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FROM THE EDITOR

To the Readers of "Symons's Meteorological Magazine."

After editing this Magazine for nearly thirteen years I am now faced with the necessity of taking a lengthened leave of absence on account of a breakdown of my eyesight, the result of continued overstrain; and although I leave home with every prospect of being able to resume work on my return within a year, I feel that it is my duty to appoint a temporary Acting-Editor. I am happy that my old friend, Mr. R. C. Mossman, has consented to take this position, and that he will also be associated with Mr. Carle Salter, now Assistant Director of the British Rainfall Organization, in editing *British Rainfall* and carrying on the rest of my work as Director of the Organization for the time.

Mr. Mossman has been a Meteorological Observer for more than twenty-five years, having like myself had the benefit of the late Dr. Alexander Buchan's advice and instruction. He was frequently in residence at the Ben Nevis Observatory, and in 1901 and 1902 kept up a series of very interesting comparative observations in Glen Nevis, which were published monthly in this Magazine for five months. When Dr. W. S. Bruce equipped the Scottish Antarctic Expedition in 1902, Mr. Mossman was appointed Meteorologist, and accompanied the *Scotia* on her cruise to Weddell Sea. He was landed on Laurie Island in the South Orkneys, where he established a first order meteorological station, of which he remained in charge for two years. After some time spent at home in working up the Antarctic data, he, in 1907, entered the service of the Argentine Meteorological Office in Buenos Aires, where his special duty was the editorship of the Volumes of Records.

Mr. Mossman's exhaustive discussions of the Climate of Edinburgh and the Climate of London, and his more recent investigations into the Correlations of Meteorological Phenomena in the Southern Hemisphere, are well known to our readers, and form an ample guarantee of his fitness for the work he has undertaken.

The principal ingredient in the prescription of my medical advisers is "a mind free from worry," and this I believe has been successfully dispensed by combining the intimate knowledge of the working of the British Rainfall Organization possessed by Mr. Salter with the great experience and wide outlook over the meteorological horizon of Mr. Mossman.

THE METEOROLOGICAL LUNCHEON.

(British Association, Birmingham, 1913.)

By E. GOLD, M.A.

METEOROLOGISTS and other Cosmical Physicists met at the Grand Hotel on Monday, September 15th, after a morning devoted to the discussion of papers on Cosmical Physics. Prof. H. N. Dickson, President of Section E, Geography, and past President of the Royal Meteorological Society, presided over the company, which included the following representatives from overseas: Mr. C. E. St. John, of Mount Wilson Solar Observatory, U.S.A.; Mr. R. C. Mossman, of the Argentine Meteorological Service; Mr. B. F. E. Keeling, of the Egyptian Survey Department; and, representing local meteorology, Mr. J. H. Reynolds, Vice-President of the Birmingham and Midland Institute.

The following is a full list of those present:—

Mr. J. S. Amery.
Mr. T. W. Backhouse.
Mr. Richard M. Barrington.
Prof. H. Bassett.
Mr. F. A. Bellamy.
Miss E. F. B. Bellamy.
Dr. H. Borns.
Dr. W. S. Bruce.
Mrs. Bruce.
Dr. S. Chapman.
Prof. H. N. Dickson.
Prof. W. G. Duffield.
Prof. A. S. Eddington.
Mr. M. McCullum Fairgrieve.
Mr. E. Gold.
Mrs. Gold.
Mr. H. R. Hassé.
Prof. A. J. Herbertson.
Dr. H. B. Heywood.
Mrs. Heywood.
Mr. B. F. E. Keeling.
Mr. A. Pearse Jenkin.
Capt. H. G. Lyons, F.R.S.
Mr. F. K. McClean.
Dr. J. R. Milne.
Mr. R. C. Mossman.
Mrs. Mossman.
Mr. T. S. Muir.
Dr. F. G. Ogilvie, C.B.
Mr. A. G. Ogilvie.
Prof. J. E. Petavel, F.R.S.
Dr. A. O. Rankine.
Col. H. E. Rawson, C.B.
Mr. J. H. Reynolds.
Mrs. Reynolds.
Mr. W. S. Rolston.
Mr. C. E. St. John.
Dr. G. H. Shakespear.
Mr. L. Southern.
Prof. H. H. Turner, F.R.S.
Miss Margaret White.
Mr. J. Woodrow.

Prof. H. H. Turner proposed the toast of "The Foreign Guests," mentioning especially Mr. St. John, Mr. Keeling and Mr. Mossman. Mr. St. John had shown to us some of the wonderful results which had been obtained at Prof. Hale's Observatory on Mount Wilson, an observatory specially erected to investigate the sun and the physics of the sun, with which meteorology and the physics of the atmosphere were inseparably connected. Mr. Keeling, who could hardly be called a foreigner, represented the Survey Department of Egypt, which had to deal with meteorological investigations and applications, in a country which depended in a simple and direct manner upon the annual recurrence of an exceptional meteorological phenomenon.

Mr. Mossman had shown in the discussion that morning how alert meteorologists in the Argentine Republic were to take account of the most recent and powerful methods of investigating the problem of seasonal forecasts.

Mr. St. John expressed his appreciation of the kind words in which Prof. Turner had referred to his work. He had at first wondered why he had been invited to a "meteorological" luncheon, since his investigations had been mainly concerned with the solar atmosphere; but when he recollected the important investigations of Mr. C. G. Abbott, by simultaneous observations of solar radiation in America and Algeria, he realised the appropriateness of a solar physicist attending a "meteorological" luncheon. He referred to the monastic isolation of the observatory on Mount Wilson, and the pleasure of remembering and relating to his colleagues there the cordial and kindly things which he had heard.

Mr. Keeling referred briefly to his official work in Egypt, and expressed his thanks for the kind reference which Prof. Turner had made to him.

Mr. Mossman said how glad he was to be present at that gathering. He had been six years in the Argentine, where he met few meteorologists, and the pleasure of renewing now his intercourse with meteorologists in England could hardly be understood by those who were constantly meeting one another. He referred to the re-organisation of the meteorological services of the different states of South America, which were advancing towards the closer co-operation essential for progress in meteorology. He hoped to take further the investigations in correlation to which reference had been made, but he expected to have a busy year in England in carrying on, in conjunction with Mr. Salter, the work of Dr. H. R. Mill, who was taking a year's leave from British Rainfall.

Prof. Dickson proposed the toast of "Local Climate" and the "local observatory," coupled with the name of Mr. J. H. Reynolds, who was Vice-President of the Midland Institute, under whose auspices regular meteorological records had been taken for many years. They had all had an opportunity of seeing in the Handbook some of the results of those records; in particular how Birmingham had about 200 hours less than its share of bright sunshine every year, and how it rarely had as much as one inch of rain in a day; possibly the outpouring, which had come with such appropriateness that morning, had been an effort on the part of the local weather to break a record in their honour.

Mr. Reynolds, in returning thanks, said that although his personal interest was chiefly in things astronomical, he was very anxious that the reputation of the local meteorological observatory should not only be maintained, but should be improved; records had now been kept for over 20 years, and the citizens of Birmingham were beginning to realise how the continued outpouring of smoke deprived them of what was best in meteorology—viz., sunshine.

SOUTHERN HEMISPHERE SEASONAL CORRELATIONS.

By R. C. Mossman, F.R.S.E.

(of the Argentine Meteorological Office).

Fifth Article.

CORRELATIONS AT ST. HELENA.

Although St. Helena is not located in an "action centre," the observations from this island are of considerable interest, inasmuch as they are influenced by and are an index of the intensity of the S.E. Trades. Although considerable time and labour have been expended in a search for correlations between St. Helena and places in the two hemispheres, the results so far cannot be looked upon as conclusive, owing to the relatively short period covered by the St. Helena record. Some suggestive resemblances and contrasts have however shown up, which will be briefly referred to.

During the 11 years 1893 to 1903 there was an undoubted relation between the quantity of rainfall over a wet district in the vicinity of Fort William during the period, January to March, and the mean temperature at St. Helena for the four months, May to August,

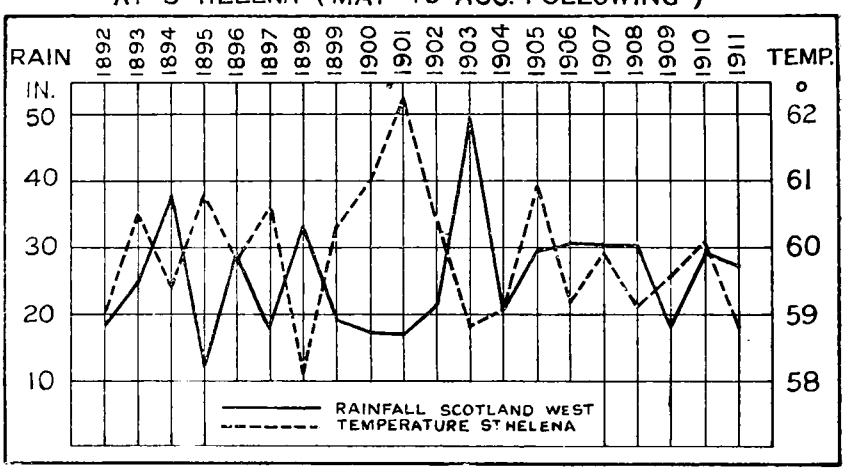

Fig. 1.

following. The district rainfall mean for Scotland west is the average of the five stations, Glenquoich, Invergarry, Bendamph, Glencarron and Fort William, the data being extracted from the *Journals of the Scot.Met.Soc.*, while the St. Helena mean temperature is from the publication *M.O.* 203, supplemented by later data kindly forwarded by Dr. Shaw.

From 1904 to 1911 the correlation breaks down, both the rainfall and the temperature data showing little fluctuation from one year to another as compared with the 11 years preceding.

Rainfall, Scotland West, January to March, and Mean Temperature, St. Helena, May to August following.

	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901
RAIN, Scotland W., Jan. to March	18·4	24·9	37·8	12·4	29·6	18·4	33·5	19·6	17·4	16·9
TEMP., St. Helena, May to Aug. following	59·0	60·5	59·4	60·8	59·8	60·6	58·1	60·3	61·0	62·2

	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	Mean.
RAIN	21·7	49·3	26·5	29·8	30·9	30·5	30 2	18·6	29·1	27·5	25·8 in.
TEMP.....	60·4	58·8	59·1	60·9	59·2	59·9	59·1	59·6	60·1	58·8	59·9 deg.

Departure from Normal.

	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901
RAIN, Scotland W. ...	—7·4	—·9	+12·0	—13·4	+3·8	—7·4	+7·7	—6·2	—8·4	—8·9
TEMP., St. Helena ...	— ·9	+ ·6	— ·5	+ ·9	— ·1	+ ·7	—1·8	+ ·4	+1·1	+2·3

	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911
RAIN	—4·1	+23·5	—5·3	+4·0	+5·1	+4·7	+4·4	—7·2	+3·3	+1·7 in.
TEMP.....	+ ·5	— 1·1	— ·8	+1·0	— ·7	·0	— ·8	— ·3	+ ·2	—1·1 deg.

The data discussed are for the 20 years, 1892 to 1911, and are given in the preceding table, the actual values being shown in Fig. 1.

A relation can be traced between the mean temperature at St. Helena during the four months, January to April, and the mean

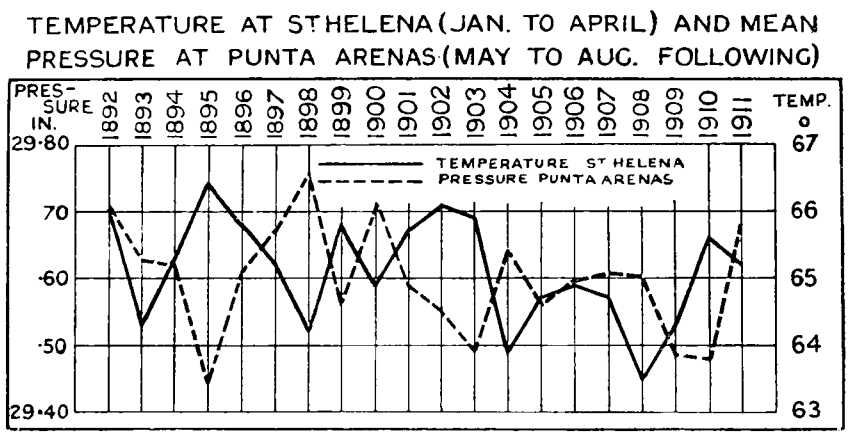

Fig. 2.

barometric pressure at Punta Arenas, in Magellan Straits, during the four months following. This relation is shown by the circumstance that if the January to April temperature at St. Helena shows a rise as compared with the year previous, the pressure at Punta Arenas during the period, May to August, in general shows a fall, and *vice versa*. During the last six years, 1906 to 1911, of the period discussed the results are not very conclusive, this being probably due

to the position occupied by Punta Arenas, which is in some groups of years dominated by Atlantic and in other periods by Pacific influences. The mean temperature and pressure values are as follows :—

	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901
TEMP., St. Helena, Jan. to April	66·0	64·3	65·3	66·4	65·8	65·2	64·2	65·8	64·9	65·7
PRESSURE, Punta Arenas, May to August ... 29 in.+	·71	·63	·62	·44	·61	·67	·76	·56	·71	·59

	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	Mean.
TEMP.	66·1	65·9	63·9	64·7	64·9	64·7	63·5	64·3	65·6	65·2	65·1 deg.
PRESSURE...	·55	·49	·64	·56	·60	·61	·60	·49	·48	·68	29·60 in.

Fig. 2 shows the above data in graphic form.

The majority of correlations which break down do so completely, passing into an indefinite type, in which the characteristic phases of

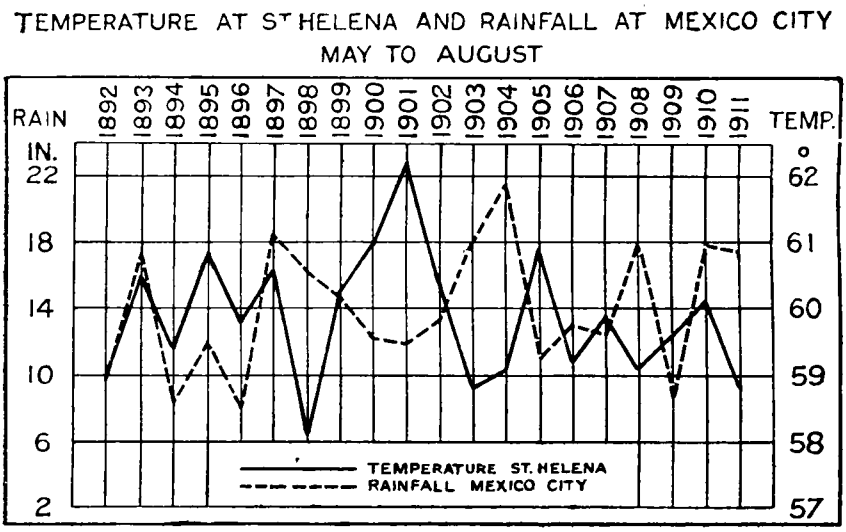

Fig. 3.

the curves are sporadically mixed up with cases of complete disagreement. Sometimes, however, a correlation which for some years may be of a positive nature, changes suddenly into one of a negative character, which may persist for some years. An example of this is shown by a comparison of the May to August rainfall at Valle de Mexico, lat. 19° 26′ N., long. 99° 08′ W., height 7,480 feet, with the mean St. Helena temperature for the same months. The St. Helena values have already appeared in this article, those referring to the Mexico rainfall (extracted from the monthly bulletins of the Central Observatory) being as follows, in inches : —

1892	1893	1894	1895	1896	1897	1898	1899	1900	1901
9·7	17·3	8·3	13·0	8·1	18·6	15·4	14·6	12·2	12·0
1902	**1903**	**1904**	**1905**	**1906**	**1907**	**1908**	**1909**	**1910**	**1911**
13·4	18·0	21·6	11·2	13·1	12·5	17·9	8·7	17·8	17·6

In this case we find the two curves (see Fig. 3) pursuing the same course from 1892 to 1898, while from 1899 to 1909 they were the reverse of each other, coming into agreement again in 1910 and 1911.

Somewhat similar results are shown from a comparison of the January barometric pressure curves at Ponta Delgado, Azores, and Punta Arenas during the 24 years, 1889—1912. For the 13 years, 1892—1904, the departures from the normal for the two places were the opposite in 11 years and the same in two years, while in the five years succeeding (1905 to 1909), the departures from the normal were positive at both places.

Correspondence.

To the Editor of Symons's Meteorological Magazine.

THE GENESIS OF DEW.

During the course of the last year or so I have been much struck by the circumstance that the amount of "dew on the grass" in the early morning, just before or about the time of sunrise, does not bear any traceable relationship either to the indicated humidity of the atmosphere or to the temperature indicated by the "grass thermometer." I am using a set of three shallow thin glass trays 8 in. by 6 in. One is set on the grass hollow side up. Into this is precipitated what I judge to be moisture from the atmosphere. Another is inverted on the grass close to the first. On the underside I find condensed moisture that has evidently exhaled as vapour from the herbage and the soil. The third is inverted on a bare patch of garden soil near by. On the underside of this I, sometimes, find moisture that has risen as vapour from the earth. It is an easy matter to take off these deposits either by means of a bit of soft sponge or blotting paper, and get the nett value with a set of photographer's grain scales. Thus treated so far, elementary arithmetic makes apparent that about sixty per cent. of a given dew deposit is exhaled by the grass, some twenty-five per cent. is precipitated from the atmosphere, and vapour from the soil is accountable for the remainder.

Of course such evidence is merely suggestive, but so far I have not met with any other analysis of the genesis of dew. Is there any authoritative pronouncement on the subject?

WILLIAM GODDEN.

20, Richmond Avenue, Willesden, N.W., 30th July, 1913.

THE CLIMATE OF TORQUAY.

MR. MACDOWALL, in criticizing my note of June 22, drags in five other towns which have no more to do with the subject—a comparison of the summer and winter climates of Torquay—than have Calcutta or Moscow. Into any comparison whatever of the respective merits or demerits of those rival health resorts I must decline to be led.

But I maintain my opinion that the winter climate of Torquay is immensely over-rated, and its summer climate hardly less maligned. My personal experience as a gardener, cultivating especially the light-loving orchids, is that recent winters here have been remarkably sunless. The winter gales have impressed themselves upon my memory by damage done to fine conifers planted here some 70 years ago by Mr. Isambard Brunel. But when I turn to the words "terribly wet," I can supply figures. The rainfall of the three winter months (December, January and February) for the four years (1909–1913) during which I have taken observations has been 16·56 in., 11·30 in., 19·55 in., and 15·43 in., giving a total of 62·84 in., and an average per quarter of 15·71 in., or per month, 5·24 in. "Whitaker," in his Almanack, gives the average rainfall (at Greenwich, I presume) for every month for 50 years, 1841-1890. For those three months he makes it out 5·24 in., or per month, 1·75 in.

I was, however, discussing the Torquay winters not absolutely, but in relation to its summers. I have always heard July and August spoken of as the wettest months of the year, so I was not surprised to find that the average of June, July and August given in "Whitaker," mounts up to 6·84 in., average per month, 2·28 in.

The June, July and August rainfall here for the aforesaid four years has been 10·12 in., 3·66 in., 13·32 in., and 1·66 in., in all 28·76 in., giving an average of 7·19 in. for the three months, and 2·39 in. per month.

Roughly speaking, then, *three times as much rain* falls here during the three winter months as does at the place (? Greenwich) whence "Whitaker" derives the figures which he uses as his standard. On the other hand, in the summer, very slightly more rain falls here than there. I think that my words "terribly wet" are abundantly justified. We have a large rainfall, and it falls mostly in the winter months.

Your Correspondent takes no exception to my remarks as to Torquay summers, but I should like to be permitted to say that, while I find in "Whitaker" maxima of 90° or over recorded seven times—once, on August 9th, 100°—in the phenomenal summer of 1911, here upon one occasion only did the shade temperature rise as high as 86½°. Of the hot oppressive airless nights with which one meets so often during a London summer, and occasionally in the Thames Valley, I can only remember one during the seven summers I have spent in Torquay.

JOHN EDWARDS-MOSS.

Roby Hall, Torquay, 30th September, 1913.

THUNDERSTORM OF SEPTEMBER 16th AT NEWCASTLE-ON-TYNE.

THE following notes upon a thunderstorm we had in this district may be of some interest.

Following a light shower in the early morning, and a slight thunderstorm at about 5 o'clock, the morning broke dull and threatening, when a torrential shower fell from 8.15 a.m. till 8.45, but not until 9 o'clock was there any indication of the coming storm. At the hour mentioned huge banks of ominous looking clouds rolled up from the west, and for about half an hour thunder, followed by lightning, was noted in the distance; this gradually approached nearer until 10 o'clock, when what can be described as nothing short of a waterspout burst. Tropical rain had fallen from 9 o'clock, and continued until about 11 o'clock, when suddenly the storm ceased and the sun shone brilliantly.

Nearly every street was rendered impassable by the roaring torrents, which rushed everywhere, and caused a considerable amount of damage. As regards the amount of the precipitation, about ·75 in. had fallen at 9 o'clock, and during the 2 hours the storm lasted, 2·53 in. fell, about 2 in. having fallen in 1¼ hours. There was no further fall of rain, so that my record for the 16th was 3·28 in., the heaviest fall of rain during 24 hours during any month I have in my records, which cover 20 years, and never during this period has an inch of rain fallen in September, nor has 3 inches been recorded during the whole month.

An extraordinary fact was that the fall of the barometer before the storm was extremely small, thus indicating a very shallow depression. The storm was only local, and appears to have been severest here.

L. J. NICHOLSON.

Woodbine Road, Gosforth, Newcastle-upon-Tyne, 22nd Sept., 1913.

YOU will perhaps wish to have some idea of the limitations of the cloudburst at Newcastle on the 16th, so I send you the rainfall as measured here about that time. There has been nothing noticeable here, but I am told that at Hawthorn and Haswell, about 8 or 10 miles south of this, there was very heavy rain at or near the same time as in Newcastle. The rain here is measured at 8 a.m. and put down to the preceding day. During the 11 days ending with the 22nd, 0·63 in. fell, and on the 16th only ·01 in. T. W. BACKHOUSE.

West Hendon House, Sunderland, 23rd Sept., 1913.

[Such severe thunderstorms occur several times every year in some part of England, although rarely twice in the same place within half a century. We cannot, however, approve the use of the word *water-spout* for any rainfall which can be measured, as a *waterspout* or *cloud-burst* must inevitably wash away any rain gauge on which it falls.—*Ed., S.M.M.*]

THE WEATHER OF SEPTEMBER.

DURING the first ten days of the month anti-cyclonic conditions predominated. Rainfall was most unequally distributed during the first week, none falling in the west of Scotland and north-west of England, while in the south-east of England the week's fall amounted to nearly four times the normal. During this time temperature over the greater part of the country was in excess of the normal, but in the east and north of Scotland there was a marked deficit, shade minima as low as 34° being recorded at Balmoral on the 5th, and 35° at Gordon Castle on the 6th. At Newton Rigg on the 6th temperature fell to 36°, but over nearly the whole of England relatively high minima were observed. On the 11th a large, and for the season, deep disturbance whose centre lay between Iceland and Greenland, caused strong winds or moderate gales in the north of Scotland and west of Ireland. Temperature in Ireland was high, the maxima for the month being very generally recorded on the 11th, when a value of 73° was recorded at Roche's Point and 72° at Killarney. On the 13th a shallow depression suddenly developed over South Wales and the south-west of England. On the morning of the 14th pressure had fallen as low as 29·1 in. at Holyhead, and a N.N.E. gale was blowing at Malin Head. Heavy rains fell over most of England and Ireland, as much as 2·2 in. at Ennistymon (Co. Clare) and 1·6 in. at Enniscoe. On the 16th a remarkably heavy thunderstorm rain was experienced at Newcastle, 2·65 in. falling in one hour and a half. This was an essentially local rainfall extending over a very small area, and it is of interest to note that a somewhat similar fall occurred to the east and south of Doncaster on the following day, when Wath-on-Dearne recorded 2·4 in. and Bantry 2·1 in. These two falls are clearly shown by the course of the isohyets on the September map, forming perhaps the most noteworthy departures from the normal of the month for any portion of the British Isles.

During the week ending the 27th unusually warm weather for the time of year was experienced with maxima as high as 79° in various parts of the Midlands, and in the north-east and north-west of England. Throughout this week the nocturnal temperature was exceptionally elevated, minima exceeding 60° being frequently recorded in the south-west of England and Channel Islands. At Totland Bay (Isle of Wight) on the 27th, and at Jersey on the 27th and 28th the temperature did not fall below 62°. Southerly winds prevailed during the week under review. On the 28th temperature fell over the midland counties and southern England, the fall becoming general on the 29th, the month closed with fair or fine weather over the country.

The general rainfall expressed as a percentage of the average was: England and Wales, 94; Scotland, 77; Ireland, 119; British Isles, 96.

THAMES VALLEY RAINFALL – SEPTEMBER, 1913.

Symons's Meteorological Magazine

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

Rainfall Stations reporting

Isohyetals.

WEATHER FALLACIES.

By A. O. Walker, F.L.S.

The experience gained in over 40 years of observing and making daily records of weather phenomena emboldens the writer to offer the following notes. Obviously the subject to attack first is that of

Weather Forecasts,

by which is meant those supplied by the Meteorological Office to the daily Press. These, of course, are based on the movements of cyclones and anticyclones (areas of low and high barometric pressure) which affect the weather of the British Islands. But before going further the writer desires to say that the criticisms he has to make on the forecasts are not intended to imply any censure on the above Office, whose staff is doubtless fully aware of defects which, in the present state of the science of Meteorology, are inevitable; also, that he writes from the point of view of an agriculturist.

At the last meeting of the British Association, on September 9th, 1912, an interesting discussion took place on "the Application of Meteorological Information to Agricultural Practice," in which Dr. Shaw is reported to have said "it was time to ask if the forecasts were useful and if they were used as they might be." Now, before attempting to answer this very sensible question, let it be understood that, practically, rain is the only item of any importance to the farmer. When a field of hay is ready to cut it is useless for the owner to look at any available forecast, because what he wants to know is not the weather of to-day when he has to make up his mind whether he will cut it to-morrow or not, or even of to-morrow (for rain does very little harm to hay until it has been turned), but whether he can have fine weather two or three days *after he has cut*; and as this information cannot be had, the best thing he can do is to cut when the hay is ripe and take his chance like his forefathers. The writer in 1906 had 1·02 in. of rain on his hay in the first two days (Thursday and Friday) after it was cut and before it was turned, and stacked it in excellent condition the following Wednesday!

If the forecast of rain could be got in time to allow of sowing before it fell and *if it could be localized*, it would indeed be useful, but, alas! there seems very little chance of either of these conditions being fulfilled! Thunderstorms, cloud-bursts, and "local showers" will continue to show themselves independent of all the calculations of meteorologists so far as the exact locality of their discharge is concerned, and until this difficulty is overcome forecasts are useless to farmers.

And if it were overcome, what then? To foretell is not to prevent, and we should still have wet summers, and bad harvests, the effects of which would be but little mitigated by fore-knowledge, which could probably only be obtained at a cost out of all proportion to the results. And it seems a pity that men of science should have to

waste their time in trying to do the impossible when there is so much to be done in the purely scientific problems of meteorology. Possibly they agree with this, but issue the forecasts under the impression that the ignorant public thinks that it gets "something for its money," whereas 99 out of 100 don't think of them at all.

The following examples well illustrate the difficulties of making accurate rainfall forecasts:—

1. On September 7th, 1910, during the prevalence of an immense anticyclone, a rainstorm passed across the north of Kent from the North Sea as far as Ulcombe, where the fall (0·74 in.) was the heaviest of the year up to the above date. To the south of Ulcombe it could not be traced; no rain fell at Hastings, and the *total* rainfall for September at Tenterden was only 0·48 in. on 10 days. There was no thunder or lightning (*Symons's Met. Mag.*, 1910, p. 191).

2. From June 1st to 11th, 1911, no rain was recorded at Ulcombe. At Sharsted Court, only 8½ miles distant (N.E.), it rained every day from 1st to 10th, the amount being 2·02 in.! Yet the one forecast applies to both places!

Rainfall.

What is a wet year? From the point of view of the man who is interested in the water-supply of the country it is a year in which the rainfall is above the average. But to the farmer (unless his land is liable to floods), and to the great majority of people, it means a year in which there is an excessive number of rainy days. Take the case of the 1·02 in. of rain mentioned in a previous page as falling on a crop of hay just cut without injury to it—had half that quantity been distributed over the following 10 days the value of the hay would havs been very seriously reduced, while the cost of getting it would have been very greatly increased. It may be thought that these two items must generally coincide, but this is by no means the case. Last year (1912), for instance, the total rainfall here was 28·88 in. against 34·81 in. in 1903. But while in 1912 it rained on 192 days, in 1903 it only rained on 172! Yet much less importance is generally attached to the number of days than to the amount of rain—indeed, many of the contributors of *British Rainfall* do not think it worth while to take daily measurements.

The effect of neglecting the number of rain days is even more misleading in the monthly rainfall than in the annual. Take the case of September, 1912: the rainfall at Ulcombe for the month was ·83 in. above the average of 10 years, so that one would suppose it to have been a rather wet month. Yet, on the contrary, it was a remarkably dry one, only ·26 in. having fallen before the 29th, on which day and the next 2·21 in. fell! And it was fortunate that it was dry, for the previous month was the wettest August as regards both amount of rain (5·71 in.) and number of days of rain (28) ever recorded by the writer in 32 years, of which 19 were in N. Wales. Indeed the number of days exceeded by 2 the highest recorded in that period for *any* month!

Averages.

These are regarded by most climatologists with an almost superstitious veneration! It is certainly convenient, when asked which are the driest and wettest months, to give the averages of a certain number of years, and both the giver and receiver are satisfied. But their satisfaction would be less if they went into the items from which the averages were deduced. For instance, in the ten years 1900–9 February has the lowest* average of 1·62 in., and October the highest of 3·10 in. But on looking into the items we find that in those years the February rainfall ranges from ·88 in. in 1909 to 3·75 in. in 1900, while October ranges from 1·66 in. in 1908 to 5·29 in. in 1903. And in 1900 the two months had changed places, October with a rainfall of 1·76 in. being the driest, and February with 3·75 in. the wettest month of the year! It is very clear, therefore, that in making arrangements, say for one's holidays, it will not do to rely on monthly rainfall averages.

Yearly averages are more useful, especially in comparing the rainfall of different localties. But here again, the average number of rain days would be, as shown above, at least as useful as that of the rainfall, yet it is very rarely given. A person looking for an agreeable climate would probably prefer one with fewer rain days and more rainfall to the reverse of these conditions. To take an example at a venture to show how the proportions of the two vary, we find in *British Rainfall, 1911*, p. [342], in two apparently not distant localities the following figures: 29·86 in. on 181 days, 41·36 in. on 166 days.

Temperature.

This is generally published in the form of the highest (max.) lowest (min.) in the Stevenson screen, and their "means" or averages obtained by adding together all the readings for a given month and dividing the total in each case by the number of days in the month. The mean temperature is arrived at by adding the mean max. to the mean min. and halving the result. Of the above it is worth observing that in hot weather, with the sun shining for hours on the screen, the temperature inside, owing to radiation from the heated wood, is considerably higher than it is in an open verandah facing north. Thus, on August 9th, 1911, at 2 p.m., the maximum thermometer and a control mercurial one in the screen stood at 95°.5, while a previously compared mercurial in a N. verandah, about 20 yards distant, at the same time stood at 88° only. This was confirmed on September 12th, the respective temperatures being 86° and 79°; at 9.20 p.m. the same evening both stood at 70°·5. To prove the heating of the wood, on July 14th, 1912, at 6.30 p.m., a thermometer on the back of the screen (inside) stood at 81°, while on the usual frame in the middle the temperature was 75°. As, however, it is necessary to have observations for comparison taken under

* "February Filldyke"!! So much for popular beliefs.

uniform conditions, and the Stevenson screen has been generally adopted, this source of error cannot be avoided, but should be allowed for.

Monthly mean temperatures are apt to be very misleading. A cold or warm spell may begin near the end of one month and continue over the first few days of the next, the mean max. or min. of each month giving little idea of the intensity of the spell, so that a gardener wishing to compare one summer with another in regard to periods hot enough to risen the wood of his fruit trees might easily be misled by the published means. The means of all important periods of heat or cold, irrespective of the calendar, ought to be published in an easily accessible form.

It is difficult to see the use of the "mean temperature" (see above), as it gives no information by itself of the climate of the locality.

Compare the following :—

Coolgardie, W. Australia, Oct., 1910.*	Dwyran, N. Wales, July, 1912.†
Mean max. = 71°·9	Mean max. = 65°·5
,, min. = 46°·6	,, min. = 53°·6
,, temp. = 59°·3	,, temp. = 59°·6

So that, with practically the same mean temperature, there is a difference between max. and min. of 25° in the one and only 12° in the other! And what different climates!

(To be continued.)

REVIEW.

The Realm of Nature, an outline of Physiography, by HUGH ROBERT MILL, D.Sc., LL.D. London: John Murray, 1913. Size 7½ × 5. Pp. xii. + 404, 19 plates. Price 5s.

THIS is a book that we cannot well review in these pages, but we may place its publication on record. The book was planned twenty-five years ago with the ambitious design of giving an outline of the scientific study of Nature on a uniform scale, and defining the limits of the various special sciences involved in studying the conditions and processes concerning the Earth as a whole. From time to time as the book was reprinted many alterations and corrections were introduced, and now a completely new edition has been prepared, large parts of the book being rewritten. The original scheme has been preserved—though we may hint to our readers that the author with the experience of another quarter of a century would not now dare to think so imperially on the whole of Nature.

The extent of the revision may be judged by the alterations on the page reproduced herewith. Most extension has been given to the treatment of meteorology.

* *Symons's Meteorological Magazine*, Vol. **46**, p. 60.
† *Monthly Weather Reports* of Meteor. Office, July, 1912, p. 72.

the north of England and south of Scotland it is April, in the Scottish highlands it is May, and in Orkney it is June. The average distribution of climate shown in the maps, although correct on the whole, cannot be depended upon to hold good at any special place for any particular month. Such maps are of great value in choosing a place to reside in, but of very little use for planning a pleasure trip. The conditions of weather are somewhat complicated, but appear to depend mainly on the distribution of atmospheric pressure, which may be classified into certain well-marked types.

Anticyclones. An anticyclone is a portion of the atmosphere in which the pressure is highest at the centre, and diminishes nearly uniformly in all directions. The wind in an anticyclone blows spirally outward, as is illustrated in the high-pressure regions shown in the Isobaric maps. In the northern hemisphere the circulation of surface wind round the edge of an anticyclone is in the same direction as the hands of a watch move, in the southern hemisphere in the opposite direction, as explained by Ferrel's or Buys Ballot's Law. An anticyclone when once formed is a very steady arrangement of pressure, and usually lasts for many days or even weeks at a time. This being so, it is evident that a supply of air must be continuously renewed from above to take the place of that passing out as surface winds. Air in fact passes through an anticyclone much as grain does through a pair of mill stones, though of course without suffering any physical change. In the upper regions of the atmosphere air must be moving inward and sinking downward to maintain the anticyclone, and the pressure in the upper region of the atmosphere must thus be least above the spot where it is greatest on the Earth's surface. This deduction has been proved to be true by observations at mountain meteorological stations. The surface winds of an anticyclone are usually light and variable. As the air is descending from above, it contains very little water-vapour, and no clouds are formed. Hence in summer anticyclonic weather is brilliant, hot, and calm, with haze at night or heavy deposits of dew, on account of great cooling by radiation. In winter an anticyclone is

RAINFALL TABLE FOR SEPTEMBER, 1913.

STATION.	COUNTY.	Lat. N.	Long. W. [*E.]	Height above Sea.	RAINFALL OF MONTH.	
					Aver. 1875—1909.	1913.
		° ′	° ′	ft.	in.	in.
Camden Square	*London*	51 32	0 8	111	2·00	1·75
Tenterden	*Kent*	51 4	*0 41	190	2·25	1·51
Arundel (Patching)	*Sussex*	50 51	0 27	130	2·58	3·05
Fawley (Cadland)	*Hampshire*	50 50	1 22	52	2·60	2·91
Oxford (Magdalen College).	*Oxfordshire*	51 45	1 15	186	1·98	1·45
Wellingborough (Croyland Abbey).	*Northampton*	52 18	0 41	174	2·14	1·49
Shoeburyness	*Essex*	51 31	*0 48	13	1·70	·83
Bury St. Edmunds (Westley)	*Suffolk*	52 15	*0 40	226	2·18	2·50
Geldeston [Beccles]	*Norfolk*	52 27	*1 31	38	2·13	2·63
Polapit Tamar [Launceston]	*Devon*	50 40	4 22	315	3·11	2·87
Rousdon [Lyme Regis]	,,	50 41	3 0	516	2·69	3·43
Stroud (Upfield)	*Gloucestershire*	51 44	2 13	226	2·39	2·56
Church Stretton (Wolstaston)	*Shropshire*	52 35	2 48	800	2·40	1·99
Coventry (Kingswood)	*Warwickshire*	52 24	1 30	340	2·35	1·72
Boston	*Lincolnshire*	52 58	0 1	11	2·07	1·75
Worksop (Hodsock Priory)	*Nottinghamshire*	53 22	1 5	56	1·84	2·13
Macclesfield	*Cheshire*	53 15	2 7	501	2·92	1·30
Southport (Hesketh Park)	*Lancashire*	53 38	2 59	38	3·09	2·29
Arncliffe Vicarage	*Yorkshire, W.R.*	54 8	2 6	732	4·55	2·07
Wetherby (Ribston Hall)	,, ,,	53 59	1 24	130	2·11	1·22
Hull (Pearson Park)	,, *E.R.*	53 45	0 20	6	2·05	1·05
Newcastle (Town Moor)	*Northumberland*	54 59	1 38	201	2·00	6·48
Borrowdale (Seathwaite)	*Cumberland*	54 30	3 10	423	11·28	4·56
Cardiff (Ely)	*Glamorgan*	51 29	3 13	53	3·61	3·87
Haverfordwest	*Pembroke*	51 48	4 58	90	3·91	8·01
Aberystwyth (Gogerddan)	*Cardigan*	52 26	4 1	83	3·89	4·36
Llandudno	*Carnarvon*	53 20	3 50	72	2·50	3·84
Cargen [Dumfries]	*Kirkcudbright*	55 2	3 37	80	3·34	3·00
Marchmont House	*Berwick*	55 44	2 24	498	2·67	1·82
Girvan (Pinmore)	*Ayr*	55 10	4 49	207	4·30	3·16
Glasgow (Queen's Park)	*Renfrew*	55 53	4 18	144	2·99	2·18
Inveraray (Newtown)	*Argyll*	56 14	5 4	17	6·15	3·25
Mull (Quinish)	,,	56 34	6 13	35	5·20	3·11
Dundee (Eastern Necropolis)	*Forfar*	56 28	2 57	199	2·34	2·21
Braemar	*Aberdeen*	57 0	3 24	1114	2·73	2·22
Aberdeen (Cranford)	,,	57 8	2 7	120	2·69	2·55
Cawdor	*Nairn*	57 31	3 57	250	2·55	3·73
Fort Augustus (S. Benedict's)	*E. Inverness*	57 9	4 41	68	3·54	1·98
Loch Torridon (Bendamph)	*W. Ross*	57 32	5 32	20	7·28	4·19
Dunrobin Castle	*Sutherland*	57 59	3 56	14	2·51	2·88
Wick	*Caithness*	58 26	3 6	77	2·57	2·90
Killarney (District Asylum)	*Kerry*	52 4	9 31	178	3·79	4·79
Waterford (Brook Lodge)	*Waterford*	52 15	7 7	104	3·19	3·32
Nenagh (Castle Lough)	*Tipperary*	52 54	8 24	120	3·16	3·39
Ennistymon House	*Clare*	52 57	9 18	37	4·22	5·56
Gorey (Courtown House)	*Wexford*	52 40	6 13	80	2·78	4·09
Abbey Leix (Blandsfort)	*Queen's County*	52 56	7 17	532	2·93	3·72
Dublin (Fitz William Square)	*Dublin*	53 21	6 14	54	2·06	4·31
Mullingar (Belvedere)	*Westmeath*	53 29	7 22	367	3·02	3·27
Crossmolina (Enniscoe)	*Mayo*	54 4	9 16	74	4·42	5·37
Cong (The Glebe)	,,	53 33	9 16	112	4·05	3·76
Collooney (Markree Obsy.)	*Sligo*	54 11	8 27	127	3·65	3·03
Seaforde	*Down*	54 19	5 50	180	3·25	6·51
Bushmills (Dundarave)	*Antrim*	55 12	6 30	162	3·49	2·07
Omagh (Edenfel)	*Tyrone*	54 36	7 18	280	3·39	3·24

RAINFALL TABLE FOR SEPTEMBER, 1913—*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.	1913. in.	Diff. from Aver. in.	% of Av.	Mean Annual 1875–1909. in.	STATION.
— ·25	88	·46	16	11	17·92	16·16	—1·76	90	25·11	Camden Square
— ·74	67	·52	5	14	18·32	17·03	—1·29	93	27·64	Tenterden
+ ·47	118	1·43	4	11	20·02	26·67	+6·65	133	30·48	Patching
+ ·31	112	·75	5	15	21·18	22·50	+1·42	107	31·87	Cadland
— ·53	73	·48	1	10	17·45	14·40	—3·05	82	24·58	Oxford
— ·65	70	·80	1	13	18·20	16·11	—2·09	88	25·17	Croyland Abbey
— ·87	49	·22	6	11	13·17	11·69	—1·48	89	19·28	Shoeburyness
+ ·32	115	·68	1, 22	14	18·14	16·45	—1·69	91	25·40	Westley
+ ·50	123	·63	17	18	16·33	16·04	— ·29	98	23·73	Geldeston
— ·24	92	·65	16	15	24·90	28·39	+3·49	114	38·27	Polapit Tamar
+ ·74	127	1·12	5	12	22·54	22·46	— ·08	100	33·54	Rousdon
+ ·17	107	·89	1	12	21·12	21·70	+ ·58	103	29·81	Stroud
— ·41	83	·60	22	16	22·71	25·63	+2·92	113	32·41	Wolstaston
— ·63	73	·77	1	11	20·51	19·08	—1·43	93	28·98	Coventry
— ·32	85	·40	1	18	16·67	14·22	—2·45	85	23·35	Boston
+ ·29	116	·94	17	12	17·54	15·68	—1·86	89	24·46	Hodsock Priory
—1·62	45	·28	22	12	24·85	23·67	—1·18	95	34·73	Macclesfield
— ·80	74	·94	26	12	22·70	20·88	—1·82	92	32·70	Southport
—2·48	45	·64	25	11	42·14	41·24	— ·90	98	61·49	Arncliffe
— ·89	58	·43	18	11	19·08	15·53	—3·55	81	26·87	Ribston Hall
—1·00	51	·38	1	11	18·57	13·89	—4·68	75	26·42	Hull
+4·48	324	2·65	16	20	19·65	22·56	+2·91	115	27·94	Newcastle
—6·72	40	1·05	13	13	88·04	89·05	+1·01	101	129·48	Seathwaite
+ ·26	107	1·26	4	13	28·63	31·94	+3·31	112	42·28	Cardiff
+4·10	205	2·06	13	13	30·96	38·49	+7·53	124	46·81	Haverfordwest
+ ·47	112	·97	22	15	30·92	41·52	+10·60	134	45·46	Gogerddan
+1·34	154	1·45	12	15	20·55	23·86	+3·31	116	30·36	Llandudno
— ·34	90	·86	13	12	29·83	34·32	+4·49	115	43·47	Cargen
— ·85	68	·42	26	12	23·89	19·58	—4·31	82	33·76	Marchmont
—1·14	73	·93	13	13	33·67	30·28	—3·39	90	49·77	Girvan
— ·81	73	·77	13	14	25·03	24·77	— ·26	99	35·97	Glasgow
—2·90	53	·95	25	13	46·21	45·88	— ·33	99	68·67	Inveraray
—2·09	60	·71	11	15	37·87	35·26	—2·61	93	56·57	Quinish
— ·13	94	·52	13	11	20·54	18·63	—1·91	91	28·64	Dundee
— ·51	81	·43	16	13	24·16	24·17	+ ·01	100	34·93	Braemar
— ·14	95	·95	13	13	22·78	20·32	—2·46	89	32·73	Aberdeen
+1·18	146	1·42	13	11	21·25	16·83	—4·42	79	29·33	Cawdor
—1·56	56	·54	16	12	30·26	29·06	—1·20	96	44·53	Fort Augustus
—3·09	58	1·76	11	14	56·79	52·62	—4·17	93	83·93	Bendamph
+ ·37	115	1·40	15	8	22·41	17·01	—5·40	76	31·90	Dunrobin Castle
+ ·33	113	·81	15	15	20·68	15·93	—4·75	77	29·88	Wick
+1·00	126	1·35	14	19	36·76	39·63	+2·87	108	54·81	Killarney
+ ·13	104	·92	22	15	27·45	29·84	+2·39	109	39·57	Waterford
+ ·23	107	·75	24	18	27·73	30·92	+3·19	112	39·43	Castle Lough
+1·34	132	2·21	14	18	32·47	35·66	+3·19	110	46·52	Ennistymon
+1·31	147	1·13	22	16	24·41	25·03	+ ·62	103	34·99	Courtown Ho.
+ ·79	127	·88	19	20	25·70	29·50	+3·80	115	35·92	Abbey Leix
+2·25	210	1·65	19	13	19·89	20·98	+1·09	105	27·68	Dublin
+ ·25	108	·75	13	15	26·19	28·55	+2·36	109	36·15	Mullingar
+ ·95	122	1·62	14	16	35·74	41·37	+5·63	116	52·87	Enniscoe
— ·29	93	1·20	14	16	33·88	36·63	+2·75	108	48·90	Cong
— ·62	83	·70	14	14	30·14	32·13	+1·99	107	42·71	Markree
+3·26	200	2·04	13	13	27·63	29·26	+1·63	106	38·91	Seaforde
—1·42	59	·54	14	15	26·32	21·25	—5·07	81	37·56	Dundarave
— ·15	96	·77	13	13	28·05	29·16	+1·11	104	39·38	Omagh

SUPPLEMENTARY RAINFALL, SEPTEMBER, 1913.

Div.	STATION.	Rain inches.	Div.	STATION.	Rain inches.
II.	Warlingham, Redvers Road..	1·40	XI.	Lligwy	3·04
,,	Ramsgate	2·39	,,	Douglas	...
,,	Hailsham	2·94	XII.	Stoneykirk, Ardwell House...	3·21
,,	Totland Bay, Aston House...	3·81	,,	Dalry, The Old Garroch.....	4·09
,,	Stockbridge, Ashley..	2·46	,,	Beattock, Kinnelhead	2·59
,,	Grayshott	3·88	,,	Langholm, Drove Road	2·50
,,	Caversham, Rectory Road ...	1·65	XIII.	Meggat Water, Cramilt Lodge	2·63
III.	Harrow Weald, Hill House...	1·61	,,	North Berwick Reservoir.....	2·08
,,	Pitsford, Sedgebrook.....	1·33	,,	Edinburgh, Royal Observaty.	2·17
,,	Woburn, Milton Bryant.....	1·57	XIV.	Maybole, Knockdon Farm ...	2·58
,,	Chatteris, The Priory.....	1·51	XV.	Ballachulish House	1·61
IV.	Colchester, Hill Ho., Lexden	1·07	,,	Campbeltown, Witchburn ..	2·80
,,	Newport, Belmont House ...	...	,,	Holy Loch, Ardnadam.....	4·12
,,	Ipswich, Rookwood, Copdock	1·18	,,	Islay, Eallabus	2·54
,,	Blakeney.....	·87	,,	Tiree, Cornaigmore	2·66
,,	Swaffham	1·12	XVI.	Dollar Academy	2·69
V.	Bishops Cannings	3·11	,,	Balquhidder, Stronvar.....	4·91
,,	Winterbourne Steepleton.....	...	,,	Glenlyon, Meggernie Castle..	3·98
,,	Ashburton, Druid House.....	4·87	,,	Blair Atholl	2·59
,,	Cullompton	1·94	,,	Coupar Angus	1·99
,,	Lynmouth, Rock House	1·59	,,	Montrose, Sunnyside Asylum.	3·18
,,	Okehampton, Oaklands.....	1·90	XVII.	Alford, Lynturk Manse	3·13
,,	Hartland Abbey.....	2·38	,,	Fyvie Castle	3·41
,,	Probus, Lamellyn.....	3·13	,,	Keith Station	2·96
,,	North Cadbury Rectory.....	3·16	XVIII.	Alvey Manse.....	1·92
VI.	Clifton, Pembroke Road.....	3·74	,,	Loch Quoich, Loan	6·10
,,	Ross, The Graig	3·05	,,	Drumnadrochit.....	2·20
,,	Shifnal, Hatton Grange.....	1·44	,,	Skye, Dunvegan	4·17
,,	Droitwich.....	1·99	,,	N. Uist, Lochmaddy	...
,,	Blockley, Upton Wold.....	3·18	,,	Glencarron Lodge	3·35
VII.	Market Overton.....	2·63	XIX.	Invershin	2·95
,,	Market Rasen	1·15	,,	Melvich	2·36
,,	Bawtry, Hesley Hall	3·92	,,	Loch Stack, Ardchullin	4·93
,,	Derby, Midland Railway.....	1·48	XX.	Skibbereen Rectory.....	6·54
,,	Buxton	1·68	,,	Dunmanway, The Rectory ..	6·97
VIII.	Nantwich, Dorfold Hall	1·61	,,	Glanmire, Lota Lodge, No. 1	5·65
,,	Chatburn, Middlewood	1·90	,,	Mitchelstown Castle.....	6·33
,,	Cartmel, Flookburgh	2·62	,,	Darrynane Abbey.....	5·02
IX.	Langsett Moor, Up. Midhope	2·61	,,	Clonmel, Bruce Villa	3·41
,,	Scarborough, Scalby	·96	,,	Newmarket-on-Fergus, Fenloe	5·02
,,	Ingleby Greenhow	1·46	XXI.	Laragh, Glendalough	...
,,	Mickleton	3·10	,,	Ballycumber, Moorock Lodge	2·99
X.	Bellingham, High Green Manor	1·86	,,	Balbriggan, Ardgillan	5·54
,,	Ilderton, Lilburn Cottage ...	2·04	XXII.	Woodlawn	5·05
,,	Keswick, The Bank.....	2·42	,,	Westport, St. Helens	3·86
XI.	Llanfrechfa Grange	4·34	,,	Dugort, Slievemore Hotel ...	4·72
,,	Treherbert, Tyn-y-waun	3·63	,,	Mohill Rectory	4·44
,,	Carmarthen, The Friary	5·85	XXIII.	Enniskillen, Portora.....	4·09
,,	Castle Malgwyn [Llechryd]...	6·31	,,	Dartrey [Cootehill]	4·02
,,	Crickhowell, Tal-y-maes.....	4·00	,,	Warrenpoint, Manor House ..	5·24
,,	New Radnor, Ednol	2·98	,,	Banbridge, Milltown	4·45
,,	Birmingham WW., Tyrmynydd	3·57	,,	Belfast, Cave Hill Road	3·90
,,	Lake Vyrnwy	2·61	,,	Glenarm Castle..... ...	3·61
,,	Llangyhanfal, Plâs Draw.....	1·89	,,	Londonderry, Creggan Res...	3·39
,,	Dolgelly, Bryntirion.....	4·91	,,	Dunfanaghy, Horn Head ...	4·34
,,	Bettws-y-Coed, Tyn-y-bryn...	3·16	,,	Killybegs	4·07

METEOROLOGICAL NOTES ON SEPTEMBER, 1913.

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.—Cloudy or dull generally with occasional sunny days. Fine, bright and dry weather in the last week with a marked rise in temp. Mean temp. 58°·9 or 1°·2 above the average. Duration of sunshine 111·3* hours, and of R 44·8 hours. Evaporation 1·07 in. Shade max. 78°·2 on 27th; min. 43°·0 on 16th. F 0, f 0.

TENTERDEN.—Showery except in the last week which was the finest since May. Duration of sunshine 152·0† hours. A tower was struck during a sharp TS on 16th Shade max. 73°·5 on 26th; min. 44°·0 on 17th. F 0, f 0.

TOTLAND BAY.—Night temps. were higher than in any preceding September since 1891. Duration of sunshine 152·4* hours. Shade max. 69°·8 on 27th; min. 45°·9 on 17th. F 0, f 0.

MILTON BRYANT.—A lovely month. Wind mostly E. and N.E., and just sufficient R to make the soil workable and set crops growing.

IPSWICH, COPDOCK.—A dismal opening gave place to a bright spell of pleasant weather from 10th to 19th and the month closed in brilliant style. Equable temp. throughout. Mean temp. 58°·0. Shade max. 71°·7 on 26th; min. 40°·3 on 16th. F 0, f 0.

POLAPIT TAMAR.—Shade max. 75°·3 on 27th; min. 41°·4 on 11th and 22nd. F 0, f 0.

NORTH CADBURY.—The largest R in September since 1899, but a genial pleasant month. Dry hot weather during the last 8 days. The nights of the first 8 and last 8 days were especially warm. Shade max. 79°·0 on 27th; min. 42°·0 on 17th. F 0, f 0.

HODSOCK PRIORY.—A warm and quiet month. A series of TSS on 17th. The last week was very warm. Shade max. 78°·7 on 27th; min. 34°·7 on 15th. F 0, f 3.

SOUTHPORT.—Duration of sunshine 123·0* hours, and of R 53·7 hours. Mean temp. 57°·3 or 1°·9 above the average. Evaporation 1·52 in. Shade max. 73°·0 on 27th; min. 39°·0 on 8th. F 0, f 1.

NEWCASTLE-ON-TYNE.—On 16th 2·65 in. of R fell in an hour and a half.

HAVERFORDWEST.—Duration of sunshine 127·9* hours. Shade max. 69°·9 on 27th; min. 42°·4 on 19th. F 0, f 0.

LLANDUDNO.—Shade max. 74°·0 on 24th; min. 43°·0 on 16th.

CARGEN.—Fine harvest weather in the first 10 days, but the remainder of the month was unsettled. Mean temp. 55°·1. Shade max. 72°·8 on 28th; min. 37°·0 on 17th.

EDINBURGH.—Duration of sunshine 80·8* hours. Shade max. 71°·3 on 24th; min. 42°·6 on 17th. F 0, f 2.

COUPAR ANGUS.—The fine summer came to an end on 7th in the middle of the harvest, and the weather has been bad ever since. Shade max. 67°·0 on several days; min. 34°·0 on 2nd.

LOCH STACK.—Duration of sunshine 112·8* hours.

WATERFORD.—Shade max. 74°·5 on 11th; min. 39°·0 on 18th.

DUBLIN.—Fine and dry to 8th. Heavy R on 13th, 19th and 24th, and fogs on 23rd and 27th. Mean temp. 56°·3. Shade max. 70°·0 on 11th; min. 41°·5 on 18th. F 0, f 0.

WARRENPOINT.—A wet month, but four-fifths of the total fall fell on 3 days, the 13th, 19th and 22nd. On the 19th R fell continuously for 21 hours and measured 2·01 in. Shade max. 68°·0 on 11th; min. 40°·0 on 16th. F 0, f 0.

OMAGH.—The fine spell of August continued into the first 10 days of September, but the remainder of the month had broken weather with some fine spells but excessive moisture.

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* Campbell-Stokes. † Jordan.

Climatological Table for the British Empire, April, 1913.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Date.	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	68·5	29	26·0	13	56·6	40·3	40·4	77	109·4	23·2	2·72	21	7·2
Malta	75·9	27	49·9	17	65·4	55·9	...	81	137·5	..	·73	4	4·6
Lagos	92·0	4	72·0	5, 7	88·7	76·7	75·4	77	161·4	70·0	2·95	8	6·2
Cape Town	88·1	13	43·2	4, 6	71·3	51·8	54·1	79	...	...	2·37	8	4·7
Natal, Durban ...	81·0	1	62·0	sev.	73·6	66·1	66·5	84	...	...	2·26	4	3·0
Johannesburg	74·9	23	43·2	19	68·9	51·5	49·6	76	141·4	42·0	2·23	13	4·4
Mauritius	84·8	22	62·8	28	81·0	69·1	66·6	77	155·0	55·4	4·66	20	6·3
Bloemfontein	80·6	3	38·8	7	72·6	49·3	48·3	72	...	...	2·66	8	3·1
Calcutta...	106·6	24	71·1	5	97·4	77·8	74·6	71	...	68·5	1·51	2	1·6
Bombay...	91·0	29	71·3	1	88·9	76·8	74·2	76	141·2	64·7	...	...	2·4
Madras	99·1	7	73·5	12	94·2	78·9	75·1	75	145·4	71·0	·02	1	2·1
Colombo, Ceylon ...	89·6	5	73·1	10	88·0	74·9	75·6	83	159·4	70·0	12·19	21	6·4
Hongkong	83·7	27	58·9	10	75·8	67·7	66·7	85	...	...	2·18	5	8·0
Sydney	83·3	13	52·3	28	71·1	59·4	56·9	78	128·1	41·9	9·19	22	5·3
Melbourne	83·5	20	45·1	25, 30	69·7	52·3	50·8	69	134·5	38·9	1·35	10	5·2
Adelaide	91·3	9	47·3	18	76·4	56·5	50·8	56	149·3	38·4	·77	5	4·6
Perth	...	...	...	...	...	...	...	...	...	...	...	...	...
Coolgardie	95·0	4	43·0	25	77·2	55·4	51·6	59	168·0	37·6	2·83	10	4·4
Hobart, Tasmania .	78·1	10	41·7	30	64·5	49·1	46·2	69	136·2	32·6	2·15	8	6·2
Wellington ...	68·2	29	38·8	21	60·2	49·0	46·3	73	130·6	27·0	2·96	11	6·5
Auckland	71·0	2, 3	41·5	21	65·2	51·0	51·9	79	97·0	40·0	1·48	9	4·4
Jamaica, Kingston ..	86·9	1	66·4	23	84·9	69·5	69·6	84	...	...	2·57	15	4·7
Grenada	88·0	13	70·0	13	84·2	72·8	...	74	140·0	...	1·07	13	3·3
Toronto	76·7	25	27·7	20	55·2	37·3	32·0	65	...	23·3	3·50	12	4·7
Fredericton	83·0	25, 26	15·0	8	52·7	31·9	...	71	...	...	2·17	10	6·2
St. John, N.B. ...	61·4	28	19·3	8	46·6	33·7	33·0	76	...	...	2·89	15	6·5
Edmonton, Alberta ...	78·0	12	20·8	29	56·2	32·3	...	49	128·8	16·4	·85	7	4·0
Victoria, B.C.	67·2	17	30·7	28	56·5	41·4	40·0	75	...	...	·62	10	6·9

MALTA.—Mean temp. of air 60°·2. Average daily sunshine 9·2 hours.

Johannesburg.—Bright sunshine 233·1 hours.

Mauritius.—Mean temp. of air 0°·1 below, and R ·08 in. above, averages. Mean hourly velocity of wind 11·5 miles or 1·0 miles below average.

COLOMBO.—Mean temp. of air 81°·5 or 1°·2 below, of dew point 1°·1 above, and R 3·87 in. above, averages. Max. velocity of wind 41 miles per hour for about ten minutes on the 10th. TS on 15 days.

HONGKONG.—Mean temp. of air 71°·2. Mean hourly velocity of wind 12·7 miles. Bright sunshine 141·7 hours.

Sydney.—Temp. of air 0°·7 above, and R 3·87 in. above, averages.

Melbourne.—Mean temp. of air 1°·5 above, and R ·97 in. below, averages.

Adelaide.—Mean temp. of air 2°·5 above, and R 1·11 in. below, averages.

Coolgardie.—Temp. of air 0°·9 above, and R 2·19 in. above, averages.

Hobart.—Mean temp. of air 1°·7 above average.

Wellington.—Mean temp. of air 2°·2 below, and R 1·06 in. below, averages. Bright sunshine 148·5 hours.

Auckland.—Unusually dry. Rainfall less than half the average of previous 40 years.