Symons's
Meteorological Magazine.

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AGRICULTURE AND CLIMATE.

The inclement Spring of 1917 has given as sharp an edge on the side of climate as the results of the submarine campaign have given on the side of agriculture to the method of adjusting farm work to meteorological conditions put forward by Mr. Wibberley in his paper "Farming on Factory Lines" read to the Newcastle meeting of the British Association last year. The fact that the British Association, which was founded in order to spread an interest in science over the whole country and to combat the tendency to centralizing scientific thought and activity in London, has unhappily decided to hold no meeting this year makes it the more important to call attention to this remarkable instance of its usefulness in bringing forward ideas which are as consistent with common sense as they are divergent from farming traditions. Many of our readers must be aware of the remarkable work of the voluntary Agriculture Organization Society which has done so much to extend the usefulness of the Board of Agriculture and Fisheries—a department that has itself been re-organized by the appointment of a well-known agriculturist, Mr. R. E. Prothero, as its Parliamentary head, and of a distinguished agricultural chemist, Mr. A. D. Hall, F.R.S., as its official head.

Mr. Wibberly contrasts the irregularity and uncertainty of work on the farm which is always being hindered, stopped or hastened by changes of weather with the steady uniform progress of work in a factory, where the weather does not matter. He sets himself to the task of re-arranging farm work so that whatever the weather may be at whatever season the farmer has always something on hand to which that weather is favourable, and the work of the farm is not stopped. He bases his methods on practise, and has tested all the schemes which he puts forward, so that whatever is theoretical in his views has been fairly confirmed by experience. He lays stress on the rush of work at the traditional seed time and harvest, and the loss and damage which result from unfavourable weather at these seasons. Then he shows how in the matter of rainfall the climate (which is the average weather) of different parts of the British Isles

differs enormously. The rainfall of the three chief tillage months February, March, April, is, he points out, nearly twice as great in Ireland as in Norfolk, making it obvious that the system of tillage suited for the one district is unsuited for the other. Again, he points out, perhaps without laying sufficient stress on geographical differences, that with the exception of some of the dead winter months the rainfall of the harvest month, August, is greater than that of any other month in the year. We may note that a harvest deferred to September, which, after all, is not uncommon, takes place in what is now the driest month of the year except early spring. Be that as it may it does not affect the two great principles which Mr. Wibberley is pressing on public attention at this critical time—first, that a special system of tillage should be devised to suit each definite climate, and, second, that by the method of continuous cropping the risks to agriculture due to weather uncertainties can be very largely eliminated. We believe that many farmers are in the habit of making use of climatic and weather data for their work, but we have nowhere seen the value of meteorological knowledge to the farmer set out so clearly as by Mr. Wibberley. He sees the need of more detailed and accurate mapping of climatic conditions for the several seasons. We would point out that once this need is realized by farmers to the extent that they set up meteorological observations as part of the farm work, the desiderated maps can readily be produced. As it is, average monthly maps of rainfall can be prepared from existing data which would go far to supply the need; but it is difficult to see how it could be done until the close of the war releases the skilled hands, without whose aid this work which seems so simple but is so complex, cannot be undertaken with any hope of success.

Mr. Wibberley's schemes of continuous cropping are too agriculturally technical for our pages; but his great principle is simplicity itself as he sets it forth :—

"It is past the wit of man to alter climatic conditions, but it is a comparatively simple thing, to alter our tillage system that it better fits in with climatic conditions. Nay more, we can so arrange our methods of cropping, that much of the rainfall, which at present hinders tillage operations, would facilitate them. Still further, whilst we cannot cause the sun to shine and ripen our corn crops, we can modify our corn growing methods so as to ensure our cereal crops receiving a greater amount of sunshine, during the ripening and harvesting period. We can in short conquer the climate, instead of as in the past, allowing the climate to conquer us."

METEOROLOGICAL OBSERVATIONS AT LU-KIA-PANG, CHINA, FOR 1916.

By Rev. J. De Moidrey, S.J.

I.—*Barometric Pressure. Millibars.*

	8 a.m.	2 p.m.	8 p.m.	Daily Mean.
Jan.	1027·2	1025·4	1027·1	1026·6
Feb.	22·5	20·8	21·7	21·7
Mar.	22·7	20·6	21·5	21·6
April	16·0	13·9	14·9	14·9
May	12·7	11·4	11·7	11·8
June	05·4	04·4	04·9	04·8
July	06·1	05·3	05·9	05·7
Aug.	*03·9*	*02·9*	*03·5*	*03·3*
Sept.	12·3	10·8	12·2	11·7
Oct.	21·8	19·8	21·0	20·8
Nov.	25·8	23·8	25·3	24·9
Dec.	26·5	24·5	25·8	25·6
Year	1016·9	1015·3	1016·3	1016·1

IV.

	Mean amount of Cloud.
Jan.	5·7
Feb.	**8·4**
Mar.	6·1
April	6·6
May	7·6
June	7·3
July	7·5
Aug.	6·3
Sept.	7·5
Oct.	6·7
Nov.	5·8
Dec.	*5·1*
Year	6·7

V.

	Days with Thunder-storms.
Jan.	—
Feb.	—
Mar.	—
April	3*a*
May	2
June	5
July	13
Aug.	3
Sept.	5
Oct.	—*b*
Nov.	—
Dec.	—
Year	31

a First, April 9. *b* Last September 22.

II.—*Temperature. Degrees Centigrade.*

	MEAN DAILY.			MINIMUM.			
	Mean.	Lowest.	Highest.	Mean.	Hour. A.M. h.	min.	Lowest.	Highest.
	°	°	°	°			°	°
Jan.	4·7	—*1·9*	12·2	*1·1*	4	30	—*7·7*	9·3
Feb.	*4·6*	1·6	8·6	2·0	4	45	—2·2	7·1
Mar.	7·1	3·5	14·1	3·5	4	10	—0·6	10·0
April	14·1	7·7	23·2	10·2	4	5	2·2	17·8
May	19·1	14·0	25·9	14·9	4	45	8·3	18·9
June	24·0	17·4	28·4	20·5	4	10	14·6	26·4
July	**26·8**	23·2	**30·1**	**23·5**	3	15	20·9	**26·6**
Aug.	26·4	23·0	28·6	23·3	4	20	19·3	26·0
Sept.	23·9	18·5	28·7	21·0	3	40	14·3	24·9
Oct.	17·0	13·4	19·5	13·6	4	25	9·5	17·4
Nov.	11·7	4·0	19·4	8·4	4	0	1·1	19·0
Dec.	5·4	—4·7	10·3	1·6	4	30	—7·6	7·3
Year	15·4	—4·9*a*	30·1*b*	12·0	4	15	—7·7*c*	26·6*d*

Latest frost, March 24th (—0°·6); earliest, December 15th (—0°·5).

II.—(*con.*)

	MAXIMUM.					RANGE.		
	Mean.	Hour. P.M. h.	m.	Lowest.	Highest.	Mean.	Lowest.	Highest.
	°			°	°	°	°	°
Jan.	9·7	1	5	—*2·4*	18·9	8·5	1·8	15·8
Feb.	*8·1*	1	15	4·5	14·7	*6·1*	1·6	12·0
Mar.	11·9	1	5	6·4	22·6	8·5	2·2	16·5
April	19·4	1	50	12·3	30·6	9·2	1·8	**18·0**
May	24·2	1	45	16·4	33·4	**9·3**	2·3	15·4
June	28·7	2	5	19·2	35·2	8·1	*0·6*	16·4
July	**31·2**	1	45	26·0	**36·8**	7·7	1·6	10·8
Aug.	31·1	1	30	25·8	34·1	7·8	3·7	11·1
Sept.	28·6	1	25	19·8	34·3	7·6	1·5	11·3
Oct.	22·0	0	50	15·2	26·6	8·4	2·7	13·6
Nov.	16·2	0	35	6·3	22·7	7·8	1·8	13·5
Dec.	10·4	1	0	—1·5	16·6	8·8	1·9	15·7
Year	20·1	1	20	—2·4*e*	36·8*f*	8·2	0·6*g*	18·0*h*

a Jan. 23. *b* July 3. *c* Jan. 25. *d* July 20. *e* Jan. 23. *f* July 21. *g* June 26. *h* Apr. 7.

III.—*Relative Humidity. Per cent.*

	RELATIVE HUMIDITY.			VAPOUR TENSION.		
	Mean.	Lowest.	Highest	Mean.	Lowest.	Highest.
Jan.	76	51	95	*5·1*	*1·8*	9·2
Feb.	78	53	**97**	*5·1*	3·0	8·0
Mar.	73	51	95	5·8	3·4	8·8
April	77	*46*	**97**	9·9	4·0	18·3
May	76	51	**97**	13·0	6·5	17·5
June	81	56	96	18·5	12·9	23·5
July	**82**	72	91	**21·8**	18·4	**27·8**
Aug.	81	71	90	21·5	16·2	26·1
Sept.	**82**	69	93	18·9	12·1	24·1
Oct.	78	60	96	11·7	8·9	14·1
Nov.	78	60	96	8·6	3·8	15·8
Dec.	77	52	95	5·4	1·9	7·9
Year	78	46	97	12·1	1·8	27·8

(To be continued.)

THE COLD APRIL WEATHER IN LONDON.

THE remarkable persistence of the cold, ungenial weather which has prevailed almost without interruption for more than four months is shown by the exceptionally low mean temperature at Camden Square for the first thirteen days of April. For this period the mean maximum temperature (in the Glaisher stand) was 46°·5, being highest, 51°·2, on the 8th and 15th, and lowest, 41°·0, on the 1st; the mean minimum temperature was 29°·6, the lowest being 26°·5, on the 2nd, and the highest, 33°·6, on the 9th. Frost in shade occurred on eleven nights, and snow fell on ten days, yielding practically the average rainfall for the whole month of April. The mean temperature (mean of maximum and minimum) was 38°·0, being 9° below the normal for the first thirteen days of April. Reference to the Camden Square records since 1858 show that the only April which approached the present month in point of severity was that of the year 1888. In this instance the mean of all the maxima was 48°·5, the mean of the minima 32°·3, and the mean temperature 40°·4. In April, 1888, the day values varied from 61°·9, on the 13th, to 42°·3, on the 8th, while the minima ranged from 27°·7 on the 6th, to 41°·8 on the 13th. Frosts, occurred on nine occasions during the first 13 days. Reference to existing records would indicate that the last occasion of such remarkable April cold occurred in the year 1837, which was the coldest April in London and Edinburgh in records extending over a century and a half. At both places the mean temperature of the whole month was under 40° F.

Correspondence.

To the Editor of Symons's Meteorological Magazine.

APRIL SNOW AND FROST.

In the early morning hours of April 1st snow began to fall and by midday the depth was 6 inches ; again, about 5 a.m., on April 2nd, a further fall commenced, which, by 11 a.m., when it ceased, amounted to a further 6½ inches ; the total depth actually lying at that hour being about 10 inches.

The readings of the thermometer at 9 a.m. on the 2nd were:—

Maximum, 29°·8 Minimum, 10°·5 Ground (on the snow), 1°·6

No such temperatures have been recorded before in April at this station, though perhaps a minimum of 15°·0, on April 24th, 1908, is equally remarkable. CHARLES LEWIS BROOK.

Harewood Lodge, Meltham, Yorks., 3rd April, 1917.

My thermometer last night in the screen sank to 10°, and on the surface of the snow to —1°. Is not this an unprecedented reading for this locality in April ? I have recorded nothing like it, in either March or April, during the last thirty years. ROBERT CROSS.

Worstead, Norwich, 2nd April, 1917.

A marked feature of the unusual April snowfall yesterday was an interlude in the City from about 8.55 to 9.15 of fine grained " snow-hail." This fell in exceptional abundance. Although small grained and therefore very compact it became nearly an inch thick. It made walking on pavement or asphalte most slippery and the cart-horses had the utmost difficulty in getting along. The fall was altogether distinct in character from the ordinary spring scuds.

The snow here yesterday measured 8½ inches in twenty-four hours, making for the three successive days of snow just the foot, really *all* in April. J. E. CLARK.

Asgarth, Riddlesdown Road, Purley, Surrey, 3rd April, 1917.

SNOWFALL ON SALISBURY PLAIN.

For several nights past we have had snow, thawing by the following afternoon ; last night this culminated in a very heavy downfall, which, at 9 a.m. this morning, though already thawing, measured 11 inches in depth on the level and 1·92 when melted, being in this last respect the heaviest snowfall I have measured. Snow began about 6.30 yesterday evening with a light air from S. ; About 8 p.m. this had veered to W. and the snow was very heavy in very large flakes. F. J. WARDALE.

Shrewton, Wilts., 3rd April. 1917.

THE COLD WINTER.

THE mean temperature here was, 1916, December, 34°·7, 1917, January, 34°·7, February, 35°·0, March, 39°·7. The mean of the four months was 35°·9 or about 4°·2 below the average. Between the middle of November and end of March (136 days) there were eighty-eight occasions when the thermometer fell to 32° or below.

As the winter progressed I was led to conclude from the meteorological reports in the papers that the intensity of cold in the south-west of England was rather exceptional as compared with that experienced in many other parts of the country.

The mean temperature of the similar months of the cold winter of 1894-5 (at Montpelier, about three-quarters of a mile south-east from here) was 36°·7, so that the recent severity has been more prolonged (if the frosts were decidedly less severe in February) than in the last severe season twenty-two years ago.

For rain the comparison is 1894-5, 9·77 in.; 1916-7, 10·66 in.

The mildest period of the recent winter was from December 29th to January 4th. On the former date temperature rose to 55° in the afternoon and a queen wasp was observed flying about, having apparently mistaken December for May! W. F. DENNING.

Bristol, 1st April, 1917.

SMALL MONTHLY TEMPERATURE RANGE.

REFERRING to Mr. Brook's letter in the March Magazine I may note the two instances of smallest range here in the last thirty-one years. One was the warmest and the other almost the coldest December and January respectively :—

	Mean Max.	Mean Min.	Range.
December, 1898 ..	50°·7	46°·2	4°·5
January, 1917 ..	38°·6	33°·7	4°·9

JOHN DOVER.

Totland Bay, Isle of Wight, 20th March, 1917.

WATER DROPS BELOW FREEZING POINT.

WITH reference to Dr. G. C. Simpson's letter, on page 17 of March Magazine, I think that my description "Lofty Cirrus" may be trusted as quite exact. The term "Fog Bow" was *not* used by *me*, though printed at head of my letter in the December Magazine.

If it is any use to him the maximum temperature here in shade on November 28th was 48°. The minima the night before in shade, 26°·5, on grass, 16°; the night after, in shade, 43, on grass, 37·5.

H. A. BOYS.

North Cadbury Rectory, 3rd April, 1917.

DR. SIMPSON's letter brings up the interesting question of the life history of a crystal in its initial stages and of the point at which surface tension succumbs in its struggle to maintain a spherical or spheroidal shape in face of the orienting or vectorial powers of crystallisation. Wolfgang Ostwald quotes evidence of the spherical form being the antecedent of every crystalline growth, in his Chemistry. Wo. Ostwald, in "Colloid Chemie," does not credit surface tension with such supremacy, but allows that every crystal begins as a spheroid. Both base their deductions upon observations under the microscope, of the rounded edges of very small crystals. From W. W. Taylor (1915) may be obtained definite data which show that if a gram of water is sub-divided into 3×10^9 droplets, its surface energy would reach 4,500 ergs, or 15×10^{-5} ergs per droplet. Operating with the extremely small curvature (radius 3×10^{-4} cm.) this energy is the equivalent of that of a 6-inch spherical eggshell made of half-inch steel and strained to its elastic limit (13 tons per square inch). Compared with such energy that of crystalline orientation is almost powerless and the droplet would remain sensibly spherical until it had increased to maybe double the size. Its surface tension would then have lost 98 per cent. of its effectiveness and the spheroidal condition would so far prevail as to preclude any rainbow phenomena.

Such a growth (eightfold in weight) would call for a considerable vertical movement, in order to effect the necessary condensation by cooling. Growth of the droplets by coalescence may be left out of consideration owing to their great distance asunder, averaging 10^6 diameters, on the assumption that a cubic meter of cirrus air would contain 2 milligrams of condensed moisture.

As to undercooling, W. W. Taylor's figures are very definite, and show that the rate of condensation is intimately bound up with it as a storehouse for the "latent heat" released by a gas in condensing to a liquid. When, however, Dr. Simpson claims such undercooling as would permit of a cirrus cloud being largely composed of liquid droplets, he is asking much. All the evidence advanced by Wo. Ostwald relates to the formation of crystals and goes to prove that they begin with *solid* spheres. He might appeal to Wo. Ostwald's statement "Precipitation of an insoluble from liquids, seems always to occur primarily in the form of droplets, *i.e.*, in the state of undercooled liquid," but such an appeal would involve the conclusion that no solid particle could exist below a certain size, in the case of substances which expand at the moment of freezing or a few degrees above their freezing point, like water.

Doubtless a cirrus droplet would begin life as a sphere and would need undercooling in order that it might grow, but such undercooling does not preclude solidification : the difficulty lies in the reconciliation of the optical effects observed, with the existence of a skin of water on such a solid spherule of ice. In order to reconcile

them it is necessary to suppose an arrested process, such as would occur if the cirrus cloud ceased to ascend or reversed its movement. Further condensation would be thereby prevented and the amorphous ice spheres would become dry and capable of producing rainbow effects, albeit with a different refractive index. It would be interesting to know the angle subtended by Mr. Boys's rainbow.

EDWARD C. BARTON.

London, 3rd April, 1917.

ROYAL METEOROLOGICAL SOCIETY.

AT the meeting of the Royal Meteorological Society, held at Caxton Hall, Westminster, on March 21st, Major H. G. Lyons, F.R.S., President, in the chair, Major G. I. Taylor, R.F.C., delivered a lecture on "The Formation of Fog and Mist," of which the following is a summary :—

Fogs are due either to precipitation of water in the air or to a condition of the atmosphere which prevents smoke from being dispersed from the air close over the roofs of a town. The two necessary conditions for the formation of a smoke fog are that the wind velocity must be very small, and the air near the ground must be relatively cold compared with the air higher up for a period sufficiently long to collect enough smoke to form a fog.

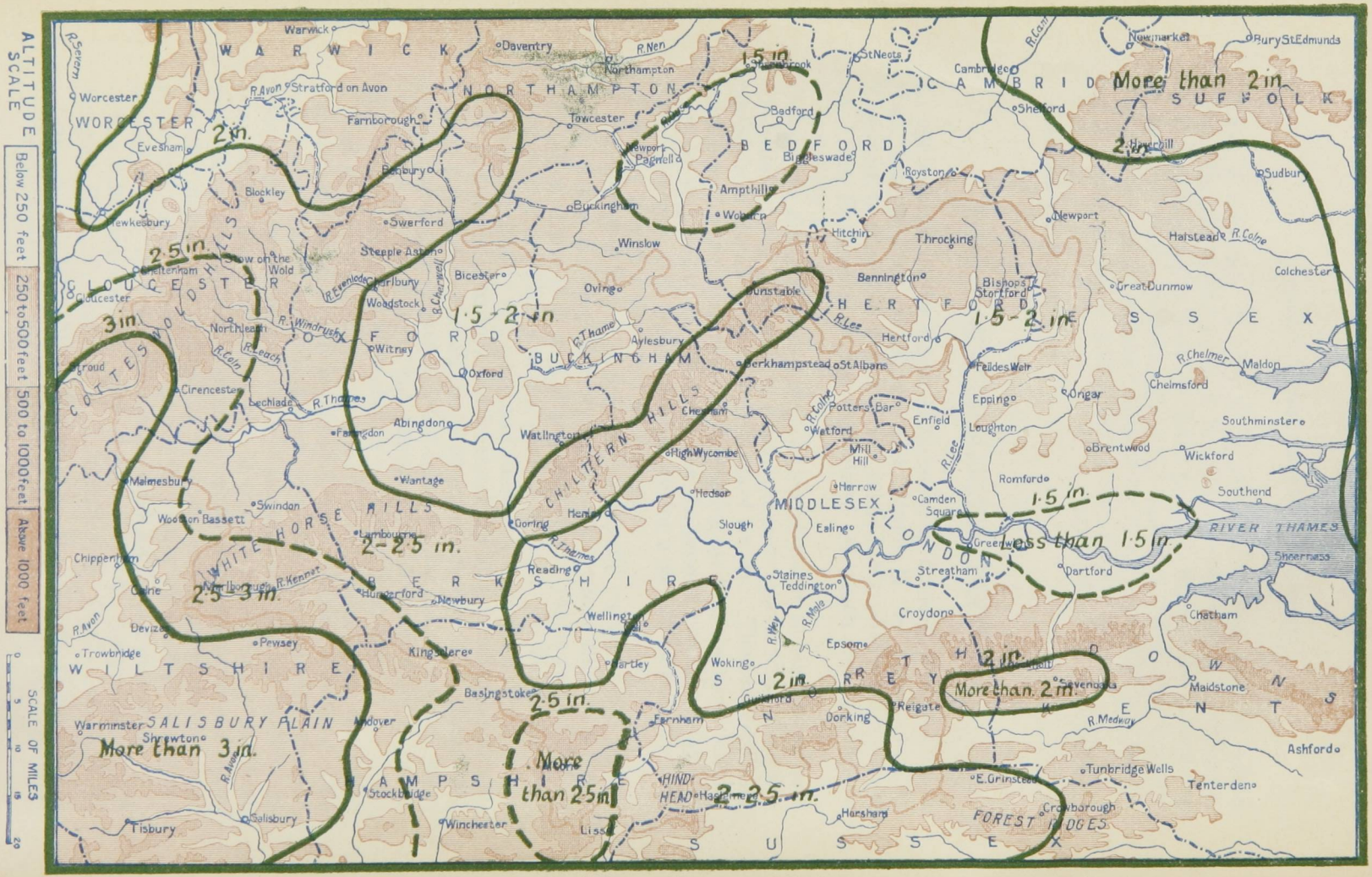
The formation of fog at sea can usually be traced to the cooling of the surface air when it flows from a place where the sea is warm to a place whe e it is cold, but sometimes a fog is caused by air flowing from a cold to a warm part of the sea. In the former case the fogs are usually low-lying and thick, while in the latter they are more frequently light fogs which stretch up to a considerable height.

Fogs consisting of small drops of water are formed on land, too, by the cooling of surface air, but in this case the air usually stays still while the lowering of the temperature of the ground by radiation to the sky at night cools the air near the surface.

Fogs of this type are not formed till the temperature has fallen considerably below the dew-point of the air during the day. This is because the formation of dew dries the air near the ground. Theoretical considerations show that the amount by which the temperature must fall below the dew-point before fog is produced depends on a complicated series of causes, but an empirical method has been devised for estimating whether, on any given night, there is enough water vapour in the air to form a fog if other conditions are suitable. This method can be used for local forecasting.

The following Fellows were elected :—P. Y. Alexander, W. T. Burgess, Capt. V. Campos. G. A. Crawley, L. Davis, Lieut. H. D. Grant, R. F. Grantham, Comm. K. M. Grieve, R.N., H. H. Humphreys, Flt.-Comm. F. Lucas, R.N., M. R. Pryor, H. C. Salmon.

THAMES VALLEY RAINFALL, MARCH, 1917.



Symons's Meteorological Magazine.

Watershed of River Thames above Teddington, and River Lee above Feildes Weir.

Isohyetals.

THE WEATHER OF MARCH.

THE outstanding feature of the weather of March was its low mean temperature, the departure from the normal taking the whole country being about three and a half degrees. The departure from the average was greatest (from 4° to 4°·5) in the east of England and the midlands, and least (2° to 2°·5) in the north of Scotland and in Ireland. In London (Camden Square) the mean temperature was 38°·6 or 3°·5 below the 50 years average, the coldest March since 1892, when the mean was 37°·4. The day maxima at this station were 4°·8 under, but the night minima only 2°·6 under the average. March was the fourth month with temperature well under the average, the mean (Camden Square) from December, 1916, to March, 1917, being 36°·7, or 3°·3 under the normal, the only colder period in the sixty years' record occurring in the four months ending March, 1891, when the mean was 35°·8. During the first half of March pressure was in general high over Iceland, Scandinavia, and Spitzbergen, and low over the British Isles, but in the second half of the month conditions were, on the whole, reversed, an anti-cyclone being frequently situated off our western coasts. The shade temperature fell to zero at Balmoral, and to 2° below zero at West Linton on the 9th, but in England the lowest values reported on this day were 8° at Alnwick Castle, and 9° at Hereford. High day temperatures were uncommon, although on the 16th, when the pressure distribution was favourable for strong southerly winds, the shade maximum rose to 61° at Foynes (Co. Limerick). As the southerly current spread eastward on the 17th several readings of 59° were recorded in the south of England including London (Westminster).

Bright sunshine varied from about 4·5 hours a day in the south-west of England, and 4 hours a day in the Channel Islands, to half this amount in the north of Scotland. As compared with the average for March no part of the country showed any pronounced excess, but there was a shortage of an hour per diem in the north of Scotland and the eastern counties of England.

The distribution of rainfall was exceedingly patchy and showed in some cases sharp variations over restricted areas. At only a few stations did the maximum daily fall exceed three quarters of an inch. Over the eastern half of Great Britain the total fall for the month was under two inches. The greatest rainfall, between five and eight inches, was recorded in the normally rainy districts in the west of Ireland and Scotland, and in Wales and the Lake district. Over Ireland a relatively uniform rainfall distribution obtained. Over the kingdom as a whole the general rainfall expressed as a percentage of the average was as follows :—England and Wales, 99 per cent.; Scotland, 73 per cent.; Ireland, 102 per cent.; British Isles, 92 per cent.

In London (Camden Square) the evaporation was ·52 in. Duration of rainfall, 32 hours. Sunshine, 69 hours.

RAINFALL TABLE FOR MARCH, 1917.

STATION.	COUNTY.	RAINFALL. Aver. 1875—1909. in.	1917. in.	Diff. from Av. in.	Per cent. of Av.	Max. in 24 hours. in.	Max. in 24 hours. Date.	No. of Days
Camden Square	*London*	1·70	1·74	+ ·04	102	·39	11	20
Tenterden	*Kent*	1·95	1·69	+ ·26	87	·25	4	19
Arundel (Patching)	*Sussex*	1·95	1·92	— ·03	98	·40	30	15
Fordingbridge (Oaklands)	*Hampshire*	2·09	3·13	+1·04	150	·45	11	22
Oxford (Magdalen College)	*Oxfordshire*	1·45	1·49	+ ·04	103	·32	6	20
Wellingborough (Swanspool)	*Northampn*	1·72	1·49	— ·23	87	·28	11	17
Bury St. Edmunds (Westley)	*Suffolk*	1·71	2·25	+ ·54	132	·61	11	18
Geldeston [Beccles]	*Norfolk*	1·57	2·58	+1·01	164	·69	11	19
Polapit Tamar [Launceston]	*Devon*	2·74	3·11	+ ·37	114	·42	4	21
Rousdon [Lyme Regis]	,,	2·30	2·96	+ ·66	129	·58	11	19
Stroud (Field Place)	*Gloucester*	2·01	3·43	+1·42	171	·70	6	23
Church Stretton (Wolstaston)	*Shropshire*	2·19	2·13	— ·06	97	·53	10	20
Boston	*Lincoln*	1·47	1·06	— ·41	72	·31	10	18
Worksop (Hodsock Priory)	*Nottingham*	1·70	1·89	+ ·19	111	·67	10	17
Mickleover Manor	*Derbyshire*	1·69	1·99	+ ·30	118	·65	10	17
Buxton	,,	3·99	2·69	—1·30	67	·65	10	23
Southport (Hesketh Park)	*Lancashire*	2·11	3·26	+1·15	155	·89	31	16
Arncliffe Vicarage	*York, W.R.*	5·17	2·69	—2·48	52	·66	28	15
Goldsborough Hall	,, ,,	2·00	2·79	+ ·79	139	·83	10	16
Hull (Pearson Park)	,, *E.R.*	1·84	1·77	— ·07	96	·52	10	17
Newcastle (Town Moor)	*North'land*	2·10	2·08	+ ·08	104	·60	10	15
Borrowdale (Seathwaite)	*Cumberland*	10·63	7·03	—3·60	66	1·70	18	14
Cardiff (Ely)	*Glamorgan*	2·89	3·04	+ ·15	105	·56	10	23
Haverfordwest	*Pembroke*	3·16	3·54	+ ·38	112	1·09	10	18
Aberystwyth (Gogerddan)	*Cardigan*	3·04	2·42	— ·62	80	·60	10	19
Llandudno	*Carnarvon*	2·13	2·13	·00	100	·40	31	18
Cargen [Dumfries]	*Kirkcudbrt.*	3·33	3·10	— ·23	93	·75	19	17
Marchmont House	*Berwick*	2·64	1·40	—1·24	53	·30	10	14
Girvan (Pinmore)	*Ayr*	3·62	2·46	—1·16	68	·48	19	19
Glasgow (Queen's Park)	*Renfrew*	2·61	...	...	...	...	...	...
Islay (Eallabus)	*Argyll*	3·68	3·32	— ·36	92	·68	28	22
Mull (Quinish)	,,	4·28	1·88	—2·40	44	·62	28	20
Balquhidder (Stronvar)	*Perth*	6·02	...	...	...	...	...	..
Dundee (Eastern Necropolis)	*Forfar*	2·06	1·83	— ·23	89	·90	10	17
Braemar	*Aberdeen*	2·87	2·54	— ·33	89	·54	5	15
Aberdeen (Cranford)	,,	2·65	2·08	— ·57	78	·48	10	21
Gordon Castle	*Moray*	2·36	1·41	— ·95	...	...	...	...
Drumnadrochit	*Inverness*	3·09	2·33	— ·76	75	·45	19	16
Fort William	,,	6·39	3·71	—2·68	58	1·00	28	20
Loch Torridon (Bendamph)	*Ross*	7·29	5·48	—1·81	75	·72	28	21
Dunrobin Castle	*Sutherland*	2·64	2·26	— ·38	86	·39	25	16
Killarney (District Asylum)	*Kerry*	4·51	2·86	—1·65	63	·46	3	26
Waterford (Brook Lodge)	*Waterford*	2·64	3·27	+ ·63	124	·65	4	17
Nenagh (Castle Lough)	*Tipperary*	2·99	2·88	— ·11	96	·57	3	23
Ennistymon House	*Clare*	3·24	3·05	— ·19	94	·65	4	21
Gorey (Courtown House)	*Wexford*	2·28	2·60	+ ·32	114	·62	4	15
Abbey Leix (Blandsfort)	*Queen's Co.*	2·59	4·18	+1·59	162	1·33	6	23
Dublin (Fitz William Square)	*Dublin*	1·98	3·00	+1·02	152	1·09	4	23
Mullingar (Belvedere)	*Westmeath*	2·64	2·00	— ·64	76	·54	6	17
Crossmolina (Enniscoe)	*Mayo*	4·36	4·69	+ ·33	108	·51	2	26
Cong (The Glebe)	,,	3·80	3·15	+ ·65	83	·61	6	27
Collooney (Markree Obsy.)	*Sligo*	3·33	3·52	+ ·19	106	·67	4	21
Seaforde	*Down*	2·84	2·53	— ·31	89	·39	28	20
Ballymena (Harryville)	*Antrim*	3·07	2·94	— ·13	96	·41	4	24
Omagh (Edenfel)	*Tyrone*	2·98	3·41	+ ·43	115	·44	28	25

SUPPLEMENTARY RAINFALL, MARCH, 1917.

Div.	STATION.	Rain inches.	Div.	STATION.	Rain inches.
II.	Warlingham, Redvers Road..	1·73	XI.	Lligwy	1·66
,,	Ramsgate	1·49	,,	Douglas, Isle of Man	2·17
,,	Hailsham	1·84	XII.	Stoneykirk, Ardwell House...	1·93
,,	Totland Bay, Aston House...	2·26	,,	Carsphairn, Shiel.....	4·23
,,	Stockbridge, Ashley..	2·90	,,	Langholm, Drove Road	2·45
,,	Grayshott	2·25	XIII.	Selkirk, The Hangingshaw..	·94
III.	Harrow Weald, Hill House...	1·77	,,	North Berwick Reservoir.....	1·14
,,	Pitsford, Sedgebrook.....	1·26	,,	Edinburgh, Royal Observaty.	1·08
,,	Woburn, Milton Bryant.....	1·51	XIV.	Biggar.....	2·10
,,	Chatteris, The Priory.....	1·60	,,	Maybole, Knockdon Farm ...	2·31
IV.	Elsenham, Gaunts End	1·55	XV.	Buchlyvie, The Manse.....	...
,,	Shoeburyness	1·85	,,	Ballachulish House	4·92
,,	Colchester, Hill Ho., Lexden	1·94	,,	Oban.....	2·19
,,	Ipswich, Rookwood, Copdock	2·56	,,	Campbeltown, Witchburn ..	2·48
,,	Aylsham, Rippon Hall..... ..	2·59	,,	Holy Loch, Ardnadam.....	4·03
,,	Swaffham	1·62	,,	Tiree, Cornaigmore	1·85
V.	Bishops Cannings	2·90	XVI.	Dollar Academy	...
,,	Wimborne, St. John's Hill ...	...	,,	Glenlyon, Meggernie Castle..	3·49
,,	Ashburton, Druid House.. ..	5·10	,,	Blair Atholl	1·52
,,	Cullompton	4·13	,,	Coupar Angus	2·29
,,	Lynmouth, Rock House	2·50	,,	Montrose, Sunnyside Asylum.	...
,,	Okehampton, Oaklands... ...	3·43	XVII.	Alford, Lynturk Manse.....	...
,,	Hartland Abbey.....	3·13	,,	Fyvie Castle	4·69
,,	St. Austell, Trevarna	4·61	,,	KeithStation	2·04
,,	North Cadbury Rectory.	3·12	XVIII.	Rothiemurchus	2·28
VI.	Clifton, Stoke Bishop	3·22	,,	Loch Quoich, Loan	11·10
,,	Ledbury, Underdown..... ...	2·66	,,	Skye, Dunvegan	3·54
,,	Shifnal, Hatton Grange.....	2·24	,,	Lochmaddy, Bayhead	...
,,	Droitwich.....	2·05	,,	Fortrose.....	1·94
,,	Blockley, Upton Wold.....	2·32	,,	Glencarron Lodge	5·50
VII.	Grantham, Saltersford.....	1·18	XIX.	Altnaharra	...
,,	Market Rasen	1·67	,,	Melvich	1·55
,,	Bawtry, Hesley Hall	1·52	,,	Loch More, Achfary	5·46
,,	Whaley Bridge, Mosley Hall	2·87	XX.	Dunmanway, The Rectory ..	3·29
,,	Derby, Midland Railway.....	1·33	,,	Glanmire, Lota Lodge.....	3·88
VIII.	Nantwich, Dorfold Hall	2·34	,,	Mitchelstown Castle.....	4·06
,,	Chatburn, Middlewood	...	,,	Darrynane Abbey.....	3·78
,,	Lancaster, Strathspey	2·06	,,	Clonmel, Bruce Villa	4·90
IX.	Langsett Moor, Up. Midhope	...	,,	Broadford, Hurdlestown.....	2·88
,,	Scarborough, Scalby	2·63	XXI.	Enniscorthy, Ballyhyland...	4·05
,,	Ingleby Greenhow	3·42	,,	Rathnew, Clonmannon	2·72
,,	Mickleton	1·60	,,	Ballycumber, Moorock Lodge	2·49
X.	Bellingham, High Green Manor	1·79	,,	Balbriggan, Ardgillan	2·54
,,	Ilderton, Lilburn Cottage ...	1·31	,,	Castle Forbes Gardens.....	2·83
,,	Keswick, The Bank.....	2·83	XXII.	Ballynahinch Castle.....	4·56
XI.	Llanfrechfa Grange	2·50	,,	Woodlawn	2·39
,,	Treherbert, Tyn-y-waun	5·03	,,	Westport, St. Helens	3·74
,,	Carmarthen, The Friary	3·10	,,	Dugort, Slievemore Hotel ...	3·28
,,	Fishguard, Goodwick Station.	1·85	XXIII.	Enniskillen, Portora.....	2·58
,,	Crickhowell, Tal-y-maes.....	4·00	,,	Dartrey [Cootehill]	3·54
,,	New Radnor, Ednol	3·87	,,	Warrenpoint, Manor House ..	3·10
,,	Birmingham WW., Tyrmynydd	4·40	,,	Belfast, Cave Hill Road	3·84
,,	Lake Vyrnwy	4·35	,,	Glenarm Castle	3·50
,,	Llangynhafal, Plas Drâw.....	3·58	,,	Londonderry, Creggan Res...	2·89
,,	Dolgelly, Bryntirion.....	4·99	,,	Dunfanaghy, Horn Head ...	3·44
,,	Bettws-y-Coed, Tyn-y-bryn...	3·53	,,	Killybegs	3·96

Climatological Table for the British Empire, October, 1916.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Absolute. Maximum. Date.	Absolute. Minimum. Temp.	Absolute. Minimum. Date.	Average. Max.	Average. Min.	Average. Dew Point.	Average. Humidity.	Absolute. Max. in Sun.	Absolute. Min. on Grass.	Total Rain Depth.	Total Rain Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
London, Camden Square	69·3	5	29·3	22	60·2	47·2	48·0	85	108·6	28·9	3·25	23	7·0
Malta	81·9	27	60·0	27	76·7	65·6	...	75	137·5	...	·53	5	1·7
Lagos	89·0	*30	70·0	1	85·2	73·1	73 3	79	158·5	68·5	6·04	16	7·7
Cape Town	82·5	17	40·9	21	69·9	53·9	52·0	69	....	...	·76	7	4·8
Johannesburg	89·6	14	42·4	6	77·9	54·7	44·6	54	...	41·4	1·94	8	4·2
Mauritius	82·2	29	61·4	18	78·3	64·8	61·7	73	...	52·9	3·79	24	5·8
Bloemfontein	93·4	13	35·6	6	80·4	51·8	44·9	47	.	...	2·62	8	3·7
Calcutta...	90·3	22	73·5	10	86·8	76·6	76·3	87	...	70·5	14·62	17	7·0
Bombay...	89·4	19	74·8	16	86·2	77·3	76·0	83	134·0	69·1	4·79	14	5·7
Madras	98·4	3	72·5	21	89·0	76·3	74·4	82	169·4	70·2	15·30	15	5·8
Colombo, Ceylon ...	85·9	2	73·1	3	84·9	75·8	73·0	82	159·3	68·8	3·25	19	7·6
Hongkong	85·3	10	65·8	31	80·2	72·3	65·8	71	...	...	·73	6	6·1
Sydney	80·4	23	50·0	18	68·4	56·2	54·2	70	141·0	40·7	11·14	17	5·7
Melbourne ...	75·4	8	38·7	1	65·8	48·2	46·6	66	141·5	27·2	3·09	14	6·0
Adelaide ...	79·8	11	38·3	18	68·9	51·2	47·9	62	145·7	31·3	1·92	13	5·5
Perth	82·0	17	44·0	12	68·6	51·2	48·3	64	151·5	37·5	1·90	11	5·0
Coolgardie	91·0	27	41·2	12	73·3	52·4	43·7	45	153·8	35·4	1·84	9	4·0
Hobart, Tasmania ..	76·5	8	35·8	1	61·4	45·8	43·1	65	143·7	26·2	2·46	19	7·0
Wellington ...	68·0	9	36·9	3	59·6	47·8	47·3	79	137·3	27·2	5·23	17	7·0
Auckland ...	...	...	...	...	63·2	52·8	...	..	...	...	6·00	21	...
Jamaica, Kingston ..	91·0	9	70·6	19	86·5	73·1	73·1	89	...	...	8·17	18	6·4
Grenada	90·0	13	70·0	+7	85·0	75·0	...	80	135·0	...	4·57	12	...
Toronto	85·2	8	29·7	18	59·6	39·5	40·7	80	148·8	41·8	3·91	9	4·9
Fredericton	81·0	5	20·0	19	58·0	34·1	39·1	81	...	...	3·58	12	4·8
St. John, N.B. ...	75·0	4	30·2	19	54·6	40·4	41·0	78	128·2	20·5	4·31	10	5·0
Victoria, B.C.	67·3	9	37·7	12	55·4	43·0	42·0	77	117·0	27·0	1·56	12	5·2

* 31, + 8.

Malta.—Crops practically lost through want of rain.

Johannesburg.—Bright sunshine, 263·6 hours.

Mauritius.—Mean. temp. 1°·1 below. Dew point 0°·2 below, and R 2·41 in. above, average.

COLOMBO, CEYLON.—Mean temp. 80°·3 or 0°·2 above, dew point 0° 9 below, and R 11·03 in. below, averages. Mean hourly velocity of wind 6·4 miles.

KONGKONG.—Mean temp. 75°·9; mean hourly velocity of wind 12·9 miles. Bright sunshine 185·5 hours.

Sydney.—Very wet month, only twice exceeded for October.

Melbourne.—Mean temp, 0°·6 below, and R ·51 in. above, averages. TS on 31st, streets flooded.

Adelaide.—Mean temp. 2°·6 below, and R ·51 in. above, averages.

Perth.—Heavy wind storm on 5th and 6th. Maximum 60 miles per hour.

Coolgardie.—Temperature 1°·1 below, and R 1·00 in. above, averages.

Hobart.—Rainfall ·23 in. above average.

Wellington.—Mean temp. 0°·4 below, and R 1·02 in., above, averages. Bright sunshine 139·2 hours. Frost on three days.

JAMAICA.—Rainfall much above average.