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## THE DIURNAL RANGE OF RAINFALL AT KARLSRUHE (BADEN) AND AT PETROGRAD.

By HENRIK RENQVIST, Helsingfors.

THE Annual Reports of the Meteorological and Hydrographical Central Office in Karlsruhe (*Jahres-Bericht des Zentralbureaus für Meteorologie und Hydrographie im Grossherzogtum Baden*) contain, beginning from the year 1892, hourly amounts of the rainfall in the summer half-year at Karlsruhe. I have, for intervals of 4 hours, added these values for the summer months (June, July, and August) of the years 1892-1913 inclusive. We thus obtain a conception of the diurnal range, based on observations from 22 consecutive years, which form the longest similarly treated period I know of from the continent. The gauge employed was a Hottinger model until 1900 inclusive, from 1901 a Hellmann gauge was used.

The registered amounts for the whole period are :—

	m. a.m.	a.m.	a.m. n.	n. p.m.	p.m.	p.m. n.
June, July,						
August ...	12—4	4—8	8—12	12—4	4—8	8—12
Karlsruhe						
(1892-1913) ...	732·3	687·0	585·0	946·3	1051·7	785·9 mm.

Hence, percentages of the total amount :—

15·3      14·3      12·2      19·8      22·0      16·4 %

The rainfalls registered at Petrograd were made out in the same way. Hourly amounts for all months are published each year in the *Annales de l'Observatoire Physique Central Nicolas*. The period is here considerably shorter, covering only 12 years (1897-1908). A Rohrdantz pluviograph was used all the time.

The amounts for intervals of four hours are :—

	m. a.m.	a.m.	a.m. n.	n. p.m.	p.m.	p.m. n.
June, July,						
August ...	12—4	4—8	8—12	12—4	4—8	8—12
Petrograd						
(1897-1908) ...	358·9	327·1	367·2	547·3	465·7	386·0 mm.

or, in percentage :—

14·6      13·3      15·0      22·3      19·0      15·7 %

We notice both Karlsruhe and Petrograd are fair representatives of the continental types, showing a maximum in the afternoon and a minimum in the morning, although the maximum and minimum at Karlsruhe occur some hours later than at Petrograd. The discrepancies may partly be caused by the non-identity of the periods considered.

It may be added, that Karlsruhe has a diurnal range highly resembling that of Perpignan, for which station we calculate the following percentages from Fines's data in the *Bulletin météorologie annuel du Département des Pyrénées Orientales*, xxix. :—

	m. a.m.	a.m.	a.m. n.	n. p.m.	p.m.	p.m. m.
June, July,						
August ...	12—4	4—8	8—12	12—4	4—8	8—12
Perpignan						
(1884-1900) ...	13·5	13·5	12·9	19·6	23·9	16·6 %

On the other hand, Petrograd shows in this respect great similarity to Kew, for which station we obtain the following percentages :—

	m. a.m.	a.m.	a.m. n.	n. p.m.	p.m.	p.m. m.
June, July,						
August ...	12—4	4—8	8—12	12—4	4—8	8—12
Kew						
(1871-1890) ...	13·4	13·1	14·9	21·5	20·2	16·8 %

These figures are calculated from the data in Scott's "The Diurnal Range of Rain," *Meteorological Council, Official No. 143*, London, 1900.

## SEASONAL LIMITS.

By FREDK. J. BRODIE.

THE pleas advanced in your issue of November last in favour of a re-adjustment of the seasonal limits employed in this country for meteorological purposes have led to an interesting correspondence, and to the expression of a wide diversity of opinion.

The propositions set forth were briefly these :—

1.—That the division of the year into four periods, each consisting of three calendar months, is unsatisfactory, inasmuch as the weather normally associated with a particular season occurs not infrequently outside the assigned limits, and is, in practice, credited to a season to which it does not properly belong.

2.—That the assignment of a period of equal length to each season is incorrect, inasmuch as the duration of typical Spring and Autumn weather is normally much shorter than that of typical Summer and Winter weather.

3.—That in order to secure a more equitable arrangement it is desirable to abandon for seasonal purposes, the ordinary monthly

grouping of meteorological results, and to substitute periods of varying length, consisting, in each case, of a series of weeks. According to this scheme the Spring would comprise a period of nine weeks, commencing with the middle of March, and ending with the middle of May; the Summer a period of seventeen weeks, commencing with the middle of May and ending with the middle of September; the Autumn a period of nine weeks, running from the middle of September to the middle of November; and the Winter a period of seventeen weeks, running from the middle of November to the middle of March.

Objections to proposition 1. are urged on the ground that in this country, at all events, the weather absolutely refuses to conform to any arbitrary rules, so that whatever seasonal limits we may fix the boundaries are liable at times to be overstepped. Mr. Charles Harding cites two cases in which the hottest day of the year occurred in the fourth week of September, and points triumphantly to the fact that in neither of these instances would the warmth have been included in the proposed Summer limits. The answer to such an objection is that the suggested arrangement is designed to meet cases which are likely to occur, not cases which are altogether exceptional. Against Mr. Harding's two instances I could mention four (all within the past 35 years), in which the hottest day of the year occurred quite early in September, and would therefore have been included within the Summer limits suggested in the scheme.

The criticisms excited by proposition 2. lead to the question as to which is meant by the terms Spring and Autumn. In this connection the dictionary affords very little help, and we must, therefore, attempt to form definitions of our own. The one season may, I think, be regarded as the period during which Nature awakes more or less gradually from its long Winter sleep; the other as the period in which it sinks more or less gradually, into repose. In attempting to fix some limits to these periods we may, perhaps, take as our guide, the behaviour of the trees, using the word in quite a general sense. In the one case we see the bare branches gradually bursting into leaf and becoming clothed eventually with the full verdure of Summer. In the other case we see the gradual decay and fall of the leaf, resulting eventually in the nakedness of Winter. Most other kinds of vegetation follow suit, and in seasons of anything like a normal character each process is, I venture to think, fairly covered by the period of nine weeks, suggested in the scheme.

Among the various objections which have been advanced, some of the most substantial are based upon what may be described as purely astronomical considerations. Most of our serious workers will probably agree that in such a connection the Sun is an altogether unreliable guide. Theoretically its influence should be greatest at

the time of the Summer solstice, when the sun reaches its greatest altitude and is longest above the horizon. Theoretically also its influence should be least at the time of the Winter solstice. As a matter of fact the maximum temperature effects lag behind each solstice to the extent of about a month. In any normal season the greatest warmth does not occur anywhere near the Summer solstice, and the term Midsummer day is a misnomer. Similarly, the greatest cold seldom occurs in or around the third week in December, but usually at least three or four weeks later. According to Mr. Bonacina a spell of severe frost which arrives late in the Winter, say in February, is altogether different in character from one which occurs in the earlier part of the Season. In a sense it is, and in a sense it is not. A late frost is accompanied by longer days, and the absence of so many hours of darkness tends to make the cold more bearable. On the other hand it is disappointing to experience a long-continued frost at a time when one is beginning to look forward to a more genial temperature. Mr. Bonacina selects two severe winter months, December, 1890, and February, 1895, and maintains that in the latter case the cold was not nearly so trying as in the former. This seems to suggest that in 1895 Mr. Bonacina occupied, in a domestic sense, an irresponsible position. The unfortunate owner of frost-blocked water pipes would scarcely have had any doubt as to the relative merits of the two Arctic spells.

It is, as Mr. Bonacina remarks, quite true that, on an average, gales and fogs are more prevalent in November than in February and that May is a sunnier month than August. In this matter we must, I venture to think, regard temperature as the only safe guide; and on that score no one could seriously agree to the extinction of February as a Winter month, or to the removal of August from its legitimate position as a very real portion of the Summer Season.

With those of your correspondents, such as Mr. Charles Harding and Mr. W. F. Denning, who advocate the retention of the present tri-monthly system on the ground of convenience and long-established usage, I can only express a very real sympathy. In view of the large accumulation of Seasonal data in the possession even of one modest worker, all arranged in accordance with the orthodox plan, the reflection that the adoption of a new scheme would entail the virtual scrapping of many years' labour, is calculated to excite feelings of a very mixed character. We must, however, bear in mind that while reform is seldom easy, its difficulties afford no excuse for persisting in a course which is, on general grounds, as I venture to think in this case, altogether indefensible.



## Correspondence.

*To the Editor of Symons's Meteorological Magazine.*

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THE SEASONS.

*Re Messrs. Bonacina and Aldridge.* Is it lawful for one who has been a farmer and who has studied the seasons (not philosophically) for upwards of 60 years, to make a few remarks?

There is a good deal in what both gentlemen say. Here in North Lancashire we seem usually to have four winter months, November to February; three spring months, March to May; two summer months, June to July; and three autumn months, August to October. In Cornwall and Devonshire, near the coast, they have two winter months, three spring, four summer, and three autumn. But looking at the matter as regards sunshine and growth, I have for many years considered that spring began on the 14th of February, at which date labourers come earlier to their work, and preparation is made for sowing in field and garden as soon as weather permits; the spring flowers come out in spite of cold weather, and the severe frosts are not felt because the days are longer. Summer begins on the 14th of May, and even as winter lingers in the lap of spring, so spring lingers in the lap of summer, and the days at the end of May are gloriously long. Autumn begins on the 14th of August, the days are rapidly shortening and the evenings closing in, and signs of the end of the real summer are not wanting. Winter begins on the 14th of November; the days are short; men then start work later, and even though now and again we may have a little skating before the 14th of November, it does not feel like winter.

W. R. NASH, F.R.Met.Soc.

*The Mount, Carke-in-Cartmel, 21st April, 1915.*

MR. ELLIS in his letter last month touches on a point which leads me to bring out some further important facts in support of my arrangement of the seasons, which were not definitely noticed in my two previous communications on the subject in the January and March numbers. The lag of the meteorological after the astronomical seasons to which Mr. Ellis refers is only true for one important element, namely temperature; in practically all the other important meteorological elements which show conspicuous variation between summer and winter, the maxima and minima do coincide with the solstitial groups as the following indicates:—

1. *Gales.*—The months of least frequency of gales in the British Isles are May, June, July, *not* June, July, and August, and the months of greatest frequency the diametrically opposite solstitial

months, November, December and January. (See Mr. Brodie's paper in *Quar. Jour. Roy. Met. Soc.*, Vol. 28).

2. *Fogs*.—The months of least frequency of fog in London, or the clearest months are again the summer solstitial group, May, June, July, *not* June, July, August, and the foggiest months as well as the stormiest, are the winter solstitial months of November, December, January. (See Mr. Brodie's paper in *Quar. Jour. Roy. Met. Soc.*, Vol. 31).

3. *Thunderstorms*.—The months of greatest frequency of violent thunderstorms in England are certainly May, June and July, rather than June, July and August. The relationship in fact, is not so much with the temperature as with the height of the sun, thunderstorms being most frequent not so much in the hottest months as in those when the amount of surface heating is greatest. (This point is emphasized by W. J. Humphreys in his paper on thunderstorm phenomena published in the *Journal of the Franklin Institute* for November, 1914 [U.S.A.]).

As regards the conditions requisite for their formation, summer thunderstorms have been shown by Dr. Shaw to be the inverse phenomena of winter land-fogs.

4. *Sunshine*.—Meteorologically as well as astronomically the sunniest months are May, June and July, and the dullest November, December and January, over the country as a whole.

It is thus seen that the only important element which lags a month or two behind the solstices is temperature—which again emphasizes my contention that warmth is nearly as much a characteristic of autumn as of summer, only it is a different kind of warmth, being stored warmth instead of direct warmth, as is that of summer. Conversely, cold from a different cause is as much the character of spring as of winter. Hence summer, May, June, July, is hot by direct heat, autumn, August, September, October, is hot by accumulated heat; and winter, November, December, January, is cold by direct loss of heat, and spring, February, March and April, is cold by the accumulated effect of such loss.

As for rainfall, its variations in amount are not so definitely associated with our ideas of "summer" and "winter" as the other meteorological elements, and in this country what relationship there is is complicated by the influence of double maxima and minima in the seasonal distribution. (See paper by Dr. Mill and Mr. Salter in *Quar. Jour. Roy. Met. Soc.*, Jan., 1915). Briefly it may be said that the intensity of the summer type of rainfall follows the temperature, so that June, July and August are wetter than May, June and July, but the relationship tends to be obscured by the circumstance that August is gradually coming under the influence of the high rainfall peculiar to the autumnal season with maximum in October.

L. C. W. BONACINA.

*Hampstead, N. W., April 18th, 1915.*

## THE SEVERE THUNDERSTORM OF MAY 6th, 1915.

THE first heat thunderstorm of the season occurred in London on the evening of May 6th, a date not far removed from the average, and whilst the storm was in essential features highly typical of its class, it had one or two somewhat unusual characteristics. As observed by me in this neighbourhood the following points are noteworthy : (1.) The storm was of very long duration, raging definitely from 8 p.m. to 10.30 p.m. (2.) The rain did not commence till quite an hour after the thunder and lightning had become severe. (3.) The air remained absolutely close and stagnant throughout, the violent gust which so often springs up during a storm being in this case entirely absent. It should be noted that the electrical conditions set in at nightfall, and this is very often the case with heat storms in England. Every year I have occasion to emphasize the facility with which heat in May breeds thunder, and I will even go so far as to say that a hot day in May, with 80° in the shade, is more likely to develop *immediate* thunderstorms than one with 90° in the shade in July.

From personal experience, too, year by year, I am becoming more and more of opinion that if we take the electrical side of thunderstorms, the worst months are May and June, but that if we take the rainfall side, the most violent storms occur in July and August. That there should be a difference in this respect is, moreover, not altogether unsupported by theory, and I hope to say something on the subject in a future article.

L. C. W. BONACINA.

*Hampstead, N. W., May 7th, 1915.*

## PARADOXICAL PHENOMENA.

THE fact that on some recent occasions the receiver of my rain gauge has been nearly empty while those of my neighbours have been overflowing, figuratively speaking, has led me to re-call some instances of exceptionally contrasted meteorological conditions in narrowly circumscribed areas.

It is a far cry from the Andes to Dartmoor, from the "Capitol" at Caracas to the Rectory at Marytavy. But the impressions of experiences at the former remain in the memory at the latter. Consequently, I may, without inconsequence, allow paradoxes to pass me without being committed to writing, and *vice versa*. For how otherwise can I treat these facts :—

1.—We never have a bad thunderstorm at Marytavy Rectory, whilst Lydford (especially), Princetown and Tavistock are reported in the local newspapers as having been visited by violent and (sometimes) destructive thunderstorms, we merely are treated to distant rumblings.

2.—About six weeks ago the lower portion of my glèbe was flooded ; there was quite a lake say 100 yards long by 50 wide.

I was standing at a transit telescope not far from my rain gauge. A few drops of rain on my face made me turn round—a strange sight I saw. One portion of my lake was undisturbed; but on a patch about 50 or 60 square feet it was raining like “cats and dogs”—not a meteorological expression perhaps—but notifying a fact and emphasizing my previously named experiences.

In the summer of 1875 I was at Caracas in Venezuela, which is situated about 4000 ft. *above the sea*, and about 4000 ft. below the Silla de Caracas, a spur of the Andes. A national fête was in progress on the day which I am about to mention, but I forget the exact date and month. The local government had decorated the city in every possible way. The Plaça had wreaths of flowers and ropes of tiny lamps for evening illumination.

The square in which the Capitol is placed was also decorated “en fête.” I forget the exact dimensions of the square (a rectangle at any rate), but it was about 200 yards long and about 80 or 90 yards wide.

On the top of the four façades of buildings the Government had placed flag posts (I should say each about 10 feet high), on which was one of the National flags (about 6 feet by 3 feet), and the flag posts looked about 15 feet apart. The day was bright and calm, just occasionally the slightest puff of wind to show to advantage this rectangle of flags, dozens and dozens of them. I could see, over the top of an intervening building, every flag in the, so-called, square. During the afternoon I happened to be using my binoculars, looking at the Silla, on the Sierra, when a breeze sprang up and—I wondered if I was mad, bilious, or if I had developed some disease of the eye—for, as I looked from my window, I could see the flags of the two ends of the rectangle were blowing in different directions.

IRVINE KEMPT ANDERSON.

*Marytavy Rectory, Tavistock, 20th March, 1915.*

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### ROYAL METEOROLOGICAL SOCIETY.

A MEETING of the above Society was held on April 21st at the Surveyors' Institution, Westminster, Major H. G. Lyons, F.R.S., President, in the Chair.

A paper on “A Study of the Moving Waves of Weather in South America,” by Mr. H. Helm Clayton, M.A., was read by Mr. R. C. Mossman. The author noted that the charts showing the weather conditions over the South American continent indicated permanent centres of high pressure at about 30° S. latitude. These high pressure systems oscillate slowly back and forth over limited areas, and there is a series of low pressure systems passing from west to east immediately south of the continent, *viz.*, in about 60° S. lat. An examination of the charts of daily pressure and temperature

changes seems to show that these changes are in the nature of waves, which, appearing first in the extreme south of South America, progress northward or north-eastward, and, diminishing in intensity, die out or disappear near the equator. It is clearly evident that these waves of changing pressure do not follow the movements of centres of high and low pressure, but that they are independent phenomena causing changes in the distribution of pressure and in the shapes of the isobars, and in this way giving rise to changes of wind and weather. In order to raise forecasting from an art to a science, Mr. Clayton believes it is essential to replace mental estimates by quantitative measurements of expected changes and to make quantitative forecasts. He applied this principle to the Argentine weather map for April 20th, 1910, and showed the map of pressure predicted in this way for April 21st together with the map of observed pressures. There was a marked similarity in the trend of the isobars in the two maps. The daily temperatures at 8 a.m. were plotted for four stations for May and June, 1910, which revealed two classes of waves taking about 3 and 6 days respectively to pass from Punta Arenas to Rio de Janeiro.

■ The President, Mr. Tripp, Mr. Lempfert and Mr. Mossman spoke. A paper on "The Correlation between changes in Barometric Height at Stations in the British Isles," by Mr. E. H. Chapman, M.A., was also read. The records at Cronkbourne, Isle of Man, were examined in conjunction with those at eleven other stations radiating out from it in all directions, in order to ascertain the relationships existing between changes in the barometric height at Cronkbourne from 9 a.m. to 9 p.m., and changes in the barometric height at the other stations, (i.) between 9 a.m. and 9 p.m. the day before, (ii.) between 9 p.m. the night before and 9 a.m. the same day, (iii.) between 9 p.m. the same day and 9 a.m. the day after, and (iv.) between 9 a.m. and 9 p.m. the day after. The records dealt with extended over the ten years 1895 to 1904, and the year was first treated as a whole, and afterwards the relationships existing in the individual months were considered. The author concluded that the magnitude of the correlation obtained depends upon the time limit, and was not satisfied that the twelve-hour unit, which he had to use, is the best. Assuming, however, that the time limit must be 12 hours, the best information for foretelling barometric changes is from a station 300 or 400 miles in a south-westerly direction from the place for which inferences are required.

Mr. F. J. Whipple, Mr. R. H. Hooker, Mr. W. W. Bryant, Dr. C. Chree and Dr. E. C. Snow took part in the discussion.

The following gentlemen were elected Fellows of the Society:—Mr. David Balfour, C.E., Mr. Peshoton S. G. Dubash, Mr. Geo. Philip, Mr. E. R. Roe-Thompson and Lieut. C. R. Treweek, R.N.R. At the March meeting the following were elected:—Mr. Harold Billett, Mr. E. Newnham, Mr. D. S. Salter and Mr. R. R. N. Sen.

## INTERNATIONAL BALLOON ASCENTS.

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

*February 1st, 1912.*

| Starting Point.   | Country.    | A (H <sub>c</sub> )<br>miles. | B (T <sub>c</sub> )<br>° F. | C<br>miles. | D<br>° F. | E<br>miles. | F          |
|-------------------|-------------|-------------------------------|-----------------------------|-------------|-----------|-------------|------------|
| Manchester ....   | England ..  | 7·2                           | -76                         | 10·4        | -63       | 145         | S.E.       |
| *Pyrton Hill .... | „ ..        | 6·0                           | -72                         | 8·5         | -72       | 60          | S. by E.   |
| Brussels .....    | Belgium ..  | 6·3                           | -85                         | 8·8         | ?         | 98          | S.E.       |
| Lindenberg ....   | Germany..   | 5·1                           | -60                         | 9·8         | -62       | 89          | E.S.E.     |
| Paris.....        | France....  | 7·4                           | -92                         | 9·0         | -77       | 187         | S.E. by E. |
| Strassburg .....  | Germany..   | 6·6                           | -84                         | 7·6         | -76       | 89          | S.E. by E. |
| Vienna.....       | Austria ..  | 5·9                           | -72                         | 7·8         | -67       | 46          | E. by S.   |
| Nizhni Olchedaëff | Russia .... | 6·1                           | -76                         | 10·4        | -63       | 82          | E.N.E.     |

\* Evening of January 30th.

On January 31st a low pressure area lay over Stockholm, on February 1st pressure was decreasing over the North Sea and the depression was extending westwards; on February 2nd the barometer had fallen over the Bay of Biscay and a trough of low pressure extended from the Bay of Biscay to the Gulf of Bothnia.

The values of T<sub>c</sub> are very irregular, the difference of 32° F. between Paris and Lindenberg being unusually large, but as is generally the rule in such cases, much greater uniformity is shown at 9 or 10 miles' height.

*March 7th, 1912.*

| Starting Point.  | Country.    | A (H <sub>c</sub> )<br>miles. | B (T <sub>c</sub> )<br>° F. | C<br>miles. | D<br>° F. | E<br>miles | F        |
|------------------|-------------|-------------------------------|-----------------------------|-------------|-----------|------------|----------|
| Manchester.....  | England ..  | 5·3                           | -71                         | 12·2        | -63       | 56         | E. by S. |
| Brussels .....   | Belgium ..  | 4·7                           | -83                         | 11·3        | ?         | 39         | E.       |
| Lindenberg.....  | Germany..   | 5·0                           | -71                         | 8·6         | -65       | 45         | E.N.E.   |
| Paris .....      | France....  | 5·4                           | -74                         | 9·7         | -66       | 55         | E.S.E.   |
| Strassburg ..... | Germany..   | 5·2                           | -66                         | 7·8         | -54       | 39         | N.N.E.   |
| Vienna.....      | Austria.... | 4·8                           | -61                         | 7·1         | ?         | 54         | N.N.E.   |
| Pavlovsk.....    | Russia .... | 6·2                           | -72                         | 10·6        | -67       | 44         | E.N.E.   |
| Batavia .....    | E. Indies   | over 9·3                      | ?                           | 9·3         | -107      | 22         | E. by S. |

The central parts of Europe were covered by an extensive depression with high pressure both north and south.

The values of H<sub>c</sub> are low in accordance with usual rule. The return from Batavia appears for the first time in the international publication. The extremely low temperature of -107° F. is quite usual for a height of 9 miles at a tropical station.

- 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

## METEOROLOGICAL NEWS AND NOTES.

THE METEOROLOGICAL OFFICE has intimated that "From May 1st, 1915, the issue to the public of Form 216, giving weather forecasts for the several districts of the British Isles, will be suspended. Arrangements have been approved for the supply of forecasts by telegraph for agricultural purposes upon payment of the cost of the telegrams as in previous years. The issue of Form 202, giving meteorological statistics for health resorts, will be continued to those subscribers to the Daily Weather Report who have expressed a wish to receive it."

MR. J. E. CULLUM has retired from his position as Superintendent of the Valencia Meteorological Observatory, Cahirciveen, and the Meteorological Office has appointed Mr. L. H. G. Dines as his successor.

NEWS FROM THE SOUTH ORKNEYS was brought by the Argentine gunboat "Uruguay," which returned to Buenos Aires on March 11th, after landing a new party and relieving the Observers who had spent 1914 on Laurie Island. Exceptionally fine weather prevailed throughout the six weeks covered by the double journey, which the Commander described as a "pleasure trip." Reference to the meteorological records brought back from Laurie Island showed that the remarkable absence of gales in the usually stormy area south of lat. 40° S., had persisted since September. October, November, and December had each the lowest mean wind velocity hitherto observed for these months. At the close of the year there was still much ice round the South Orkney group, the absence of ocean swell and the light winds having retarded the break up of the floes. As the station is only visited annually by a relief ship, the Observers had remained in blissful ignorance of the war, until well on in February.

"No WILL, No WAY," was the terse comment of a valued correspondent in sending us the newspaper report of a discussion in the Folkestone Town Council on April 28th, when a motion to suspend the weather reports was moved, seconded, and carried, on the ground that the Corporation had no longer the means to provide an annual grant of £50 for the purpose. We are glad to observe that several members of the Council were sufficiently enlightened and courageous to oppose the motion, but that has not prevented the discontinuance of observations and the breaking of a record which can never be pieced together again. The quaint plea was brought forward by one ingenuous Councillor that "that was one of the things that was a sort of luxury, and could very well be dispensed with!"

MR. LOUIS G. SCHULTZ, Director of the Argentine Central Magnetic Observatory at Pilar, since its foundation in 1903, has recently resigned and returned to the United States.

## RAINFALL TABLE FOR APRIL, 1915.

| STATION.                          | COUNTY.               | Lat.<br>N. | Long.<br>W.<br>[*E.] | Height<br>above<br>Sea.<br>ft. | RAINFALL<br>OF MONTH.          |              |
|-----------------------------------|-----------------------|------------|----------------------|--------------------------------|--------------------------------|--------------|
|                                   |                       |            |                      |                                | Aver.<br>1875—<br>1909.<br>in. | 1915.<br>in. |
| Camden Square.....                | London .....          | 51 32      | 0 8                  | 111                            | 1'74                           | 1'13         |
| Tenterden .....                   | Kent .....            | 51 4       | *0 41                | 190                            | 1'77                           | 1'37         |
| Arundel (Patching).....           | Sussex .....          | 50 51      | 0 27                 | 130                            | 1'82                           | 1'68         |
| Fawley (Cadland) .....            | Hampshire .....       | 50 50      | 1 22                 | 52                             | 1'98                           | 1'21         |
| Oxford (Magdalen College).....    | Oxfordshire .....     | 51 45      | 1 15                 | 186                            | 1'67                           | '78          |
| Wellingborough(Swanspool).....    | Northampton .....     | 52 18      | 0 41                 | 155                            | 1'78                           | '66          |
| Shoeburyness.....                 | Essex .....           | 51 31      | *0 48                | 13                             | 1'25                           | '92          |
| Bury St. Edmunds(Westley).....    | Suffolk .....         | 52 15      | *0 40                | 226                            | 1'62                           | '92          |
| Geldeston [Beccles].....          | Norfolk .....         | 52 27      | *1 31                | 38                             | 1'55                           | '95          |
| Polapit Tamar [Launceston].....   | Devon .....           | 50 40      | 4 22                 | 315                            | 2'34                           | 1'39         |
| Rousdon [Lyne Regis] .....        | " .....               | 50 41      | 3 0                  | 516                            | 2'39                           | '87          |
| Stroud (Upheld) .....             | Gloucestershire ..... | 51 44      | 2 13                 | 226                            | 2'09                           | 1'32         |
| Church Stretton (Wolstaston)..... | Shropshire .....      | 52 35      | 2 48                 | 800                            | 2'20                           | 1'78         |
| Boston .....                      | Lincolnshire.....     | 52 58      | 0 1                  | 11                             | 1'57                           | '48          |
| Worksop (Hodscock Priory).....    | Nottinghamshire ..... | 53 22      | 1 5                  | 56                             | 1'62                           | '76          |
| Mickleover Manor .....            | Derbyshire .....      | 52 54      | 1 32                 | 280                            | 1'77                           | '75          |
| Macclesfield .....                | Cheshire .....        | 53 15      | 2 7                  | 501                            | 2'02                           | 1'63         |
| Southport (Hesketh Park).....     | Lancashire .....      | 53 39      | 2 59                 | 38                             | 1'84                           | 2'28         |
| Arncliffe Vicarage .....          | Yorkshire, W.R. ..... | 54 8       | 2 6                  | 732                            | 3'73                           | 3'45         |
| Wetherby (Ribston Hall) ..        | " .....               | 53 59      | 1 24                 | 130                            | 1'85                           | 1'19         |
| Hull (Pearson Park) .....         | " E.R. .....          | 53 45      | 0 20                 | 6                              | 1'69                           | '60          |
| Newcastle (Town Moor) ..          | Northumberland .....  | 54 59      | 1 38                 | 201                            | 1'84                           | '56          |
| Borrowdale (Seathwaite) ..        | Cumberland.....       | 54 30      | 3 10                 | 423                            | 6'91                           | 9'79         |
| Cardiff (Ely).....                | Glamorgan .....       | 51 29      | 3 13                 | 53                             | 2'50                           | 1'79         |
| Haverfordwest.....                | Pembroke .....        | 51 48      | 4 58                 | 90                             | 2'82                           | 1'97         |
| Aberystwyth (Gogerddan).....      | Cardigan .....        | 52 26      | 4 1                  | 83                             | 2'48                           | 2'89         |
| Llandudno .....                   | Carnarvon .....       | 53 20      | 3 50                 | 72                             | 1'79                           | 2'31         |
| Cargen [Dumtries] .....           | Kirkcudbright.....    | 55 2       | 3 37                 | 80                             | 2'50                           | 3'40         |
| Marchmont House .....             | Berwick .....         | 55 44      | 2 24                 | 498                            | 2'28                           | '56          |
| Girvan (Pinmore).....             | Ayr .....             | 55 10      | 4 49                 | 207                            | 2'81                           | 3'79         |
| Glasgow (Queen's Park) ..         | Renfrew .....         | 55 53      | 4 18                 | 144                            | 1'86                           | 2'37         |
| Inveraray (Newtown) .....         | Argyll .....          | 56 14      | 5 4                  | 17                             | 3'69                           | 6'48         |
| Mull (Quinish).....               | " .....               | 56 34      | 6 13                 | 35                             | 2'98                           | 4'71         |
| Dundee (Eastern Necropolis).....  | Forfar .....          | 56 28      | 2 57                 | 199                            | 1'93                           | '84          |
| Braemar .....                     | Aberdeen .....        | 57 0       | 3 24                 | 1114                           | 2'30                           | 2'14         |
| Aberdeen (Cranford) .....         | " .....               | 57 8       | 2 7                  | 120                            | 2'23                           | 1'20         |
| Gordon Castle .....               | Moray .....           | 57 37      | 3 5                  | 107                            | 1'74                           | 2'24         |
| Fort Augustus(S. Benedict's)..... | E. Inverness .....    | 57 9       | 4 41                 | 68                             | 2'22                           | 4'52         |
| Loch Torridon (Bendamph).....     | W. Ross .....         | 57 32      | 5 32                 | 20                             | 4'70                           | 8'01         |
| Dunrobin Castle .....             | Sutherland .....      | 57 59      | 3 56                 | 14                             | 2'02                           | 3'09         |
| Wick .....                        | Caithness .....       | 58 26      | 3 6                  | 77                             | 1'89                           | 2'13         |
| Killarney (District Asylum).....  | Kerry .....           | 52 4       | 9 31                 | 178                            | 3'46                           | 2'95         |
| Waterford (Brook Lodge).....      | Waterford .....       | 52 15      | 7 7                  | 104                            | 2'68                           | 1'68         |
| Nenagh (Castle Lough).....        | Tipperary .....       | 52 54      | 8 24                 | 120                            | 2'54                           | 2'22         |
| Ennistymon House .....            | Clare .....           | 52 57      | 9 18                 | 37                             | 2'81                           | 2'86         |
| Gorey (Courtown House) ..         | Wexford .....         | 52 40      | 6 13                 | 80                             | 2'37                           | '86          |
| Abbey Leix (Blandsfort).....      | Queen's County.....   | 52 56      | 7 17                 | 532                            | 2'54                           | 1'71         |
| Dublin (Fitz William Square)..... | Westm .....           | 53 21      | 6 14                 | 54                             | 2'03                           | 1'42         |
| Mullingar (Belvedere) .....       | Westmeath .....       | 53 29      | 7 22                 | 367                            | 2'37                           | 2'40         |
| Crossmolina (Enniscoo).....       | Mayo .....            | 54 4       | 9 16                 | 74                             | 3'13                           | 3'76         |
| Cong (The Glebe).....             | " .....               | 53 33      | 9 16                 | 112                            | 2'98                           | 3'19         |
| Collooney (Markree Obsy.).....    | Sligo .....           | 54 11      | 8 27                 | 127                            | 2'52                           | 3'73         |
| Seaforde .....                    | Down .....            | 54 19      | 5 50                 | 180                            | 2'76                           | 2'36         |
| Bushmills (Dundarave) .....       | Antrim .....          | 55 12      | 6 30                 | 162                            | 2'08                           | 2'66         |
| Omagh (Edenfel).....              | Tyrone .....          | 54 36      | 7 18                 | 280                            | 2'50                           | 2'99         |

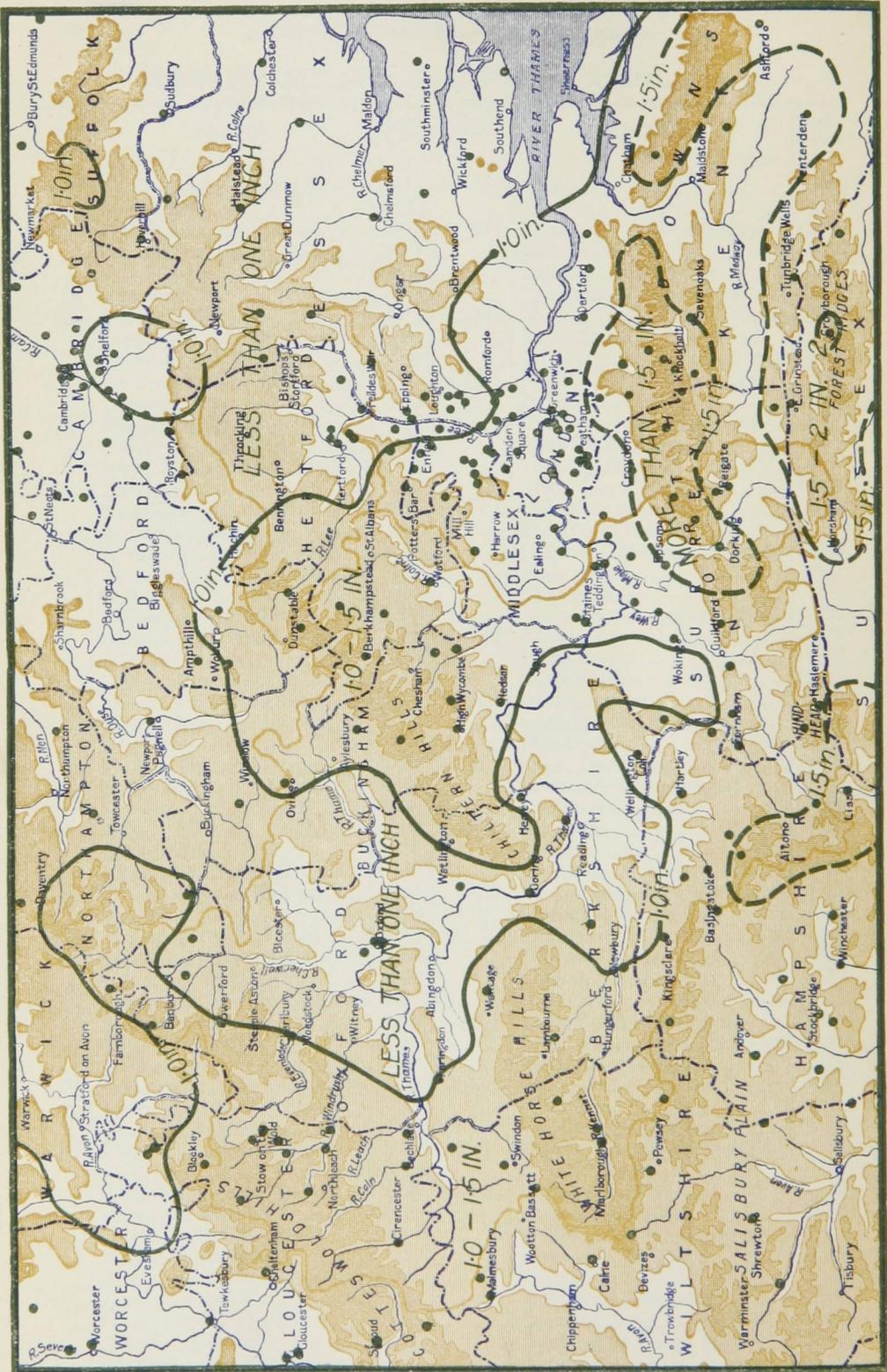
## RAINFALL TABLE FOR APRIL, 1915—continued.

| RAINFALL OF MONTH (con.) |          |                   |       | RAINFALL FROM JAN. 1. |       |                      |          | Mean Annual 1875-1909. | STATION. |        |                 |
|--------------------------|----------|-------------------|-------|-----------------------|-------|----------------------|----------|------------------------|----------|--------|-----------------|
| Diff. from Av. in.       | % of Av. | Max. in 24 hours. |       | Aver. 1875-1909.      | 1915. | Diff. from Aver. in. | % of Av. |                        |          |        |                 |
|                          |          | in.               | Date. |                       |       |                      |          | No. of Days            | in.      | in.    |                 |
| -                        | 61       | 65                | 26    | 12                    | 9     | 6.93                 | 9.53     | +2.60                  | 138      | 25.11  | Camden Square   |
| -                        | 40       | 77                | 54    | 6                     | 12    | 7.76                 | 9.81     | +2.05                  | 126      | 27.64  | Tenterden       |
| -                        | 14       | 92                | 54    | 6                     | 12    | 8.53                 | 12.14    | +3.61                  | 142      | 30.48  | Patching        |
| -                        | 77       | 61                | 47    | 6                     | 12    | 9.18                 | 11.79    | +2.61                  | 128      | 31.87  | Cadland         |
| -                        | 89       | 47                | 32    | 12                    | 10    | 6.52                 | 7.90     | +1.38                  | 121      | 24.58  | Oxford          |
| -                        | 12       | 37                | 19    | 12                    | 9     | 7.10                 | 6.62     | - .48                  | 93       | 25.20  | Swanspool       |
| -                        | 33       | 74                | 24    | 12                    | 15    | 4.96                 | 5.37     | + .41                  | 108      | 19.28  | Shoeburyness    |
| -                        | 70       | 57                | 35    | 12                    | 8     | 6.62                 | 8.06     | +1.44                  | 122      | 25.40  | Westley         |
| -                        | 60       | 61                | 33    | 12                    | 12    | 6.06                 | 9.00     | +2.94                  | 148      | 23.73  | Geldeston       |
| -                        | 95       | 59                | 27    | 9                     | 15    | 11.62                | 15.91    | +4.29                  | 137      | 38.27  | Polapit Tamar   |
| -                        | 52       | 36                | 33    | 6                     | 14    | 10.13                | 10.85    | + .72                  | 107      | 33.54  | Rousdon         |
| -                        | 77       | 63                | 30    | 12                    | 13    | 8.55                 | 10.16    | +1.61                  | 119      | 29.81  | Stroud          |
| -                        | 42       | 81                | 30    | 2                     | 14    | 9.07                 | 12.61    | +3.54                  | 139      | 32.41  | Wolstaston      |
| -                        | 109      | 31                | 13    | 12                    | 12    | 6.11                 | 6.43     | + .32                  | 105      | 23.35  | Boston          |
| -                        | 86       | 47                | 20    | 12                    | 11    | 6.66                 | 6.57     | - .09                  | 99       | 24.46  | Hodsock Priory  |
| -                        | 02       | 42                | 18    | 12                    | 11    | 7.12                 | 6.90     | - .22                  | 97       | 26.65  | Mickleover      |
| -                        | 39       | 81                | 26    | 3                     | 17    | 9.48                 | 12.58    | +3.10                  | 133      | 34.73  | Macclesfield    |
| +                        | 44       | 124               | 49    | 3                     | 16    | 8.57                 | 11.07    | +2.50                  | 129      | 32.70  | Southport       |
| -                        | 28       | 92                | 69    | 19                    | 17    | 20.04                | 24.72    | +4.68                  | 123      | 61.49  | Arncliffe       |
| -                        | 66       | 64                | 35    | 2                     | 6     | 7.37                 | 9.19     | +1.82                  | 125      | 26.87  | Ribston Hall    |
| -                        | 09       | 36                | 20    | 12                    | 8     | 7.01                 | 8.23     | +1.22                  | 117      | 26.42  | Hull            |
| -                        | 28       | 30                | 14    | 12                    | 15    | 7.47                 | 7.59     | + .12                  | 102      | 27.94  | Newcastle       |
| +                        | 288      | 142               | 3.67  | 20                    | 17    | 41.94                | 52.26    | +10.32                 | 125      | 129.48 | Seathwaite      |
| -                        | 71       | 72                | 47    | 3                     | 19    | 12.11                | 12.81    | + .70                  | 106      | 42.28  | Cardiff         |
| -                        | 85       | 70                | 33    | 2, 30                 | 13    | 14.09                | 15.99    | +1.90                  | 113      | 46.81  | Haverfordwest   |
| +                        | 41       | 116               | 71    | 2                     | 16    | 12.52                | 17.84    | +5.32                  | 142      | 45.46  | Gogerddan       |
| +                        | 52       | 129               | 35    | 10                    | 17    | 8.54                 | 10.08    | +1.54                  | 118      | 30.36  | Llandudno       |
| +                        | 90       | 136               | 60    | 19                    | 19    | 13.35                | 19.93    | +6.58                  | 149      | 43.47  | Cargen          |
| -                        | 72       | 25                | 10    | 21                    | 9     | 9.47                 | 7.91     | -1.56                  | 84       | 33.76  | Marchmont       |
| +                        | 98       | 135               | 60    | 3                     | 21    | 15.08                | 21.27    | +6.19                  | 141      | 49.77  | Girvan          |
| +                        | 51       | 127               | 30    | 7                     | 21    | 10.70                | 10.20    | - .50                  | 95       | 35.97  | Glasgow         |
| +                        | 279      | 175               | 93    | 18                    | 24    | 22.15                | 28.56    | +6.41                  | 129      | 68.67  | Inveraray       |
| +                        | 73       | 158               | 63    | 19                    | 22    | 17.26                | 22.65    | +5.39                  | 131      | 56.57  | Quinish         |
| -                        | 09       | 44                | 14    | 4                     | 14    | 7.91                 | 8.69     | + .78                  | 110      | 28.64  | Dundee          |
| -                        | 16       | 93                | 48    | 8                     | 20    | 10.64                | 15.33    | +4.69                  | 144      | 34.93  | Braemar         |
| -                        | 03       | 54                | 29    | 30                    | 11    | 9.60                 | 10.93    | +1.33                  | 114      | 32.73  | Aberdeen        |
| +                        | 50       | 129               | 58    | 19                    | 19    | 8.04                 | 11.11    | +3.07                  | 138      | 30.34  | Gordon Castle   |
| +                        | 230      | 204               | 1.00  | 18                    | 21    | 15.79                | 13.77    | -2.02                  | 87       | 44.53  | Fort Augustus   |
| +                        | 331      | 170               | 1.41  | 18                    | 21    | 28.94                | 33.22    | +4.28                  | 115      | 83.93  | Bendauph        |
| +                        | 07       | 153               | 53    | 30                    | 18    | 9.99                 | ...      | ...                    | ...      | 31.90  | Dunrobin Castle |
| +                        | 24       | 113               | ...   | ...                   | ...   | 8.84                 | 8.80     | - .04                  | 99       | 29.88  | Wick            |
| -                        | 51       | 85                | 65    | 9                     | 18    | 18.90                | 19.43    | + .53                  | 103      | 54.81  | Killarney       |
| -                        | 00       | 63                | 42    | 5                     | 12    | 12.28                | 10.73    | -1.55                  | 87       | 39.57  | Waterford       |
| -                        | 32       | 87                | 48    | 5                     | 15    | 12.30                | 13.34    | +1.04                  | 108      | 39.43  | Castle Lough    |
| +                        | 05       | 102               | 48    | 9                     | 20    | 13.79                | 17.24    | +3.45                  | 125      | 46.52  | Ennistymon      |
| -                        | 51       | 36                | 21    | 5                     | 11    | 10.59                | 9.44     | -1.15                  | 89       | 34.99  | Courtown Ho.    |
| -                        | 83       | 67                | 26    | 30                    | 19    | 10.83                | 11.08    | + .25                  | 102      | 35.92  | Abbey Leix      |
| -                        | 61       | 70                | 21    | 30                    | 19    | 8.08                 | 7.90     | - .18                  | 98       | 27.68  | Dublin          |
| +                        | 03       | 101               | 52    | 30                    | 22    | 10.78                | 13.68    | +2.90                  | 127      | 36.15  | Mullingar.      |
| +                        | 63       | 120               | 54    | 19                    | 20    | 17.04                | 18.80    | +1.76                  | 110      | 52.87  | Enniscoo        |
| +                        | 21       | 107               | 57    | 30                    | 18    | 15.29                | 16.74    | +1.45                  | 109      | 48.90  | Cong            |
| +                        | 21       | 148               | 49    | 9                     | 20    | 12.92                | 16.41    | +3.49                  | 127      | 42.71  | Markree         |
| -                        | 40       | 85                | 42    | 2, 30                 | 17    | 11.82                | 12.16    | + .34                  | 103      | 38.91  | Seaforde        |
| +                        | 58       | 128               | 37    | 10                    | 20    | 10.56                | 9.81     | - .75                  | 93       | 37.56  | Dundarave       |
| +                        | 49       | 120               | 45    | 7                     | 20    | 11.62                | 13.33    | +1.71                  | 115      | 39.38  | Omagh           |

## SUPPLEMENTARY RAINFALL, APRIL, 1915.

| Div.  | STATION.                      | Rain<br>inches | Div.   | STATION.                      | Rain<br>inches. |
|-------|-------------------------------|----------------|--------|-------------------------------|-----------------|
| II.   | Warlingham, Redvers Road .    | 1·83           | XI.    | Lligwy .....                  | 1·82            |
| "     | Ramsgate .....                | 1·28           | "      | Douglas .....                 | 2·66            |
| "     | Hailsham .....                | 1·77           | XII.   | Stoneykirk, Ardwell House...  | 2·80            |
| "     | Totland Bay, Aston House...   | 1·21           | "      | Carsphairn Shiel .....        | 4·73            |
| "     | Stockbridge, Ashley .....     | 1·22           | "      | Beattock, Kinnelhead .....    | 3·69            |
| "     | Grayshott .....               | 1·42           | "      | Langholm, Drove Road .....    | 3·06            |
| III.  | Harrow Weald, Hill House...   | 1·11           | XIII.  | Meggat Water, Cramilt Lodge   | 1·39            |
| "     | Caversham, Rectory Road ...   | ·85            | "      | North Berwick Reservoir.....  | ·79             |
| "     | Pitsford, Sedgebrook.....     | ·68            | "      | Edinburgh, Royal Observaty.   | 1·28            |
| "     | Woburn, Milton Bryant.....    | 1·01           | XIV.   | Maybole, Knockdon Farm ...    | 2·27            |
| "     | Chatteris, The Priory.....    | ·45            | XV.    | Ballachulish House .....      | 8·18            |
| IV.   | Elsenhams, Gaunts End .....   | ·85            | "      | Campbeltown, Witchburn ..     | 2·66            |
| "     | Colchester, Hill Ho., Lexden  | ·71            | "      | Holy Loch, Ardnadam .....     | 5·77            |
| "     | Ipswich, Rookwood, Copdock    | 1·16           | "      | Islay, Eallabus .....         | 4·67            |
| "     | Blakeney .....                | ·64            | "      | Tiree, Cornaigmore .....      | 3·54            |
| "     | Swaffham .....                | ·85            | XVI.   | Dollar Academy .....          | 2·16            |
| V.    | Bishops Cannings .....        | 1·41           | "      | Balquhidder, Stronvar.....    | ...             |
| "     | Wimborne, St. John's Hill ... | 1·53           | "      | Glenlyon, Meggernie Castle..  | 5·22            |
| "     | Ashburton, Druid House.....   | 1·58           | "      | Blair Atholl .....            | 2·31            |
| "     | Cullompton .....              | 1·25           | "      | Coupar Angus .....            | 1·04            |
| "     | Lynmouth, Rock House .....    | 1·55           | "      | Montrose, Sunnyside Asylum.   | ·62             |
| "     | Okehampton, Oaklands.....     | 1·97           | XVII.  | Alford, Lynturk Manse .....   | 1·18            |
| "     | Hartland Abbey.....           | 1·36           | "      | Fyvie Castle .....            | 1·65            |
| "     | Probus, Lamellyn.....         | 1·50           | "      | Keith Station .....           | 2·00            |
| "     | North Cadbury Rectory.....    | 1·32           | XVIII. | Rothiernmurchus .....         | 3·80            |
| VI.   | Clifton, Pembroke Road.....   | 1·42           | "      | Loch Quoich, Loan .....       | 17·90           |
| "     | Ross, The Graig .....         | ·74            | "      | Drumna drochit .....          | 3·37            |
| "     | Shifnal, Hatton Grange.....   | 1·30           | "      | Skye, Dunvegan .....          | 5·77            |
| "     | Droitwich .....               | 1·43           | "      | Lochmaddy, Bayhead .....      | 4·67            |
| "     | Blockley, Upton Wold.....     | 1·34           | "      | Glencarron Lodge .....        | 9·17            |
| VII.  | Market Overton.....           | ·96            | XIX.   | Invershin .....               | 3·72            |
| "     | Market Rasen .....            | ·71            | "      | Melvich .....                 | ...             |
| "     | Bawtry, Hesley Hall .....     | ·69            | "      | Loch Stack, Achfary .....     | 8·79            |
| "     | Derby, Midland Railway.....   | ·96            | XX.    | Dunmanway, The Rectory ..     | 2·68            |
| "     | Buxton .....                  | 2·12           | "      | Glanmire, Lota Lodge.....     | 1·40            |
| VIII. | Nantwich, Dorfold Hall .....  | 1·18           | "      | Mitchelstown Castle.....      | 1·48            |
| "     | Chatburn, Middlewood .....    | 2·11           | "      | Darrynane Abbey.....          | 2·31            |
| "     | Lancaster, Strathspey .....   | 2·60           | "      | Clonmel, Bruce Villa .....    | 1·48            |
| IX.   | Langsett Moor, Up. Midhope    | 1·59           | "      | Newmarket-on-Fergus, Fenloe   | 2·11            |
| "     | Scarborough, Scalby .....     | 1·28           | XXI.   | Laragh, Glendalough .....     | 1·74            |
| "     | Ingleby Greenhow .....        | 1·11           | "      | Ballycumber, Moorock Lodge    | 2·03            |
| "     | Mickleton .....               | 2·10           | "      | Balbriggan, Ardgillan .....   | 1·78            |
| X.    | Bellingham, High Green Manor  | 1·55           | XXII.  | Ballynahinch Castle.....      | 4·66            |
| "     | Ilderton, Lilburn Cottage ... | ·59            | "      | Woodlawn .....                | 2·65            |
| "     | Keswick, The Bank.....        | 3·44           | "      | Westport, St. Helens .....    | 3·17            |
| XI.   | Llanfrecchfa Grange .....     | 1·36           | "      | Dugort, Slievemore Hotel ...  | 4·56            |
| "     | Treherbert, Tyn-y-waun .....  | 3·75           | "      | Mohill Rectory .....          | 2·30            |
| "     | Carmarthen, The Friary .....  | 2·08           | XXIII. | Enniskillen, Portora.....     | 2·45            |
| "     | Fishguard Goodwick Station.   | 2·00           | "      | Dartrey [Cootehill] .....     | 2·41            |
| "     | Crickhowell, Tal-y-maes ..... | 1·80           | "      | Warrenpoint, Manor House ..   | 2·37            |
| "     | New Radnor, Ednol .....       | ...            | "      | Banbridge, Milltown .....     | 2·46            |
| "     | Birmingham WW., Tyrmynydd     | 2·21           | "      | Belfast, Cave Hill Road ..... | 2·32            |
| "     | Lake Vyrnwy .....             | 1·69           | "      | Ballymena Harryville .....    | 3·37            |
| "     | Llangynhafal, Plás Draw.....  | 1·65           | "      | Londonderry, Creggan Res...   | 3·84            |
| "     | Dolgelly, Bryntirion.....     | 4·47           | "      | Dunfanaghy, Horn Head ...     | 3·84            |
| "     | Bettws-y-Coed, Tyn-y-bryn...  | ...            | "      | Killybegs .....               | 6·12            |





ALTITUDE SCALE

|                |                 |                  |                 |
|----------------|-----------------|------------------|-----------------|
| Below 250 feet | 250 to 500 feet | 500 to 1000 feet | Above 1000 feet |
|----------------|-----------------|------------------|-----------------|

SCALE OF MILES



## THE WEATHER OF APRIL.

The cold weather of the closing days of March was succeeded by a gradual increase of temperature during the first week of April, but the weather remained unsettled generally. A depression skirting the north-western coasts caused rain in most districts on the 2nd, and the fall exceeded an inch in the north of Ireland, the Lake District and the west of Scotland. The changeable conditions continued over Ireland and the north and west of Great Britain, but in the south and east it was more settled after the 3rd and relatively sunny. Thunderstorms were rather widespread over England on the 7th, and occurred in London and Manchester on the 8th. On the latter day a deep depression passed across the north of Scotland to the eastward, and occasioned heavy rain in the northern districts, the fall amounting to 1·85 in. at Glencarron. Anticyclonic conditions prevailed generally from the 11th to the 17th, and, except in the north of Ireland and the west of Scotland, the weather was dry. There was, however, a deficiency of bright sunshine except in the extreme south of England. Heavy rain accompanied a depression which crossed Scotland to the North Sea on the 18th and 19th, amounting to considerably more than an inch on both days at many widely distributed stations in the north and west, and reaching 2·10 in. at Furnace (Argyll) and rather more than 3·00 in. in the Lake District on the 19th. In the south and east of England the weather was fine and sunny. Temperature was low for the time of year, and night frosts occurred in all parts of Great Britain between the 18th and 21st. During the last ten days of the month the pressure distribution underwent but little change, remaining generally anticyclonic, and fair or fine dry weather prevailed with an increase of warmth in the last week. Shade maxima of 70° or above occurred in most districts between the 28th and 30th, and 73° was recorded at Fort William on the 28th, and at Bawtry and Raunds on the 30th.

The month was again very dry over England, the total rainfall being less than an inch over practically the whole of the east of England and the Midlands as far west as Derby. Part of this area is shown on the accompanying map, extending over the Thames Valley around Oxford and as far south as Aldershot. The fall exceeded 2·00 in. only over the Pennines and the country to the west, over Wales, Exmoor, Dartmoor, and a small area in north-east Sussex. In Scotland the fall was generally heavy, and was only less than 2·00 in. in the east and south-east and along the shores of the Moray Firth. A large area with more than 6·00 in. extended over the western Highlands. In Ireland the fall was heavy in the north and west but light in the south and east. Over Munster and Leinster it was less than 2·00 in., except in the west. The greater part of Ulster had more than 3·00 in., and in the Connemara district some stations had more than 7 in. Over the Kingdom, as a whole, the general rainfall expressed as a percentage of the average was as follows: England and Wales, 78; Scotland, 129; Ireland, 95; British Isles, 96.

The following amounts of the duration of sunshine are reported: London (Camden Square) 151·2 hours, Margate 190·6 hours, Totland Bay 179·7 hours, Copdock 176·3 hours, Weymouth 158·4 hours, Ilfracombe 157·9 hours, Ashbourne 160·5 hours, Matlock Bath 150·6 hours, Southport 184·6 hours, Hull 124·4 hours, Haverfordwest 170·5 hours, Paisley Observatory 146·0 hours, Perth 180·6 hours, and Loch Stack 107·0 hours.

In London the month was fine and dry generally, especially in the latter half when the duration of sunshine frequently exceeded 10 hours per day. The mean temperature, 48°·1 was exactly equal to the average. Duration of rainfall, 31·8 hours. Evaporation, 1·65 in.

## Climatological Table for the British Empire, November, 1914.

| STATIONS.<br><br>(Those in italics are<br>South of the Equator.) | Absolute. |       |          |       | Average. |      |               |           | Absolute.       |                   | Total Rain |       | Aver.<br>Cloud. |     |
|------------------------------------------------------------------|-----------|-------|----------|-------|----------|------|---------------|-----------|-----------------|-------------------|------------|-------|-----------------|-----|
|                                                                  | Maximum.  |       | Minimum. |       | Max.     | Min. | Dew<br>Point. | Humidity. | Max. in<br>Sun. | Min. on<br>Grass. | Depth.     | Days. |                 |     |
|                                                                  | Temp.     | Date. | Temp.    | Date. |          |      |               |           |                 |                   |            |       |                 |     |
| London, Camden Square                                            | 61°3      | 5     | 29°7     | 18    | 51°0     | 39°9 | 41°6          | 89        | 88°0            | 26°1              | inches     | 3·52  | 18              | 7·2 |
| Malta ... ..                                                     | 75·2      | 1     | 50·9     | 29    | 68·0     | 57·9 | ...           | 79        | 131·0           | ...               | ...        | 3·49  | 14              | 1·6 |
| Lagos ... ..                                                     | 91·0      | 23    | 72·0     | 11†   | 87·5     | 76·2 | 74·0          | 75        | 156·2           | 69·0              | ...        | 7·01  | 9               | 6·5 |
| Cape Town ... ..                                                 | 89·9      | 25    | 46·8     | 17    | 73·1     | 56·7 | 52·9          | 66        | ...             | ...               | ...        | 1·09  | 6               | 4·0 |
| Natal, Durban ... ..                                             | ...       | ...   | ...      | ...   | ...      | ...  | ...           | ...       | ...             | ...               | ...        | ...   | ...             | ... |
| Johannesburg ... ..                                              | 89·6      | 17    | 40·9     | 11    | 72·7     | 51·3 | 49·7          | 71        | ...             | 40·1              | ...        | 6·86  | 19              | 3·6 |
| Mauritius ... ..                                                 | 84·4      | 13*   | 66·2     | 5     | 82·4     | 68·5 | 62·8          | 67        | ...             | 58·3              | ...        | ·93   | 16              | 5·3 |
| Bloemfontein ... ..                                              | 92·1      | 16    | 39·5     | 11    | 78·4     | 53·0 | 46·1          | 50        | ...             | ...               | ...        | 3·46  | 9               | 3·6 |
| Calcutta ... ..                                                  | 89·4      | 4, 5  | 58·6     | 26    | 84·6     | 63·8 | 61·2          | 66        | ...             | 53·8              | ...        | ·00   | 0               | 1·5 |
| Bombay ... ..                                                    | 93·2      | 11    | 71·7     | 25    | 90·0     | 76·3 | 69·8          | 66        | 139·0           | 59·3              | ...        | ·18   | 2               | 2·6 |
| Madras ... ..                                                    | 87·3      | 9     | 65·2     | 23    | 85·1     | 73·0 | 71·8          | 82        | 155·6           | 61·3              | ...        | 14·03 | 12              | 5·4 |
| Colombo, Ceylon ... ..                                           | 89·7      | 13    | 69·0     | 24    | 87·3     | 73·4 | 72·9          | 80        | 162·0           | 62·8              | ...        | 11·97 | 17              | 7·1 |
| Hongkong ... ..                                                  | 81·8      | 3     | 59·0     | 29    | 73·5     | 66·4 | 61·7          | 74        | ...             | ...               | ...        | 8·82  | 16              | 7·8 |
| Sydney ... ..                                                    | 91·1      | 21    | 59·2     | 30    | 77·8     | 65·2 | 60·8          | 69        | 152·9           | 52·0              | ...        | 2·57  | 18              | 7·5 |
| Melbourne ... ..                                                 | 93·7      | 16    | 44·7     | 22    | 74·9     | 55·5 | 50·4          | 57        | 156·7           | 36·8              | ...        | 2·37  | 14              | 5·7 |
| Adelaide ... ..                                                  | 100·3     | 13    | 50·6     | 27    | 83·7     | 60·4 | 52·8          | 48        | 159·7           | 44·8              | ...        | 2·05  | 8               | 5·6 |
| Perth ... ..                                                     | 89·8      | 29    | 46·9     | 24    | 75·7     | 58·2 | 54·6          | 64        | 159·0           | 41·0              | ...        | 1·73  | 12              | 5·0 |
| Coolgardie ... ..                                                | 94·6      | 20    | 45·4     | 24    | 79·9     | 58·3 | 52·5          | 55        | 163·8           | 43·4              | ...        | 3·06  | 12              | 5·8 |
| Hobart, Tasmania ... ..                                          | 86·3      | 14    | 38·0     | 28    | 65·8     | 48·3 | 43·2          | 59        | 152·0           | 32·2              | ...        | 1·66  | 12              | 6·1 |
| Wellington ... ..                                                | 68·8      | 19    | 41·8     | 20    | 61·3     | 51·1 | 48·2          | 75        | 138·8           | 29·0              | ...        | 1·98  | 11              | 7·5 |
| Auckland ... ..                                                  | 71·5      | 25    | 47·5     | 6     | 64·6     | 52·2 | 50·9          | 76        | 142·0           | 45·0              | ...        | 1·45  | 16              | 6·8 |
| Jamaica, Kingston ... ..                                         | 92·0      | 1     | 69·8     | 28    | 88·2     | 72·2 | 71·7          | 84        | ...             | ...               | ...        | 1·56  | 8               | 5·0 |
| Grenada ... ..                                                   | 87·0      | 13    | 72·0     | 4†    | 83·9     | 75·0 | ...           | 79        | 136·0           | ...               | ...        | 7·77  | 20              | 3·8 |
| Toronto ... ..                                                   | 62·0      | 3     | 12·8     | 23    | 45·4     | 30·8 | 30·8          | 80        | 105·0           | 10·5              | ...        | 2·83  | 12              | 5·7 |
| Fredericton ... ..                                               | 58·0      | 16    | 3·0      | 19    | 39·6     | 22·2 | ...           | 84        | ...             | ...               | ...        | 2·71  | 9               | 6·1 |
| St. John, N.B. ... ..                                            | 56·6      | 2     | 9·8      | 19    | 42·7     | 27·7 | 29·0          | 78        | ...             | ...               | ...        | 3·72  | 13              | 6·2 |
| Alberta, Edmonton ... ..                                         | 54·0      | 2     | —4·8     | 16    | 36·5     | 22·1 | ...           | 78        | 103·0           | —11·0             | ...        | ·76   | 10              | 6·5 |
| Victoria, B.C. ... ..                                            | 54·2      | 1     | 33·2     | 13    | 48·4     | 41·5 | ...           | 92        | ...             | ...               | ...        | 5·83  | 25              | 8·1 |

\* and 24.

† and 18.

‡ and 17, 19.

*Johannesburg.*—Bright sunshine 254·3 hours. Rainfall a record for November for 11 years since observations commenced.

*Mauritius.*—Mean temp. 0°·2, dew point 1°·4, and E ·81 in., below averages. Mean hourly velocity of wind 13·4 miles, or 2·7 miles above average.

COLOMBO, CEYLON.—Mean temp. 80°·4 or 0°·7 above, dew point 0°·2 below, and R 1·82 in. above, averages. Mean hourly velocity of wind 5·0 miles.

HONGKONG.—Mean temp. 69°·9. Mean hourly velocity of wind 11·3 miles. Bright sunshine 113·1 hours.

*Melbourne.*—Mean temp. 4°·0 above, and E ·18 in. above, averages.

*Adelaide.*—Mean temp. 5°·0 above, and E ·90 in. above, averages.

*Perth.*—Temp. 1°·6 above, and E generally above, averages.

*Coolgardie.*—Temp. 0°·9 below, and E 2·5 in. above, averages.

*Hobart.*—Temp. 0°·3 below, and E ·86 in. below, averages.

*Wellington.*—Mean temp. 0°·6 below, and E 1·40 in. below, averages. Bright sunshine 200·3 hours.

*Auckland.*—Mean temp. 2°·5 below, and E under half the averages.

ALBERTA, EDMONTON.—Warm, dry and cloudy, with great temperature variations, frequent snow showers.