, for example, the rainfall amounted to 7.58 in. on 24 days, all after the 6th of the month, against the previous August record in about half a century of 7.02 in. on 22 days in 1905. At other places, and this also applies to some English stations, August established a record as the wettest month ever experienced.

In Scotland the rainfall was much less remarkable, ranging from about 3.5 in. in the outlying western islands—where the precipitation was under the normal—and also in the north-east, at Keith, to over 10 inches near Glencoe and in West Inverness. Mr. A. Watt, Secretary to the Scottish Meteorological Society, has kindly sent us the following notes on the weather in Scotland :—"The mean pressure for the month was the lowest recorded in August for at least 50 years. A striking feature was the very moderate fluctuations of the night temperatures. These were, as a rule, decidedly above the normal; higher on the average than in any August for at least 50 years; and, leaving out of account fairly low readings, around 20th, or 31st, showed at many stations a variation of only five or six degrees throughout the month, the mean daily range for the "Eight Large Towns" being the lowest on record. Except in the east little or no rain fell during the first week and Orkney experienced all but rainless weather until the 16th. By the 8th conditions had become unsettled generally and remained more or less so throughout the month, with some heavy falls in most districts, especially from the 8th to the 18th, 22nd to the 24th, and 26th to the 28th. On the last-mentioned day a severe rain-storm was general in east and north, with numerous falls exceeding an inch, and as much as 2.40 in. at Ardrross Castle, in Ross-shire. Except in the extreme north and at some western stations aggregates were above the normal, in most eastern districts decidedly so, and in Berwickshire the month was the wettest August on record." The general rainfall expressed as a percentage of the average was :—England and Wales, 192 per cent.; Scotland, 121 per cent.; Ireland, 192 per cent.; British Isles, 173 per cent. During the very wet August of 1912, the rainfall in England and Wales was 198 per cent., Scotland gave 119 per cent., Ireland, 129 per cent., while the British Isles had 158 per cent. of the average. Thus in England and Wales and also in Scotland the values for the two years under review were much the same, the excess in Ireland in August, 1917, being the most pronounced feature, as shown from the data given in the monthly rainfall table for 55 stations, which appears in this Magazine.

The rainfall of the summer months of June, July, and August, 1917, shows great variations from the average over the British Isles, although the transition from wetness to drought proceeded with considerable regularity over the country. We have taken the 55 stations given in the general table and expressed the results for

the three months as a percentage of the average of the period 1875-1909.

The south of the British Isles was conspicuously the wettest area, more than 20 per cent. above the average falling south of a line drawn from Sligo Bay to the Wash. More than 40 per cent. above the average fell over the greater part of the south of Ireland, south-west Wales, and south-east of England. In the last mentioned area portions of the counties of Middlesex, Surrey, Sussex, and Kent had an excess of more than 80 per cent., rising in patches to double the average. When it is remembered that the first half of June was practically rainless over most of the south-east of England the exceptional character of the eleven weeks in this area is emphasized.

Less than the average fell generally in the north and west of Scotland and as far south as Morecombe Bay. The driest area was the west of Scotland and the English Lake District, with a deficiency of 20 per cent., rising to 40 per cent in Mull. In the North Midlands of England the rainfall was only slightly above the average, and may have fallen under the average in places.

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## STONYHURST COLLEGE AND CLIMATE.

By L. C. W. BONACINA.

THE Stonyhurst Observatory is situated near the Yorkshire border of Lancashire, about 400 feet above sea-level, on a shoulder of ground rising from the steep-cut, picturesque valley of the Hodder, not far from its confluence with the Ribble below Clitheroe; and is set amid bold outlying spurs of the Pennine chain within easy reach of some of the wildest and most untameable fell-country in the north of England.

Founded by the Jesuit Fathers in 1838, it has taken a prominent place among the astronomical observatories of these islands, and has conducted no fewer than seven total solar eclipse expeditions to distant parts of the globe, all except one under Government authority. The first four of these expeditions were led by the Rev. S. J. Perry, S.J., F.R.S., who died in 1889 while on one of these expeditions; the latter three were led by the Rev. A. L. Cortie, S.J. In addition to the astronomical work Stonyhurst maintains a continuous record of meteorological, magnetic and seismological conditions, and the results of the observations which were, till 1913, sent to the Meteorological Office in connection with the latter's secondary stations, are embodied in an Annual Report compiled by the Rev. W. Sidgreaves, S.J., the Director of the Observatory, in a form which for conciseness and arrangement leaves little to be desired.

The absolute extremes of air temperature during the 69 years ending with 1915 were 89°·0, on July 20th, 1901, and 4°·6 on January,

15th, 1881, and the warmest and coldest months were July, 1901, with a mean temperature of  $63^{\circ}2$ , and February, 1855, with a mean of  $28^{\circ}6$ . The warmest year was 1868, with a mean of  $49^{\circ}1$ , and the coldest 1879, with  $44^{\circ}1$ . The greatest rainfall in any one day was 3.7 in., on November 16th, 1866, in any one month, 13.437, in October, 1870, and in any one year, 62.09, in 1866. The driest month was May, 1859, with .25 in., and the driest year, 1887, with 31.25.

The following table shows the average mean monthly temperature and rainfall for the last 69 years, and of sunshine for the last thirty-six years :—

	Temperature in degs. F. (adopted mean).	Rainfall in inches.	Sunshine in hours.	
			hours.	per cent. of possible.
Jan. ....	37.5	4.230	32.8	13.2
Feb.....	38.3	3.535	59.0	21.5
March ....	40.0	3.398	103.4	28.3
April ....	44.5	2.568	150.0	35.8
May ....	49.5	2.684	186.0	37.7
June ....	55.1	3.409	184.0	36.2
July.....	57.8	3.998	174.2	34.2
Aug. ....	57.4	4.998	151.2	33.1
Sept. ....	53.8	4.217	125.7	33.2
Oct. ....	47.6	4.962	83.4	25.6
Nov. ....	41.8	4.424	46.7	18.3
Dec.....	38.8	4.627	25.2	10.9
Year ....	47.0	47.050	321.6	29.6

The mean annual temperature is about  $2\frac{1}{2}^{\circ}$  below that of Greenwich at the opposite end of England, and the annual rainfall—under the influence of orographic features—nearly double. It will be seen that Stonyhurst shows the well-marked April-May minimum of rainfall characteristic of northern England and southern Scotland; but that the maximum is less definite, indicating that the different seasonal factors which produce isolated maxima in many parts of the country are all more or less prominent at Stonyhurst. Thus the August figure, which is actually the highest in the year, betrays the thunderstorms for which the locality is rather noted; the October figure is in keeping with the generally high rainfall of that month, reaching a maximum over a large part of the country; and finally the December figure exhibits the heavy cyclonic rainfalls which in the west of Scotland and Ireland make the depth of winter the wettest period of the year. The sunshine columns show that both meteorologically, with 37.7 per cent. of the possible amount, and climatically, with 186.0 hours, the sunniest month in the year at Stonyhurst is May—a month which astronomically, of course, only ranks third in possible sunniness everywhere in the Northern Hemisphere. The “climatic” sunniness is the most significant, since it depends both on the time of the year and the state of the weather, *i.e.*, on the astronomical and meteorological estimates of sunniness.

The general character of the climate of north-east Lancashire is cold and bracing, and, though distinctly harder than that of south-country places, is highly salubrious. The January temperature at Stonyhurst is only about a degree lower than that of Greenwich, but the general character of the winter weather is more severe. A long sequence of heavy cyclonic gales and pitiless, sweeping rainstorms is a common feature in the depth of winter; but the wet weather is broken at intervals by spells of hard and invigorating frost, and now and again the district is visited by snowstorms of true Pennine severity. It is probable, however, that the district, as a rule, suffers less from snow than places on the eastern side of the Pennine Range. The cool July temperature of barely 58° results from the combination of Northern and Atlantic influences. But though a great deal of chilly broken weather marks the summer, spells of brilliantly hot weather occur here as in all parts of England, and when these accompany the very long days which the north-country enjoys, the midsummer effects are magnificent. Moreover, character is given to the summer climate of the Ribble Valley and the Pendle and Bowland Forest uplands by the tendency to thunderstorms of a somewhat violent type which occur with greater frequency than in most parts of England. Although the Stonyhurst Reports do not give the mean frequency of thunderstorms in the locality, it is interesting to note that statistics compiled elsewhere have shown a very high frequency of thunderstorms at Stonyhurst, in fact, one of the highest in England and higher than that of the London district with its distinctly hotter summers.

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### Correspondence.

*To the Editor of Symons's Meteorological Magazine.*

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#### THE WET AUGUST.

ON Tuesday, August 28th, at 7.20 a.m., G.M.T., the barometer here fell to 28.557 ins. corrected and reduced to sea level. This is by far the lowest I have registered in August, and has only once been approached in the summer half of the year, *viz.*, on September 2nd, 1883, when the pressure fell to 28.686 ins. at 7 p.m. Only twice in 38 years has the rainfall (6.52 in.) been exceeded, and only once has the number of rain-days (28) been surpassed in any month, *viz.*, in October, 1903 (29 days).

The barometric mean, 29.655 in., is also the lowest in my record for August, and probably the lowest since 1860.

CHARLES LEWIS BROOK.

*Harewood Lodge, Meltham, Yorks, September 1, 1917.*

My rainfall figures for the month of August, 1917, are so remarkable that I send them to you in detail. The total of 8·54 in. for the month exceeds by over an inch any single month's record in this part of the country that I have ever heard of. ROGER P. SING.

*Eastham, Birkenhead, 1st September, 1917*

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THE rainfall here during August was notable, no less than 6·39 in. being registered. Not only was it the wettest August since 1900, but the rainfall was the greatest recorded at Blundellsands in any one month since October, 1903. The excess was principally due to the very heavy rain on the 17th, when 1·93 in. fell.

The average rainfall for August at Blundellsands for the past forty-one years is 3·27 in., so that this amount was exceeded by 3·12 in. or over 95 per cent.

HUGH MONTGOMERY, F.R.Met.Soc.

*"Myra," Blundellsands, 1st September, 1917.*

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THE rainfall for the past month recorded at Bothalhaugh was 6·74 in. The highest recorded for August was 6·83 in. in 1877. In that year, 1877, there were two days without rain. In this August there were three days; but the heavy rain which fell on September 1st began just before the time for taking the record. A few minutes more and there would have been enough to register, and to make it equal to the rainfall of 1877. I give the records of the heaviest monthly falls since 1877 :—

In 1903 (October), 9·42 in.; 1878 (November), 7·37 in.; 1877 (August), 6·83 in.; 1917 (August), 6·74 in.; 1896 (October), 6·34 in.; 1900 (October), 6·11 in.

The average of August for 41 years is 3·24 in.

WILLIAM ELLIS.

*Bothalhaugh, Morpeth, September 3rd, 1917.*

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## HEAVY RAINFALL IN THE SOUTH-EAST OF ENGLAND.

IN the article under this heading in your August issue, after giving the amounts of rainfall at the end of July, and beginning of August, you say, "many of these amounts are doubtless unprecedented . . the Observer . . . at Teynham, Kent, describes the rainfall of the six days under notice as altogether beyond any previous record of mine during forty-five years' observations." Also in this note you

mention a heavy fall in Essex and as a contrast the comparative dryness of other parts, particularly the north-east coast.

This appears to the writer to strongly support his theory, that the abnormal disturbance of the atmosphere over France and Flanders must cause a larger rainfall than usual within a limited area, of which the south-east and east of England form one of the borders. Apparently no meteorologist has been sufficiently enthusiastic to fix up a raingauge in the actual war area, but should such a thing be possible the writer feels certain the amounts recorded would be out of all proportion to those of normal times. It is only reasonable to assume that, apart from the concussions of the explosions, the enormous amount of chemical matter discharged into the atmosphere must effect it in the same manner as a volcanic eruption, which nearly always causes a disturbance of an electrical nature over the crater, known as a volcanic thunderstorm.

Thunderstorms have been remarkably frequent at the seat of war, which also seems to bear out this theory; also nearly all the rains have been caused by secondary or thunderstorm depressions which generally have their origin locally. All this would seem to point to the fact that meteorologists should approach the matter of gunfire and rainfall with a more open mind than they have hitherto.

D. W. HORNER, F.R.Met.Soc.

*Tower Park, Moreton Hampstead*

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## THE DEMERITS OF RAIN GAUGES "ONE FOOT FROM THE GROUND."

AFTER reading Mr. Boys' letter in your August issue, I feel I should like to send you the results of some personal experiments touching these matters.

In regard to the question of the "demerits of rain gauges" raised in Mr. Boys' letter in the August number, I have experimented with three gauges, two Snowdon and one shallow-rimmed pattern. When placed together these gauges registered alike in what may be called ordinary rain, but in extremes, such as heavy rain, or in light drizzle, differences arose. The Snowdons invariably registering more in heavy rain, and slightly less in light drizzle. The former resulting from no out-splashing, and the latter from a greater surface to be covered before delivery into funnel, whilst in snow and hail the Snowdons were always considerably more, especially so if a wind of more than force 4 was blowing, so much so, that I decided the shallow gauge useless for anything approaching a correct estimate of the real "rainfall."

Then I experimented further with the two Snowdons, always keeping my standard in its own position, with rim 1 foot above

the surface, placing the other a distance of 3 feet away, with the rim moved to various heights above the surface. At 6 inches it registered slightly more, viz., 0.25 in. against 0.245 in. at 12 inches. At 2 feet serious differences arose, increasing according as the height was increased, to such an extent, that I thought it unnecessary to experiment further. When gauge was placed on hard bare soil in-splashing became very evident at anything below 12 inches, but when placed on a short grass surface I could trace no in-splashing at 12 inches, either during very heavy rain, or hail. What seems to be a greater obstacle to accuracy is the measuring glass. There are so many shapes and forms in use, some old patterns being quite inaccurate, especially in the smaller readings. And again, all Observers should read the meniscus alike, whereas some read the "top," and some read "midway," whilst others read the "bottom," these differences make serious totals. Surely the bottom line of meniscus is the true reading.

From these few experiments I feel sure that for accurate and comparable results, the height of 12 inches should be maintained, all gauges should be alike in form, *i.e.*, Snowdon, or deep rimmed. Measuring glasses should be true and read to '005 in., and the gauge placed on short grass plot, free from all low-growing vegetables or flowers, for at least a space of 3 feet on either side.

FREDERICK LOWE, F.R.Met.Soc.

*S. Michael's, Tenbury, 28th August, 1917.*

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## UNUSUAL RAINBOW.

ON August 15th, at 6.40 p.m. (summer time), a very unusual rainbow was seen here. It took the form of an arc ( $80^\circ$  at most) with the prismatic colours arranged as in an ordinary primary bow, *i.e.*, with the red on the outside of the curve; but what was so remarkable was that it lay *between the sun and the zenith*. So far as I can judge it centred on the zenith, at a distance of about  $20^\circ$  from it, and it seemed to be part of a circle. The cloud in which it lay was nimbus, and not specially high; but as it did not extend further east, there was no opportunity of observing the completion of the circle, if, indeed, any such completion were possible.

I am familiar with the general theory of primary and secondary bows, which alone are mentioned in such books on the subject as I possess; but I am unable to understand this bow, the position of which is quite new to me.

HENRY BURY.

*Mayfield House, Farnham, Surrey, August 16th, 1917.*



## RAINFALL TABLE FOR AUGUST, 1917.

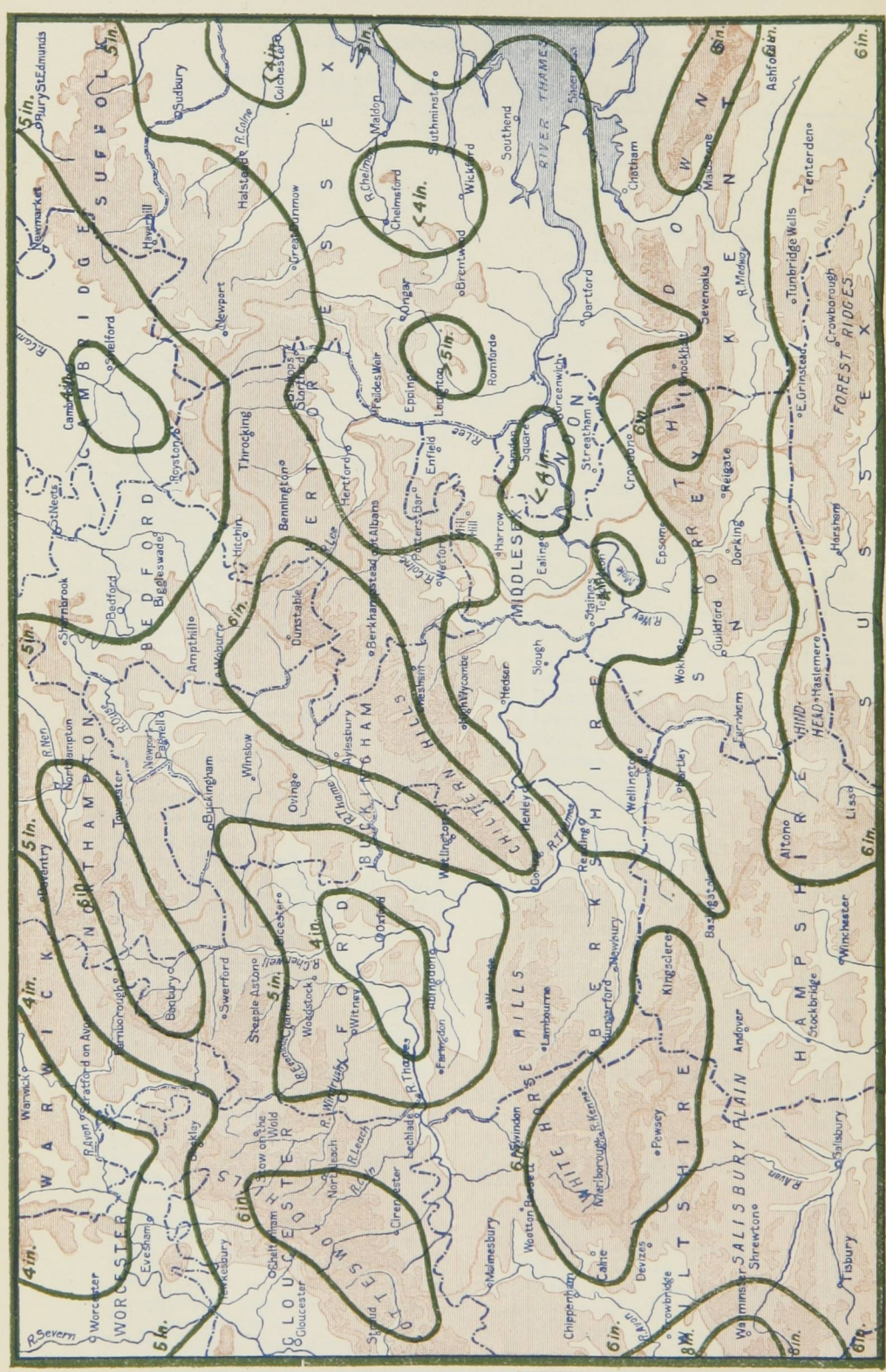
STATION.	COUNTY.	RAINFALL.						
		Aver. 1875— 1909. in.	1917. in.	Diff. from Av. in.	Per cent. of Av.	Max. in 24 hours.		No. of Days
						in.	Date.	
Camden Square.....	London.....	2·39	3·99	+1·60	167	1·05	27	23
Tenterden.....	Kent.....	2·42	6·40	+3·98	265	1·66	27	22
Arundel (Patching).....	Sussex.....	2·52	5·78	+3·26	229	1·22	1	20
Fordingbridge (Oaklands)...	Hampshire.....	2·76	5·04	+2·28	183	1·05	1	29
Oxford (Magdalen College)...	Oxfordshire.....	2·44	3·46	+1·02	142	·95	1	21
Wellingborough (Swanspool)...	Northampton.....	2·36	6·64	+4·28	281	1·14	1	23
Bury St. Edmunds (Westley)...	Suffolk.....	2·52	5·02	+2·50	199	1·65	1	22
Geldeston [Beccles].....	Norfolk.....	2·22	3·74	+1·52	169	·93	3	19
Polapit Tamar [Launceston]...	Devon.....	3·17	5·88	+2·71	186	1·20	27	23
Rousdon [Lyme Regis].....	".....	2·84	5·21	+2·37	183	·83	27	24
Stroud (Field Place).....	Gloucester.....	2·90	5·99	+3·09	207	·82	1	25
Church Stretton (Wolstaston)...	Shropshire.....	3·43	6·62	+3·19	193	1·17	27	29
Boston.....	Lincoln.....	2·39	4·47	+2·08	187	·84	1	21
Worksop (Hodsock Priory)...	Nottingham.....	2·55	4·75	+2·20	186	1·31	8	25
Mickleover Manor.....	Derbyshire.....	2·80	4·37	+1·57	156	·72	27	27
Buxton.....	".....	4·52	8·77	+4·25	194	1·06	28	27
Southport (Hesketh Park)...	Lancashire.....	3·73	6·12	+2·41	164	1·56	17	23
Arncliffe Vicarage.....	York, W.R.....	5·62	9·49	+3·87	169	1·22	8	28
Goldsbrough Hall.....	".....	2·80	...	...	...	...	...	...
Hull (Pearson Park).....	" E.R.....	3·05	5·76	+2·71	189	·99	8	25
Newcastle (Town Moor)...	Northland.....	3·20	7·58	+4·38	237	1·06	27	29
Borrowdale (Seathwaite)...	Cumberland.....	11·47	19·83	+8·36	173	2·52	16	22
Cardiff (Ely).....	Glamorgan.....	4·54	7·90	+3·36	174	·91	27	28
Haverfordwest.....	Pembroke.....	4·21	8·73	+4·52	207	1·55	17	19
Aberystwyth (Gogerddan)...	Cardigan.....	4·88	11·52	+6·64	236	2·65	17	22
Llandudno.....	Carnarvon.....	3·16	5·68	+2·52	180	·88	26	22
Cargen [Dumfries].....	Kirkcudbrt.....	4·23	5·94	+1·71	140	·90	23	24
Marchmont House.....	Berwick.....	3·54	8·35	+4·81	236	1·15	27	27
Girvan (Pinnmore).....	Ayr.....	4·54	4·78	+·24	105	1·37	23	21
Glasgow (Queen's Park)...	Renfrew.....	3·62	...	...	...	...	...	...
Islay (Eallabus).....	Argyll.....	4·49	3·60	—·89	80	·51	11	22
Mull (Quinish).....	".....	5·00	3·49	+1·51	70	·85	23	21
Balquhiddy (Stronvar).....	Perth.....	6·22	8·08	+1·86	130	·92	24	21
Dundee (Eastern Necropolis)...	Forfar.....	3·34	5·56	+2·22	167	1·00	14	29
Braemar.....	Aberdeen.....	3·63	5·44	+1·81	150	1·53	28	22
Aberdeen (Cranford).....	".....	3·07	4·50	+1·45	147	1·09	14	25
Gordon Castle.....	Moray.....	3·29	3·07	—·22	93	...	...	...
Drumnadrochit.....	Inverness.....	3·11	4·97	+1·86	160	2·63	28	18
Fort William.....	".....	6·15	6·11	—·04	99	1·46	23	21
Loch Torridon (Bendamph)...	Ross.....	6·61	6·21	—·40	94	1·04	28	23
Dunrobin Castle.....	Sutherland.....	2·71	4·09	+1·38	151	1·30	28	21
Killarney (District Asylum)...	Kerry.....	4·57	11·36	+6·79	249	1·70	28	29
Waterford (Brook Lodge)...	Waterford.....	3·73	6·95	+3·22	186	1·72	27	23
Nenagh (Castle Lough).....	Tipperary.....	4·04	8·81	+4·77	218	1·80	10	25
Ennistymon House.....	Clare.....	5·01	8·28	+3·27	165	1·13	10	26
Gorey (Courtown House)...	Wexford.....	3·31	8·87	+5·56	268	2·12	27	24
Abbey Leix (Blandsfort)....	Queen's Co.....	3·94	9·33	+5·39	237	1·72	10	26
Dublin (Fitz William Square)...	Dublin.....	3·08	7·58	+4·50	246	1·21	27	24
Mullingar (Belvedere).....	Westmeath.....	4·00	7·17	+3·17	179	1·10	10	25
Crossmolina (Enniscoie).....	Mayo.....	4·68	7·57	+2·89	167	1·36	10	29
Cong (The Glebe).....	".....	4·70	9·33	+4·63	199	1·58	7	24
Collooney (Markree Obsy.)...	Sligo.....	4·30	6·97	+2·67	162	·87	23	26
Seaforde.....	Down.....	3·64	7·28	+3·64	200	·85	13, 15	25
Ballymena (Harryville).....	Antrim.....	4·18	5·08	+·90	122	·70	21	24
Omagh (Edenfel).....	Tyrone.....	4·22	5·60	+1·38	133	·93	7	24

## SUPPLEMENTARY RAINFALL, AUGUST, 1917.

Div.	STATION.	Rain inches.	Div.	STATION.	Rain inches.
II.	Warlingham, Redvers Road..	6·53	XI.	Lligwy .....	8·13
„	Ramsgate .....	6·47	„	Douglas, Isle of Man .....	6·92
„	Hailsham .....	6·52	XII.	Stoneykirk, Ardwell House...	2·78
„	Totland Bay, Aston House...	4·30	„	Carsphairn, Shiel .....	7·65
„	Stockbridge, Ashley..	5·64	„	Langholm, Drove Road .....	8·62
„	Grayshott .....	7·25	XIII.	Selkirk, The Hangingshaw..	6·66
III.	Harrow Weald, Hill House...	5·48	„	North Berwick Reservoir.....	4·63
„	Pitsford, Sedgebrook.....	5·55	„	Edinburgh, Royal Observaty.	4·77
„	Woburn, Milton Bryant.....	6·45	XIV.	Biggar.....	5·78
„	Chatteris, The Priory.....	3·89	„	Maybole, Knockdon Farm ...	3·93
IV.	Elsenhamp, Gaunts End .....	5·57	XV.	Buchlyvie, The Manse .....	5·11
„	Shoeburyness .....	4·20	„	Ballachulish House .....	10·22
„	Colchester, Hill Ho., Lexden	3·68	„	Oban.....	4·18
„	Ipswich, Rookwood, Copdock	4·14	„	Campbeltown, Witchburn ..	5·20
„	Aylsham, Rippon Hall .....	4·59	„	Holy Loch, Ardnadam .....	7·77
„	Swaffham .....	4·07	„	Tiree, Cornaigmore .....	...
V.	Bishops Cannings .....	5·95	XVI.	Glenquey .....	7·20
„	Weymouth.....	4·09	„	Glenlyon, Meggernie Castle..	6·39
„	Ashburton, Druid House.....	7·95	„	Blair Atholl .....	4·48
„	Cullompton .....	5·65	„	Coupar Angus .....	5·03
„	Lynmouth, Rock House .....	7·32	„	Montrose, Sunnyside Asylum.	3·96
„	Okehampton, Oaklands.....	9·00	XVII.	Balmoral .....	4·98
„	Hartland Abbey.....	5·51	„	Fyvie Castle .....	4·98
„	St. Austell, Trevarna .....	6·50	„	Keith Station ..	3·24
„	North Cadbury Rectory.....	6·63	XVIII.	Rothiemurchus .....	4·71
VI.	Clifton, Stoke Bishop .....	7·30	„	Loch Quoich, Loan .....	12·33
„	Ledbury, Underdown.....	6·01	„	Skye, Dunvegan .....	5·54
„	Shifnal, Hatton Grange.....	5·32	„	Fortrose .....	5·69
„	Droitwich.....	4·87	„	Glencarron Lodge .....	7·85
„	Blockley, Upton Wold.....	5·73	XIX.	Altnaharra .....	...
VII.	Grantham, Saltersford.....	6·55	„	Melvich .....	...
„	Market Rasen .....	5·12	„	Loch More, Achfary .....	7·31
„	Bawtry, Hesley Hall .....	3·79	XX.	Dunmanway, The Rectory ..	9·15
„	Whaley Bridge, Mosley Hall	6·44	„	Glanmire, Lota Lodge.....	7·52
„	Derby, Midland Railway.....	4·64	„	Mitchelstown Castle.....	7·82
VIII.	Nantwich, Dorfold Hall .....	6·34	„	Darrynane Abbey.....	7·36
„	Chatburn, Middlewood .....	...	„	Clonmel, Bruce Villa .....	7·34
„	Lancaster, Strathspey .....	7·96	„	Broadford, Hurdlestown.....	9·02
IX.	Langsett Moor, Up. Midhope	5·47	XXI.	Enniscorthy, Ballyhyland...	8·52
„	Scarborough, Scalby .....	8·17	„	Ratlinew, Clonmannon .....	7·52
„	Ingleby Greenhow .....	7·37	„	Ballycumber, Moorrock Lodge	7·86
„	Mickleton .....	6·50	„	Balbriggan, Ardgillan .....	6·78
X.	Bellingham, High Green Manor	6·96	„	Castle Forbes Gardens.....	7·23
„	Ilderton, Lilburn Cottage ..	7·53	XXII.	Ballynahinch Castle.....	9·92
„	Keswick, The Bank.....	9·51	„	Woodlawn .....	8·72
XI.	Llanfrechfa Grange .....	8·87	„	Westport, St. Helens ..	6·84
„	Treherbert, Tyn-y-waun .....	17·69	„	Dugot, Slievemore Hotel ...	8·63
„	Carmarthen, The Friary .....	10·78	XXIII.	Enniskillen, Portora .....	...
„	Fishguard, Goodwick Station.	6·67	„	Dartrey [Cootehill] .....	6·92
„	Crickhowell, Tal-y-maes.....	8·50	„	Warrenpoint, Manor House ..	6·32
„	New Radnor, Ednol .....	4·65	„	Belfast, Cave Hill Road .....	5·41
„	Birmingham WW., Tyrmynydd	13·62	„	Glenarm Castle .....	5·04
„	Lake Vyrnwy .....	8·77	„	Londonderry, Creggan Res....	8·47
„	Llangynhafal, Plas Drâw.....	6·34	„	Dunfanaghy, Horn Head ...	5·72
„	Dolgelly, Bryntirion.....	11·09	„	Killybegs .....	8·60
„	Bettws-y-Coed, Tyn-y-bryn...	9·00			



# THAMES VALLEY RAINFALL AUGUST, 1917.



**ALTITUDE SCALE**

Below 250 feet	250 to 500 feet	500 to 1000 feet	Above 1000 feet
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**SCALE OF MILES**

## THE WEATHER OF AUGUST.

THE characteristic features of the weather of August were the heavy rainfall, the unseasonal strength of the prevailing southerly and south-westerly winds, and the absence of any pronounced spell of warm settled weather throughout the month. The month opened with the western and south-eastern counties of England under cyclonic influence, while the weather over the United Kingdom as a whole was dominated by anti-cyclonic conditions. The mean temperature of the month, taking the country as a whole, was  $0^{\circ}6$  F. above the average, the excess being considerable (slightly over  $2^{\circ}$ ) in the north and west of Scotland. On the other hand, temperature in the south-east of England was  $0^{\circ}5$  below the average, and in the English Channel,  $1^{\circ}1$  below. In most other parts of the country there was a slight excess, due largely to the relative warmth of the nights, the day temperatures in general being below the average, except in parts of Scotland. On the 5th the screen maximum was  $81^{\circ}$ , at Kilmarnock, and on the 6th, at Nairn, the maximum was  $84^{\circ}$ . Temperature over England, and also in the south-east of Scotland remained low, there being many maximum values below  $70^{\circ}$ , as low as  $66^{\circ}$ , at St. Anne's Head, on the 5th, and at Edinburgh, on the 6th. No very low temperatures were noted during the month, the lowest reported being  $38^{\circ}$ , at Balmoral, on the 19th, and at Kilkenny, on the 27th. A large number of shallow depressions passed over the country, pressure being in general high to the south and south-west of the British Isles. A deep depression passed over the country from the 26th to the 28th, causing gales and very heavy rains over a wide area. At southern coastal stations a whole gale with squalls of hurricane force were experienced principally from south-westerly points. In some places thunderstorms were reported.

Bright sunshine was below the average in most parts of Great Britain, but in Ireland and the north of Scotland there was an average daily excess of about half an hour. In the east of Scotland, on the other hand, there was a daily deficiency of nearly two hours, while the Midland counties, and the south-east of England, had a deficit of an hour and a half. The actual amounts recorded varied from three hours a day, in the east of Scotland, and about four hours a day in the more northern parts of England, including the Midlands, to over 6 hours in the English Channel and over 5 hours in Ireland and England south-west.

Rainfall was nearly everywhere much in excess of the average (see special article, ante. p. 85).

In London (Camden Square) the mean temperature was  $63^{\circ}2$ , being the average. Duration of rainfall, 54.1 hours, of sunshine, 160 hours. Evaporation, 1.95 in.

## Climatological Table for the British Empire, March, 1917.

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		
London, Camden Square	57·0	17	20·2	9	45·2	32·8	34·0	88	101·6	20·1	1·74	20	7·6
Malta ... ..	68·0	24	48·0	2, 3	61·7	53·0	...	80	121·9	...	·86	4	2·6
Lagos ... ..	94·0	26	73·0	6	90·1	76·4	75·2	72	152·0	69·0	3·22	4	6·6
Cape Town ... ..	89·4	7	52·7	7	77·7	59·0	57·7	72	...	...	·48	8	3·5
Johannesburg ... ..	80·7	6	49·0	5	74·8	53·8	51·9	71	...	47·2	1·55	7	4·7
Mauritius ... ..	86·2	var.	64·8	29	84·0	70·4	68·7	77	...	57·0	6·34	22	6·1
Bloemfontein .. ..	83·3	23	47·8	17	77·3	55·7	60·4	67	...	...	2·29	12	3·8
Calcutta... ..	100·0	31	58·1	1	90·7	68·5	64·4	64	...	47·3	1·42	2	1·9
Bombay... ..	92·4	31	67·7	8	86·1	73·2	69·3	71	141·7	61·0	·00	0	1·5
Madras ... ..	91·4	18	64·5	3	89·3	71·8	69·2	71	158·5	61·1	·00	0	2·4
Colombo, Ceylon ... ..	90·0	3	70·2	3	86·4	73·3	72·3	82	158·2	64·6	10·03	21	6·3
Hongkong ... ..	77·2	19	48·4	1	65·9	58·4	55·0	78	...	...	2·67	9	7·8
Sydney ... ..	89·2	30	52·4	24	77·1	62·0	58·8	70	140·0	42·0	·98	10	4·8
Melbourne ... ..	85·0	13	39·3	24	71·7	55·1	51·9	66	140·7	35·8	1·41	10	6·1
Adelaide ... ..	94·5	4	52·4	31	79·3	59·7	53·0	54	149·2	40·8	2·50	11	5·3
Perth ... ..	89·0	5	47·6	13	76·1	59·2	56·6	69	152·4	41·0	·54	8	5·5
Coolgardie ... ..	102·4	1	45·0	30	79·0	59·3	52·2	71	160·0	43·0	3·68	10	5·4
Hobart, Tasmania .. ..	76·0	13	39·0	24	65·3	51·3	49·6	73	141·0	31·4	2·06	19	7·3
Wellington ... ..	74·6	19	43·6	28	68·5	55·7	52·8	72	136·0	32·3	1·47	4	5·4
Auckland ... ..	...	...	...	...	70·4	57·8	...	...	...	...	2·72	11	...
Jamaica, Kingston .. ..	89·0	19	63·3	6	86·2	66·6	65·0	75	...	...	·07	4	3·2
Grenada ... ..	85·0	7	67·0	3	81·8	70·8	...	71	137·0	...	2·95	14	3·7
Toronto ... ..	62·6	26	6·8	6	39·0	25·3	24·0	76	118·2	—1·0	2·32	12	4·7
Fredericton ... ..	56·0	26	—5·0	3	36·7	15·7	20·6	81	...	...	2·66	12	4·7
St. John, N.B. ... ..	46·6	27	4·5	20	35·7	21·6	22·8	72	118·5	3·8	3·93	12	5·1
Victoria, B.C. ... ..	50·2	16	29·6	2	45·7	35·0	35·0	78	119·0	18·8	2·63	19	6·2

*Malta.*—Poor crops for want of rain.

*Johannesburg.*—Bright sunshine 272·2 hours.

COLOMBO, CEYLON.—Mean temp. 79°·9 or 1°·5 below, dew point 0°·4 below, and R 10·03 in. or 5·59 in. above, averages. Mean hourly velocity of wind 3·8 miles. TS on 6 days. Rain storm on 28th when 1·18 in. fell.

HONGKONG.—Mean temp. 61°·6. Bright sunshine 116·9 hours. Mean hourly velocity of wind 14·2 miles.

*Sydney.*—Rainfall 4·23 in. below, average.

*Melbourne.*—Mean temp. 1°·2 below, and R ·76 in. below, averages

*Adelaide.*—Mean temp. 0°·4 below, and R 1·45 in. above, averages.

*Coolgardie.*—Temp. 2° 5 below, and R 3 to 3·50 in. above, averages.

*Wellington.*—Mean temp. 1°·7 above, and R 1·87 in. below, averages. Bright sunshine 216·5 hours. Bright and sunny.