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Sir Alexander Richardson Binnie.

London, 26 March, 1839—Bere, Devon, 19 May, 1917.

We much regret to record the death of Sir Alexander Binnie, the third Trustee of the British Rainfall Organization who has died in little more than three years. He was a pupil of the famous civil engineer, Mr. J. F. Bateman, and had early experience on railway construction. At the age of thirty he went to India and served for six years in the Public Works Department, where his most important undertaking was the Nagpur Water Works. In India his attention was directed to the vital importance of a knowledge of rainfall in planning water works, and throughout his whole life he continued to study this question on which he was a leading authority. On leaving India Mr. Binnie was for fifteen years the water engineer at Bradford, where he planned the extensive water works in the Nidd Valley, and then came to London as chief engineer to the London County Council. The Blackwall Tunnel under the Thames and the new Highgate Archway are monuments of his official labours, and he was knighted in 1897. In 1902 Sir Alexander retired from official work, but devoted himself as a consulting engineer to the pursuit of his profession in advising on public works in many parts of the world. While at the County Council Sir Alexander Binnie devoted much time and thought to planning a great scheme for the water supply of London from the valleys of south and central Wales. Under his authority an extensive series of rain gauges were set up by Mr. Symons, some in very remote places. After the scheme was abandoned the London County Council presented the rain gauges to the British Rainfall Organization, and several of them are being kept up by the old Observers who were formerly paid but who continue the routine as a labour of love to this day.

In India Sir Alexander turned his attention to the periodicity of rainfall and to the difficult question of the length of time necessary to establish the normal rainfall of a locality. This led him to study long records of rainfall in all parts of the world and resulted in a very important paper "On mean or average annual rainfall and the

fluctuations to which it is subject," read to the Institution of Civil Engineers in 1892. No paper is more frequently referred to in the course of theoretical as well as practical investigations of the problems it tackled.

Sir Alexander was a man of wide sympathies, a pleasant colleague in work and a charming companion in leisure. He took a lofty view of his profession, and his outlook on life was coloured by the philosophical bent of his mind and his cheerful temperament. As the result of failing health he relinquished his professional work and left London for the picturesque seclusion of Bere, in Devon, a few years ago.

Baldwin Latham.

1837—1917.

The death of Mr. Baldwin Latham removes yet another of the past presidents of the Royal Meteorological Society and a life-long meteorological Observer. Mr. Latham was one of the early friends and supporters of the late Mr. Symons in his rainfall work, and to the end he stimulated the municipalities and other local authorities with which he had professional relations as a consulting civil engineer to institute and maintain rainfall observations. For many years he had been one of the leading authorities on Water Supply and Sewage Works and carried out extensive schemes in Calcutta, Bombay and other Indian cities, as well as at home. At his residence, in Croydon, he had the earliest self-recording rain gauge from which records were published, and also one of the earliest evaporation and percolation gauges. With Mr. Campbell Bayard he made the Croydon Natural History Society, in which he took a great interest, the foremost local society in the study of meteorology. Mr. Latham studied the phenomena of the movements of underground water in chalk and other strata with particular attention. He also investigated the use of the wet and dry bulb thermometers for the determination of humidity, and contributed many valuable papers to the *Quarterly Journal* of the Royal Meteorological Society.

To those who knew Mr. Latham as an engineer and man of science only he seemed to be immersed in work of the sternest aspect; but he expanded to a surprising extent in historical studies. He revealed his civic associations to many of his friends by the gift of highly ornate packs of cards one Christmas, and greatly mystified them by the unexpected act until it was noticed that the ace of spades bore his familiar countenance, enshrined there as the Master of the Company of Playing Card Makers.

SOME PROBLEMS CONNECTED WITH THE TEMPERATURE ELEMENT IN CLIMATOLOGY.

By L. C. W. Bonacina.

(*Continued from p. 39.*)

The considerations stated are, I think, sufficient to demonstrate that all pictures of climate derived from the study of air temperature alone must necessarily be incomplete, and to raise the question of the ultimate possibility of investigating radiation influences in a manner that will yield results having climatological significance. In this connection it may be noted that the pair of instruments which commonly form part of the equipment of a meteorological observing station known as the "black and bright bulbs in vacuo," though an excellent index of the diathermancy of the atmosphere from day to day, are not of much use for the purposes of general climatic study, because they eliminate not only air movement or wind, a factor of great importance in deciding to what extent a body will be heated on exposure to a given intensity of radiation, but also, as the name of the thermometers indicates, the air itself whose temperature likewise is a factor in determining the temperature acquired by bodies exposed to radiation and the sense of warmth experienced by animals when exposed to the same. We all know, for example, that in this country given the same altitude of the sun with the same diathermancy, temperature, and humidity of the air the solar rays are less troublesome to us on a windy day than on a calm day, and that a given object exposed to a given radiation will be heated to a higher temperature according as there is less air movement. We know also that on a brilliant summer day, with a moderate air temperature, say 70° F., the sun's rays feel far less oppressive than does the same brilliancy of sunshine on a day with a very high air temperature, say 90° F., or than a considerably feebler radiation might in a like degree of warmth. What is wanted, therefore, for the adequate representation of the thermal aspect of climate is a system of thermometry which will furnish results compounded of radiation and air temperature effects as modified by such a natural agency. It is clear that such a need could be met by the simple expedient of using freely exposed thermometers to supplement—not supplant—the ordinary screened instruments, if only certain practical objections and possibly also certain theoretical misconceptions can be abolished. Exposed instruments have, indeed, already been employed by botanical investigators* to whom is brought home very forcibly the great importance of radiation temperatures to plants and crops. In

* R. H. Yapp—On Stratification in Vegetation of a Marsh. (Annals of Botany, Vol. 23, No. 90. (London), April, 1909).

a paper† written a few years back, moreover, I myself drew attention to the need of freely exposed thermometers, and it was then discovered that a series of observations of this nature had been previously made in this country, at Uckfield, Sussex, by Mr. Prince, as also in Servia, at Belgrade, by P. Vujevïc.‡ Whilst no one has ever disputed the validity of the arguments put forth on behalf of this procedure, there appear to be two outstanding difficulties of a practical nature which have discouraged further systematic attempts in this direction, namely, the difficulty of obtaining sufficient uniformity of exposure to ensure that the readings of the exposed thermometers may be climatically comparable, and the alleged difficulty in constructing a pattern of standard thermometer such as would ensure the elimination of thermal pecularities in the individual instruments. As to the first difficulty this could in many instances probably be surmounted with the exercise of a little experience and judgment in the selection of a site, and as regards the second, which is more serious, if real, one can only hope that it is not beyond the skill of the makers of modern instruments of precision to meet. It is evident, however, that the adoption of a reliable standard would be a *sine qua non* in any such system of observations as is here proposed in as much as different thermometers take up different temperatures on exposure to the same radiation, and it may be as well here to meet a possible misconception that may arise in this regard..

An exposed thermometer might record, say, 90° F. in the sun, whilst another along side of it equally accurate, but of a different "make," might record 85° F., and yet another 95° F.; but transfer all three instruments to the Stevenson Screen and they will all, in so far as they are accurate, show the same reading, let us say 80° F. In the latter case the instruments have merely taken up the temperature of the body of air in which they are immersed; in the former case they are subjected in addition to an amount of radiant energy which, though the same for each, will not effect the same temperature in each unless the material and construction of each is, thermally speaking, identical. Hence it follows that "exposed readings" so far as their actual values are concerned correspond to no external temperature and are not in themselves climatically significant. But if a reliable standard were devized the reative values of the instruments in comparing place with place, and time with time, might be of very great climatological utility, even though the actual values might not be significant. If, for example, on one day in summer the exposed instrument gave in one place a reading of 75° F. and in another place one of 85° F., one could say that in the

† A Plea for the Use of Freely Exposed Thermometers in addition to Sheltered Ones. [Q. J., Roy.Met.Soc., Vols. **35** (1909), p. 281; **36** (1910), p. 235].

‡ See note in *Nature* for March 31st, 1910.

former place it was 10° hotter in the sun than in the latter; but the actual readings 75° and 85° would be discarded as relating only to the instruments. It would be advantageous to construct a form of standard instrument either mercurial or electrical resistance designed to magnify as much as possible the difference between its exposed readings and the ordinary shaded readings, because some thirty years ago it was found in the course of some experiments conducted by John Aitken that thermometers with *very small* bulbs did not show sun readings in excess of those in the shade. But since it is an obvious fact that vegetation and crops, as likewise the human skin, experience much higher temperatures under the influence of solar radiation than they do in the shade, and that bare rock and soil often becomes very hot indeed in full sunshine, the legitimate conclusion is that the thermal aspect of climate will never be fully studied until we are able to take radiation temperatures in conjunction with shade temperatures.

ROYAL METEOROLOGICAL SOCIETY.

THE monthly meeting of this Society was held on May 16th, at 70, Victoria Street, Westminster, Major H. G. Lyons, F.R.S., President, in the Chair.

The Phenological Report for 1916 by Mr. J. E. Clark and Mr. H. B. Adames was read by Mr. Clark, who pointed out that the peculiar distribution of wet and warm weather combined with a deficiency of sunshine was responsible for the disastrous effect on vegetation revealed by an analysis of the phenological data. The warm winter developed growth which the cold spring checked. June was very cold and even in the first half of July occasional frosts were not uncommon. The cold summer destroyed much of the fruit crop and lowered the quality of the harvest. The potato crop was a failure owing to the heavy rainfall of October and November, the period of the ripening off and lifting. The hazel was remarkably early appearing on January 26th, probably for the first time on record in that month. A very interesting summary was given regarding the areas of equal dates of appearance to which the name "isophainal" zones has been assigned. The earliest before April 29th appears to include South-West Wales, Cornwall, Devon, and a tongue stretching from Hants to Worcester, East Sussex, Surrey and Kent. In Scotland dates later than May 19th prevail, but, owing to the paucity of stations, definite dates cannot be given north of the Tweed. An animated discussion followed, in which the President, Col. Rawson, and Messrs. Hopkinson, Inwards, Mellish and Taylor took part. Maj.-Gen. W. Du G. Grey, C.B., Col. Sir H. McMahon, G.C.V.O. and Mr. E. Wigglesworth were elected fellows of the Society.

Correspondence.

To the Editor of Symons's Meteorological Magazine.

THE GREAT THUNDERSTORM OF MAY 29th.

I HAVE time and again emphasized that marked climatic tendency which practically every year assures the local development up and down the country of extremely violent heat thunderstorms during the period when May is melting into June.

On May 29th I happened to be at Potters Bar, and, during the heat of the afternoon, observed a growing tendency towards the formation of thundery cumulo-form clouds. About 4.30 p.m. I noticed that the summits of some of the cumulus banks were turning into false cirrus—a sure indication of storminess. A preliminary storm had already broken over London, and catching the 4.55 train to King's Cross I soon noticed that the independent centres of cumulus cloud were coalescing into a dense thunder mass with the precipitation of huge drops of rain. I reached Hampstead about 6 p.m., just in time for the commencement of the main storm, which lasted an hour. During this hour a dense storm sheet of terrible blackness moved stealthily over the high ground of Hampstead Heath from N.W. to S.E., discharging to the ground a series of dangerous but magnificent forked flashes followed in at least three cases by instantaneous crashes of the most alarming, explosion-like character—that impressive brand of thunder which from time to time during the longest days is liable to strike, the hour of the summer solstice. At the same time a surface current from a southerly direction was moving across the storm track, and it appeared to reach nearly up to the cloud level—to judge from the contrary motion of some lower scud. After the storm had ceased, about 7 p.m., the warm moist atmosphere was fraught with the delicious fragance of the May blossoms, and the clearing of the sky revealed, high above the receding thunder clouds, an exceptionally delicate and beautiful structure of cirro-cumulus at first in soft small flakes, afterwards in well-marked ripples having a pearly lustre.

L. C. W. BONACINA.

Hampstead, N. W., 3rd June, 1917.

[We regret that it is impossible to find space for the many letters we have received on the remarkable series of thunderstorms of the last week of May; but hope to utilize the information received in "British Rainfall, 1917."—ED.—S.M.M.]

THE REMARKABLE WINTER OF 1916-17.

In the following table I compare particulars of the snow during the past winter with those of other winters in my record. The columns headed "Products" give the average number of days when snow covered the ground multiplied by the average depth in inches. Other items are also given when these were abnormal. The thermometers have not been kept on screens, but against the house, and the observations are therefore not standard, though comparable year with year. By far the lowest point reached in the winter was on April 2nd.

SNOW.*

1916—17 Month	Days fell	Difference from Average	Days lay	Difference from Average	Days Covered	Difference from Average	Products	Difference from Average
Oct. ..	0	—0·5	0	—0·8	0	—0·2	0	—0·1
Nov. ..	1	—1·3	1	—2·6	0	—1·1	0	—1·8
Dec. ..	5	+0·3	13	+4·6	4	—0·3	3·8	—13·9
Jan. ..	19	+12·9	22	+9·5	8	+3·2	5	—6·7
Feb. ..	4	—2·1	17	+7·5	8	+4·5	8	+1·4
Mar. ..	9	+1·9	14	+5·3	8	+4·3	4·5	—3·4
Apr. ..	12	+9·8	11	+9·2	11	+10·7	33·1	+32·9
May ..	0	—0·5	0	—0·2	0	—0·0	0	—0·0
Total..	50	+20·5	78	+32·5	39	+21·1	54	+9

In April, 1917, the minimum temperature was 16° on the 2nd, the lowest previously recorded in April having been 24° in 1862. The lowest maximum was 32° on the 1st, the previous lowest having been 39° in 1862. In January, 1917, the number of days of easterly or sea wind (*i.e.*, from N. to S.E.) was 17¾, or 12¼ more than the average, the largest number previously noted in January being 11, in 1873. The amount of cloud was ·86, or ·23 above the average for January.

The excessive cloud is evidently connected with the easterly winds. This is shown also in the cloudiest January next to 1917, viz., 1897, when the average was ·81; the days of observation being 23·5, the easterly winds blowing for 10 days. In the whole month, if in the same proportion, there would have been 13 days.

On April 14th, 1917, foliage of trees was about 2 days behind 1881, which was the most backward of any of the 48 years I could compare, beginning with 1861. Those years were not all consecutive, there being gaps in my record.

On May 10th, 1917, foliage was a day or two in advance of 1860, 1879 and 1881, 1879 being probably slightly the most backward of the 52 years I could compare.

T. W. BACKHOUSE.

West Hendon House, Sunderland.

* Not including sleet, but including soft hail.

REVIEWS.

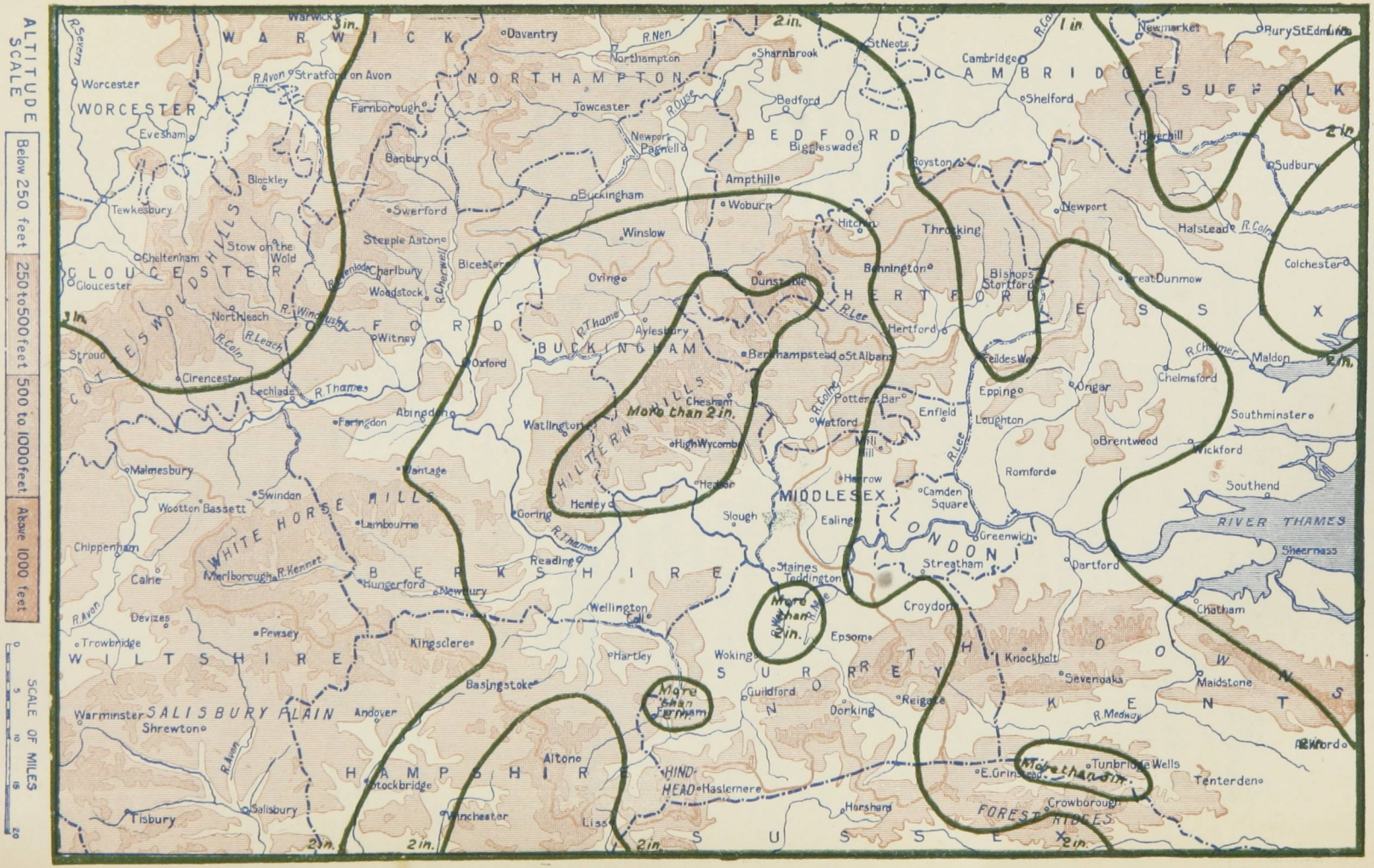
Republica Argentina. Oficina Meteorológica Nacional Jorge O. Wiggin, *Jefe. Boletin Mensual. Ano* 1—*Numeros* I.—V. *Enero à Mayo* 1916. Size, 15 × 12 in. Pp. 41. Plates, 6.

With 1916 the Argentine Meteorological Office commenced the publication of a new monthly Weather Review. A summary is given of the observations made thrice daily at 75 stations, pressure, temperature, and humidity being corrected to the mean of the 24 hours. The tri-daily observations at 23 stations are given *in extenso*. The stations range in latitude from 22° to 55° S., and in height from 8 to 3,447 metres. Some 16 pages in each "boletin" contain the daily rainfall at 1,421 stations, of which more than a third are in the province of Buenos Aires. Magnetic and seismic data are given for Pilar, and the hydrometric section gives a summary of the daily height of the rivers and lakes, along with an analysis of the monthly height of the Parana and other rivers from 1884 to 1915. Six maps show the distribution of the various elements over the country. This Boletin supplies a long-felt want, and constitutes a notable contribution to the monthly weather reviews of the Southern Hemisphere. In the May number there is a very interesting notice by Señor Hessling of a negative correlation between the temperature at the South Orkneys in April to September of one year and the July to December rains in Buenos Aires of the year following. On the strength of the available data a wet period is predicted in Buenos Aires during the second half of this year. In the work involved in the preparation of the "Boletin," under the direction of Mr. Wiggin, we may specially note the labours of Messrs. Rector, Bigelow and Helm Clayton, and of Señors Talamon and Wolff.

Bacon's New Series of Physical Wall Atlases. Scale, 1 : 1,187,000 (18·7 *miles to an inch*). Geology, Contours, Isotherms, Rainfall, Isobars, etc. Productions, etc. Population. Communications. 7 maps, on cloth, folded in case. London, G. W. Bacon and Co., Ltd. [1917]. Price, 21*s*.

The isohyetal lines on the Rainfall map are by Dr. H. R. Mill. The maps are very boldly printed and are striking illustrations of distributions. Our only criticism is that too many features are shown, *e.g.*, the isobars or isotherms for average and extreme conditions tend to confuse.

THAMES VALLEY RAINFALL, MAY, 1917.



THE WEATHER OF MAY.

THE outstanding feature of the weather of May was its high mean temperature, this being most pronounced in the immediate neighbourhood of London, and least marked at coastal stations. On the average of the whole country the mean excess was about 2° F., being greatest, over 3° in the east and south-east of England and the Midlands. Scotland had a general excess of half a degree, but in the east a practically normal temperature was experienced, whilst in Ireland the excess was 1°·5. Individual stations, especially those in strictly insular situation were much cooler than inland stations in the vicinity. Portland Bill, for example, had a mean temperature 0°·5 below the average, whilst at Shaftesbury the mean was 3° in excess. At Great Yarmouth the mean was about 1°·5 above the average, but at Norwich over 4°, in the vicinity of London, Tottenham, had a mean over 5° in excess of the average, whilst at Dungeness the mean temperature of May was normal. In Scotland and Ireland a considerable number of stations on the coast had a mean from 0·5° F. to 1°·0 F. under the average, although in Scotland, Crieff, an inland station, showed the largest defect, viz., 2°, a similar excess occurring at Colmonell, in Ayr. During the greater part of the month anti-cyclonic conditions prevailed, the general fine weather being interrupted only for a few days, from the 16th to the 23rd, when shallow depressions passed eastward over the south of the British Isles.

During the first half of the month the weather remained in general cold or cool, the lowest screen temperatures recorded being 28° at West Linton on the 3rd, and 22° at the same station on the 7th, other low values on the latter date being 25° at Bawtry, in the Midlands, and 26° at West Witton. Shade temperatures of 32° or below were recorded as late as the 16th and 17th in various parts of Scotland, and the north of England. During the second half of the month very warm weather prevailed, with local cool areas on the coast where the temperature remained normal for the time of year. A considerable number of places experienced maxima of 79° on various dates between the 13th and 28th. On the 28th shade maxima of 79° were recorded at Bawtry, and in London (Regents Park), while at Camden Square the temperature rose to 80° in the Stevenson Screen and to 84° on the Glaisher Stand.

Bright sunshine varied from an average of 5 hours a day in Scotland and the north of Ireland to 7½ hours a day in the east of England. There was an average daily deficit of one hour in Ireland and an excess of about the same amount in the east of the British Isles.

Rainfall showed sharp local variations due to thunderstorms, but little more than half an inch fell on the Kent coast, whilst inland the amount increased to over 3 inches at Tunbridge Wells. Over a considerable area around Worcester from 3 to 4 inches fell, but large parts of the eastern half of England, including the Midland counties as well as the north-east of Scotland, had less than 2 inches. Falls of over 5 inches occurred in the normally wet areas and also at one or two places in the south of Scotland. In Ireland the rainfall varied within relatively small limits. Over the Kingdom as a whole the general rainfall expressed as a percentage of the average was :—England and Wales, 98 per cent.; Scotland, 92 per cent.; Ireland, 120 per cent.; British Isles, 102 per cent.

In London (Camden Square) the rainfall was 1·99 in., being 1% per cent. above the average. An absolute drought lasting 27 days terminated on the 15th, there being only two longer absolute droughts in the 60 years' record, while the mean temperature of 59°·1 was 5°·1 above the average, and the highest in 60 years. May, 1868, was very nearly as warm, and it appears probable that the mean temperature exceeded 60° in London in the years 1833, 1811, 1809, 1808, 1804, 1788 and 1784. It is curious to note that the extremely warm May of 1809 also followed an extremely cold April.

The duration of rainfall was 19 hours; of Sunshine, 209 hours; Evaporation amounted to 3·06 in.

RAINFALL TABLE FOR MAY, 1917.

STATION.	COUNTY.	RAINFALL. Aver. 1875–1909. in.	1917. in.	Diff. from Av. in.	Per cent. of Av.	Max. in 24 hours. in.	Date.	No. of Days
Camden Square	*London*	1·75	1·99	+ ·24	114	·62	20	8
Tenterden	*Kent*	1·65	2·45	+ ·80	149	·79	20	9
Arundel (Patching)	*Sussex*	1·80	1·08	— ·72	60	·44	20	10
Fordingbridge (Oaklands)	*Hampshire*	2·09	1·46	— ·63	70	·48	27	12
Oxford (Magdalen College)	*Oxfordshire*	1·81	1·94	+ ·13	107	·67	17	11
Wellingborough (Swanspool)	*Northampn*	1·98	2·59	+ ·61	131	·83	20	11
Bury St. Edmunds (Westley)	*Suffolk*	1·93	·75	—1·18	39	·57	17	5
Geldeston [Beccles]	*Norfolk*	1·78	·77	—1·01	43	·40	17	7
Polapit Tamar [Launceston]	*Devon*	2·08	1·68	— ·40	81	·44	20	10
Rousdon [Lyme Regis]	,,	2·02	2·00	— ·02	99	·58	26	9
Stroud (Field Place)	*Gloucester*	2·10	2·61	+ ·51	124	·97	27	10
Church Stretton (Wolstaston)	*Shropshire*	2.64	3·77	+1·13	143	1·34	27	12
Boston	*Lincoln*	1·80	1·38	— ·42	77	·59	17	12
Worksop (Hodsock Priory)	*Nottingham*	2·08	1·86	·22	89	·59	17	10
Mickleover Manor	*Derbyshire*	2·10	2·57	+ ·47	122	·62	10	11
Buxton	,,	3·30	2·10	—1·20	64	·48	12	15
Southport (Hesketh Park)	*Lancashire*	2·13	2·66	+ ·53	125	·62	27	13
Arncliffe Vicarage	*York, W.R.*	3·55	...	...	...	...	...	...
Goldsborough Hall	,, ,,	2·16	1·54	·62	71	·45	17	7
Hull (Pearson Park)	,, *E.R.*	1·98	1·68	— ·30	85	·68	10	8
Newcastle (Town Moor)	*North'land*	2·04	1·63	— ·41	80	·50	17	9
Borrowdale (Seathwaite)	*Cumberland*	7·50	6·77	— ·73	90	3·33	30	15
Cardiff (Ely)	*Glamorgan*	2·56	3·36	+ ·80	131	1·04	12	19
Haverfordwest	*Pembroke*	2·62	3·34	+ ·72	128	1·35	26	14
Aberystwyth (Gogerddan)	*Cardigan*	2·63	2·99	+ ·36	114	·85	12	11
Llandudno	*Carnarvon*	1·86	2·29	+ ·43	123	·99	27	13
Cargen [Dumfries]	*Kirkcudbrt.*	2·87	4·58	+1·71	160	1·04	14	15
Marchmont House	*Berwick*	2·53	2·18	— ·35	86	.60	12	14
Girvan (Pinmore)	*Ayr*	2·98	3·64	+ ·66	122	·85	27	16
Glasgow (Queen's Park)	*Renfrew*	2·40	...	...	...	...	...	...
Islay (Eallabus)	*Argyll*	2·58	4·36	+1·78	169	·93	26	18
Mull (Quinish)	,,	2·99	3·86	+ ·87	129	1·06	26	15
Balquhidder (Stronvar)	*Perth*	4·10	3.20	—5·90	78	.39	28	19
Dundee (Eastern Necropolis)	*Forfar*	2·05	1·99	— 06	97	·57	8	14
Braemar	*Aberdeen*	2·33	2·73	+ ·40	117	·47	29	13
Aberdeen (Cranford)	,,	2·40	1·35	—1·05	56	·21	11	11
Gordon Castle	*Moray*	2·10	1·28	·82	61	...		...
Drumnadrochit	*Inverness*	2·33	1·70	— ·63	73	·42	7	16
Fort William	,,	3·93	1·98	—1·95	50	·88	31	13
Loch Torridon (Bendamph)	*Ross*	4·54	2·10	—2·44	46	·50	26	14
Dunrobin Castle	*Sutherland*	2·19	1·61	— ·58	74	·49	10	10
Killarney (District Asylum)	*Kerry*	3·05	2·62	— ·43	86	·39	22	15
Waterford (Brook Lodge)	*Waterford*	2·33	3·46	+1·13	149	·77	20	11
Nenagh (Castle Lough)	*Tipperary*	2·51	3·10	+ ·59	124	.72	26	13
Ennistymon House	*Clare*	2·70	2·30	— ·40	85	·45	26	13
Gorey (Courtown House)	*Wexford*	2·24	3·62	+1·38	162	·74	12	15
Abbey Leix (Blandsfort)	*Queen's Co.*	2·43	...	...	...	...	...	...
Dublin (Fitz William Square)	*Dublin*	2·07	2·98	+ ·91	144	·85	26	12
Mullingar (Belvedere)	*Westmeath*	2·51	2·14	—5·37	85	·31	13	11
Crossmolina (Enniscoe)	*Mayo*	3·17	3·10	— ·07	98	·71	21	16
Cong (The Glebe)	,,	2·94	2·85	— ·09	97	·59	21	14
Collooney (Markree Obsy.)	*Sligo*	2·80	3·17	+ ·37	113	1·23	26	17
Seaforde	*Down*	2·72	5·08	+2·36	187	2·18	26	16
Ballymena (Harryville)	*Antrim*	2·84	4·47	+1·63	157	1·17	26	19
Omagh (Edenfel)	*Tyrone*	2·66	2·27	— ·39	85	·40	12, 26	16

SUPPLEMENTARY RAINFALL, MAY, 1917.

Div.	STATION.	Rain inches.	Div.	STATION.	Rain inches
II.	Warlingham, Redvers Road..	1·96	XI.	Lligwy	2·99
,,	Ramsgate	·58	,,	Douglas, Isle of Man	4·15
,,	Hailsham	2·02	XII.	Stoneykirk, Ardwell House...	3·34
,,	Totland Bay, Aston House...	1·75	,,	Carsphairn, Shiel	5·45
,,	Stockbridge, Ashley..	1·78	,,	Langholm, Drove Road	3·58
,,	Grayshott	1·64	XIII.	Selkirk, The Hangingshaw..	2·23
III.	Harrow Weald, Hill House...	1·60	,,	North Berwick Reservoir.....	1·81
,,	Pitsford, Sedgebrook...	1·87	,,	Edinburgh, Royal Observaty.	1·47
,,	Woburn, Milton Bryant.....	1·73	XIV.	Biggar.....	2·02
,,	Chatteris, The Priory.....	1·11	,,	Maybole, Knockdon Farm ...	3·05
IV.	Elsenham, Gaunts End	2·09	XV.	Buchlyvie, The Manse.....	3·76
,,	Shoeburyness	1·48	,,	Ballachulish House	2·61
,,	Colchester, Hill Ho., Lexden	2·89	,,	Oban.....	4.24
,,	Ipswich, Rookwood,Copdock	1·26	,,	Campbeltown, Witchburn ..	5·36
,,	Aylsham, Rippon Hall.... ..	·62	,,	Holy Loch, Ardnadam.....	5·45
,,	Swaffham	·45	,,	Tiree, Cornaigmore	3·90
V.	Bishops Cannings	2·00	XVI.	Glenquay	2·80
,,	Weymouth.....	1·93	,,	Glenlyon, Meggernie Castle..	1·57
,,	Ashburton, Druid House.. ...	3·09	,,	Blair Atholl	1·97
,,	Cullompton	2·00	,,	Coupar Angus	2·23
,,	Lynmouth, Rock House	2·16	,,	Montrose, Sunnyside Asylum.	1·72
,,	Okehampton, Oaklands.. ...	2·34	XVII.	Balmoral	2.19
,,	Hartland Abbey.....	2·17	,,	Fyvie Castle	1·31
,,	St. Austell, Trevarna	2·95	,,	KeithStation	1·85
,,	North Cadbury Rectory.....	2·48	XVIII.	Rothiemurchus	1·52
VI.	Clifton, Stoke Bishop	2·24	,,	Loch Quoich, Loan	...
,,	Ledbury, Underdown..... ...	3·67	,,	Skye, Dunvegan	3·97
,,	Shifnal, Hatton Grange.....	3·78	,,	Fortrose.....	2·21
,,	Droitwich.....	3·85	,,	Glencarron Lodge	1·08
,,	Blockley, Upton Wold.....	3·40	XIX.	Altnaharra	...
VII.	Grantham, Saltersford.....	1·49	,,	Melvich	·99
,,	Market Rasen	1·08	,,	Loch More, Achfary	1·50
,,	Bawtry, Hesley Hall	1·90	XX.	Dunmanway, The Rectory ..	4·50
,,	Whaley Bridge, Mosley Hall	1·78	,,	Glanmire, Lota Lodge.....	4·63
,,	Derby, Midland Railway.....	2·61	,,	Mitchelstown Castle.....	4·58
VIII.	Nantwich, Dorfold Hall	3·28	,,	Darrynane Abbey.....	2·05
,,	Chatburn, Middlewood	...	,,	Clonmel, Bruce Villa	3·35
,,	Lancaster, Strathspey	2·21	,,	Broadford, Hurdlestown.....	3·61
IX.	Langsett Moor, Up. Midhope	2·06	XXI.	Enniscorthy, Ballyhyland...	3·43
,,	Scarborough, Scalby	1·71	,,	Rathnew, Clonmannon	3·65
,,	Ingleby Greenhow	1·21	,,	Ballycumber, Moorock Lodge	2·54
,,	Mickleton	2·00	,,	Balbriggan, Ardgillan	3·31
X.	Bellingham, High Green Manor	2·99	,,	Castle Forbes Gardens.....	2·93
,,	Ilderton, Lilburn Cottage ...	1·92	XXII.	Ballynahinch Castle.....	3·65
,,	Keswick, The Bank.....	3·17	,,	Woodlawn	3·41
XI.	Llanfrechfa Grange	4·18	,,	Westport, St. Helens	2·52
,,	Treherbert, Tyn-y-waun	4·98	,,	Dugort, Slievemore Hotel ...	3·83
,,	Carmarthen, The Friary	2·93	XXIII.	Enniskillen, Portora.....	2·06
,,	Fishguard, Goodwick Station.	2·81	,,	Dartrey [Cootehill]	2·20
,,	Crickhowell, Tal-y-maes.....	6·50	,,	Warrenpoint, Manor House ..	3·55
,,	New Radnor, Ednol	3·80	,,	Belfast, Cave Hill Road	5·73
,,	Birmingham WW., Tyrmynydd	4·40	,,	Glenarm Castle	5·33
,,	Lake Vyrnwy	3·08	,,	Londonderry, Creggan Res...	3·36
,,	Llangynhafal, Plas Dráw.....	3·24	,,	Dunfanaghy, Horn Head ...	3·85
,,	Dolgelly, Bryntirion.....	3·08	,,	Killybegs	4·52
,,	Bettws-y-Coed, Tyn-y-bryn...	2·53			

Climatological Table for the British Empire, December, 1916.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Date.	Absolute. Minimum. Temp.	Date.	Average. Max.	Min.	Dew Point.	Humidity.	Absolute. Max. in Sun.	Min. on Grass.	Total Rain. Depth.	Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
London, Camden Square	55·1	29	25·5	17	41·9	32·8	35·2	92	67·7	24·4	2·55	15	8·2
Malta	73·8	12	50·0	9	67·6	58·6	...	82	107·5	...	1·19	4	2·3
Lagos	90·1	13	69·0	28	87·8	74·4	73·4	75	150·0	64·2	·02	1	5·7
Cape Town	98·6	16	48·2	10	79·5	59·8	57·4	65	...	...	·48	7	3·2
Johannesburg	79·0	3	49·1	31	72·9	54·8	55·1	79	...	48·9	9·41	20	5·8
Mauritius	87·4	9	65·0	17	83·5	69·8	66·6	73	...	61·5	2·74	21	6·6
Bloemfontein	91·7	5	53·4	8	83·9	59·0	56·3	60	..	...	2·78	9	4·2
Calcutta...	79·6	18	49·2	31	75·9	56·6	55·0	69	...	36·7	·00	0	1·1
Bombay...	89·2	4	64·5	31	84·0	70·6	65·2	68	138·5	58·5	·00	0	1·0
Madras	85·8	2	64·1	25	83·7	69·7	67·0	76	155·5	60·3	3·91	8	4·1
Colombo, Ceylon ...	91·6	8	66·1	27	86·4	70·1	68·9	78	162·6	58·4	2·03	6	5·4
Hongkong	76·4	8	50·4	1	67·9	57·9	49·0	60	...	...	·05	1	4·5
Syaney	86·0	9	57·6	14	76·0	63·3	62·8	77	147·0	48·7	3·42	18	5·9
Melbourne	96·6	27	48·9	6	75·0	56·8	52·7	62	157·0	41·8	4·38	14	5·5
Adelaide	106·0	27	45·6	4	80·5	57·7	50·8	50	167·1	37·5	1·67	9	3·2
Perth	98·4	14	51·0	1	81·6	60·1	54·2	55	163·3	41·3	·16	2	1·5
Coolgardie	106·4	18	45·4	11	88·0	57·2	46·3	35	168·0	43·0	·17	2	1·7
Hobart, Tasmania ..	82·4	28	43·8	15	67·3	53·2	50·0	69	148·0	36·4	7·72	19	7·9
Wellington ...	79·5	24	44·2	1	70·3	56·4	53·6	71	158·0	33·8	·00	0	5·5
Auckland	...	...	...	...	71·9	60·0	...	...	...	...	8·59	10	...
Jamaica, Kingston ..	88·0	24	61·8	31	84·6	66·5	65·0	78	...	...	·02	1	2·6
Grenada	86·0	8	70·0	sevl	83·0	72·0	...	73	134·0	...	6·04	15	2·5
Toronto	55·0	5	5·0	16	33·1	20·8	21·0	83	97·0	3·0	2·03	20	7·5
Fredericton	52·0	1	—11·0	15	29·1	15·9	19·4	91		...	5·26	17	6·7
St. John, N.B. ...	50·0	1	—1·0	30	31·7	20·1	21·0	80	92·0	—2·0	5·10	19	6·4
Victoria, B.C.	49·0	2	27·0	29	40·4	34·2	35·0	89	89·0	22·0	4·92	23	·1

Malta.—Sunshine average hours per day 5·1.

Johannesbury.—Rainfall record for December since 1904. Bright sunshine, 197·6 hours.

Mauritius.—Mean. temp. 1°·8, dew point 1°·3, and R 1·98 in. below, average.

COLOMBO, CEYLON.—Mean temp. 78°·1 or 0°·9 below, dew point 2°·3 below, and R 2·15 in. below, averages. Mean hourly velocity of wind 5·3 miles. TS on 12th and 13th.

HONGKONG.—Mean temp. 62°·8; mean hourly velocity of wind 10·4 miles. Bright sunshine 209·0 hours.

Melbourne.—Rainfall for the year, 38·04 in., is the highest on record for 61 years, previous 36·61 in. Season exceptionally good and splendid yield of wheat.

Adelaide.—Mean temp 2°·1 below. and R ·72 in. above, averages.

Coolgardie.—Temp 3° 5 below, and R about half an inch below, averages.

Hobart.—Cloudy and wet month.

Wellington.—Mean temp. 3°·0 above, and R 3·33 in., below, averages. Bright sunshine 268·5 hours. A fine summer month.