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THE DAYLIGHT SAVING BILL.

It is a fact which must have caused regret to every lover of nature, that most people sleep through many hours of summer sunlight in the early morning, and live by artificial light for several hours in the evening. The ancient adage,

> "Early to bed and early to rise
> Makes a man healthy, wealthy and wise,"

expresses the ideal of daylight saving; and we agree with the promoters of the Summer Season Time Bill now before Parliament in believing that almost anything would be justified to make the nation earlier risers in summer were it even to the extent of a single hour. But we except the tampering with time standards from the category of almost anything.

Last year the Daylight Saving Bill proposed to ensure the fuller utilization of daylight by setting the clock forward by twenty minutes at a time on several occasions in spring, and restoring it to Greenwich time by equal stages in autumn. Many practical men applauded the scheme, and some men of science approved it; but the Bill was opposed by the Post Office, by the Astronomer Royal, the Director of the Meteorological Office and the President of the Royal Meteorological Society, with the result that it was modified by the Committee to which it had been referred, and has been introduced this year simplified to the extent that it is now proposed to set the clock forward by one hour on the third Sunday of April, and to set it back to Greenwich or Dublin time, as the case may be, on the third Sunday of September. Until one thinks it out the device appears charmingly simple. By adopting Central European time as proposed in the Bill (the time kept in Germany, Austria-Hungary and Italy), we in Great Britain should rise in summer at 7 by the clock, though at 6 by the sun, and find that tradesmen, railways, offices and shops had all unconsciously commenced for the day simultaneously early, so that a delighted people would be presented with an hour of extra daylight after working hours.

We think that Parliament might very justly decree that all Government Offices should open an hour earlier and close an hour earlier in the summer half-year, and that legislative pressure might be brought to bear on banks and railways to do the same, leaving it to the self-interest of the community to follow the good example and

grow in health and wealth accordingly. But we do not think that the expedient of enforcing Central European time on the Greenwich meridian is characterised by the wisdom which together with health and wealth we have been taught to associate with early rising. Being crafty, the promotors of the Bill would catch us by guile and cheat us into the possession of such health and wealth as the extra hour of daily daylight—frequently, let us hope, an hour of sunshine —might bring. We have no sentimental regard for local time; we would gladly abolish the anomaly of the use of Dublin time in Ireland while Greenwich time is used in the Hebrides, and we feel that the standardization of time by successive hourly intervals round the world is a magnificent conception, now happily nearly carried into effect. We go farther, and say that if international agreement could be obtained for the adoption of one standard time for the whole world we should welcome the innovation, though local noon would find itself in curious positions on the dial. What we object to is the periodical change of standard on the same meridian.

We find no difficulty in using either the centigrade or the Fahrenheit thermometer scale, though the one starts from the freezing point of water and the other from the temperature of snow melted by salt; but we should be sorely plagued if our thermometers were hitched up by ten degrees in winter so as to make us less afraid of the cold, and in summer dropped to their original values again.

To the Summer Season Time Bill as now proposed, there are two serious objections—one moral, the other scientific. The moral objection is to calling the same thing by different names at different seasons, the hours passing under an alias for five months; the scientific objection is in our case concentrated in the confusion which would be introduced into meteorological observations. It is true that the Meteorological Office has, for the sake of uniformity, adopted 8 a.m. of Central European time for the morning observations from which the *Daily Weather Report* is compiled; but that hour is honestly referred to as 7 a.m. Greenwich time, and it is adhered to in winter as well as in summer, so that 7 a.m. is always 24 hours removed from the preceding and the succeeding 7 a.m. If the Daylight Saving Bill should by any unhappy accident become law, 7 a.m. would be really 7 a.m. for seven months and called 8 a.m. for the other five, and the time between one nominal 7 a.m. and the next would on one day in the year be 25 hours, on another day in the year 23 hours, though for the rest it would be 24 hours. It would be practically impossible to know with certainty to which system an observer referred when he mentioned an hour, the problem of tracing such phenomena as thunderstorms, line-squalls and whirlwinds in their passage over the country would be seriously complicated, and the discussion of maximum falls on rainfall days would be subject to the qualification that two of the "days" in the year were of unequal length. These misfits of days being dependent on the day of the week, would range through seven possible dates in April and

September, sometimes as early as the 15th, sometimes as late as the 21st, so that each year a different pair of dates would have to be kept in mind as the days the rainfall of which could not be compared fairly with that of other days. It will no doubt be conceded that Greenwich time should be used consistently for scientific purposes, and so of course it would be by scientific men. But a vast majority of the 4,500 rainfall observers are not scientific specialists, and for them 9 a.m. of the clock as used for the purposes of common life is by far the most convenient hour.

It has been pointed out that some employments could not be commenced an hour earlier than at present, especially fruit-picking, which begins now at the earliest hour at which the dew is off the fruit, and no juggling with the clock will set forward the shadow on the dial. We strongly approve the virtuous intentions of the Bill, but protest against the fiction which is relied upon to bring them into force.

THE RAINFALL OF MARCH, AND OF THE WINTER HALF YEAR.

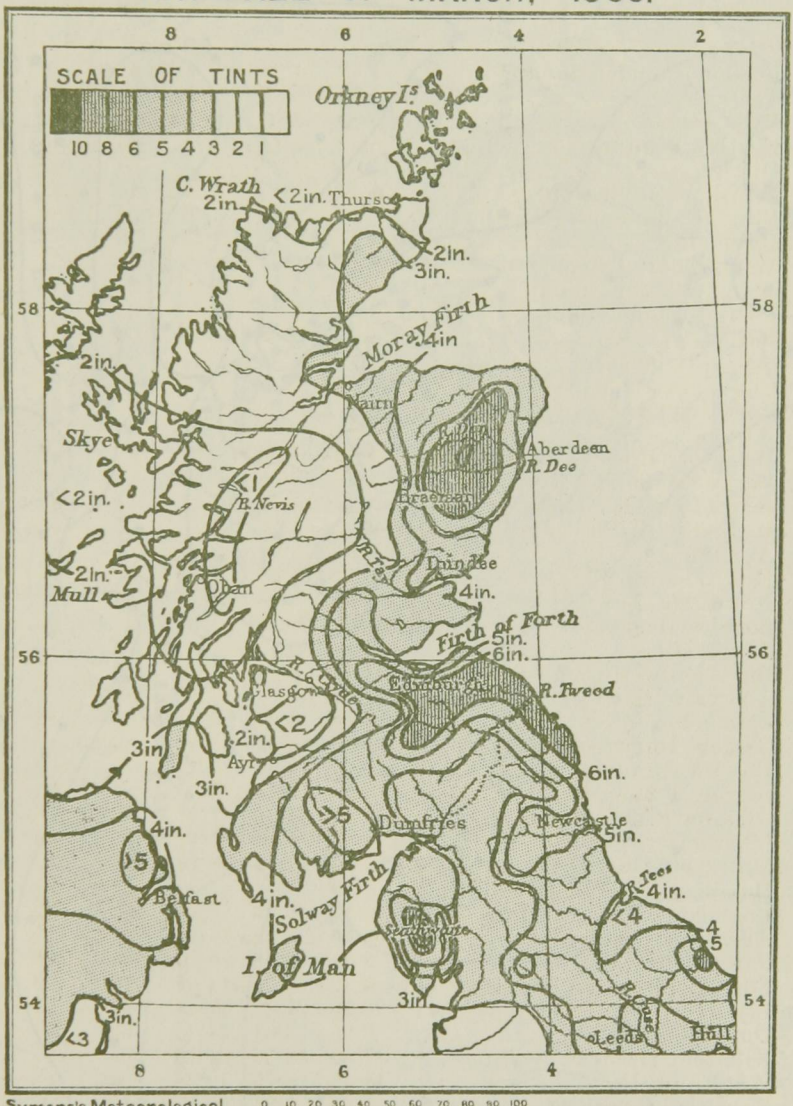
THE Table on p. 59 shows that the two dry months with which the year 1909 began were succeeded by a wet March, wet that is to say over the greater part of the British Isles, but extraordinarily dry in the west of Scotland, where the earlier months had been wet. A broad belt of the south of England, including Cornwall, Devon, Somerset, Wiltshire, Dorset, Hampshire, Berkshire, Sussex, Surrey and Kent, had more than twice the average rainfall, and so had a broad belt along the east of Great Britain from Cambridgeshire to Aberdeenshire; and also a little patch in the north-east of Ireland. The west of Ireland, the north-west of England, and the whole west of Scotland had less than the average rainfall, most of the west of Scotland had less than half, and a considerable portion less than a quarter of the average fall. The distribution of rain for March in Scotland and the north of England was so remarkable that we reproduce, along with the usual map of the Thames Valley, the special map showing how completely inverted was the usual order of a high rainfall in the west and a low rainfall in the east. The greater part of the west Highlands had less than two inches of rain, and at Fort William less than half an inch; the greater part of the north-east had more than six inches, and at one station more than eight. Inversions of this sort are usually associated with the prevalence of easterly winds which have the effect of giving the east coast the benefit of the first call on the atmospheric moisture passing across the British Isles, temporarily transferring the centre of action as regards rain from the Atlantic to the North Sea seaboard.

The effect of this distribution of rain in March has been to raise the rainfall of the winter six months to within 75 per cent. of the

RAINFALL, OCTOBER, 1908—MARCH, 1909.

STATIONS.	Oct. —Dec., 1908.	Jan. —Mar. 1909.	Oct., 1908 —Mar., 1909.	Per cent. of Average. Oct. —Dec., 1908.	Jan. —Mar., 1909.	Oct., 1908 —Mar., 1909.
	in.	in.	in.			
London (Camden Square)	4·53	4·05	8·58	61	79	68
Tenterden	5·98	5·87	11·85	63	96	76
West Dean	5·24	5·07	10·31	55	76	63
Hartley Wintney	5·62	5·34	10·96	65	86	74
Hitchin	4·39	4·46	8·85	60	91	72
Winslow (Addington)	3·86	3·40	7·26	49	63	55
Bury St. Edmunds (Westley)	4·37	4·03	8·40	60	82	69
Brundall	4·57	3·89	8·46	58	81	67
Winterbourne Steepleton	12·12	7·67	19·79	91	81	87
Torquay (Cary Green)	6·79	7·54	14·33	60	89	72
Polapit Tamar [Launceston]	7·06	8·81	15·87	52	97	70
Bath	5·41	5·06	10·47	60	77	66
Stroud (Uplield)	4·91	5·46	10·37	57	85	69
Church Stretton (Wolstaston)	6·49	5·57	12·06	64	78	70
Coventry (Kingswood)	4·62	4·99	9·61	55	82	66
Boston	3·24	4·57	7·81	50	102	71
Worksop (Hodsock Priory)	3·23	4·90	8·13	47	101	69
Derby (Midland Railway)	4·16	5·00	9·16	57	98	74
Bolton (Queen's Park)	9·44	7·73	17·17	74	87	79
Wetherby (Ribston Hall)	4·11	5·66	9·77	54	105	75
Arncliffe Vicarage	15·61	13·94	29·55	82	87	84
Hull (Pearson Park)	3·54	5·28	8·82	44	97	65
Newcastle (Town Moor)	4·08	8·00	12·08	50	142	87
Borrowdale (Seathwaite)	29·29	31·16	60·45	70	85	77
Cardiff (Ely)	9·45	6·99	16·44	70	72	71
Haverfordwest (High Street)	13·83	9·15	22·98	85	77	82
Aberystwyth (Gogerddan)	9·29	7·09	16·38	63	72	67
Llandudno	6·74	5·76	12·50	65	88	74
Cargen [Dumfries]	9·35	13·32	22·67	69	119	92
Hawick (Branxholm)	4·79	9·14	13·93	45	109	73
Girvan (Pinmore)	13·50	12·26	25·76	84	99	91
Glasgow (Queen's Park)	7·80	9·60	17·40	75	118	94
Inveraray (Newtown)	16·51	14·60	31·11	82	88	85
Mull (Quinish)	14·39	11·74	26·13	76	81	78
Dundee (Eastern Necropolis)	6·10	5·54	11·64	74	91	81
Braemar	5·81	6·63	12·44	52	82	65
Aberdeen (Cranford)	9·76	8·39	18·15	97	117	105
Cawdor	3·55	6·55	10·10	44	106	71
Fort Augustus (S. Benedict's)	9·82	8·79	18·61	70	69	70
Loch Torridon (Bendamph)	26·36	21·27	47·63	92	97	94
Dunrobin Castle	6·25	8·01	14·26	63	107	82
Killarney (District Asylum)	11·80	12·36	24·16	64	77	70
Waterford (Brook Lodge)	11·49	6·79	18·28	94	68	83
Broadford (Hurdlestown)	10·63	7·84	18·47	110	107	109
Abbey Leix (Blandsfort)	9·03	6·20	15·23	89	77	83
Dublin (FitzWilliam Square)	4·20	4·54	8·74	52	76	62
Mullingar (Belvedere)	7·00	6·96	13·96	68	87	76
Ballinasloe	9·22	6·53	15·75	86	78	82
Crossmolina (Enniscoe)	12·56	12·11	24·67	76	93	84
Collooney (Markree Obsy.)	9·27	9·77	19·04	73	104	86
Seaforde	12·91	9·57	22·48	113	104	109
Londonderry (Creggan Res.)	8·82	12·79	21·61	68	137	97
Omagh (Edenfel)	8·30	9·78	18·08	75	118	94

RAINFALL OF MARCH, 1909.



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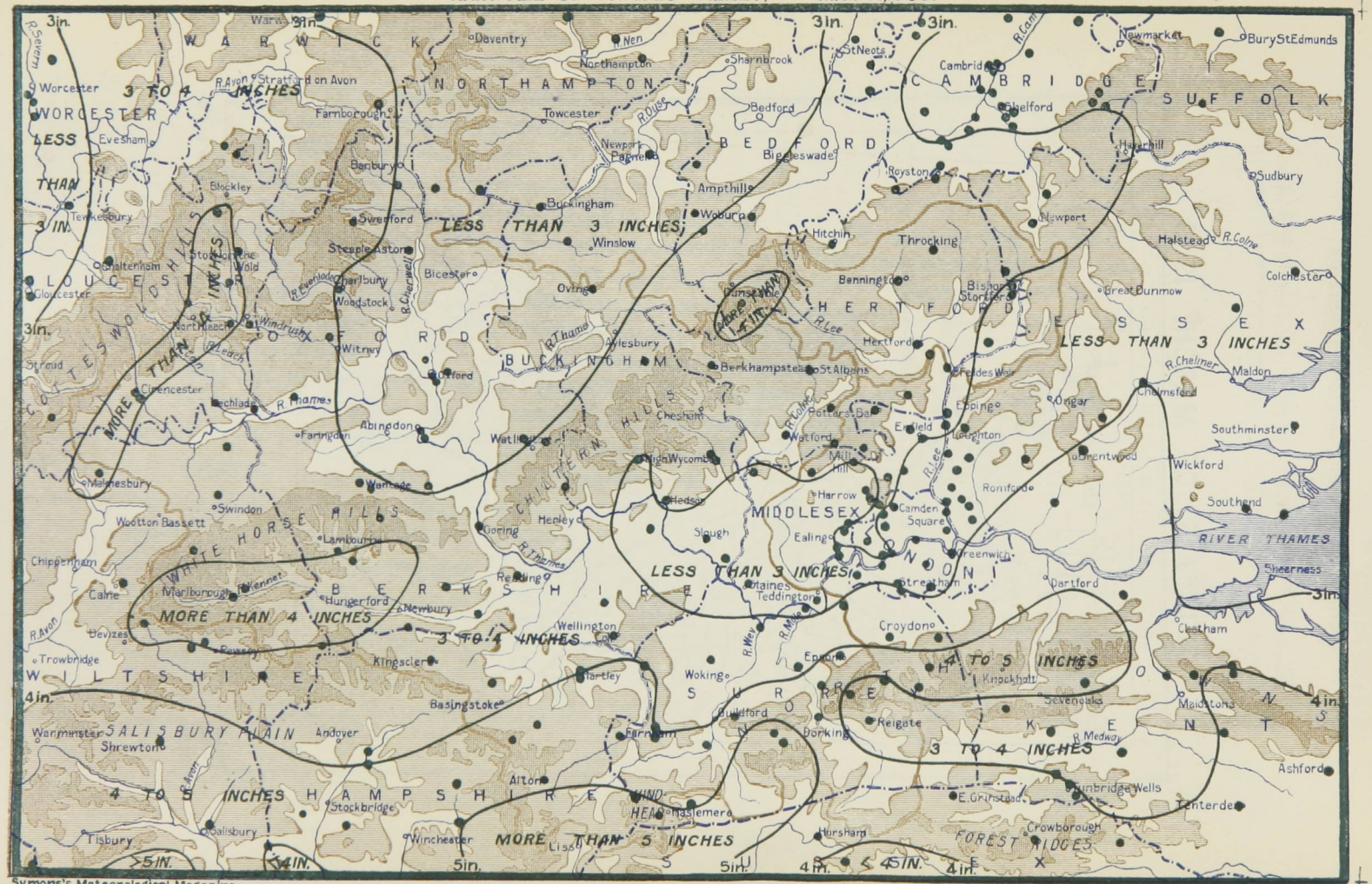
RAINFALL OF THAMES VALLEY, — MARCH, 1909.



average in Ireland, the north-west and north-east of England, and the east, north and west of Scotland. At two stations in Ireland the fall for the six months comes out as a little above the average, but the surrounding stations do not indicate that this held good over any considerable area. The greater part of England and Wales had less than 75 per cent. of the average rainfall, but only one out of the 53 stations considered had less than 63 per cent. The accompanying table shows the rainfall for each of the three months and for the six months of the winter half year expressed as percentage of the average for the stations usually published in our monthly tables. Generalizing these returns we get the following result.

General Rainfall for Winter Six Months, October, 1908—March, 1909 expressed as percentage of the average.

	England & Wales.	Scotland.	Ireland.	British Isles
Oct.–Dec., 1908.....	61	71	81	68
Jan.–Mar., 1909	88	99	94	92
Oct., 1908–Mar., 1909 ...	72	82	86	78

The extreme of dryness is, as usual, less marked in Ireland than in Great Britain, and for that country and for Scotland the shortage of rain, although distinct, is not serious. For England and Wales, however, a deficiency of more than one quarter of the normal rainfall of the half year must be viewed with some anxiety. The dry autumn of 1908 may indeed, if followed by no counterbalancing severity of weather in summer, be expected to produce an exceptionally heavy wheat harvest in 1909; but the general dryness of the whole winter half year cannot fail to cause anxiety as to the yield of wells and the replenishment of reservoirs. While it has been shown that some wells are not dependent on the winter rain, but respond to showers at all seasons, in most instances the summer rainfall fails to percolate through three feet of soil but is either evaporated or absorbed by vegetation before it reaches the subsoil. It would, therefore, be prudent for owners of wells and water authorities in the central parts of England, whose resources have not at all times an ample margin, to make preparations in time for the possibility of a deficient yield in the warm months.

THE WEATHER OF MARCH, 1909.

By Fred. J. Brodie.

The peculiarly inclement weather of last month may, as a matter of fact, be attributed to the extraordinary type of pressure distribution, which was the very reverse of what it should have been. In an average March the mean height of the barometer diminishes gradually from about 30·0 in. over France, and a trifle less in the south of England, to about 29·7 in. in an area lying between Iceland and Greenland. Last month the highest mean pressures were found in the Icelandic region, and the lowest over the south-western parts

of the United Kingdom. In the former region the barometer was about three-tenths of an inch too high, while in the south of England it was about four tenths too low, the mean pressure in London being the lowest observed in March as far back at least as the year 1871. With an anticyclonic system existing almost constantly in the neighbourhood of Iceland, and another extending very frequently over south-western Europe from the southern portions of the North Atlantic, the United Kingdom occupied an unenviable position in an intervening valley of low pressure, and became the breeding place for numerous barometrical depressions, each of which was accompanied by snow or by more or less copious falls of rain.

In the first week the entire country experienced frosts and snowstorms of mid-wintry severity, the coldest weather occurring between the 3rd and 6th of the month, when the sheltered thermometer fell in nearly all districts below 15°. Over the inland parts of Great Britain readings below 10° were common, the thermometer sinking to 5° at Balmoral, to 3° at Swarraton (Hants), to 1° at West Linton, and to zero at Marlborough. In some places the indications of thermometers exposed on the ground were rendered unreliable owing to the fact that the instruments were covered with snow; but at Llangammarch Wells a reading of 4° below zero was reached, and at West Linton a reading of 5° below zero. Over the United Kingdom generally the frost in this opening week of March was the sharpest experienced since February, 1895, and in not a few places it was the sharpest ever recorded at so late a period in the season. After the 6th the month became a trifle less cold, but on the night either of the 10th or 11th another sharp frost was experienced over North Britain, the exposed thermometer falling in several places slightly below 20°.

After the middle of the month the wind, which had hitherto blown almost persistently from between north and east, shifted to the southward, and temperature rose decidedly, the mildest weather being experienced between the 19th and 21st, when the thermometer in many parts of England rose slightly above 55°. A sharp frost occurred, however, in some districts on the night of the 20th or 21st, the exposed thermometer at Buxton falling on the latter occasion to a minimum of 20°. The closing portion of the month was marked by great variations both in wind and weather. As a rule the temperature was slightly above the normal, but no readings as high as 60° were recorded until the 29th, when that value was reached and slightly exceeded in several isolated parts of England, the thermometer at Greenwich rising to 62°. On the night of the 26th a sharp frost occurred, the sheltered thermometer falling in many places to about 25°, while the instruments exposed on the grass sank below 20°, and at Llangammarch Wells to 13°.

Over the country generally the month was the coldest March experienced for many years past. In London and many other parts of eastern and central England the mean temperature was the lowest

recorded since 1892; at Aberdeen it was the lowest since 1888, and at Leith it was the lowest shown by the Meteorological Office record extending back to 1872. In the last-mentioned locality the thermometer last month did not once rise above 49°, the absolute maximum being at least 5° lower than in any March of the previous 37 years. In London (at the recording station in connection with the Meteorological Office) the thermometer rose 10° higher than in the Edinburgh neighbourhood. The absolute maximum of 59° was, as a matter of fact, a trifle higher than that of a twelvemonth ago, but with that exception it was the lowest recorded in March since 1901.

ROYAL METEOROLOGICAL SOCIETY.

THE March meeting of this Society is always the "popular" night of the session, and Wednesday evening, March 17th, was no exception to the rule. The meeting was held at the Institution of Civil Engineers, and there was a large gathering of the Fellows and their friends to hear Dr. Vaughan Cornish deliver an interesting lecture on "Wind-waves in Water, Sand and Snow." Mr. H. Mellish, President, occupied the chair.

Dealing first with waves of the sea, Dr. Cornish described the gradual evolution of large sea waves during the passage of a cyclone or other depression across the Atlantic. The great sea-waves are produced at that portion of the cyclone where the direction of the wind coincides with the direction of advance of the depression. Along this line of advance the waves in their gravitational progress are accompanied by a strong wind blowing across their ridges as long as the atmospheric depression maintains itself. Thus the waves are developed until they attain a considerable steepness. The average height attained by these waves in feet is about half the velocity of the wind in miles per hour. Thus a wind of 52 miles per hour gives waves of an average height of about 26 feet, although individuals will then attain a height of 40 feet. The speed and, therefore, length of the steep waves probably depends upon the rate of advance of the atmospheric depression as well as upon the velocity of the wind; because of all the sets of waves running the growth of that particular set is fostered the length, and consequently the speed, of which is such that its gravitational progress is at the same rate as the advance of the atmospheric depression. In the circumpolar Southern Ocean the height of North Atlantic waves is somewhat exceeded, but the outstanding feature of the waves of high southern latitudes is their greater length from crest to crest. South of the Cape of Good Hope and of Cape Horn there is neither windward nor leeward shore, and the prevailing wind in all longitudes is westerly. Thus, wherever a westerly wind springs up it finds a long westerly swell, the effect of a previous wind, still running, and the principal effect of the newly-born wind is to increase the steepness of the long swell already running, so as to form majestic storm-waves, which sometimes attain

a length of 1200 feet from crest to crest. The longest swells due to wind are almost invisible during storms, for they are masked by the shorter and steeper waves. They emerge into view, however, after or beyond the storm, and Dr. Cornish has found their speed to be approximately equal to that of the wind by which they are created, sometimes attaining even in the North Atlantic a velocity of more than sixty miles per hour.

The action of the wind to drift dry sand in a procession of regular waves was studied by the lecturer in the Egyptian deserts. As the sand-waves are unable to travel by gravitation, as do the waves of the sea, their movements are entirely directed and controlled by the wind, and when comparatively small they are therefore simpler and more regular in form and movement than ocean waves. When they grow to great size as in the desert sand-dunes, which attain a height of several hundred feet, the forms become more complicated owing to the partial consolidation of the lower layers of sand by pressure.

Mackerel-sky (a rippled form of cloud) is produced by the formation of an undulating surface where a lighter layer of air flows over a heavier one. The positive and negative of a rippled-cloud photograph were shown, and it was explained that the negative, showing the pattern not of the clouds themselves but of the unclouded sky between, was the true aërial "ripplemark," corresponding to sand-waves.

For the purpose of studying snow-waves, the lecturer traversed Canada twice during winter, and found the phenomenon best developed on the prairies near Winnipeg, when the temperature was below zero (Fahrenheit) and the snow had quite lost the adhesive character which it retains in less cold weather. Freshly-fallen dry snow is drifted by wind in a procession of regular waves similar to desert sand-waves, but less than half as steep, the wave-length being fifty times as great as the height. The flatness of the wind-formed snow-waves affords an indication of the great distance to which hills give effective shelter from wind, and helps to explain the climatic advantages of certain localities. The forms of snow-drifts produced in the neighbourhood of obstructions were also studied by the lecturer. Multitudinous shapes are assumed while the eddy-space formed by the obstacle is being filled up with snow, but when sufficient snow has fallen and been drifted in, so that the space is filled, the vertical section of the drift is fish-shaped, with a blunt head and tapering tail, which is the form of least eddy-making resistance.

The lecture was illustrated by numerous photographs taken by Dr. Cornish in his travels.

Prof. Cleveland Abbe (U.S. Weather Bureau, Washington), Dr. J. R. Sutton (Kimberley, Cape Colony), and M. Léon Teisserenc de Bort (Paris) were elected Honorary Members; and Mr. W. H. Brown, Col. C. R. Burn, Mr. J. E. Burnett, Mr. E. Gurney, Capt. S. A. Pidgeon, Capt. M. S. H. Smith, Mr. E. K. Toogood, F.L.S., Capt. T. Trotter, Dr. R. H. Wilshaw and Mr. H. E. Wood, were elected Fellows of the Society.

SCOTTISH METEOROLOGICAL SOCIETY.

AN evening meeting of the Soecity was held (by permission of the University Court) in the University Engineering Class-Room, Edinburgh, on 18th March, Professor C. G. Knott, in the chair.

The chairman explained that whilst the meeting had been promoted for a discussion on "The Study of Weather Knowledge in Schools," there was no desire on the part of the Society to press for the recognition of meteorology as a regular subject in an already over-crowded curriculum.

Mr. T. S. Muir, of the Royal High School, Edinburgh, in opening the discussion, pointed out that man's place in nature was so bound up with climatic considerations that without a knowledge of meteorology geography could not be properly taught. Much could be done without an elaborate or expensive equipment. Considering the subject from the point of view of a teacher of geography, the course of study followed from the junior classes up to the highest was described in detail. He was convinced that the most logical method, and that most easily grasped, was to divide the world into climatic regions. At the High School practical observing work was done in the science department, and the senior pupils periodically discussed the Daily Weather Report.

Mr. H. J. Findlay, of George Watson's College, also showed a number of slides and explained that at his school they had a regulation Stevenson Screen and a full observing equipment. The boys took it in turns to observe, and the observations were systematically recorded and worked up.

Mr. G. G. Chisholm, Lecturer on Geography at Edinburgh University, strongly objected to the commonly used term "insular climate," since an island, *e.g.*, Long Island, might be characterised by a climate of great extremes.

The discussion was continued by Messrs. Cash and Fairgrieve (Edinburgh Academy), Cossar and Crockett (George Heriot's School), Miss Meiklejohn (George Watson's Ladies' College), Mr. J. B. Clark, Headmaster of George Heriot's School, and Mr. James Macdonald, Secretary of the Highland and Agricultural Society. There was considerable difference of opinion as to the powers of an average junior pupil to grasp the full meaning of the isobaric maps of the Daily Weather Report. It was, however, the experience of one teacher who had charge of a junior class, that boys of 13 and 14 took a great interest in the maps and were capable of thoroughly understanding them.

Miss Meiklejohn said that at George Watson's Ladies' College the senior pupils were accustomed to plot on blank maps the data from the first page of the Daily Weather Report, to develop the isobaric lines, and to frame forecasts which were subsequently compared with the official deliverances of the Meteorological Office.

Dr. Shaw, Director of the Meteorological Office, had sent for distribution a supply of the Daily Weather Report for the two preceding

days, and had suggested in a letter that the preparation of maps, such as those in the Monthly Weather Report from the data given in the reports was a useful exercise, and might be carried out for Canada, India, and probably in course of time for Australia. It would be a simple matter to organize a lending library for schools for various official publications.

A letter was read from the Rev. J. S. Begg, of West Linton. With the hearty approval of the School Board, he was in the habit of giving relays of children from the local school instruction in the use of the various instruments at his observing station.

Mr. A. Watt, Secretary, showed a large number of slides, most of them from original diagrams. He was of opinion that a boldly drawn "home-made" diagram was often more useful for purposes of demonstration than a highly finished professional production. Note-books were exhibited with specimens of work done in the various schools, and Professor Knott, in summing up, said that there was no doubt that a large amount of excellent work in meteorology was being done in the secondary schools of Edinburgh. He felt that the meeting had been of a most stimulating character.

ESSAY PRIZE IN METEOROLOGY.

THE Scottish Meteorological Society offers, through its Council, a Prize of £20 for the best essay on a meteorological subject. As an indication of the kind of essay the Council are prepared to consider, the following subject may be mentioned:—

A discussion of the extent to which the heat set free when water vapour is converted into the liquid state influences the temperature of the atmosphere, with special reference to the climatology of different parts of Scotland.

The Council, however, wish it to be clearly understood that an essay on any other subject will be equally eligible.

The following are the conditions on which the prize is offered:—

1. The competition shall be open to regular matriculated students of the four Scottish Universities, including University College, Dundee, who have attended classes of Mathematics and Natural Philosophy, or to graduates of the Scottish Universities who at 1st January, 1910, shall be of not more than five years' standing.

2. The essays must be lodged with the Secretary to the Scottish Meteorological Society, 122, George Street, Edinburgh, on or before 31st March, 1910, with a statement of the Candidate's qualification to compete.

3. All essays must be legibly written, or typewritten, on one side of the paper only.

4. The Council of the Society shall appoint a referee or referees to report on the essays, and the decision of the Council as intimated by the Secretary shall be final.

5. The Council reserve the right to publish the successful essay in the Society's *Journal*. The other essays will be returned to the competitors.

SNOWDONIA'S AUGUST FLOODS.

By J. R. Gethin Jones.

Referring to Mr. Lockwood's interesting letter, *re* the above, in the January number, I beg to make a few remarks on the same rainfall mentioned by him, to show the influence of wind force, elevation and mountain condensation at the south-west and north-east end of the range, which are about 12 miles apart. The range runs from south-west to north-east. The particulars and records of Mr. Lockwood at the south-west, and my own at the north-east end, with the weather prevailing at the time, were as follows :—

Date. 1908.	South-West End.		North-East End.		Wind Conditions during each Storm.
	Gwynant Vale. 300 ft O.D.	Llydaw Lake. 1400 ft. O.D.	Conway Vale. 25 ft. O.D.	Eigiau Lake. 1200 ft. O.D.	
	in	in.	in.	in.	
August 20.....	1·11	1·33	·95	1·10	Wind force about 1, Direction S.E.
,, 26.....	1·79	3·16	·91	1·64	Wind force about 5, Direction S.W.
,, 31.....	1·32	2·53	1·64	2·23	Wind force 6, Direction S.W. & N.W.
Total	4·22	7·02	3·50	4·97	

I find, from general observations, that when it rains without wind the amount is the same, practically, at any elevation and all parts of the range. but if the wind blows parallel with the range, from either end, the rainfall is much heavier at the first contact position and least at the forward. The additional quantity, due to elevation, will remain in the same general ratio at both ends, shewing that the chief factor to cause such difference in the rainfall is the wind force and its direction in relation to the range, thereby varying the condensation conditions.

The average rainfall at Gwynant Vale and Llydaw Lake is about 100 and 180 inches a year, and at Conway Vale and Eigiau Lake, 60 and 100 inches. During the rain storm of August 20th it will be seen that, with a slight wind, the percentage of difference due to elevation at both the south-west and north-east end of the range is the same, viz., 20%, and the quantity at the high and low level at each end—compared with the average—is practically the same.

The storm of August 26th, with a wind force of 5 blowing south-west and parallel to the range, shows the decreased precipitation towards the north-east end, the amount being in proportion to the average difference of the low and the high level at each end; the difference due to the elevation being also the same, viz., 90%.

During the storm of August 31st, with a high wind from south-west and then veering to north-west, the record in each case is what

one may expect, because the north-west wind would blow across the range and therefore produce an equal amount at each end; hence the decreased difference from the average.

I believe the high proportion recorded at the north-east, low level, was on account of local special features, because at the time when the wind veered from south-west to north-west the wind changed suddenly during a very heavy rain and a whirlwind, both of sufficient strength to produce a cloud-burst, which fell on a steep slope and the side sheltered from the wind at the time. A cloud-burst is a very unusual occurance so near the vale. The most notable feature about this burst was that it took place *exactly* at the change of the barometer and turn of the wind, and when the centre of the cyclone was nearest to North Wales.

Correspondence.

To the Editor of Symons's Meteorological Magazine.

A HIGH BAROMETER RAINSTORM.

THE recent rainstorm, which flooded Ireland on April 2nd and 3rd, is particularly noticeable because of the height of the barometer throughout the downpour. I will confine myself to the observations at my own station in the City of Dublin.

At 9 a.m. on Friday, April 2nd, the barometer stood at 30·392 inches. From that point it fell slowly to 30·118 inches by 4 p.m. on Saturday, the 3rd inst. Thence it rose equally slowly to 30·294 inches at 9 a.m. to-day (Monday, April 5th). On Friday the wind gradually freshened from S.E. and S.S.E. until it blew a fresh gale early on Saturday. In the afternoon of this latter day it moderated without veering beyond S. On Sunday it backed, and to-day it blows freshly from S.E. At 7 a.m. on Friday a sheet of cirrus and cirro-stratus cloud had already spread across the entire sky as seen from Dublin. Through this cloud-veil the sun was seen dimly at times; but the veil was too dense to allow a halo to form in it, and early in the afternoon the sun was quite blotted out. At 4 p.m. rain began to fall, and it continued to do so, with a couple of hours intermission on Saturday afternoon, until 11 a.m. on Sunday, when it finally ceased. By 9. a.m. on Saturday ·368 inch had fallen. In the subsequent 24 hours, 1·581 inches were measured. A further fall of ·029 inch on Sunday forenoon brought the total precipitation up to 1·978 inches in a downpour which lasted for 37 hours.

Saturday's rainfall of more than one and a half inches in Dublin far exceeds the total fall in this city in either January (1·264 inches) or February (·593 inch) of the present year. During the week ended Saturday, April 3rd, rain fell in Dublin on six days to the amount of nearly 2¾ inches (2·720 inches), thus exceeding the total measurement for March, namely 2·693 inches.

The continuous and heavy rainfall in Ireland on April 2nd and 3rd apparently resulted from the chilling of a moist Atlantic air current by an in-draught of cold air from an anticyclonic system lying over Great Britain and the North Sea. This system developed with extreme rapidity in the wake of a cyclonic depression, which travelled swiftly across the British Isles eastwards on March 31st. It assumed the form of a ridge of high pressure (30·5 inches), which on Friday morning, April 2nd, stretched southwards from the Orkneys to the neighbourhood of Bristol. Within its confines sharp frost prevailed at a time when an Atlantic low pressure area had already arrived off the west coast of Ireland. The latter system failed to spread eastward—in fact, it ultimately passed out again over the Atlantic and disappeared.

So far as Dublin is concerned, the remarkable rainstorm of the opening days of April has more than made up the previously existing large deficit in the rainfall of 1909.

JOHN W. MOORE, M.A., M.D., D.Sc., F.R.Met.Soc.

40, Fitzwilliam Square, W., Dublin, April 5th, 1909.

THE PROSPECT OF A SHORT WATER SUPPLY.

SPEAKING particularly of the Thames Valley, I am afraid we must look forward to a deficient water supply in the coming summer. I base my prediction on the measurements of a well in the Upper Greensand, of which I have a daily record for the last 40 years and more, in fact ever since it was sunk. My father, the Rev. J. C. Clutterbuck, of Long Wittenham, Berks, who was a great authority on water supply, always considered this well as a very good test as regards water supply. Now as to present conditions of the well, only on two occasions has the well been as low as it is now; first in the autumn of 1898, when it was quite dry, and was then cleaned out and deepened two and a half feet. On that occasion it began to rise about the end of the year, and by the end of January there was 18 feet of water in the well. The second occasion was in the spring of 1905. In that year the well never rose at all, as is usual, but kept falling slightly till the end of the year. 1905 was a year of very short water supply in the Thames Valley, and I predict the same shortness again this year. I have always noticed that it requires 10 inches of rain from the 1st October before the well begins to rise. It is well known, especially by those who keep a Dalton's Rain Gauge, that there is no percolation to the deeper springs from the 1st of April to the 1st of October, except under exceptional circumstances, such as occurred in June, 1903, or in April, 1908. In the six months, October-March inclusive, 1904-5, the rainfall was 9·24; in 1908-9 it was 9·13, almost similar conditions. Therefore we may expect the same deficiency this year as was experienced in 1905.

F. C. CLUTTERBUCK.

Culham Vicarage, Abingdon.

COMPARISON OF SUNSHINE REGISTERED BY TWO SUNSHINE RECORDERS OF THE CAMPBELL-STOKES PATTERN.

THE great differences of sunshine registered at Westminster, Camden Square and Mill Hill during January are certainly caused by local influences, but may they not be exaggerated by instrumental errors? That two sunshine recorders of the Campbell-Stokes pattern, placed side by side, do not always give the same results, can be seen from the following example.

At the Central Physical Observatory of St. Petersburg the sunshine is registered regularly by a Campbell-Stokes sunshine recorder. In June, 1906, there was placed another tested sunshine recorder of the same pattern at the side of the first. These two sunshine recorders gave the following registrations :—

	I.—*Sunshine Recorder of the Observatory.*	II.—*Sunshine Recorder taken for comparison.*
	hours.	hours.
1906, June 13	8·9	7·6
,, ,, 14	5·9	5·3
,, ,, 15	10·9	10·5
,, ,, 16	11·2	10·0
,, ,, 17	13·8	9·9
,, ,, 18	10·2	9·8
,, ,, 19	12·1	11·7
,, ,, 21	14·2	13·5

These differences, which reached 3·9 hours on one day, certainly depend on the different qualities of the glass spheres used for the sunshine recorders.

P. WANNARY.

St. Petersburg, March, 1909.

[The question raised by this letter is of great interest, although we believe that the disparity of the records referred to in our article was entirely due to fog and smoke. We hope, however, to deal with the comparability of Campbell-Stokes records at an early date, and should be glad of the views of observers on the matter.—ED. *S.M.M.*]

THE REMARKABLE METEOR OF FEBRUARY 22nd.

A GREAT number of observations of this object were made, some of them by qualified persons, but the majority by casual spectators, and the discordances amongst them are difficult to harmonize. The meteor seems to have been rather higher in the air than the preliminary calculations indicated, the elevation based on later and more accurate data being 56 to 41 miles, while the radiant point was about 14° E.N.E. of β Leonis, or at 190° + 20° −. The streak remained visible in a distinct form for fully two hours according to about a score of the observers, but several others watched its lingering relics for three hours after the meteor's flight at 7.30 p.m.

W. F. DENNING.

Bristol, March 31st, 1909.

METEOROLOGICAL NEWS AND NOTES.

LIEUTENANT SHACKLETON'S ANTARCTIC EXPEDITION has proved the most successful in the history of South Polar exploration. The magnetic pole of the Earth was reached in 72° 25′ S., 154° E.; and the main expedition southward, under Lieut. Shackleton himself, attained the unprecedented latitude of 88° 23′ in 162° E. This point is 1° 37′, or 97 nautical miles or 113 statute miles from the south pole, and is by far the nearest approach yet made to either extremity of the Earth's axis. The telegraphic reports do not enable us to say anything definite as to meteorological results, but we are confident that these will be of great value and interest.

A "WINTER SUNSHINE RACE" has been kept up in the columns of the *Daily Mirror* from October 1st to March 31st, the weekly duration of sunshine at 44 places in England and Wales being published in order of magnitude, and the total duration to date. The "contest" is so far satisfactory that it is confined to stations using the same type of sunshine recorder; but it is deprived of all scientific value by the measurement of the cards being made by 44 different individuals, for everyone who has attempted to measure a sunshine card on a day of fleeting clouds knows how much scope there is for individual variation. Apart from this, the idea of rivalry in the measurement of natural phenomena is to be deprecated, and some of the remarks reported regarding this "contest" in the records of Town or District Council meetings in local newspapers show a serious misapprehension of the principles according to which scientific instruments ought to be selected.

DEW-PONDS formed the subject of an interesting address by Mr. George Hubbard at the Royal Society of Arts on March 3rd, published in the *Journal* of the Society, Vol. **57**, p. 331. We note, however, the usual failure to take account of the action of rain in filling dew-ponds, which we are convinced is the principal factor. On the summit of the South Downs the annual rainfall is from 35 to 40 inches; the annual evaporation is certainly not more than 20 inches, and so from rain alone a pond should accumulate a depth of from 15 to 20 inches in a year, supposing that the bottom is watertight.

THE NATIONAL PHYSICAL LABORATORY at Bushy House, Teddington, was open on March 19th for the inspection of an invited party of men of science and representatives of the press, when the various departments of the great institution which has grown up within the last few years were seen in working order. The Laboratory is concerned with the testing of instruments for every sort of physical measurement, apart from those concerned with meteorology, which are cared for in the separate building of Kew Observatory.

RAINFALL TABLE FOR MARCH, 1909.

STATION.	COUNTY.	Lat. N.	Long. W. [*E.]	Height above Sea. ft.	RAINFALL OF MONTH.	
					Aver. 1870-99.	1909.
		° ′	° ′		in.	in.
Camden Square	*London*	51 32	0 8	111	1·62	2·84
Tenterden	*Kent*	51 4	*0 41	190	1·89	4·35
West Dean	*Hampshire*	51 3	1 38	137	1·79	3·98
Hartley Wintney	,,	51 18	0 53	222	1·77	4·00
Hitchin	*Hertfordshire*	51 57	0 17	238	1·53	3·25
Winslow (Addington)	*Buckinghamshr.*	51 58	0 53	309	1·62	2·05
Bury St. Edmunds (Westley)	*Suffolk*	52 15	*0 40	226	1·64	2·57
Brundall	*Norfolk*	52 37	*1 26	66	1·65	2·65
Winterbourne Steepleton	*Dorset*	50 42	2 31	316	2·41	5·60
Torquay (Cary Green)	*Devon*	50 28	3 32	12	2·45	5·53
Polapit Tamar [Launceston]	,,	50 40	4 22	315	2·41	5·18
Bath	*Somerset*	51 23	2 21	67	1·94	3·23
Stroud (Upfield)	*Gloucestershire*	51 44	2 13	226	1·86	3·65
Church Stretton (Wolstaston)	*Shropshire*	52 35	2 48	800	2·01	2·88
Coventry (Kingswood)	*Warwickshire*	52 24	1 30	340	1·75	3·14
Boston	*Lincolnshire*	52 58	0 1	25	1·36	3·19
Worksop (Hodsock Priory)	*Nottinghamshire*	53 22	1 5	56	1·55	3·23
Derby (Midland Railway)	*Derbyshire*	52 55	1 28	156	1·49	3·07
Bolton (Queen's Park)	*Lancashire*	53 35	2 28	390	2·88	3·60
Wetherby (Ribston Hall)	*Yorkshire, W.R.*	53 59	1 24	130	1·85	4·21
Arncliffe Vicarage	,, ,,	54 8	2 6	732	5·03	4·22
Hull (Pearson Park)	,, *E.R.*	53 45	0 20	6	1·79	3·58
Newcastle (Town Moor)	*Northumberland*	54 59	1 38	201	2·10	5·35
Borrowdale (Seathwaite)	*Cumberland*	54 30	3 10	423	10·51	9·08
Cardiff (Ely)	*Glamorgan*	51 29	3 13	53	2·79	4·25
Haverfordwest (High Street)	*Pembroke*	51 48	4 58	95	3·03	6·28
Aberystwyth (Gogerddan)	*Cardigan*	52 26	4 1	83	2·93	3·23
Llandudno	*Carnarvon*	53 20	3 50	72	1·97	2·52
Cargen [Dumfries]	*Kirkcudbright*	55 2	3 37	80	3·01	5·59
Hawick (Branxholm)	*Roxburgh*	55 24	2 51	457	2·55	4·21
Edinburgh (Royal Observy.)	*Midlothian*	55 55	3 11	442	...	4·20
Girvan (Pinmore)	*Ayr*	55 10	4 49	207	3·47	3·47
Glasgow (Queen's Park)	*Renfrew*	55 53	4 18	144	2·33	2·46
Inveraray (Newtown)	*Argyll*	56 14	5 4	17	4·96	·93
Mull (Quinish)	,,	56 36	6 13	35	4·23	1·62
Dundee (Eastern Necropolis)	*Forfar*	56 28	2 57	199	1·92	3·25
Braemar	*Aberdeen*	57 0	3 24	1114	2·42	2·80
Aberdeen (Cranford)	,,	57 8	2 7	120	2·43	5·65
Cawdor	*Nairn*	57 31	3 57	250	2·16	2·96
Fort Augustus (S. Benedict's)	*E. Inverness*	57 9	4 41	68	3·68	·77
Loch Torridon (Bendamph)	*W. Ross*	57 32	5 32	20	6·38	2·91
Dunrobin Castle	*Sutherland*	57 59	3 56	14	2·47	3·11
Castletown	*Caithness*	58 35	3 23	100	...	1·69
Killarney (District Asylum)	*Kerry*	52 4	9 31	178	4·03	3·70
Waterford (Brook Lodge)	*Waterford*	52 15	7 7	104	2·55	4·01
Broadford (Hurdlestown)	*Clare*	52 48	8 38	167	2·17	2·90
Abbey Leix (Blandsfort)	*Queen's County*	52 56	7 17	532	2·38	2·72
Dublin (Fitz William Square)	*Dublin*	53 21	6 14	54	1·85	2·69
Mullingar (Belvedere)	*Westmeath*	53 29	7 22	367	2·46	2·59
Ballinasloe	*Galway*	53 20	8 15	160	2·45	2·63
Crossmolina (Enniscoe)	*Mayo*	54 4	9 18	74	3·95	3·82
Collooney (Markree Obsy.)	*Sligo*	54 11	8 27	127	2·99	2·63
Seaforde	*Down*	54 19	5 50	180	2·56	5·76
Londonderry (Creggan Res.)	*Londonderry*	54 59	7 19	320	3·06	3·95
Omagh (Edenfel)	*Tyrone*	54 36	7 18	280	2·47	4·11

RAINFALL TABLE FOR MARCH, 1909—*continued.*

RAINFALL OF MONTH (*con.*)					RAINFALL FROM JAN. 1.					
Diff. from Av. in.	% of Av.	Max. in 24 hours. in.	Max. in 24 hours. Date.	No. of Days	Aver. 1870-99. in.	1909. in.	Diff. from Aver. in.	% of Av.	Mean Annual 1870-1899. in.	STATION.
+1·22	175	·39	6	25	5·13	4·05	—1·08	79	25·16	Camden Square
+2·46	230	·83	3	25	6·10	5·87	— ·23	96	28·36	Tenterden
+2·19	222	·95	7	18	6·74	5·07	—1·67	76	29·93	West Dean
+2·23	226	1·20	6	27	6·22	5·34	— ·88	86	27·10	Hartley Wintney
+1·72	213	·85	6	25	4·88	4·46	— ·42	91	24·66	Hitchin
+ ·43	127	·47	6	22	5·40	3·40	—2·00	63	26·75	Addington
+ ·93	157	·53	6	19	4·89	4·03	— ·86	82	25·39	Westley
+1·00	161	·47	6	19	4·81	3·89	— ·92	81	25·40	Brundall
+3·19	232	1·15	6	25	9·42	7·67	—1·75	81	39·00	Winterbourne Stpltn
+3·08	226	1·51	8	24	8·51	7·54	— ·97	89	35·00	Torquay
+2·77	215	·70	8	27	9·12	8·81	— ·31	97	38·85	Polapit Tamar
+1·29	167	·91	6	19	6·58	5·06	—1·52	77	30·75	Bath
+1·79	196	·82	6	26	6·45	5·46	— ·99	85	29·85	Stroud
+ ·87	143	·46	24	20	7·09	5·57	—1·52	79	33·04	Wolstaston
+1·39	179	1·11	6	20	6·08	4·99	—1·09	82	29·21	Coventry
+1·83	235	·90	6	24	4·50	4·57	+ ·07	102	23·30	Boston
+1·68	209	1·14	6	23	4·87	4·90	+ ·03	101	24·70	Hodsock Priory
+1·58	206	·94	6	20	5·10	5·00	— ·10	98	26·18	Derby
+ ·72	125	1·29	24	21	8·93	7·73	—1·20	87	42·43	Bolton
+2·36	227	1·00	6	21	5·37	5·66	+ ·29	105	26·96	Ribston Hall
— ·81	84	1·03	28	21	16·10	13·94	—2·16	87	60·96	Arncliffe Vic.
+1·79	200	1·02	6	22	5·45	5·28	— ·17	97	27·02	Hull
+3·25	254	1·06	6	23	5·64	8·00	+2·36	142	27·99	Newcastle
—1·43	86	1·62	29	19	36·86	31·16	—5·70	85	132·68	Seathwaite
+1·46	152	·93	24	24	9·77	6·99	—2·78	72	42·81	Cardiff
+3·25	207	1·06	5	27	11·86	9·15	—2·71	77	47·88	Haverfordwest
+ ·30	110	·85	24	17	9·83	7·09	—2·74	72	45·41	Gogerddan
+ ·55	128	·43	24	22	6·51	5·76	— ·75	88	30·98	Llandudno
+2·58	186	·88	28	15	11·17	13·32	+2·15	119	43·43	Cargen
+1·66	165	·90	23	21	8·36	9·14	+ ·78	109	34·80	Branxholm
...	...	1·23	24	20	...	8·04	...	...	...	Edinburgh
·00	100	·80	25	19	12·39	12·26	— ·13	99	48·87	Girvan
+ ·13	106	·60	24	15	8·11	9·60	+1·49	118	35·80	Glasgow
—4·03	19	·19	18	12	16·49	14·60	—1·89	88	57·90	Inveraray
—2·61	38	·48	19	15	14·58	11·74	—2·84	81	57·53	Quinish
+1·33	169	1·01	7	19	6·12	5·54	— ·58	91	28·95	Dundee
+ ·38	116	...	...	...	8·03	6·63	—1·40	82	36·07	Braemar
+3·22	232	·85	30	29	7·18	8·39	+1·21	117	33·01	Aberdeen
+ ·80	137	·51	29	15	6·16	6·55	+ ·39	106	29·37	Cawdor
—2·91	21	·10	7	17	12·66	8·79	—3·87	69	43·71	Fort Augustus
—3·47	46	1·15	7	13	21·90	21·27	— ·63	97	86·50	Bendamph
+ ·64	126	1·20	7	16	7·48	8·01	+ ·53	107	31·60	Dunrobin Castle
...	...	·27	1	22	...	7·04	...	...	...	Castletown
— ·33	92	·65	17	26	16·04	12·36	—3·68	77	58·11	Killarney
+1·46	157	·95	28	21	9·91	6·79	—3·12	68	39·30	Waterford
+ ·73	134	·46	27	23	7·34	7·84	+ ·50	107	33·47	Hurdlestown
+ ·34	114	·38	28	25	8·10	6·20	—1·90	77	35·19	Abbey Leix
+ ·84	145	·44	28	19	5·99	4·54	—1·45	76	27·75	Dublin
+ ·13	105	·52	27	15	8·03	6·96	—1·07	87	36·48	Mullingar.
+ ·18	107	·43	27	21	8·42	6·53	—1·89	78	37·04	Ballinasloe
— ·13	97	·44	2	27	12·96	12·11	— ·85	93	50·50	Enniscoe
— ·36	88	·37	24	22	9·44	9·77	+ ·33	104	41·83	Markree Obsy.
+3·20	225	·99	6	21	9·16	9·57	+ ·41	104	38·61	Seaforde
+ ·89	129	·67	29	27	9·35	12·79	+3·44	137	41·20	Londonderry
+1·64	166	·73	19	22	8·30	9·78	+1·48	118	37·85	Omagh

SUPPLEMENTARY RAINFALL, MARCH, 1909.

Div.	STATION.	Rain inches	Div.	STATION.	Rain. inches
II.	Warlingham, Redvers Road	4·15	XI.	Rhayader, Tyrmynydd	4·74
,,	Ramsgate	2·50	,,	Lake Vyrnwy	4·81
,,	Steyning	4·21	,,	Llangyhanfal, Plâs Draw	2·38
,,	Hailsham	3·75	,,	Llwdiarth Esgob	3·48
,,	Totland Bay, Aston House	3·72	,,	Snowdon, Cwm Dyli	9·13
,,	Stockbridge, Ashley	4·15	,,	Lligwy	2·83
,,	Grayshott	5·11	,,	Douglas, Woodville	4·10
,,	Reading, Calcot Place	3·27	XII.	Stoneykirk, Ardwell House	3·57
III.	Harrow Weald, Hill House	3·11	,,	Dalry, The Old Garroch	5·11
,,	Oxford, Magdalen College	2·27	,,	Langholm, Drove Road	3·37
,,	Pitsford, Sedgebrook	2·68	,,	Moniaive, Maxwelton House	5·03
,,	Huntingdon, Brampton	3·49	XIII.	N. Esk Reservoir [Penicuick]	6·15
,,	Woburn, Milton Bryant	3·09	XIV.	Maybole, Knockdon Farm	2·80
,,	Wisbech, Monica Road	4·06	XV.	Campbeltown, Witchburn	3·33
IV.	Southend Water Works	2·34	,,	Glenreasdell Mains	2·86
,,	Colchester, Lexden	2·45	,,	Ballachulish House	·72
,,	Newport, The Vicarage	3·42	,,	Islay, Eallabus	2·61
,,	Rendlesham	2·51	XVI.	Dollar Academy	3·55
,,	Swaffham	2·95	,,	Loch Leven Sluice	2·93?
,,	Blakeney	2·19	,,	Balquhidder, Stronvar	2·65
V.	Bishops Cannings	4·11	,,	Perth, The Museum	3·87
,,	Ashburton, Druid House	7·99	,,	Coupar Angus	3·17
,,	Honiton, Combe Raleigh	5·29	,,	Blair Atholl	1·65
,,	Okehampton, Oaklands	6·94	,,	Montrose, Sunnyside Asylum	4·67
,,	Hartland Abbey	3·38	XVII.	Alford, Lynturk Manse	8·14
,,	Lynmouth, Rock House	4·09	,,	Keith Station	4·18
,,	Probus, Lamellyn	4·37	XVIII.	N. Uist, Lochmaddy	1·87
,,	North Cadbury Rectory	4·21	,,	Alvey Manse	2·19
VI.	Clifton, Pembroke Road	3·59	,,	Loch Ness, Drumnadrochit	2·07
,,	Ross, The Graig	2·77	,,	Glencarron Lodge	2·35
,,	Shifnal, Hatton Grange	2·35	,,	Fearn, Lower Pitkerrie	1·44
,,	Blockley, Upton Wold	4·04	XIX.	Invershin	1·09
,,	Worcester, Boughton Park	3·02	,,	Altnaharra	2·10
VII.	Market Overton	4·08	,,	Bettyhill	1·89
,,	Market Rasen	3·18	XX.	Dunmanway, The Rectory	4·92
,,	Bawtry, Hesley Hall	2·78	,,	Cork	3·17
,,	Buxton	4·72	,,	Mitchelstown Castle	3·28
VIII.	Neston, Hinderton Lodge	2·34	,,	Darrynane Abbey	5·40
,,	Southport, Hesketh Park	2·85	,,	Glenam [Clonmel]	3·49
,,	Chatburn, Middlewood	2·79	,,	Ballingarry, Gurteen	2·36
,,	Cartmel, Flookburgh	3·75	,,	Miltown Malbay	2·99
IX.	Langsett Moor, Up. Midhope	5·23	XXI.	Gorey, Courtown House	3·04
,,	Scarborough, Scalby	6·66	,,	Moynalty, Westland	3·52
,,	Ingleby Greenhow	3·99	,,	Athlone, Twyford	2·51
,,	Mickleton	3·89	XXII.	Woodlawn	3·92
X.	Bardon Mill, Beltingham	4·11	,,	Westport, St. Helens	3·55
,,	Ewesley, Font Reservoir	3·94	,,	Mohill	3·03
,,	Ilderton, Lilburn Cottage	5·82	XXIII.	Enniskillen, Portora	3·18
,,	Keswick, The Bank	4·23	,,	Dartrey [Cootehill]	3·12
XI.	Llanfrechfa Grange	5·43	,,	Warrenpoint, Manor House	3·23
,,	Treherbert, Tyn-y-waun	7·96	,,	Banbridge, Milltown	3·72
,,	Carmarthen, The Friary	4·67	,,	Belfast, Springfield	4·21
,,	Castle Malgwyn [Llechryd]	4·77	,,	Bushmills, Dundarave	2·61
,,	Plynlimon	5·50	,,	Sion House	3·69
,,	Crickhowell, Ffordlas	5·10	,,	Killybegs	3·91
,,	New Radnor, Ednol	3·80	,,	Horn Head	3·89

METEOROLOGICAL NOTES ON MARCH, 1909.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Temp. for Temperature; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; TS for Thunderstorm; R for Rain; H for Hail; S for Snow; F for number of days Frost in Screen; f on Grass.

LONDON, CAMDEN SQUARE.—The weather was dull and cheerless almost throughout, with much R and S. On the evening of 2nd and morning of 3rd S fell to a depth of 5 inches, and an additional 2½ inches fell during the afternoon and evening of 3rd. Bar always below 30 in., and average bar. the lowest for March in record of 51 years. Duration of sunshine, 59·7* hours, and of R 94·0 hours. Mean temp. 39°·8, was 2°·3 below the average, or equal to the average for February. Shade max. 60°·5 on 29th; min. 18°·5 on 5th, and the lowest on record for March with the single exception of 15°·6 on 4th March, 1890. F 11, f 19.

TENTERDEN.—Duration of sunshine 79·5† hours. Mean temp. 38°·6. Shade max. 57°·5 on 29th; min. 9°·0 on 5th. F 12, f 17.

TOTLAND BAY.—Duration of sunshine 96·7* hours, and the lowest amount ever recorded in March. Shade max. 53°·2 on 29th; min. 19°·6 on 3rd, which is the lowest March temp. for 23 years. F 9, f 17.

PITSFORD.—R ·98 in. above the average. Mean temp. 38°·2. Shade max. 60°·4 on 29th; min. 17°·3 on 5th. F 18.

TORQUAY.—Duration of sunshine 106·7* hours, or 36·6 hours below the average. Mean temp. 41°·6, or 2°·5 below the average. Shade max. 56°·0 on 23rd; min. 24°·9 on 5th. F 8, f 15.

NORTH CADBURY.—A cold, wet and stormy month. The R and the number of rain days were the greatest in 13 Marches. Shade max. 57°·0 on 29th; min 14°·5 on 5th. F 10, f 24.

ROSS.—Shade max. 56°·6 on 30th; min. 7° 6 on 5th. F 15, f 20.

HODSOCK PRIORY.—The coldest March since 1892, and the wettest, except 1889, in 33 years. Mean pressure was the lowest in any month during 30 years. Shade max. 58°·0 on 29th; min. 21°·3 on 17th. F 17, f 23.

SOUTHPORT.—R ·68 in. above the average of 35 years. Duration of sunshine 102·8* hours, or 24·8 hours below the average. Duration of R 88·1 hours. Mean temp. 39°·1, or 2°·4 below the average. Shade max. 56°·7 on 22nd; min. 22°·2 on 4th. F 13, f 19.

HULL.—Shade max. 60°·0 on 29th; min. 22°·0 on 17th. F 15, f 22.

HAVERFORDWEST.—Duration of sunshine 93·8* hours. Shade max. 52°·4; min. 23°·2. F 10, f 13.

LLANDUDNO.—Shade max. 53°·5 on 19th and 29th; min. 23°·7 on 4th. F 8.

DOUGLAS.—A most disagreeable month, with the wind always in a cold quarter, low temp., and excessive R, especially towards the end. The ground was too sodden and cold for seeding purposes, and there were no signs of any material change for the better.

CARGEN.—One of the most disagreeable months of March on record, with constant S storms, cold E. winds, and low temp. Farm work was at a standstill and vegetation very backward. Max. temp. 53°·0 on 22nd; min. 13°·0 on 5th. F 15.

EDINBURGH.—Shade max. 48°·6 on 22nd; min. 21°·8 on 6th. F 14, f 19.

DUNDEE.—Shade max. 48°·0 on 27th; min. 21°·6 on 4th. F 15.

FORT AUGUSTUS.—Shade max. 53°·1 on 22nd; min 12°·9 on 5th. F 14.

WATERFORD.—Shade max. 56°·0 on 23rd; min. 18°·0 on 5th. F 14.

DUBLIN.—Severely cold at first; gloomy and wet towards the close. Mean temp. 40°·8. Shade max. 55°·3 on 24th; min. 25°·8 on 4th. F 10, f 14.

MARKREE.—The coldest month for many years. S and H, with some heavy frosts were recorded to 18th. Bright sunshine was much under the average. Shade max. 55°·8 on 23rd; min. 14°·0 on 6th. F 17, f 22.

WARRENPOINT.—Shade max. 58°·0 on 20th and 23rd; min. 24°·0 on 2nd and 4th. F 11, f 22.

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* Campbell-Stokes † Jordan

Climatological Table for the British Empire, October, 1908.

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	79·0	2	32·9	25	62·4	47·3	51·1	93	110·2	27·4	1·95	10	8·5
Malta	79·3	28	62·0	2†	74·8	65·4	60·4	72	143·0	...	1·38	11	4·6
Lagos	91·0	7	71·0	9	84·6	73·8	74·2	82	158·0	63·0	8·24	19	7·9
Cape Town	82·6	13	46·5	15	69·0	53·2	51·0	70	...	...	2·03	9	4·7
Durban, Natal ...	83·9	25	53·7	6	74·1	61·6	...	...	141·8	...	8·11	21	7·1
Johannesburg	84·1	17	33·1	6	72·6	50·3	46·0	61	147·2	33·2	4·04	7	3·3
Mauritius	82·9	15	57·6	19	80·8	65·2	62·0	70	154·4	48·4	1·04	15	5·4
Calcutta...	92·1	18	63·5	31	89 3	73·5	71·5	74	154·8	58·0	1·94	5	3·0
Bombay...	93·1	24	72·8	19	88·3	77·4	75·1	80	140·0	68·8	·62	3	3·1
Madras	96·6	2	70·1	12	89·4	74·7	74·5	83	144·7	65·9	24·78	11	4·8
Kodaikanal	64·6	2	50·0	21	60·8	51·6	54·1	89	130·6	37·2	16·42	25	7·6
Colombo, Ceylon ...	89·2	14	71·2	22	85·9	75·1	73·8	81	157·8	71·0	13·27	23	7·0
Hongkong	86·5	5	67·0	31	80·8	73·4	69·5	78	136·9	...	5·44	16	6·9
Melbourne	89·2	6	36·8	3	67·4	47·7	45·5	64	144·1	30·1	2·22	12	5·3
Adelaide	99·1	29	39·9	10	72·9	50·7	47·8	60	158·5	32·1	3·59	10	4·7
Coolgardie	95·6	26	40·2	7	77·0	49·0	42·1	47	155·4	37·2	·44	4	2·8
Perth	87·8	22	43·4	13	70·8	52·6	50·0	66	141·5	38·3	2·19	13	4·8
Sydney	90·5	7	45·1	9	70·6	53·7	49·9	62	124·0	33·9	1·33	17	4·2
Wellington ...	64·6	11	39·6	14	58·1	48·0	45·6	76	116·0	31·0	5·09	16	7·7
Auckland	66·0	18,22	44·0	28	61·5	50·3	47·4	78	131·0	38·0	4·02	19	6·2
Jamaica, Kingston ...	90·8	13	69·6	21	87·5	72·3	71·6	80	...	...	4·72	15	...
Trinidad	90·0	15*	68·0	29	86·9	72·8	73·4	85	165·0	60·0	5·45	20	...
Grenada	86·4	2	72·5	30	83·9	74·8	76·0	79	147·4	...	11·40	25	5·5
Toronto	76·9	18	28·2	12	59·3	41·5	...	...	99·2	24·8	1·01	7	...
Fredericton	76·6	16	24·8	21	59·5	35·5	...	76	...	...	5·63	4	3·9
St. John's, N.B. ...	68·2	17	30·0	31	57·1	43·0	...	...	...	...	3·60	10	4·6
Victoria, B.C.	67·0	10	31·2	21	55·4	43·2	...	82	...	...	2·33	14	6·7
Dawson	52·0	2	-22·5	28	24·3	9·3	...	...	...	...	·69	7	...

* and 19, 25. † and 17, 28.

MALTA.—Mean temp. of air 69°·9. Average bright sunshine 6·6 hours per day.

Johannesburg.—Bright sunshine 291 hours.

Mauritius.—Mean temp. of air 0°·3 and dew point 0°·2, above, and R ·59 in. below, averages. Mean hourly velocity of wind 9·9 miles, or 1·1 below average.

KODAIKANAL.—Bright sunshine 100 hours. Rain much above average.

COLOMBO.—Mean temp. of air 78°·9, or 1°·2 below, of dew point 0°·7 above, and R 1·40 in. below, averages. Mean hourly velocity of wind 5 miles. TSS on 2 days.

HONGKONG.—Mean temp. of air 76°·8. Bright sunshine 174·4 hours, or 28 hours below average. Mean hourly velocity of wind 17·2 miles, or 2·6 above average.

Melbourne.—Mean temp. of air 0°·1 above, and R ·14 in. below, averages.

Adelaide.—Mean temp. of air normal. R 1·84 in. above average.

Sydney.—Mean temp. of air 1°·1 below, and R 1·53 in. below, averages.

Wellington.—Mean temp. of air 1°·2 below, and R ·86 in. above, averages. Bright sunshine 167·4 hours.

TRINIDAD.—R 1·20 in. below the 43 years' average.

RAINFALL OF THAMES VALLEY, APRIL 1909.

Symons's Meteorological Magazine

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

Isohyetals ———