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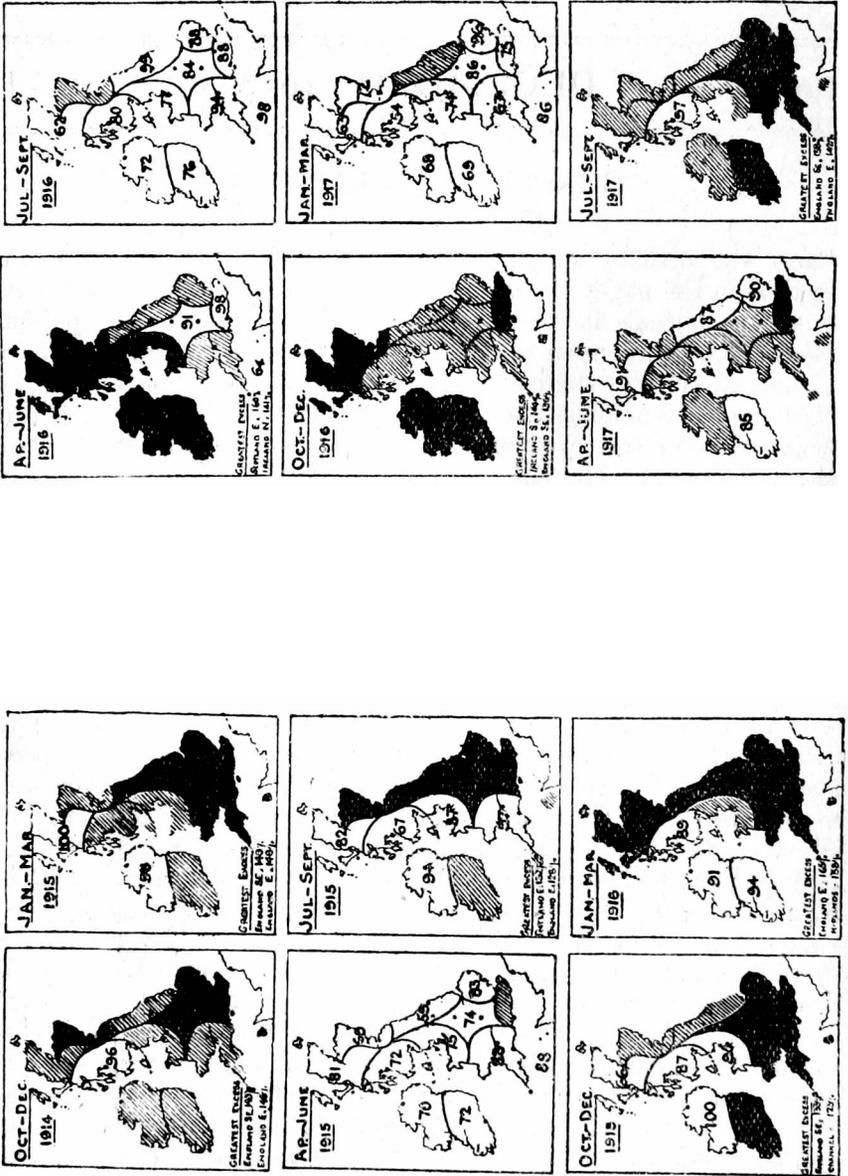
VOL. LII.

GUNFIRE AND RAINFALL.

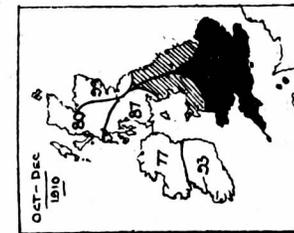
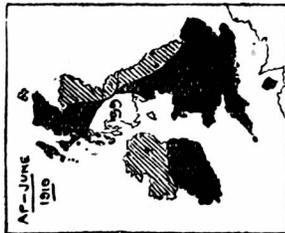
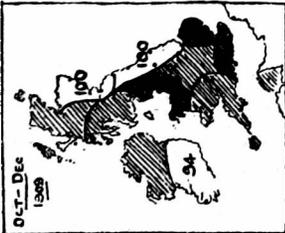
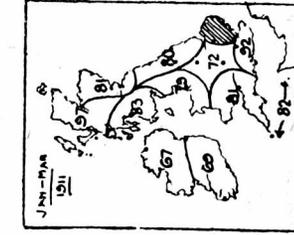
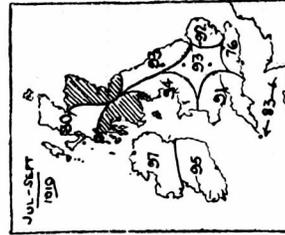
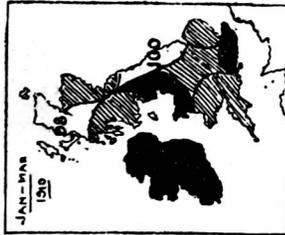
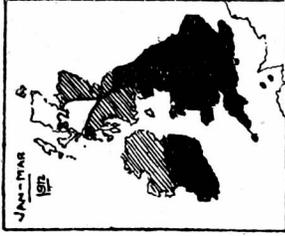
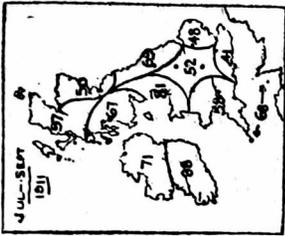
By FREDK. J. BRODIE.

FROM the articles and correspondence which appear from time to time in the pages of *Symons's Meteorological Magazine* and other scientific journals it is clear that the question as to the possible effect of Gunfire upon Rainfall still retains a certain amount of vigour, in spite of the blows it has received from most of our professional meteorologists. To those of us who happen to have acquired some sort of reputation, however slender, in the ranks of the weather-wise the subject has occasionally proved a source of embarrassment. Over and over again during the prevalence of a rainy spell have we been bombarded with the question "Do you think this atrocious weather is due in any measure to the heavy gunfire in Flanders?" As a refuge from such attacks most of us have, I suppose, been glad to shelter behind the great authorities. We have told our inquisitive friends that in the opinion of those best qualified to judge the heavy explosions and the huge air waves which have originated a few miles from our shores have been quite insufficient to generate in the surrounding atmosphere the effect necessary to produce any heavy or widespread deposition of moisture in these islands. The reply has, for the moment, satisfied the anxious enquirer, but whether it has in all cases quieted the doubts which may have arisen in the mind of the teacher is not quite so certain. Some of us may, perhaps, have experienced, as we repeated our lesson, faint qualms of suspicion, and may even have begun to wonder whether the question admitted of as simple a solution as the one we have so boldly offered. Quite recently, when this iconoclastic spirit was upon me, I thought it might be of interest to investigate somewhat carefully the rainfall conditions which have existed in this country since the commencement of the war. The material employed for the purpose was derived from the quarterly summaries issued periodically as appendices to the Weekly Weather Report of the Meteorological Office. These summaries give, *inter alia*, the total rainfall experienced during the quarter in each of the twelve meteorological districts into which the United Kingdom is divided, and also a comparison with the average rainfall for thirty-five years, expressed in the form of percentages. In its tabular

Excess or Defect of Rainfall during twelve Calendar Quarters.



Excess or Defect of Rainfall during twelve Calendar Quarters.



form the information did not appeal much to the eye, but when plotted on maps it acquired a more striking interest. In the twelve quarterly maps reproduced on pp. 122-3, no account has been taken of the actual quantity of rain which fell in the various districts, simply the difference from the normal as shown by the percentages. Districts in which the rainfall was equal to or below the average have been left blank, but the actual percentage has been inserted. Districts in which the rainfall exceeded the average by 19 per cent. or less have been shaded, while those in which the excess amounted to 20 per cent or more have been blackened in.

The maps show :—

(a.) That over a large portion of the United Kingdom an excess of rain was reported in 9 quarters out of the 12. The only quarters with anything like a general deficiency were April-June, 1915, July-September, 1916, and January-March, 1917.

(b.) That in 7 out of the 9 wet quarters the excess of rain was greatest in districts situated in the eastern or southern half of the country, or in both. Further that in 2 of the 3 dry quarters the only districts which failed to report any deficiency were again situated either in the eastern or in the southern section.

The following table gives for each district the number of quarters in the past 3 years in which an excess of rainfall was reported :—

DISTRICT.	EASTERN HALF OF UNITED KINGDOM.		DISTRICT.	WESTERN HALF OF UNITED KINGDOM.	
	No. of Quarters.			No. of Quarters.	
	Above Aver.	At least 20 per cent above Aver.		Above Aver.	At least 20 per cent above Aver.
Scotland, E. ...	10	5	Scotland, W. ...	4	1
England, N.E. ...	9	3	England, N.W. ...	7	1
England, E. ...	8	6	England, S.W. ...	8	4
Midland Counties	8	6	Ireland, N. ...	5	2
England, S.E. ...	9	8	Ireland, S. ...	7	4

EXTREME SOUTHERN AND NORTHERN DISTRICTS.

English Channel...	8	5		Scotland, N. ...	5	3
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It will be seen that over the eastern half of Great Britain the number of quarters with an excess of rain varied between 8 and 10; in Ireland, N., and Scotland, N., there were only 5 such occasions, and in Scotland, W., only 4. The number of very wet quarters, *i.e.*, quarters with an excess amounting to at least 20 per cent., ranged from 8 in England, S.E., 6 in England, E., and the Midland counties, and 5 in Scotland, E. and the English Channel. to only 2 in Ireland, N., and to only 1 in Scotland, W., and England, N.W.

For any single quarter the greatest excess was 65 per cent., in

England, E. (January-March, 1916), 60 per cent., in Scotland, E. (April-June, 1916), and 58 per cent, in the Midland counties (January-March, 1916), and in England, S.E. (July-September, 1917). In 5 quarters out of the 12 the greatest excess of rain occurred in England, S.E.

The results for the entire three years, October, 1914, to September, 1917, are shown in the maps facing p. 126, from which it will be seen that in England, E., there was an excess of rainfall amounting to 20 per cent., and in England, S.E., to as much as 26 per cent. Westward and northward of those unfortunate regions the excess diminished in extent, and finally disappeared altogether. In the English Channel the excess was only 11 per cent., in England, N.E., 10, and in England, S.W., only 9. England, N.W., had just the average quantity of rain, and Ireland, N., 1 per cent., less than the average. In Scotland, N., there was a deficiency of 5 per cent., and in Scotland, W., a deficiency of 10 per cent.

Here, then, are the facts, and what is one to say about them? It may be, after all, a mere coincidence that the repeated discharge on a wholly unprecedented scale of vast quantities of the most violent explosives ever known to mankind should have been accompanied in this country by an excess of rain which was far more pronounced in districts lying contiguous to the seat of war than in any other part of the United Kingdom. It may be, also, that some diligent investigator may be able to discover among the records of the past, and at a time of profound peace, a three years' period of rainfall showing similar characteristics to those which have been recently noted. But the matter appears to me to be one of curious interest, and if the somewhat striking facts indicated by the maps, admit, as they may, of an explanation entirely differing from the one so timidly foreshadowed, I shall not regret the slight expenditure of time and labour involved in the preparation of this modest memoir.

At the suggestion of the Editor I have examined the rainfall of the three years 1910-12. To make the results strictly comparable with those for 1914-17 I have adopted the period ended September, 1912. It matters, however, very little which period we select. The final three months of 1909 and of 1912 were both wet quarters, and the results for the three years ended either with September or December do not show in any district a variation of more than 3 per cent; in most districts the difference between the two does not exceed 1 per cent.

The maps have been compiled, as in the former case, from the quarterly summaries of the Weekly Weather Report. It will be seen that over the country generally the period 1909-12 was not nearly so wet as 1914-17, and that the eastern and southern districts were not affected to anything like so serious an extent. In one respect the results show, most certainly, a rather striking similarity,

the rainfall being above the average over the country generally and more especially in the east of England, but deficient in most of the districts lying within what may be described as the north-western section of the United Kingdom. In 1909-12 the excess in the east and south was, however, not nearly so large as in 1914-17. England, E., was, in comparison with the average, the wettest district, but even there the excess amounted to only 12 per cent., as against 20 per cent., in 1914-17. A more striking difference was reported in England, S.E., and also in Scotland, E. In 1914-17, England, S.E., stands out boldly as the wettest part of the country, with an excess of rainfall amounting to no less than 26 per cent. In 1909-12 the excess was only 8 per cent., and, in comparison with the average, the district was not quite so wet as England, S.W., practically the same as the Midland counties, and very little wetter than England, N.E. and England, N.W.

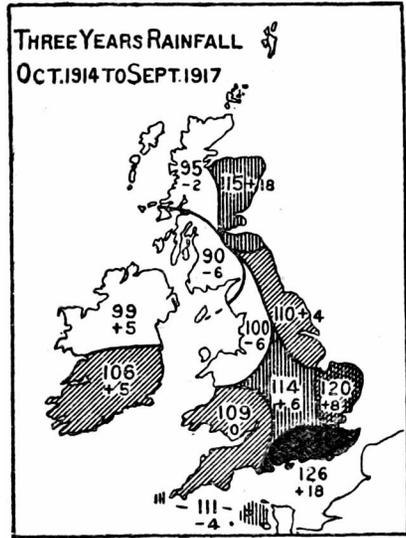
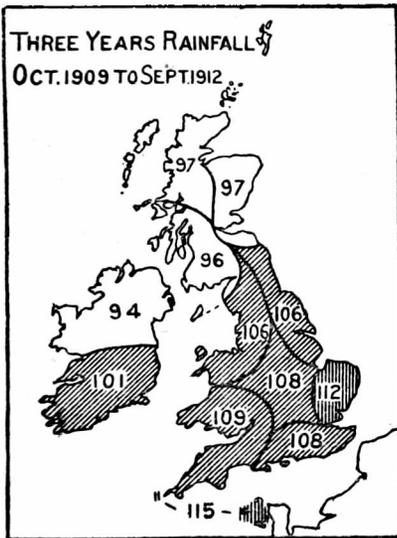
There can be no question that for so extended a period as three years an excess of rainfall amounting to as much as 26 per cent. is extremely large, and it seems to me very doubtful whether it would be possible to find its equal in the records for any consecutive period of thirty-six months. At Greenwich the greatest excess in any three-year period (calendar years) was apparently 24 per cent., in 1879-80. For England, S.E., as a whole, the quarterly summary of the Weekly Weather Report shows for these years an excess of only 15 per cent., but in early times the number of stations from which district values were computed was small, and their geographical distribution was less satisfactory than in later years.

METEOROLOGICAL NEWS AND NOTES.

THE STUDY OF WINTER THUNDERSTORMS is being continued by Capt. C. J. P. Cave, R.E., and our readers are reminded that any information on storms up to the end of March, 1918, will be of value. The most important items are date and time, especially the time when the storm is overhead, the intensity and duration of the storm, and its direction of travel. the direction of lightning, changes of wind and temperature, and occurrence of hail. Reports should be sent direct to The Meteorologist in Charge, Meteorological Office, South Farnborough, Hants.

THE ROYAL SOCIETY has awarded a Royal Medal to Dr. John Aitken, F.R.S., for his work on Cloudy Condensation.

THE ROYAL METEOROLOGICAL SOCIETY has awarded the Symons' Gold Medal for 1918 to Dr. H. R. Mill, for his work in connection with Meteorological Science.



Face p. 126

ROYAL METEOROLOGICAL SOCIETY.

THE first monthly meeting of this Society for the present Session was held on Wednesday, the 21st November, at the Society's Rooms, 70, Victoria Street, Westminster, Lt.-Col. Henry Mellish, C.B., Vice-President, in the Chair.

A paper by Dr. G. C. Simpson, F.R.S., entitled, "The Twelve-hourly Barometer Oscillation," was communicated by Mr. F. J. W. Whipple. The existence of the twelve-hourly atmospheric vibrations, first suggested by Lord Kelvin, in 1882, and developed by Schmidt, in 1890, and further investigated by E. Alt, in 1909, has been proved. These twelve-hourly atmospheric vibrations—one parallel to the circles of latitude and the other parallel to the meridians—have been stated mathematically by Dr. Simpson by an expression containing the geographical position as the only variable, for the amplitude and phase of each vibration. The observed variations in amplitude and phase of the twelve-hourly barometer oscillations caused by the interference of these two waves accounted very completely for the observed diurnal range especially in high northern latitudes. Between the equator and 50 degrees north and south it was shown that the maxima of the waves passed over every station on the same circle of latitude at the same local time. Near the poles the relationship is not so simple, as the maxima do not occur even approximately at the same local time at the different stations. These apparent anomalies had been cleared up by taking the oscillation along the meridians as well as those parallel to the circles of latitude into consideration. A long discussion followed, in which Messrs. Mellish, Chree, Chapman, Tripp, Barton, Dines and Bryant took part, and Mr. Whipple replied.

Mr. W. W. Bryant gave the results of an investigation dealing with "Abnormal Temperature, with special reference to the daily Maximum Air Temperature at Greenwich." The author advocated that for specific meteorological elements the term "abnormal" should be given to a value which departs from a well established normal by twice at least the average departure. This method has been applied to the mean maximum temperature of the air on each day of the year at Greenwich, and is based on the average of the 65 years 1841-1905, the comparisons with the normal being carried down to the end of 1916. The results show that the limits defining abnormal days depart from the average by from 8° to 12.5° F., so that no fixed limit can be applied. From the analysis one day in ten is found to be abnormal, the proportion being higher in the months from May to October and much lower in December and January. Spells or alternations of heat and cold and the distribution of abnormal days were also dealt with, and the principal extended to monthly and annual values. The relatively hottest month in

the period was June, 1846, and the coldest, December, 1890, the hottest year 1868, and the coldest, 1879. The longest period without a "warm day" was one of 353 days, terminating on 5th March, 1880, and in this period were included 44 "cold" days. The longest period without a "cold" day was the 401 days ending 28th October, 1846, in which period 39 were "warm" days.

In the discussion which followed Mr. W. H. Dines, F.R.S., said he thought it very desirable that some definite standard should be adopted. The standard deviation was not difficult to calculate as sufficient accuracy could be obtained by taking it as equal to four-fifths of the mean of the numerical deviation.

Messrs. Mellish, Harding, and Whipple also took part in the discussion and Mr. Bryant replied.

REVIEW.

The Weather Calendar, or a Record of the Weather for every day in the year, being a series of passages collected from letters and diaries and arranged by Mrs. Henry Head. Oxford, Clarendon Press, 1917. Size, 6 × 4. Pp. iv. + 160. Price, 1s. 6d. (paper), or 2s. (cloth).

THE weather motto prefixed, *Plus ça change, plus c'est la même chose*, aptly expresses the value of this little book in clarifying popular thought on the weather. The choiceness and delicate literary quality of the quotations by which the thesis is supported are a tribute to the fine taste and selective instinct of the compiler.

One or two, or rarely three, short extracts are given for every day in the year, for the most part from writers of over a hundred years ago, but all bear witness to the unchanging changeableness of our weather. Pepys, of course, comes first as a representative of the seventeenth century, Walpole and Swift supply much pleasant reading from the eighteenth and Dorothy Wordsworth and Fitzgerald from the nineteenth, but about thirty other authors are drawn upon. As examples of the "seasonable" and "unseasonable" Pepys recorded 2nd January, 1667, as "mighty cold but dry," while 15th January, 1662, had been "a fast day ordered by the Parliament to pray for more seasonable weather, it having hitherto been summer weather that is, both as to warmth and every other thing just as if it were the middle of May or June, which do threaten a plague (as all men think) to follow." Walpole, on 12th July, 1757, complained of "the heat of this magnificent weather," but on 3rd July, 1790, he says, "To-night I am writing to you comfortably by the fireside for we are forced to raise an English July in a hothouse, like grapes."

THE WEATHER OF NOVEMBER.

THE outstanding features of the weather of November were the high mean temperature and the contrast between the very dry conditions over the southern half of England, and the extreme wetness of the west of Scotland and Ireland.

Pressure throughout most of the month was high at the Azores and low between the north of Scotland and Iceland. Only for a few days after the 15th, when the high pressure area advanced to the south of England and the south-west of Ireland, were anticyclonic conditions in evidence. On the 25th when a large depression covered the Baltic, a gale from the north-west accompanied in many districts by snow was experienced.

Owing to the persistence of westerly and south-westerly winds high temperatures for the season were recorded, especially after the middle of the month. On the 21st the shade maximum rose to 60° at Crieff, while readings of 59° were reached over a large portion of England, North Wales and the south of Ireland. On the 28th shade maxima exceeding 55° occurred nearly everywhere and as far north as Aberdeen 60° was recorded, while on the following day 59° was noted at various places in the English Midlands and at Kilkenny.

The lowest shade temperatures in England were experienced on the 15th or 16th; 26° at Rhayader, and Marlborough, while in Scotland the 26th showed the lowest values, 25° at Marchmont and West Linton, and 23° at Eskdalemuir. The mean temperature of the month over the whole country was 3° F. above the average, and, except in the English Channel where the excess was only 1° , was unusually uniform, varying from $3^{\circ}\cdot 8$ in the north-east of England to $2^{\circ}\cdot 4$ in the southern districts.

It is worthy of mention that the mean temperature of the month was very slightly under that of October.

The duration of bright sunshine did not depart much from the average. The mean daily amount varied from about 2 hours in the eastern half of England to an hour in the north of Ireland.

More than a quarter of the total possible was recorded in the east of England and only 9 per cent. in the north of Scotland. The rainfall expressed as a percentage of the average varied widely. In England many places in Hampshire, Oxfordshire and Yorkshire had less than a third of the average, while at Stroud barely one-fifth of the average fell. Comparatively few stations had an excess, the greatest being 31 per cent. at Arncliffe and 22 per cent. at Seathwaite. Wales was in general well under the average. Except for a deficiency in Berwickshire, Scotland showed a general excess, being nearly double the average in the west and also in Morayshire. In Ireland, Markree Observatory had more than double the average, while Killarney had under half the average. The general rainfall expressed as a percentage of the average was, England and Wales 78 per cent., Scotland 151 per cent., Ireland 107 per cent., British Isles 107 per cent.

The smallest amount of rain—in general less than one inch, and falling in places to about half-an-inch—was recorded over the greater part of the counties of Wilts, Hampshire and Oxford; thus lying within the limits of our map of the Thames Valley. In Scotland and Ireland the driest areas were centred round Berwick and Dublin respectively with about two inches.

The wettest areas were as usual located in the west, where in isolated spots in Connemara and Sligo, in Ireland, the Lake District, and west of Scotland, from 15 to 30 inches fell. In London (Camden Square) the mean temperature was $46^{\circ}\cdot 7$ being $3^{\circ}\cdot 2$ above the average. Duration of rainfall 34 hours, of sunshine 37 hours. Evaporation $\cdot 31$ in.

RAINFALL TABLE FOR NOVEMBER, 1917.

STATION.	COUNTY.	RAINFALL.						
		Aver. 1875-1909.	1917.	Diff. from Av. in.	Per cent. of Av.	Max. in 24 hours.		No. of Days
		in.				in.	Date.	
Camden Square.....	London.....	2'34	1'82	— '52	78	'54	26	15
Tenterden.....	Kent.....	3'07	1'64	—1'43	54	'83	26	13
Arundel (Patching).....	Sussex.....	3'54	1'37	—2'17	39	'62	26	8
Fordingbridge (Oaklands)...	Hampshire.....	3'41	1'09	—2'32	32	'28	9	16
Oxford (Magdalen College).....	Oxfordshire.....	2'25	'64	—1'61	28	'14	5	12
Wellingborough (Swanspool).....	Northampn.....	2'22	1'01	—1'21	46	'18	26	14
Bury St. Edmunds (Westley).....	Suffolk.....	2'40	1'65	— '75	69	'62	26	14
Geldeston [Beccles].....	Norfolk.....	2'49	1'83	— '66	74	'45	26	17
Polapit Tamar [Launceston].....	Devon.....	4'07	3'13	— '94	77	'60	3	21
Rousdon [Lyme Regis].....	".....	3'51	1'64	—1'87	47	1'11	3	11
Stroud (Field Place).....	Gloucester..	2'77	'60	—2'17	22	'17	6	13
Church Stretton (Wolstaston).....	Shropshire..	2'94	1'40	—1'54	48	...	...	...
Boston.....	Lincoln.....	2'05	1'36	— '69	66	'48	26	16
Worksop (Hodsock Priory).....	Nottingham.....	1'98	'97	—1'01	46	'22	9	15
Mickleover Manor.....	Derbyshire.....	2'21	1'75	— '46	79	'42	26	17
Buxton.....	".....	4'83	4'92	+ '09	102	'63	9	23
Southport (Hesketh Park).....	Lancashire.....	3'16	3'33	+ '17	105	'72	26	21
Arneliffe Vicarage.....	York, W.R.....	6'12	8'00	+1'88	131	...	...	...
Wetherby (Ribston Hall).....	".....	2'34	1'98	— '36	85	'40	24	10
Hull (Pearson Park).....	" E.R.....	2'34	1'40	— '94	60	'34	26	18
Newcastle (Town Moor).....	North'land.....	2'63	1'31	—1'32	50	'39	24	17
Borrowdale (Seathwaite).....	Cumberland.....	13'59	16'52	+2'93	122	3'47	26	20
Cardiff (Ely).....	Glamorgan.....	4'08	2'55	—1'53	62	'42	8	26
Haverfordwest.....	Pembroke.....	5'16	3'70	—1'46	72	'73	3	19
Aberystwyth (Gogerddan).....	Cardigan.....	4'50	4'73	+ '23	105	'82	26	23
Llandudno.....	Carnarvon.....	3'19	2'43	— '76	76	'59	26	20
Cargen [Dumfries].....	Kirkcudbrt.....	4'35	4'38	+ '03	101	1'04	5	23
Marchmont House.....	Berwick.....	3'21	2'32	— '89	72	'64	5	16
Girvan (Pinmore).....	Ayr.....	5'24	6'86	+1'62	131	1'40	26	26
Glasgow (Queen's Park).....	Renfrew.....	3'63	6'37	+2'74	176	1'64	6	18
Islay (Eallabus).....	Argyll.....	5'33	9'70	+4'37	182	1'57	26	28
Mull (Quinish).....	".....	6'24	7'62	+1'38	122	1'09	26	27
Balquhider (Stronvar).....	Perth.....	7'87	...	...	...	...	...	...
Dundee (Eastern Necropolis).....	Forfar.....	2'62	3'09	+ '47	118	1'15	29	17
Braemar.....	Aberdeen.....	3'76	4'51	+ '75	120	1'07	29	15
Aberdeen (Cranford).....	".....	3'29	3'75	+ '46	114	1'14	5	19
Gordon Castle.....	Moray.....	2'85	5'68	+2'83	199	...	...	...
Drumnadrochit.....	Inverness.....	3'41	4'99	+1'58	146	'73	23	23
Fort William.....	".....	7'55	14'51	+6'96	192	1'88	29	27
Loch Torridon (Bendamph).....	Ross.....	8'90	16'16	+7'26	182	1'58	20	29
Dunrobin Castle.....	Sutherland.....	3'25	6'04	+2'79	186	'82	23	19
Killarney (District Asylum).....	Kerry.....	5'54	2'17	—3'37	39	'45	7	25
Waterford (Brook Lodge).....	Waterford.....	3'80	2'20	—1'60	58	'84	2	16
Nenagh (Castle Lough).....	Tipperary.....	3'88	3'25	— '63	84	'48	5	23
Ennistymon House.....	Clare.....	4'62	4'60	— '02	100	'54	5	26
Gorey (Courtown House).....	Wexford.....	3'41	2'12	—1'29	62	'68	2	15
Abbey Leix (Blandsfort).....	Queen's Co.....	3'28	2'43	— '85	74	'77	11	22
Dublin (Fitz William Square).....	Dublin.....	2'64	1'71	— '93	65	'41	11	20
Mullingar (Belvedere).....	Westmeath.....	3'38	4'38	+1'00	130	'81	11	23
Crossmolina (Enniscoo).....	Mayo.....	5'75	6'72	+ '97	117	1'52	5	24
Cong (The Glebe).....	".....	5'00	5'44	+ '44	109	'94	2	24
Collooney (Markree Obsy.).....	Sligo.....	4'02	8'60	+4'58	214	1'95	5	25
Seaforde.....	Down.....	3'86	3'56	— '30	92	1'02	2	20
Ballymena (Harryville).....	Antrim.....	3'95	5'76	+1'81	146	1'38	5	28
Omagh (Edenfel).....	Tyrone.....	3'66	7'17	+3'51	196	1'69	5	27

SUPPLEMENTARY RAINFALL, NOVEMBER, 1917.

Div.	STATION.	Rain inches.	Div.	STATION.	Rain inches.
II.	Waringham, Redvers Road..	1·93	XI.	Lligwy	3·25
„	Ramsgate	1·37	„	Douglas, Isle of Man .....	..
„	Hailsham	1·71	XII.	Stoneykirk, Ardwell House...	4·35
„	Totland Bay, Aston House...	·80	„	Carsphairn, Shiel	11·94
„	Stockbridge, Ashley	·88	„	Langholm, Drove Road	5·75
„	Grayshott	1·18	XIII.	Selkirk, The Hangingshaw..	2·99
III.	Harrow Weald, Hill House...	1·61	„	North Berwick Reservoir.....	1·39
„	Pitsford, Sedgebrook.....	1·16	„	Edinburgh, Royal Observaty.	2·00
„	Woburn, Milton Bryant.....	1·27	XIV.	Biggar.....	3·71
„	Chatteris, The Priory.....	1·06	„	Maybole, Knockdon Farm ...	7·42
IV.	Elsenham, Gaunts End	1·63	XV.	Buchlyvie, The Manse	8·27
„	Shoeburyness	1·51	„	Ardgour House	22·60
„	Colchester, Hill Ho., Lexden	1·36	„	Oban.....	9·22
„	Ipswich, Rookwood, Copdock	1·62	„	Campbeltown, Witchburn ..	8·35
„	Aylsham, Rippon Hall	2·23	„	Holy Loch, Ardnadam.....	14·21
„	Swaffham	1·95	„	Tiree, Coraigmore	5·24
V.	Bishops Cannings	1·01	XVI.	Glenquey	5·30
„	Weymouth.....	1·40	„	Glenlyon, Meggernie Castle..	8·50
„	Ashburton, Druid House.....	2·55	„	Blair Atholl	4·15
„	Cullompton	2·49	„	Coupar Angus	2·63
„	Lynmouth, Rock House	2·43	„	Montrose, Sunnyside Asylum.	2·65
„	Okehampton, Oaklands.....	3·73	XVII.	Balmoral	3·70
„	Hartland Abbey.....	3·00	„	Fyvie Castle	5·52
„	St. Austell, Trevarna	2·88	„	Keith Station	6·44
„	North Cadbury Rectory.....	·82	XVIII.	Rothiemurchus	4·46
VI.	Clifton, Stoke Bishop	·98	„	Loch Quoich, Loan	31·15
„	Ledbury, Underdown.....	·91	„	Skye, Dunvegan	11·16
„	Shifnal, Hatton Grange.....	1·92	„	Fortrose.....	4·97
„	Droitwich	·96	„	Glencarron Lodge	19·13
„	Blockley, Upton Wold.....	1·34	XIX.	Tongue Manse	7·42
VII.	Grantham, Saltersford.....	·92	„	Melvich	7·66
„	Market Rasen	1·58	„	Loch More, Achfary	16·32
„	Bawtry, Hesley Hall	·82	XX.	Dunmanway, The Rectory ..	2·16
„	Whaley Bridge, Mosley Hall	4·74	„	Glanmire, Lota Lodge.....	1·38
„	Derby, Midland Railway.....	1·47	„	Mitchelstown Castle.....	2·30
VIII.	Nantwich, Dorfold Hall	2·90	„	Darrynane Abbey.....	3·57
„	Bolton, Queen's Park	6·02	„	Clonmel, Bruce Villa	1·60
„	Lancaster, Strathspey	3·67	„	Broadford, Hurdlestown.....	3·93
IX.	Langsett Moor, Up. Midhope	3·19	XXI.	Enniscorthy, Ballyhyland...	3·14
„	Scarborough, Scalby	2·41	„	Rathnew, Clonmannon	1·86
„	Ingleby Greenhow	2·44	„	Ballycumber, Moorock Lodge	3·01
„	Mickleton	3·10	„	Balbriggan, Ardgillan	2·23
X.	Bellingham, High Green Manor	2·65	„	Castle Forbes Gardens.....	4·02
„	Ilderton, Lilburn Cottage ..	2·11	XXII.	Ballynahinch Castle.....	7·22
„	Keswick, The Bank.....	6·18	„	Woodlawn	3·30
XI.	Llanfrechfa Grange	2·15	„	Westport, St. Helens	5·17
„	Treherbert, Tyn-y-waun	6·40	„	Dugot, Slievemore Hotel ...	8·86
„	Carmarthen, The Friary	3·51	XXIII.	Enniskillen, Portora.....	5·83
„	Fishguard, Goodwick Station.	3·26	„	Dartrey [Cootehill]	5·10
„	Crickhowell, Tal-y-maes	2·30	„	Warrenpoint, Manor House ..	3·84
„	New Radnor, Ednol	1·45	„	Belfast, Cave Hill Road	4·67
„	Birmingham WW., Tyrmynydd	5·95	„	Glenarm Castle	7·20
„	Lake Vyrnwy	4·67	„	Londonderry, Creggan Res... 6·47	
„	Llangynhafal, Plas Drâw.....	2·88	„	Dunfanaghy, Horn Head ...	..
„	Dolgelly, Bryntirion.....	7·89	„	Killybegs	11 78
„	Bettws-y-Coed, Tyn-y-bryn... ..	..		

Climatological Table for the British Empire, June, 1917.

STATIONS. <i>(Those in italics are South of the Equator.)</i>	Absolute.				Average.				Absolute.		Total Rain		Aver. Cloud.
	Maximum.		Minimum.		Max.	Min.	Dew Point.	Humidity.	Max. in Sun.	Min. on Grass.	Depth.	Days.	
	Temp.	Date.	Temp.	Date.									
London, Camden Square	89·9	17	46·1	23	76·0	54·2	54·2	...	134·1	44·6	5·29	10	5·8
Malta	88·3	24	64·0	1	77·6	68·8	...	81	141·0	...	·43	2	1·6
Lagos	89·4	1, 2	70·0	25	86·6	74·1	73·8	79	155·5	67·5	19·34	19	7·5
Cape Town	70·3	20	37·9	14	61·6	49·1	48·6	61	...	...	3·84	18	6·2
Johannesburg	69·5	3	32·5	18	58·1	41·6	32·9	83	...	30·0	·67	7	3·4
Mauritius	79·5	9	55·2	16	76·6	63·1	62·2	78	...	46·6	3·16	19	5·2
Bloemfontein	67·8	4	19·6	26	60·4	31·1	32·5	72	...	...	·32	3	3·3
Calcutta	96·6	1	75·0	4	90·1	78·4	78·1	85	...	73·1	11·66	20	8·5
Bombay	92·5	3	75·8	12	86·6	79·1	77·3	84	136·0	72·1	15·33	25	8·2
Madras	100·3	2, 21	75·2	14	94·5	78·5	73·1	72	159·3	69·8	5·53	10	6·7
Colombo, Ceylon	87·2	1	72·2	14	85·2	76·7	74·2	83	153·6	69·7	5·41	20	7·4
Hongkong	89·1	29	74·9	30	86·6	78·4	76·0	83	...	...	11·54	28	8·0
Sydney ... ..	...	...	...	...	...	...	...	...	...	...	...	...	...
Melbourne	67·0	4	31·4	22	56·2	44·1	42·6	74	106·8	23·3	3·63	16	6·8
Adelaide	73·0	3	36·7	21	60·5	45·5	45·4	74	124·4	29·5	2·61	15	6·6
Perth	70·0	1	40·3	4	63·0	49·6	49·9	79	126·2	32·0	10·25	23	6·8
Coolgardie	73·0	2	33·5	6	60·9	43·4	41·6	65	129·0	29·0	1·52	12	4·8
Hobart, Tasmania	65·2	4	34·5	10	52·8	41·5	39·9	75	107·9	28·1	3·35	24	6·8
Wellington	62·0	10	34·9	2	55·7	46·6	45·4	81	110·0	24·0	6·44	15	6·9
Auckland ... ..	...	...	...	...	60·3	49·8	...	...	...	...	6·41	18	...
Jamaica, Kingston	94·2	12	70·6	3	88·6	72·8	70·4	77	...	...	3·24	7	6·4
Grenada	88·0	5	72·0	24	85·0	75·0	...	74	137·0	...	5·83	20	3·5
Toronto	83·2	19	40·7	15	70·7	51·0	51·9	76	135·9	36·6	5·39	15	5·4
Fredericton	80·5	14*	37·5	1	69·6	48·6	53·8	81	...	...	6·93	17	6·3
St. John, N.B.	73·1	28	40·0	1, 2	61·5	47·4	51·1	88	141·8	35·4	5·41	20	7·1
Victoria, B.C.	78·2	13	43·2	11	61·9	47·5	46·0	74	143·0	37·5	·93	12	5·6

* And 21.

Johannesburg.—Bright sunshine 244·8 hours.*Bloemfontein.*—Temperature on 26th the lowest yet recorded here.

COLOMBO, CEYLON.—Mean temp. 81°·0 or 0°·6 below, dew point 0°·6 below and R 5·41 in., or 2·50 in. above, average. Mean hourly velocity of wind 5·9 miles. Rain storm on 24th when 1·56 in. fell.

HONGKONG.—Mean temp. 81°·8. Bright sunshine 167·8 hours. Mean hourly velocity of wind 8·4 miles.

Melbourne.—Mean temp. 0°·2 below, and R 1·55 in. above, averages.*Adelaide.*—Mean temp. 0°·1 above and R ·50 in. below averages.*Perth.*—Rainfall 3·64 in. above average, exceeded only on three previous occasions in June during 41 years.*Coolgardie.*—Rainfall about 25 per cent. above average.*Hobart.*—Rainfall 1·18 in. above average.*Wellington.*—Mean temp. 3°·7 above, and rainfall 1·47 in. above, averages. Bright sunshine 102·5 hours. Frost on five days.