Symons's
Meteorological Magazine.

No. 554. MARCH, 1912. Vol. XLVII.

Correspondence.

It is probable that to many of our readers the Correspondence forms the most interesting feature of this Magazine, and it is only right that it should now and again be given the first place. In the present issue we are devoting to the ever welcome communications of our readers a larger space than usual, holding over several of the longer articles in order to avoid an accumulation of letters which are too interesting to lose, and some of them too appropriate to the moment to postpone. We wish that we could enlarge the Magazine permanently to 24 or 30 pages, but the slow growth of the circulation, notwithstanding the steadiness of the growth in recent years, does not justify us in doing so. We would like to ask those readers who are really interested in the Magazine to help us to make it known to others to whom the study of the many aspects of meteorology appeals, and we are always happy to supply specimen numbers gratis and post-free. The Magazine is not of sufficient financial importance to make it worth the while of a publisher to "push" it by the ordinary methods, and as it is not run for profit our only object in desiring a larger circulation is to enable us to spend more money on its production, especially by increasing the size and so diminishing the number of useful communications which have to be left out.

To the Editor of Symons's Meteorological Magazine.

THE WINDS OF JANUARY AND FEBRUARY, 1912.

I wonder if the extraordinary deficiency of S.W. wind this year has been generally noticed.

I had only 2 days in January (10th and 24th), and 5 in February (12th, 16th, 22nd, 23rd, and 26th), in the 9 a.m. observations. On the other hand the wind was S. or S.E. on 7 mornings in January and 15 in February.

J. E. MACE.

Tenterden, March 5th, 1912.

LARGE SNOW FLAKES.

THIS morning, at 11 a.m., after several hours' continuous rain, sleet succeeded, and then snow fell rather heavily for two hours. The flakes were quite of abnormal size, one being 3½ inches and some others about 3 inches in their greatest diameter. The ground being sodden the snow disappeared almost as quickly as it alighted. I have been an interested spectator of most of the local snowstorms since the middle of the last century, but cannot remember to have observed larger flakes. The storm occurred on the eve of the anniversary of the great snowfall of January 18th and 19th, 1881, which wrought widespread damage and interfered seriously with railway traffic.

W. F. DENNING.

Bristol, January 17th, 1912.

EXTRAORDINARY SILVER THAW.

IN the recent frost the minimum temperature, by an exposed thermometer 4 feet above ground, was 3° on the morning of February 3rd. The maximum temperature was below the freezing point on six days, the lowest maximum being 27° on the 4th. The frost broke up on the 6th; rain began at 8 a.m. with temperature 29° and everything became a sheet of ice, only the grass being covered with half an inch of snow. The rain was not merely drizzle but heavy at times, so much so that, although it was freezing, it ran off the ice-covered slopes before it could turn into ice. Trees and everything were encrusted with ice. When the rain ceased at noon the temperature had risen to 32°, but it was not till 10 p.m. that it rose to 33°. It would be interesting to know to what height the temperature reversal existed. Mr. Gethin Jones gives me some figures from the Black Mountain for this day which show that at Capel-y-ffin, 1,350 ft. and about 10 miles distant, the air—as was only to be expected—was warmer than here, only 200 ft. above sea. His thermometer at 9 a.m. registered the same as mine, 29°, and about 9.30 he reports rain in larger drops for about 10 minutes only with temperature 30°; the rain at Capel-y-ffin, however, soon turned into drizzle and by 10 a.m. the temperature stood at 35°, *i.e.*, about 5° higher than here. The large drops of rain must have melted at a considerable height before coming down to the colder layer of air near the ground, and Mr. Jones noted next day that the snow, from 1,350 ft. up to 2,000 ft., was pitted with hundreds of holes in every square yard as if birds had been pecking it, but the marks were not visible above 2,000 ft. However, I think the rain must have started at a much greater height that 2,000 ft., perhaps as high as 3,500 to 4,000 ft. I have seen many silver thaws but never one with such a marked temperature reversal as this one. When a silver thaw occurs I find a general thaw is pretty certain within 24 hours.

R. P. DANSEY, F.R.Met.Soc.

Kentchurch Rectory, Hereford, February 13th.

JANUARY SNOWSTORM IN THE MIDLANDS.

I was much interested in the account of the fall of frozen rain at Wrotham, Kent, on January 17th and 18th, as at exactly the same time Birmingham was experiencing its deepest snowfall of the past 20 years. The type of weather here was similar to that at Wrotham, but the wind appears to have backed into the E. a day sooner in this district, with a much heavier downfall and lower temperature. Rain started about noon on the 16th, becoming mingled with hail in the early hours of the 17th, changing to snow about 8 a.m. on the same day. Snow then fell continuously until 9 p.m. on the 18th, so that the downfall of rain, hail and snow, lasted 57 hours. Below is a copy of my observations made at 7 a.m.

	Wind.	Force.	Weather.	Thermometer. Max.	Thermometer. Min.	Rain. in.	Depth of Snow. in.
Jan. 16	E.S.E....	Mod.....	Rain	43°·8	42°·0	·47	—
,, 17.....	E.....	Fresh.....	Rain & Hail	37°·3	36°·0	·86*	—
,, 18.....	N.E.....	Light	Snow.....	32°·2	26°·1	·36*	11
,, 19.....	S.S.E....	Light Air	Mist	36°·5	27°·5	·17	13

During the rest of the month the temperature was below the normal, with severe frost at the end and during the early days of February, so that the country around Birmingham was covered by snow for three weeks.

DAVID HILL OWEN.

Sparkhill, Birmingham, March 5th, 1912.

STORM OF MARCH 4th, 1912.

The extraordinary velocity of the wind on the 4th inst. deserves notice.

The following notes are from the record of the Dines Pressure Tube Anemometer erected at Pendennis Castle, Falmouth, by the Meteorological Office :—

The wind which during the morning attained a progressive hourly velocity of from 20 to 50 miles, increased in force during the afternoon, and from 6 p.m. until midnight an hourly velocity of 65 miles was sustained. Between 2 p.m. and midnight many heavy squalls were experienced, during which a velocity of 80 miles and over occurred 20 times. The climax was reached at 6 p.m., when a tremendous squall of 98 miles was registered. No such gust has been experienced since the Dines' Anemometer was fixed at Pendennis Castle in July, 1902, except on the 14th March, 1905, when 103 miles were reached at 11.30 p.m. The only other time when the velocity has reached 90 was on the 13th February, 1904, when it was 93. Several trees were blown down in the neighbourhood, and large branches from others, but little other damage appears to have been sustained.

WILSON LLOYD FOX.

Carmino, Falmouth, 9th March, 1912.

THE ZODIACAL LIGHT.

In continuation of the notes on this subject in the numbers of your Magazine for November and December, 1911, I may remark that Capt. Campbell Hepworth is perfectly correct in saying that the Light can be seen across the sky. Indeed, I have always so seen it during the last 35 or 40 years in the absence of clouds and moonlight, and other disturbing factors, such as the crossing of the Light and the Milky Way, and a small angle between the Light and the horizon.

To observe it all artificial lights must be put out or avoided, and the eyesight should be strengthened by keeping out of doors for some five or ten minutes before commencing observations.

The following are the breadths of the Light at different distances from the sun, measured along the ecliptic—

Distance from Sun...	30°	40°	50°	60°	70°	80°	90°	120°	180°
Breadth of Z. L.....	44°	38°	33°	29°	25°	21°	18°	13°	6°

The last measure does not include the large and irregular counterglow often seen diametrically opposite the sun.

The divergencies of the central line of the Light from the plane of the ecliptic are small; and there is no connection between the latitude of any point in the central line and its distances from the sun; but there is a connection between its latitude and longtitude, and it will be found that the central line closely follows the invariable plane of the solar system. This plane not only is a mathematical conception, but it may also be regarded as the original plane of the solar system throughout which was scattered the bulk of the matter subsequently condensed into the sun and planets.

The following table gives the latitudes of points on the invariable plane corresponding to points taken at every 30° along the ecliptic—

Longitude.		Latitude.
0°	.....	—1° 31′
30°	.....	1° 33′
60°	.....	1° 9′
90°	.....	—0° 28′
120°	.....	+0° 22′
150	.....	1° 5′
180°	.....	1° 31′
210°	.....	1° 33′
240	.....	1° 9′
270°	.....	+0° 28′
300°	.....	—0° 22′
330°	.....	—1° 5′

The above are heliocentric longitudes; and that we should see the Light in much the same position as from the sun is, I believe, in consequence of the small inclination of the central line to the ecliptic and the great distance of many of the particles which reflect the light of the sun.

I still observe the position of the central line every now and then :—

		Longitude.	Latitude.
1911—December	13th	313°	—0° 45′
,, ,,	14th	340°	0° 30′
,, ,,	17th	19°	1° 0′
1912—January	8th	340°	0° 30′
,, ,,	22nd	0°	—1° 30′

So the Light still follows the invariable plane as usual.

MAXWELL HALL.

Kempshot Observatory, Jamaica, January 23rd, 1912.

VARIATIONS IN OUR CLIMATE.

It is instructive, I think, to treat long series of meteorological data, such as those of Greenwich from 1841, by adding them in the 50 years ending 1890, '91, '92, and so on. The number 50 is an arbitrary choice.

When we do this, *e.g.*, with the number of frost days in the winter seasons, September to May, commencing with 1842 (*i.e.*, 1841-42), we get the series following, and I note the difference between each member and the next.

50 Winters ending	Frost Days	Diff.	50 Winters ending	Frost Days	Diff.
1891	2806		1901	2740	+ 18
1892	2816	+ 10	1902	2729	— 11
1893	2819	+ 3	1903	2718	— 11
1894	2813	— 6	1904	2705	— 13
1895	2800	— 13	1905	2655	— 50
1896	2796	— 4	1906	2658	+ 3
1897	2755	— 41	1907	2646	— 12
1898	2738	— 17	1908	2630	— 16
1899	2734	— 4	1909	2644	+ 14
1900	2722	— 12	1910	2622	— 22
			1911	2613	— 9

We notice a general decline in the figures and the last is the lowest. That is, the last 50 winters, September to May, had a smaller number of frost days than any previous 50 consecutive winters since 1841. There are 5 plus differences in 20 ; or reckoning only the groups after 1893, the highest 3 in 18.

This method implies a comparison of the 20 winters, 1842 to 1861, with the 20, 1892 to 1911. The former had 11 with an excess of frost days (over 54), the latter only 4 with an excess. Total in former, 1136 ; in latter, 943 ; difference, 193.

We may anticipate, I suppose, that the downward course of the curve will be arrested ere long, and a rise take its place. Have we any means of determining when ?

A similar treatment of the annual Greenwich rainfall yields a curve which descends in general to 1902, since which there is a general rise.

ALEX. B. MACDOWALL.

PLANETARY RAINFALL.

THE annual percentages of rainfall for Cape Town, given in my letter—printed in the September, 1911, issue of this journal—were quoted from a longer series, and consequently they do not average 100 per cent. This, perhaps, accounts for the low correlation coefficient obtained by Mr. Dines. When the true arithmetical mean of the 40 years is used the coefficient will be found nearer to +·20. This also is a low result: it is made so low by the abnormal rainfall (78·90 inches) of the last year of the series at Buenos Aires. If we reject this last year, the coefficient for the 39 years, 1861-1899, comes to nearly +·40, and the probable error ·09. This seems to me to be a better correlation than those shadowy relationships between the respective rainfalls of India and South Africa so much thought of by makers of cycles.

But I doubt the validity of deducing correlation coefficients from percentage deviations. Moreover, the coefficient obtained when, say, the spring rainfall is compared with the crop of hay, will depend largely on the units employed. However, when inches are used the correlation coefficient between Cape Town and Buenos Aires is +·39, which is nearly that found from the percentages. Whether this should be considered large or small depends upon temperament. It is, at any rate, greater than the correlation coefficient between Kimberley and Durban, which are both in the summer rainfall system of South Africa. For the winter half year, April to September, in 35 years between 1875 and 1911, this coefficient is only +·06; for the summer half-year, October to March, only +·19. So that if a correlation coefficient is of any value at all, there is more than twice the probability that Cape Town and Buenos Aires are in one (Atlantic) rainfall system than that Kimberley and Durban are in one.

In any given year let a be the deviation of rainfall at Buenos Aires, b that at Cape Town; then the product ab will be positive when a and b are both less or both greater than the mean. The computation for the 39 years in question gives 33 positive and 6 negative products. The same sort of computation for Kimberley and Durban gives 21 positive to 14 negative products in winter, and 20 positive to 15 negative products in summer, in 35 years.

I wish that some of your readers would discuss the question of the general applicability of the correlation coefficient in meteorology. A point which might be argued is whether such an extreme case as the 1900 rainfall at Buenos Aires should be allowed to stand in a comparison like this one, *i.e.*, whether it should not be treated, for numerical purposes, from the point of view of, say, Chauvenet's Criterion as a doubtful quantity. It seems to me that genuine cases of parallelism, or synchronism, among planetary phenomena may be often ruled out by the correlation coefficient if abnormal cases are allowed to stand in unweighted. It is possible, of course,

that abnormal falls of rain would be eliminated automatically from a comparison if large areas were considered instead of just two stations —if, that is, the whole littoral of the mouth of the Rio de la Plata were compared with the west coast of South Africa.

Some day, when the meteorology of the whole Atlantic Basin comes to be discussed in one piece, some valuable results will be obtained. Meanwhile records are too scanty for the southern areas, and observing stations too few. Some years ago the Royal Society of South Africa tried to fill one of the gaps, and arranged for second-order observations on Tristan da Cunha, the De Beers Company kindly supplying instruments for the purpose. So far, however, none of the observations have reached me. The rainfall of Tristan da Cunha ought to prove, or disprove, a correlation between the respective rainfalls of Buenos Aires and Cape Town.*

Kimberley, November 24th, 1911. J. R. SUTTON.

ON DATING TEMPERATURE OBSERVATIONS.

I SHOULD like to raise for discussion in your pages a question as to the dating of observed temperatures. It has always been my custom to regard the 24 hours ending at 9 a.m. as the weather-day, and I enter not only the rainfall, but also the maximum and minimum temperatures then read, to the previous civil day. I have gradually discovered that it is the almost invariable practice amongst other observers to enter the maximum to the previous, and the minimum to the current civil day. The object of this is obviously to try to make the maximum and minimum accord with those of the civil days concerned, it being assumed that the maximum will usually occur in the afternoon, or at any rate between 9 a.m. and the following midnight, and that the minimum will usually occur between midnight and 9 a.m. This would no doubt usually be the case in summer, but by no means necessarily so in winter. Let us take an instance—let us suppose that the temperature drops to 32° at 9 a.m. on 1st January, and then rises steadily with a south wind to 50° at midnight and 55° at 9 a.m. on the 2nd. At this hour the observer would read maximum 55°, which he would enter to the 1st, and minimum 32°, which he would enter to the 2nd, and both would be wrong; and it must very frequently happen that either maximum or minimum goes down to the wrong date. I would suggest that as we already have a rainfall day selected for convenience, and differing from both the civil and the astronomical days, it would make meteorology more symmetrical and less incongruous to adopt that same day for all purposes, with the possible exception of sunshine, which might be read at sunset and entered to the same day.

Shrewton, Wilts, 30th July, 1911. F. J. WARDALE.

* The mean of the annual rainfalls of Cape Town and Buenos Aires, smoothed in threes, gives a very interesting series of groups of plus and minus years.

SUSSEX DEW-PONDS AND THE 1911 DROUGHT.

THE droughts during the summer of 1911 put many of the down-land ponds to a severe test, as well as many a lowland pond. Those that were dried up showed how remarkably shallow the actual water-retaining area was. On August 7th the large pond at Patcham Church, which had never been known before to dry up completely, was perfectly dry. This was a lowland pond, being only 205 ft. O.D. A large one in the village of Ditchling, also below the hills, 210 ft. O.D., with numerous trees overhanging it on one side, maintained a considerable quantity of water, although it diminished in area. No. 1 pond* (One Tree pond), was of course dry. Nos. 3 and 4, on the Keymer Downs, were dry, the latter having a quantity of young grass growing in it. No. 22 pond (Greystones pond, Standean), was dry except for the soft, damp, peaty moss of which its centre was composed. This pond was found, on drying, to be disappointingly shallow. High Park Corner pond (No. 6), had suffered a good deal of loss. On August 12th, 1908, the circumference of the water was 227½ ft.; on August 7th, 1911, it was 105 ft., and extremely shallow. Upper Standean pond (No. 17), on which my 24 hours' experiments were made in 1909, had shrunk from a circumference of 160 ft. in August, 1909, to 120 ft. in August, 1911. Ditchling Beacon pond (No. 5), similarly had decreased from 245 ft. in December, 1910, to 155 ft. in August, 1911, but a considerable depth of water remained. Piddingworth pond (No. 21), showed practically no diminution in size. It is partly overhung on one side by trees. Ewebottom Hill pond (No. 18), was reduced from 201½ ft., December, 1909, to 137½ ft. in August, 1911. Of the nine ponds referred to and visited in the course of a single day, five were dry, four were considerably reduced in size, and one (overhung by trees), remained practically the same.

The pond at Ditchling Beacon deserves special reference. It is not actually at the highest point of the Beacon, and must not be confused with two smaller dry pond-areas which are on the line of the old vallum. It is close to the top of the road leading up the Bostel from the north, and at the head of a dry chalk valley leading up from the south. It is not a little remarkable that this pond has continued to retain so much water throughout the summer. I think we have here evidence that a position at the head of a valley leading up from the south is advantageous to the maintenance of a pond. It is deeper than most ponds in the neighbourhood, and this again must have been an advantage. Shallow ponds have no chance at all during a long spell of hot weather. In this case I think it is clear that moisture laden winds from the south, condensing into mists in the early morning, have had a good deal to do with the continuance of the supply. There has been almost a continuous absence of dew all through the summer, so that "dew-fed" it could not have been. It may be argued that others have become dry because

* See *Geographical Journal*, October, 1910, for these numbers.

of this absence of dew, but in that case you must explain why this one maintained its water so well. If you do not allow that mist has been all-powerful to this end, then you must fall back on rain, of which there was, to the end of August, 13·74 in. only, as compared with 28·63 in. during the same period of 1910. Failing rain, you have but one factor left, and that is the depth of the pond. I grant that it is probable that many ponds might have been saved during the drought if they had been deeper, and in this case many flocks of sheep might have been spared and many pounds might have been saved. Thus the whole matter resolves itself into the great subject of sufficient storage accommodation. How many droughts might have been robbed of their sting if only the storage had been ample! At the same time I must confess to my doubts if even Ditchling Beacon pond would have behaved so well, had it not been for its position, and the mist-laden winds from the south.

The rainfall at Clayton Mills was during July but ·38 in., during August only ·53 in., and during September 1·97 in. In October it was no less than 6·11 in., in November, 10 16 in., and in December, 12·86 in. With the heavy rains came the filling-up of the ponds, and on December 26th all those referred to were in a flourishing condition except in the case of No. 1 pond which was almost empty and which must have become damaged in its foundation during the drought. Patcham Church pond was full to overflowing. No. 3 pond was 170 feet, and No. 4 was 145 feet, in circumference. No. 22 was 105 feet round, and No. 17 was broader than I had ever known it before and was 177 feet in circumference. No. 18 had covered up all former marks which had shown its level at various times, and was no less than 230 feet round. Night-dews on the grass returned with the return of the rain. They all but ceased with the absence of rain. Had the ponds been fed by dew when there was no rain they might have been *dew*-ponds.

EDWD. A. MARTIN.

285, Holmesdale Road, South Norwood, S.E.

DEW AND THE DIURNAL VARIATION OF RAINFALL.

It is a fact that differences between both the rainfall, and the rain days, for the year, obtained from standard 5-inch, and from larger (including most recording) gauges, are frequently occasioned, in humid localities, by the latter being *dew*-collecting gauges, and the former "dew-less" ones, to use the name I gave, several years ago, to Snowdon glove-fitting funnels of copper which are in very good thermal contact with the warm earth; and which also, in consequence of their deep rims and small diameter together cutting off most of their sky view, are exposed to a very limited radiation area. I find that surprisingly little dew, or true hoar-frost (rime, in fog, is a different thing), collects within these.

Large recording gauges, even though of copper, generally have several joints and sharp bends in their design; the thermal con-

nection to the warm ground below the sod, is comparatively bad. Moreover, their wide opening and relatively shallow rim expose an excellent depositing surface to a considerable area of sky. Hence the funnel pretty readily cools to the dew-point, and on our humid western coasts enough dew is collected to lengthen greatly the "duration of rainfall," at all events if the chart be measured by a distant computer who is ignorant of the fine character of the night the record for which he is tabulating. The duration of dew has nothing to do with the diurnal variation of rainfall (except very indirectly), and should not be statistically confused with it; however willingly we may admit an additional dozen or so "rain days" per annum, caused solely by dew and hoar-frost, and excluded by the good-conducting and deep-rimmed little Snowdon.

Errors produced by the admission of copious dews are far from being the only ones by which determinations of the duration of rainfall—and especially of its striking diurnal inequality—are liable to be affected, but they are the most difficult of any either wholly to guard against or eliminate. Friction can, nowadays, be entirely overcome; whilst the group of errors connected with chart-sheets, viz., inaccurate printing and cutting, or placing on the drum, and stretching, can largely be corrected by the use of a horizontal reference line, in say, green ink, drawn about halfway up the drum, at the same speed as the rain line, but by a fixed pen.

JOSEPH BAXENDELL.

Fernley Observatory, Southport, Feb. 29th, 1912.

WINTERS IN THE SEVENTEENTH CENTURY.

In Mr. Sedgwick's article in the December number of this Magazine he has suggested that the Thames would have frozen more readily in the seventeenth centnry than now, and that the somewhat frequent occasions when the Thames was frozen in the life-time of Evelyn is not necessarily an indication that the weather was more severe in his day than now. With this view I quite agree.

The real reason I think why the Thames was more frequently frozen over in London in those days was the existence of Old London Bridge, which so obstructed the waterway as to create almost still water above it on the ebb tide, and to prevent there being any upward stream, or next to none, on the flood. For this reason also the water above London Bridge was probably not brackish in those days.

In these days the removal of Old London Bridge, and the Embankment of the River has very greatly increased both the horizontal and vertical range of the tide, and therefore the velocity of the current, so that the actual freezing over of the tidal portion of the Thames is very unlikely to happen again, although I have seen the river nearly covered with ice floes brought down from the upper reaches and blocked up between the bridges in the severe frosts of 1891 and 1895.

5, Queen Anne's Gate, S.W., Jan. 10th, 1912. W. VAUX GRAHAM.

SOOT FIGURES UNDER WATER.

On "taking" the rainfall on the morning of November 17th I was surprised to find on the bottom of the glass rain measure a peculiar figure or formation, a photograph of which is enclosed. I have not yet been able to obtain any explanation of it. When used on the morning of the 16th the glass was perfectly clean. The water measured that morning was ·14 in., and after reading the amount I poured a few drops on the linen of the wet bulb thermometer and then placed the glass, unemptied and upright, at the back of the Stevenson screen. It was never moved or touched again until it was necessary to measure the rainfall on the 17th, the water which had been standing was then thrown away and the figure was seen. No frost had been registered that night or for many days before, therefore it was not a frost figure such as we see on glass panes on a wintry morning. I continued my rain measuring in the ordinary course for about 3 weeks, and the application of water had no effect on the permanence or strength of the figure: consequently the substance forming the pattern cannot have been soluble. I did, however, notice that the water was somewhat turbid and this, I take it, must have been soot washed down by the rain. I had the substance examined carefully chemically, in order to find whether some solution of the copper receiver had taken place from acids dissolved by the rain, but no indication of copper, or of any other metal, was forthcoming.

On examining the deposit a black amorphous paste was all that was found—brownish by transmitted light but perfectly black on linen or clean paper, and no trace of etching on the glass was shown.

If the substance be nothing but soot I am at a loss to know how it can form such a figure, or by what power it was produced.

THOMAS NEWBITT.

20, Crescent Avenue, Whitby, Yorks, Dec. 30th, 1911.

[In a later letter Mr. Newbitt states that he was able to reproduce these designs experimentally, and we hope to have further particulars of this very interesting phenomenon.—Ed. *S.M.M.*]

THE WEATHER OF FEBRUARY.

By FRED. J. BRODIE.

THE early days of February witnessed a continuance and an intensification of the severe frost which set in at the close of January. Between the 2nd and 5th of the month the thermometer in the screen fell to 15° or less at a number of places situated in nearly all parts of the United Kingdom, and to 10° or less in many inland localities in Great Britain, a reading of 5° being recorded as far south as Wokingham. The greatest intensity occurred in Scotland, the sheltered thermometer on the morning of the 4th falling to 5° below zero at West Linton (Peebleshire), and on the morning of the 5th to 2° below zero at Balmoral. On the surface of the ground, which was at the time mostly under snow, the readings were still lower; the exposed thermometer sinking to 7° below zero at Crathes, and to slightly below zero at a few inland stations in England. The winds at the time were light in force, and chiefly from between north and east, but on the night of the 5th, when a barometrical depression, which had appeared off our south-west coast, began to move northwards along the west of Ireland, a general veering to south-east took place, and in the course of the following day a rapid thaw extended from the southward over nearly the whole country. With a subsequent strengthening of the equatorial air current, the thermometer continued to rise steadily, and between the 8th and 10th maximum readings well above 50° were recorded in nearly all districts, and a reading of 56° at Llandudno, Bath and Clifton. On the 11th and 12th, the north easterly passage of a cyclonic disturbance (which had originally advanced from the southward) across the south and east of England, caused the wind to back temporarily to the eastward and north-eastward, with colder weather, and sharp ground frosts in many parts of Ireland and North Britain. The influence of a large Atlantic low pressure system was, however, soon restored, and between the 15th and 17th, when mild southerly winds were again experienced very generally, the thermometer rose to 55° or slightly above it over a large portion of England and Ireland. Another temporary shift of wind to polar quarters occurred on the 18th and 19th, when the centre of a well marked barometrical depression travelled north-eastwards directly across the United Kingdom, causing heavy rain in Ireland, and northerly gales on many parts of our western coasts. By the 22nd the wind had again returned to the southward, and on that day or the 23rd the thermometer rose above 55° in all districts excepting the west and north of Scotland, and touched 60° in central Ireland (at Birr Castle). During the remainder of the month a strong current of air from the south and south-west, increasing at times to the force of a gale, prevailed very generally, with frequent falls of rain, the latter being occasionally heavy in the west and north. Temperature was considerably above the average, the highest readings being observed on the 27th or 28th, when a shade maximum of 60°

THAMES VALLEY RAINFALL — FEBRUARY, 1912.

was recorded at a number of places in England and Wales; and readings of 56° and upwards in several parts of Ireland and Scotland.

The exceedingly mild weather experienced in the latter half of the month more than outweighed the effect of the previous cold, the mean temperature of February being above the normal in nearly all parts of the United Kingdom. In London, and at most other places in Central and Southern England, the month proved to be upon the whole the mildest February since that of 1903. In a few scattered parts of Ireland and the west of Scotland, the total duration of bright sunshine was slightly in excess of the average, but over the country generally it was deficient. In London (at Westminster) the aggregate amount, 26 hours, was 8 below the average, and was considerably smaller than in any February since that of 1902.

ROYAL METEOROLOGICAL SOCIETY.

THE monthly meeting of this Society was held on Wednesday evening, February 21st, at the Institution of Civil Engineers, Great George Street, Westminster, Dr. H. N. Dickson, President, in the chair.

Mr. J. Fairgrieve read a paper on "The Thunderstorms of May 31st, 1911," in which he dealt with the thunderstorm which visited the London district on Derby-day, and specially with the movement of the rain which accompanied the storm. Having obtained information from nearly 700 observers as to the time when rain was falling, he had prepared an interesting series of maps for each quarter of an hour from 0.30 to 8.45 p.m., showing the areas over which it was raining at the moment. From an examination of these maps there appear to have been five phases of rain movement, viz.: (1.) A storm appeared on the northern edge of the Chiltern Hills, and extended north and south while moving bodily south-westward. (2.) The northerly movement ceased, while the southerly movement continued. (3.) A separate storm appeared at Crowborough, and the two storms gradually united, (4.) Isolated rain areas appeared to the east of the main storms and united, the rain on the western margin became lighter and ceased, while the rain on the east became heavy. At the same time the storm extended north-westward along two belts, leaving an area of little or no rain between. (5.) Rain gradually ceased, leaving patches of rain for a time on a belt running north-west and south-east through London.

An interesting discussion followed the reading of this paper, in which Mr. F. C. Bayard, Colonel H. E. Rawson, Mr. C. Salter, Mr. R. H. Hooker, Mr. J. E. Clark, Mr. R. G. K. Lempfert, and Mr. W. B. Tripp took part. The author was complimented upon having achieved a piece of pioneer work by succeeding in tracing out the movements of the rain area, which could not fail to add considerably to our knowledge of the mechanism of the thunderstorm.

Mr. R. G. K. Lempfert read a paper on "The Thunderstorms of July 29th, 1911." This storm was of the line-squall type. The author has been able to trace the spread of the phenomenon across the British Isles, and he showed by an isochronic map that it first struck the extreme end of Cornwall about 2 p.m. on July 29th, and passed across Shetland at 3 p.m. the next day. From an examination of the Weather Charts, the author says that "we may regard the disturbance as being incidental to the displacement of the east wind by a southerly or south-westerly one." The extraordinary violence of the changes may probably be attributed to the temperature conditions. As far as Great Britain is concerned, the region over which we can trace the isochronous lines without difficulty corresponds almost exactly with that in which maximum temperatures of over 80° occurred. At many places in the central and southern counties of England 90° was exceeded. The temperature over the land was thus very high during the day, but over the sea much lower.

The general sequence of events seems to have been somewhat as follows:—A moderate east wind is interrupted suddenly by a squall from the south. After the squall has passed the wind returns temporarily to an easterly direction, to be again interrupted by another squall from the south. This process may repeat itself several times. A period of several hours of light and variable wind, during which easterly directions predominate, supervenes, and finally the wind settles down to a steady southerly or south-westerly wind of moderate force. In many cases the squalls were not accompanied by rainfall. What appears to have struck Observers most forcibly was the way in which huge quantities of dust were whirled up by the wind. Accounts from Cardiff state that dust was brought from the south side of the Bristol Channel by the squall winds which did much damage.

Colonel H. E. Rawson, Mr. E. Gold, Mr. W. W. Bryant, Mr. H. Harries, Dr. C. Chree and Mr. W. B. Tripp took part in the discussion, and Mr. Lempfert replied.

A paper by Mr. S. Skinner on "The Drosometer: an Instrument for Measuring the Amount of Dew," was read, and the discussion was adjourned to the next ordinary meeting.

The following gentlemen were elected Fellows of the Society:—Mr. R. Dukoff-Gordon, B.A., Dr. Marc de Levis, Rev. William O'Leary, S.J., and Capt. George Usborne, R.N.

A Provincial Meeting of the Royal Meteorological Society has been arranged by the Council of the Society, on the invitation of the Mayor and Corporation of Southport, to take place on Monday, May 13th. The Mayor of Southport has offered to entertain the Fellows who attend the meeting to lunch, and special facilities will be afforded for an inspection of the well-known Fernley Meteorological Observatory, which is under the charge of Mr. J. Baxendell.

INTERNATIONAL BALLOON ASCENTS.

By W. H. DINES, F.R.S.

October 6th, 1909.

Starting Point.	Country.	A miles.	B ° F.	C miles.	D ° F.	E miles.	F
Manchester....	England	6·9	—62	8·8	—62	78	E.N.E.
Pyrton Hill....	,, ...	6·9	—73	9·4	—69	60	E.N.E.
Lindenberg....	Germany	7·0	—72	10·7	—78	63	E.N.E.
Paris.....	France	6·2	—59	7·5	—62	141	E.N.E.
Strassburg	Germany	7·1	—76	9·8	—71	84	N.E. by E.
Nizhni Olchadaeff	Russia....	7·0	—70	10·9	—66	21	E. by S.

October 7th, 1909.

Pyrton Hill....	England	6·9	—74	11·1	—78	63	E. by N.
Paris	France	6·8	—67	10·6	—75	66	E.N.E.
Strassburg	Germany....	6·3	—58	12·4	—68	58	E.N.E.
Munich (8 a.m.)	,, ...	7·2	—71	11·2	?	125	N.E. by E.
,, (2 p.m.)	,, ...	6·8	—63	12·7	—60	54	E.N.E.
Vienna	Austria	7·4	—67	10·7	—62	72	N.N.E.
Pavlovsk	Russia	6·7	—52	9·4	—56	53	N.E.
Nizhni Olchadaeff	,, ...	7·0	—81	9·1	—71	26	E.

October 8th, 1909.

Manchester....	England	6·3	—56	8·1	—55	94	N. by E.
Hamburg.....	Germany....	6·8	—64	11·0	—67	56	N.E.
Lindenberg....	,, ...	7·0	—65	8·5	—69	40	N.
Strassburg	,, ...	6·7	—63	8·7	—72	75	N.E. by E.
Munich	,, ...	?	..	8·6	—67	56	E. by S.
Vienna	Austria.....	?	..	7·9	—60	38	E.S.E.
Nizhni Olchadaeff	Russia....	7·6	—77	7·9	—75	45	E.N.E.

A Height in miles of commencement of isothermal column.
B Temperature, F°., at bottom of column.
C Greatest height of reliable record in miles.
D Temperature, F°., at greatest height.
E Distance in miles of point where balloon fell.
F Bearing of falling point from starting point.

The height of the isothermal layer is very badly defined in several instances, the fall of temperature ceasing gradually instead of suddenly as it usually does. At Munich and Vienna on the 8th it is doubtful if it was reached. There is a remarkable uniformity about the direction of drift of the balloons, notably on the 6th, otherwise average conditions prevailed.

On October 6th an extensive cyclone lay between Iceland and the Baltic, with an anticyclone over Spain and Central Russia. The Spanish anticyclone moved rapidly to the N.E. reaching Russia by the 8th. By the 9th a fresh deep depression had appeared near Iceland and a new anticyclone over Spain.

RAINFALL TABLE FOR FEBRUARY, 1912.

STATION.	COUNTY.	Lat. N.	Long. W. [*E.]	Height above Sea. ft.	RAINFALL OF MONTH. Aver. 1875—1909. in.	1912. in.
		° ′	° ′			
Camden Square	*London*	51 32	0 8	111	1·66	1·71
Tenterden	*Kent*	51 4	*0 41	190	1·90	2·46
Arundel (Patching)	*Sussex*	50 51	0 27	130	2·17	3·16
Southampton (Cadland)	*Hampshire*	50 50	1 22	52	2·28	2·48
Oxford (Magdalen College)	*Oxfordshire*	51 45	1 15	186	1·62	2·02
Wellingborough (Croyland Abbey)	*Northampton*	52 18	0 41	174	1·69	1·71
Shoeburyness	*Essex*	51 31	*0 48	13	1·19	1·11
Bury St. Edmunds (Westley)	*Suffolk*	52 15	*0 40	226	1·59	1·17
Geldeston [Beccles]	*Norfolk*	52 27	*1 31	38	1·41	·97
Polapit Tamar [Launceston]	*Devon*	50 40	4 22	315	2·95	3·68
Rousdon [Lyme Regis]	,,	50 41	3 0	516	2·50	3·62
Stroud (Upfield)	*Gloucestershire*	51 44	2 13	226	2·12	2·61
Church Stretton (Wolstaston)	*Shropshire*	52 35	2 48	800	2·17	1·68
Coventry (Kingswood)	*Warwickshire*	52 24	1 30	340	2·01	2·17
Boston	*Lincolnshire*	52 58	0 1	25	1·53	1·05
Worksop (Hodsock Priory)	*Nottinghamshire*	53 22	1 5	56	1·64	1·34
Macclesfield	*Cheshire*	53 15	2 7	501	2·30	·98
Southport (Hesketh Park)	*Lancashire*	53 38	2 59	38	2·07	1·64
Arncliffe Vicarage	*Yorkshire, W.R.*	54 8	2 6	732	4·88	3·82
Wetherby (Ribston Hall)	,, ,,	53 59	1 24	130	1·71	1·59
Hull (Pearson Park)	,, *E.R.*	53 45	0 20	6	1·78	1·39
Newcastle (Town Moor)	*Northumberland*	54 59	1 38	201	1·63	2·63
Borrowdale (Seathwaite)	*Cumberland*	54 30	3 10	423	10·96	7·64
Cardiff (Ely)	*Glamorgan*	51 29	3 13	53	3·07	3·23
Haverfordwest	*Pembroke*	51 48	4 58	95	3·42	4·07
Aberystwyth (Gogerddan)	*Cardigan*	52 26	4 1	83	3·09	2·77
Llandudno	*Carnarvon*	53 20	3 50	72	2·11	1·65
Cargen [Dumfries]	*Kirkcudbright*	55 2	3 37	80	3·42	3·88
Marchmont House	*Berwick*	55 44	2 24	498	2·15	2·73
Girvan (Pinmore)	*Ayr*	55 10	4 49	207	3·87	4·28
Glasgow (Queen's Park)	*Renfrew*	55 53	4 18	144	2·70	2·71
Inveraray (Newtown)	*Argyll*	56 14	5 4	17	5·71	5·30
Mull (Quinish)	,,	56 34	6 13	35	4·45	3·62
Dundee (Eastern Necropolis)	*Forfar*	56 28	2 57	199	1·91	2·12
Braemar	*Aberdeen*	57 0	3 24	1114	2·55	2·90
Aberdeen (Cranford)	,,	57 8	2 7	120	2·36	3·35
Cawdor	*Nairn*	57 31	3 57	250	2·06	1·19
Fort Augustus (S. Benedict's)	*E. Inverness*	57 9	4 41	68	4·20	2·81
Loch Torridon (Bendamph)	*W. Ross*	57 32	5 32	20	7·53	7·10
Dunrobin Castle	*Sutherland*	57 59	3 56	14	2·58	1·80
Wick	*Caithness*	58 26	3 6	77	2·23	2·39
Killarney (District Asylum)	*Kerry*	52 4	9 31	178	4·99	6·08
Waterford (Brook Lodge)	*Waterford*	52 15	7 7	104	3·18	4·51
Nenagh (Castle Lough)	*Tipperary*	52 54	8 24	120	2·89	3·58
Miltown Malbay	*Clare*	52 52	9 26	400	3·21	3·07
Gorey (Courtown House)	*Wexford*	52 40	6 13	80	2·75	5·04
Abbey Leix (Blandsfort)	*Queen's County*	52 56	7 17	532	2·55	3·34
Dublin (Fitz William Square)	*Dublin*	53 21	6 14	54	1·93	2·56
Mullingar (Belvedere)	*Westmeath*	53 29	7 22	367	2·67	3·65
Cong (The Glebe)	*Mayo*	53 33	9 16	112	3·72	4·35
Crossmolina (Enniscoe)	*Mayo*	54 4	9 16	74	4·20	3·95
Collooney (Markree Obsy.)	*Sligo*	54 11	8 27	127	3·20	4·04
Seaforde	*Down*	54 19	5 50	180	2·81	5·32
Bushmills (Dundarave)	*Antrim*	55 12	6 30	162	2·56	1·94
Omagh (Edenfel)	*Tyrone*	54 36	7 18	280	2·68	3·31

RAINFALL TABLE FOR FEBRUARY, 1912—*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. 1875—1909. in.	1912. in.	Diff. from Aver. in.	% of Av.	Mean Annual 1875-1909. in.	STATION.
+ ·05	103	·36	11	20	3·49	5·79	+2·30	166	25·11	Camden Square
+ ·56	129	·43	8	20	4·04	5·22	+1·18	129	27·64	Tenterden
+ ·99	146	·67	22	23	4·76	6·86	+2·10	144	30·48	Patching
+ ·20	109	·54	22	22	5·03	7·12	+2·09	142	31·87	Cadland
+ ·40	125	·40	23	17	3·40	6·37	+2·97	188	24·58	Oxford
+ ·02	101	·40	12	16	3·58	4·86	+1·28	136	25·17	Croyland Abbey
— ·08	93	·22	23	16	2·52	4·04	+1·52	160	19·28	Shoeburyness
— ·42	74	·45	23	15	3·29	3·77	+ ·48	115	25·40	Westley
— ·44	69	·37	23	17	2·94	3·09	+ ·15	105	23·73	Geldeston
+ ·73	125	·74	7	23	6·54	8·45	+1·91	129	38·27	Polapit Tamar
+1·12	145	·60	7	21	5·44	8·08	+2·64	148	33·54	Rousdon
+ ·49	123	·78	12	22	4·45	6·97	+2·52	156	29·81	Stroud
— ·49	77	·26	12	19	4·68	5·48	+ ·80	117	32·41	Wolstaston
+ ·16	108	·73	5	14	4·23	7·14	+2·91	169	28·98	Coventry
— ·48	69	·24	12	20	3·07	3·76	+ ·69	122	23·35	Boston
— ·30	82	·32	8	15	3·34	4·85	+1·51	145	24·46	Hodsock Priory
—1·32	43	·17	6	15	4·96	3·60	—1·36	73	34·73	Macclesfield
— ·43	79	·31	17	16	4·62	5·16	+ ·54	112	32·70	Southport
—1·06	78	·59	22	16	11·14	9·19	—1·95	83	61·49	Arncliffe
— ·12	93	·22	19	17	3·60	6·07	+2·47	168	26·87	Ribston Hall
— ·39	78	·21	19	18	3·48	4·23	+ ·75	122	26·42	Hull
+1·00	161	·76	19	20	3·53	5·91	+2·38	168	27·94	Newcastle
—3·32	70	1·65	22	22	24·40	19·22	—5·18	79	129·48	Seathwaite
+ ·16	105	·46	23	23	6·72	8·68	+1·96	129	42·28	Cardiff
+ ·65	119	·69	7	22	8·11	10·54	+2·43	130	46·81	Haverfordwest
— ·32	90	·42	16	19	7·00	5·60	—1·40	80	45·46	Gogerddan
— ·46	78	·50	17	18	4·62	3·94	— ·68	85	30·36	Llandudno
+ ·46	114	·75	7	19	7·52	8·68	+1·16	115	43·47	Cargen
+ ·58	127	·90	19	22	4·55	5·26	+ ·71	116	33·76	Marchmont
+ ·41	111	·83	7	21	8·65	11·16	+2·51	129	49·77	Girvan
+ ·01	100	·46	18	14	6·23	5·24	— ·99	84	35·97	Glasgow
— ·41	93	1·95	27	17	13·05	11·24	—1·81	86	68·67	Inveraray
— ·83	81	·62	22	18	10·00	7·78	—2·22	78	56·57	Quinish
+ ·21	111	·35	19	19	3·92	4·97	+1·05	127	28·64	Dundee
+ ·35	114	...	...	...	5·47	9·34	+3·87	171	34·93	Braemar
+ ·99	142	·48	19	19	4·72	6·78	+2·06	144	32·73	Aberdeen
— ·87	58	·71	18	6	4·34	2·33	—2·01	54	29·33	Cawdor
—1·39	67	·62	18	18	9·78	5·28	—4·50	54	44·53	Fort Augustus
— ·43	94	·82	28	17	16·95	12·94	—4·01	76	83·93	Bendamph
— ·78	70	·55	18	14	5·33	3·53	—1·80	66	31·90	Dunrobin Castle
+ ·16	107	·67	19	21	4·71	3·98	— ·73	85	29·88	Wick
+1·09	122	1·30	18	23	10·93	11·44	+ ·51	105	54·81	Killarney
+1·33	142	·78	7	19	6·96	9·83	+2·87	141	39·57	Waterford
+ ·69	124	1·11	18	19	6·77	6·96	+ ·19	103	39·43	Castle Lough
— ·14	96	·99	18	19	7·22	6·34	— ·88	88	45·11	Miltown Malbay
+2·29	183	1·20	7	21	5·94	10·61	+4·67	179	34·99	Courtown Ho.
+ ·79	131	·65	7	19	5·70	6·96	+1·26	122	35·92	Abbey Leix
+ ·63	133	·59	18	18	4·07	6·07	+2·00	149	27·68	Dublin
+ ·98	137	1·02	18	18	5·77	7·98	+2·21	138	36·15	Mullingar
+ ·63	117	1·24	18	22	8·51	7·59	— ·92	89	48·90	Cong
— ·25	94	1·04	18	23	9·55	8·05	—1·50	84	52·87	Enniscoe
+ ·84	126	1·05	18	20	7·07	7·07	·00	100	42·71	Markree
+2·51	189	1·52	7	18	6·22	10·34	+4·12	166	38·91	Seaforde
— ·62	76	·90	18	11	5·75	5·60	— ·15	97	37·56	Dundarave
+ ·63	123	1·00	18	18	6·14	6·62	+ ·48	108	39·38	Omagh

SUPPLEMENTARY RAINFALL, FEBRUARY, 1912.

Div.	STATION.	Rain inches	Div.	STATION.	Rain inches.
II.	Warlingham, Redvers Road .	2·66	XI.	Lligwy	1·81
,,	Ramsgate	·90	,,	Douglas	3·69
,,	Hailsham	2·75	XII.	Stoneykirk, Ardwell House...	3·42
,,	Totland Bay, Aston House...	2·62	,,	Dalry, The Old Garroch	5·22
,,	Stockbridge, Ashley..	2·88	,,	Langholm, Drove Road	3·60
,,	Grayshott	3·47	,,	Beattock, Kinnelhead	5·70
,,	Reading, Caversham Lock ...	1·81	XIII.	St. Mary's Loch, Cramilt Ldge	4·07
III.	Harrow Weald, Hill House...	1·70	,,	North Berwick Reservoir	2·17
,,	Pitsford, Sedgebrook	1·88	,,	Edinburgh, Royal Observaty.	1·81
,,	Woburn, Milton Bryant	1·85	XIV.	Maybole, Knockdon Farm ...	2·48
,,	Chatteris, The Priory	1·12	XV.	Campbeltown, Witchburn ..	4·02
IV.	Colchester, Lexden	1·26	,,	Glenreasdell Mains	3·73
,,	Newport	1·39	,,	Holy Loch, Ardnadam	7·06
,,	Ipswich, Copdock	1·08	,,	Ballachulish House	6·23
,,	Blakeney	1·22	,,	Islay, Eallabus	3·27
,,	Swaffham	1·15	XVI.	Dollar Academy	3·09
V.	Bishops Cannings	2·48	,,	Balquhidder, Stronvar	8·23
,,	Winterbourne Steepleton	4·58	,,	Coupar Angus	2·54
,,	Ashburton, Druid House	6·23	,,	Glenlyon, Meggernie Castle..	5·58
,,	Cullompton	3·72	,,	Blair Athol	2·92
,,	Lynmouth, Rock House	3·25	,,	Montrose, Sunnyside Asylum.	2·95
,,	Okehampton, Oaklands	3·94	XVII.	Alford, Lynturk Manse	2·58
,,	Hartland Abbey	2·40	,,	Fyvie Castle	2·37
,,	Probus, Lamellyn	3·82	,,	Keith Station ..	1·84
,,	North Cadbury Rectory	2·54	XVIII.	Skye, Dunvegan	7·05
VI.	Clifton, Pembroke Road	2·57	,,	N. Uist, Lochmaddy	5·13
,,	Ross, The Graig	2·26	,,	Glenquoich, Loan	11·00
,,	Shifnal, Hatton Grange	1·09	,,	Alvey Manse	1·27
,,	Droitwich	1·47	,,	Loch Ness, Drumnadrochit...	2·32
,,	Blockley, Upton Wold	2·59	,,	Glencarron Lodge	5·44
VII.	Market Overton	1·88	XIX.	Invershin	1·86
,,	Market Rasen	1·10	,,	Loch Stack, Ardchullin	5·41
,,	Bawtry, Hesley Hall	1·11	,,	Melvich	2·67
,,	Derby, Midland Railway	1·60	XX.	Skibbereen Rectory	4·60
,,	Buxton	1·80	,,	Dunmanway, The Rectory ..	8·07
VIII.	Nantwich, Dorfold Hall	1·11	,,	Cork	5·75
,,	Chatburn, Middlewood	1·87	,,	Mitchelstown Castle	4·36
,,	Cartmel, Flookburgh	2·83	,,	Darrynane Abbey	4·61
IX.	Langsett Moor, Up. Midhope	...	,,	Clonmel, Bruce Villa	4·25
,,	Scarborough, Scalby	1·61	,,	Newmarket-on-Fergus, Fenloe	2·82
,,	Ingleby Greenhow	2·16	XXI.	Laragh, Glendalough	8·47
,,	Mickleton	2·11	,,	Ballycumber, Moorock Lodge	2·91
X.	Bellingham, High Green Manor	2·91	,,	Balbriggan, Ardgillan	2·83
,,	Ilderton, Lilburn Cottage ...	2·51	XXII.	Woodlawn	3·57
,,	Keswick, The Bank	3·39	,,	Westport, St. Helens ...	4·05
XI.	Llanfrechfa Grange	4·26	,,	Achill Island, Dugort	3·44
,,	Treherbert, Tyn-y-waun	8·33	,,	Mohill, The Rectory ..	3·29
,,	Carmarthen, The Friary	4·70	XXIII.	Enniskillen, Portora	4·08
,,	Castle Malgwyn [Llechryd]...	3·17	,,	Dartrey [Cootehill]	3·17
,,	Crickhowell, Tal-y-maes	3·80	,,	Warrenpoint, Manor House ..	5·24
,,	New Radnor, Ednol	3·50	,,	Banbridge, Milltown	3·06
,,	Rhayader, Tyrmynydd	3·95	,,	Belfast, Cave Hill Road	3·24
,,	Lake Vyrnwy	3·59	,,	Glenarm Castle	4·34
,,	Llangyhanfal, Plâs Draw	2·09	,,	Londonderry, Creggan Res...	2·39
,,	Dolgelly, Bryntirion	3·22	,,	Killybegs	3·44
,,	Bettws-y-Coed, Tyn-y-bryn...	3·71	,,	Horn Head	3·24

METEOROLOGICAL NOTES ON FEBRUARY, 1912.

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.—Very frequent though not heavy R was experienced throughout the month. The most severe frosts of the winter occurred in the first week. Temp. did not rise above 28°·3 on 4th, which with only two exceptions was the lowest shade max. recorded in February in 55 years. Temp. rose rapidly after the thaw on 6th, and remained high throughout the month. On only 5 days from 8th to the close did it fail to reach 50°. Mean temp. 43°·3, or 3°·6 above the average. Duration of sunshine 25·8* hours, and of R 44·7 hours. Evaporation ·16 in. Shade max. 58°·5 on 28th, and the highest temp. recorded in February since 1903; min. 16°·7 on 3rd. F 7, f 9.

TENTERDEN.—The first five days were cold with S; the rest of the month was warm and wet. Duration of sunshine, 58·0† hours. Shade max. 58°·0 on 28th; min. 14°·0 on 3rd. F 7, f 9.

TOTLAND BAY.—R fell on 25 days, the greatest recorded in February in 25 years. Duration of sunshine, 58·6* hours. Shade max. 52°·3 on 29th; min. 20°·9 on 3rd. F 6, f 9.

PITSFORD.—Mean temp. 40°·8. Shade max. 58°·7 on 28th; min. 15°·6 on 3rd. F 8.

NORTH CADBURY.—The month contained half of the severest and longest frost since February, 1895, and the coldest night in that time; yet a warm month with high average temp., and the warmest night in 16 Februaries. Shade max. 59°·2 on 29th; min. 15°·0 on 3rd. F 6, f 11.

ROSS.—Shade max. 58°·9 on 28th; min. 14°1. on 3rd. F 8, f 10.

HODSOCK PRIORY.—Sharp frost in the first week; very mild towards the end. Shade max. 58°·7 on 28th; min. 8°·7 on 5th. F 9, f 16.

CHATBURN, MIDDLEWOOD.—R 1·63 in. below the average of 23 years.

HULL.—Shade max. 60°·0 on 28th; min. 19°·0 on 3rd. F 6, f 12.

HAVERFORDWEST.—The first five days were cold; afterwards mild and wet. Duration of sunshine 58·2* hours.

BETTWS-Y-COED.—Cold during the early part; wet towards the close with high winds. Shade max. 59°·0 on 28th and 29th; min. 10°·0 on 4th. F 9, f 11.

CARGEN.—Shade max. 53°·5 on 28th; min. 12°·0 on 4th. F 9.

EDINBURGH.—Shade max. 53°·8 on 29th; min. 16°·8 on 5th. F 6, f 13.

COUPAR ANGUS.—The frost of January continued well into February, but high day temp. and the absence of night frosts brought up the mean temp. A sunless month with persistent light R kept back all farm work. Shade max. 58°·0 on 28th; min. 9°·0 on 5th.

FORT AUGUSTUS.—Shade max. 53°·7 on 29th; min. 8°·0 on 5th. F 9.

LOCH STACK.—Duration of sunshine, 49·5 hours.

WATERFORD.—Very mild month, and the wettest February since 1904. Shade max. 54°·5 on 21st; min. 15°·0 on 3rd. F 8.

DUBLIN.—Opening with a spell of very severe cold, February proved mild, though changeable, rainy and windy. Southerly winds prevailed. Mean temp. 43°·7. Shade max. 57°·8 on 22nd; min. 23°·8 on 3rd. F 6, f 8.

MARKREE.—Severe frost with slight S during the first few days. Very mild weather from 4th, though showery on 20 days. Shade max. 58°·0 on 28th; min. 15°·0 on 3rd. F 15, f 15.

WARRENPOINT.—A month of high winds and heavy R, but on the whole mild. Easterly winds prevailed for 20 days. Shade max. 54°·0 on 28th; min. 27°·0 on 2nd. F 4, f 7.

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* Campbell-Stokes. † Jordan.

Climatological Table for the British Empire, September, 1911.

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	92·3	8	39·0	22†	73·0	50·0	52·3	79	127·7	38·0	1·31	11	3·0
Malta	90·1	17	62·6	30	81·3	71·1	66·1	73	150·0	...	1·60	3	2·5
Lagos	89·0	8	71·0	30	84·6	73·6	71·0	78	155·0	66·0	2·94	11	...
Cape Town	86·7	14	42·0	6	64·8	50·0	50·6	76	...	...	4·59	13	5·5
Durban, Natal ...	83·7	23	49·2	14	75·4	57·1	...	...	152·5	...	4·02	6	3·9
Johannesburg	86·7	23	32·9	7	72·9	49·1	39·9	51	139·7	31·9	·08	2	1·1
Blœmfontein	86·7	25	29·6	6	73·5	43·2	35·1	45	...	...	·10	2	3·0
Calcutta...	92·2	22	75·9	16	88·9	78·4	77·9	85	...	74·5	7·31	15	8·1
Bombay...	87·5	28	75·6	22	85·8	77·5	74·9	81	131·3	71·8	2·50	15	6·3
Madras	100·2	3	70·6	16	94·5	77·9	75·7	78	151·2	70·4	7·62	11	4·9
Kodaikanal	68·4	7	50·5	12	64·2	52·1	51·2	82	146·9	39·0	2·89	13	6·7
Colombo, Ceylon ...	87·5	27	72·6	8	85·9	76·1	74·5	81	153·1	70·9	4·12	18	7·0
Hongkong	92·1	17	75·0	3	86·1	77·4	73·6	78	143·9	...	6·22	10	5·7
Sydney	85·0	14	47·1	17	68·6	53·0	49·3	69	137·8	39·0	2·09	21	4·8
Melbourne	75·8	27	33·7	18	63·0	48·1	46·5	74	136·1	27·6	3·06	19	6·9
Adelaide	83·1	12	39·6	15	66·8	48·8	48·1	71	140·1	32·9	3·80	15	5·6
Perth	70·2	15	40·0	1	64·7	49·2	48·1	72	128·6	34·0	2·40	13	4·2
Coolgardie	88·2	11	34·0	1, 8	71·0	45·0	39·6	50	149·0	32·2	·10	2	2·3
Hobart, Tasmania ..	66·0	1	36·3	24	57·8	44·9	42·2	72	128·8	31·9	1·20	15	6·4
Wellington	63·0	10*	36·6	7	56·9	46·0	39·3	62	109·0	30·0	3·01	19	6·8
Auckland	65·0	11	40·0	30	60·4	47·9	46·9	76	101·0	37·0	2·70	18	6·4
Jamaica, Kingston ..	95·2	21	71·3	12	92·2	74·3	71·3	78	...	...	·86	3	5·0
Grenada	90·0	11	72·0	25	85·3	75·8	...	78	141·0	...	7·86	22	4·0
Toronto	87·3	1	34·2	14	69·9	51·2	...	...	103·4	29·9	2·57	12	4·0
Fredericton	74·2	11	26·5	29	63·0	42·7	...	80	...	...	2·69	12	6·0
St. John, N.B. ...	70·5	3	35·5	29	59·9	48·7	...	...	...	...	5·32	16	5·8
Edmonton, Alta. ...	76·8	2	19·7	22	61·2	37·8	...	75	129·2	13·2	·72	8	4·7
Victoria, B.C. ...	72·7	2	37·8	26	62·5	48·5	...	79	...	...	2·25	12	7·0
Dawson	77·0	6	12·0	19	55·8	30·7	...	...	...	...	·86	9	6·2

* and 13. † and 29.

Errata in Table for August, 1911. London, Camden Square, Average max., *for* 57°·9 *read* 80°·8; mean min., *for* 53°·0 *read* 57°·9.

MALTA.—Mean temp. of air 75°·7. Average bright sunshine 9·3 hours per day.

Johannesburg.—Bright sunshine, 305·7 hours.

KODAIKANAL.—Bright sunshine, 123 hours. TS on 12 days.

COLOMBO.—Mean temp. of air 81°·0 or 0°·3 above, of dew point 1°·2 above, and R ·55 in. below, averages. Mean hourly velocity of wind 7·4 miles.

HONGKONG.—Mean temp. of air 81°·1. R 3·40 in. below the average. Bright sunshine 211 hours, or 14 hours above. Mean hourly velocity of wind 11·4 miles.

Sydney.—Mean temp. of air 1°·9 above, and R ·80 in. below, averages.

Melbourne.—Mean temp. of air 1°·6 above, and R ·72 in. above, averages.

Adelaide.—Mean temp. of air 0°·8 above, and R 2·02 in. above, averages.

Perth.—Mean temp of air 1°·0 below, and R ·93 in. below, averages.

Hobart.—Mean temp of air 0°·7 below, and R ·90 in. below, averages.

Wellington.—R 1·25 in. below, average. Bright sunshine 151·8 hours.

Auckland.—Mean temp. below the average. R nearly one inch below average of last 44 years.