

# Symons's Meteorological Magazine.

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## THE MASTERY OF THE AIR.

No one who saw ten years ago the prophetic engraving which we reproduced as the frontispiece of our last volume would have hesitated to express the opinion that the Channel tunnel there delineated would be a highway of traffic long before the various aerial vessels also represented would carry a man across. Balloons, of course, have crossed the Channel many times, though at the mercy of the winds. Kites which rise against the wind were the only aeroplanes foreseen in 1804, and an aeroplane is merely a kite with an engine to drive it, instead of a string to call forth by its resistance the lifting power of moving air on an inclined plane. It has been pointed out—alas for verifying one's references in an age of morning and evening papers, each quoting the ideas of the other—that the pneumatic tyre which was invented to help the bicycle made possible the high speed motor car, and the internal combustion engines developed in lightness and strength by the motor car, made possible the mechanically driven aeroplane. An aeroplane engine not only propels the vehicle but by its unceasing motion it makes the road that carries it, and when the engine stops the road gives way and the winged chariot falls. But for an incident which would have meant only a few minutes roadside halt in a motor car, M. Hubert Latham would have flown across the channel on July 19th; as it was he alighted like a sea bird seven miles from land, and floated safely until he was picked up. To him belongs the honour of the pioneer, and if owing to a hitch with his engine he failed to fly as far over the sea as he had often flown over the land, he proved that a forced descent into the water did not mean certain death, and so he helped to smooth the way.

On July 25th M. Louis Blériot, in another type of aeroplane, flew easily from Calais to Dover, following a curved course of 30 miles, for a fog obscured the land, and he only required 37 minutes for the journey. The significance of the achievement is enormous, for it marks the emergence of a new era, an era in which it becomes possible to travel indifferently over land or sea, and in every student

of the ways of the air such a feat must arouse enthusiastic admiration. There are some things that make the doer of them a cause of pride to his countrymen and a source of chagrin to the people of other countries who cannot match the feat. But just as there are times when a great deed for the empire finds the public indifferent whether the hero hails from Lancashire or Yorkshire, so there are some achievements in the history of human progress so momentous that mankind rightly constituted is indifferent whether it has been honoured by a Frenchman, or a German, or an Englishman. We do not say this from any wish to detract from the glory of France in the conquest of the air; the idea is second-hand, for it occurred to us first, with a sense of the amazing parochialism of outlook with which an eminent writer viewed the deeds of E. H. Shackleton and his comrades in their attainment of an unprecedentedly high latitude amongst unheard of difficulties, when he hailed them as a triumph for the British flag. It was perfectly true; true also it was a triumph for Dulwich College: but we were glowing with the thought of the triumph of humanity, the new proof of the undying progressive power of mankind as the monarchs of the world.

To the meteorologist the coming of aerial navigation, still more of aviation, throws into relief certain special problems. These relate mainly to wind and the vertical components of aerial movements. The question of gusts is all important for the stability of so delicately poised a machine as an aeroplane; and questions of torrential showers, hailstorms, and above all, thunderstorms, are likely to become prominent too. The interest in weather forecasts will be enhanced, and an army of intelligent critics is in the making who will want to "know the reason why" when a forecaster fails.

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### BRITISH RAINFALL, 1908.

BEFORE another number of this Magazine is in the hands of our readers, the forty-eighth volume of *British Rainfall* will have been published; it is completed so far as proofs can tell as we write, and only the printer and bookbinder will feel the further stress of producing it. Of the eleven survivors whose records appeared in *British Rainfall*, 1861, no less than seven appear as Observers in 1908. The whole number of records dealt with now exceeds 4,500; the increase over last year amounts to 193 records, the largest accession in any year except 1903, when it was the same, and it is very satisfactory to know that many of the new returns, especially those from Scotland and Ireland, are in places concerning which no information was available before.

There is an important new departure in the treatment of Monthly Rainfall, the introduction of which is made the occasion of a historical retrospect, tracing the gradual development of the detailed

study of the months. Two maps of monthly rainfall are given side by side ; one showing the actual amount of the fall in inches, the isohyetal lines being reduced from a large scale map on which are plotted the returns from about 2,000 stations ; the other, based on a much smaller number of points, shows the variation from the average of the month, indicating by shading the various degrees of wetness and dryness, as judged by the standard of the normal for the month in question.

The Rainfall Organization does a national work, and is recognized in many ways as of public utility ; but it has no financial support save the subscriptions of a limited number of the Observers and the personal credit of the Director, who bears the whole responsibility of keeping the system going from year to year. He feels the importance and the impending necessity of some more stable guarantee of permanence, and seizes the opportunity of a generous gift from an Observer to make of it the basis of an Endowment Fund which may, some time in the future, supply an income which will materially augment the subscriptions, and enable the data which come in to be more thoroughly and more quickly discussed.

With regard to the character of the year 1908, it is seen to have been on the whole moderately dry, but the coloured frontispiece shows that the average was exceeded in some parts of the country though not reached over a larger area. April and September were the months of largest rainfall in general, June and October those of the smallest ; indeed it is pointed out that the area with a rainfall exceeding 4 inches was never nearly so small in any previous October.

The question of duration of rainfall is dealt with on the basis of a very small number of gauges, the records sent in for discussion bearing no reasonable proportion to the large number of recording gauges in use. This is probably due in some degree to the liability of many forms of recording gauge to go out of order unless tended with a solicitude for which few Observers have time. Some increase appears in the number of records of percolation and evaporation, and the detailed comparison of the evaporation and other elements of climate at Camden Square seems to suggest the possibility of arriving at the amount of loss from an exposed water surface by observations of sunshine and temperature.

The special articles in the volume include the description of a new self-recording rain gauge, the Hyetograph, which has been designed to combine simplicity and accuracy. Simplicity is secured by dispensing with an automatic emptying arrangement and making the receiver large enough to contain the greatest rainfall likely to occur in one day. Other special articles deal with the rainfall records on Snowdon, giving a map of the position of the gauges, and with a remarkable seasonal relationship pointed out by Mr. Gardhouse Charlton between the rainfall of Seathwaite and that of a station 38 miles to the east.

The volume is the largest yet issued, extending to 404 pp.

## THE WEATHER OF JULY, 1909.

By FRED. J. BRODIE.

THE best, and at the same time perhaps the worst, that can be said about the month of July is that over the United Kingdom generally it was a trifle better than in June. The comparison appears to have been most favourable in the south of England, where the sun, after a few weeks of partial retirement, shewed signs of something like activity, and in some places shone with a persistence not far removed from the normal. With winds blowing mainly from the westward and coming, in fact, straight from the cool surface waters of the Atlantic, the thermometer was as a rule well below its average summer level especially in the daytime; no station from which reports were received at the Meteorological Office experiencing a shade temperature as high as  $80^{\circ}$ . In many places the thermometer in fact never rose to  $70^{\circ}$ , and at Douglas (Isle of Man) there were as many as 13 days on which it failed to reach  $60^{\circ}$ .

A brief anticyclonic spell at the commencement of the month was marked by a wide range of temperature, the nights being very cool, but the days fairly warm. Early on the 1st a ground frost was experienced in many parts of the country, and as far south even as Kew, the lowest grass temperature reported being one of  $25^{\circ}$  at Llangammarch Wells. On the 2nd and 3rd, however, the thermometer in a number of places rose to between  $70^{\circ}$  and  $75^{\circ}$ , and at Greenwich and Killarney it touched  $76^{\circ}$ . The anticyclone afterwards receded to the southward, and between the 3rd and 5th a cool westerly type of weather prevailed. The wind afterwards veered to north-west or north, and from the 6th to the 11th the conditions were as a rule exceedingly inclement, the thermometer at many English stations failing on the last day of the period to reach a maximum of  $55^{\circ}$ . A brief interruption to this unseasonable spell occurred, however, on the 8th and 9th when readings above  $70^{\circ}$  were recorded somewhat commonly in England, and locally in Scotland and the south of Ireland. From the 12th to about the 16th a cool, showery, westerly type was again experienced, but after this the conditions improved, and for some four, five, or even more days an absence of rain was reported over all the more southern parts of the country, while temperature again rose a little above its normal height. Between the 17th and 19th maximum readings, ranging between  $70^{\circ}$  and  $75^{\circ}$ , were experienced in many places, the thermometer touching  $77^{\circ}$  at Cambridge and Raunds on the 17th, and  $78^{\circ}$  at Greenwich on the 18th. After about the 20th the weather became extremely unsettled and in the fourth week it was also very wet, the heaviest falls of rain being experienced respectively in Scotland, Wales, and some parts of Ireland, on the 25th, and over England generally on the 27th. Temperature was low for the time of year until quite the close of the month, when it again rose within a measurable distance of the

normal. On the 30th and 31st shade maxima of  $70^{\circ}$  and upwards were registered in many parts of the country, and on the latter day the thermometer at Greenwich touched  $76^{\circ}$ .

With such a conspicuous rarity of summer heat it is not surprising to find that the mean temperature of the month was everywhere below the average, the deficiency of warmth being, however, much greater in the daytime than at night. The total duration of bright sunshine was somewhat low, but in the south of England it was much larger than in June, the amounts at Westminster for the two months being respectively 166 hours and 91 hours. Considering the generally unsettled character of the weather the prevalence of thunderstorms was small, and those actually experienced were, with a few local exceptions, of no great severity.

## THE RAIN GAUGE IN AN ELEMENTARY SCHOOL.

By H. W. WALBANK.

*Usworth Central Council School, Co. Durham.*

As a means of introducing practical arithmetic into the ordinary school curriculum, we have adopted the rain gauge, and keep daily, monthly, and yearly records of the rainfall: these records, being in *hundredths* of an inch, certainly tend to make the pupils more disposed to use decimals (instead of vulgar fractions) in both thinking and working. Rules of arithmetic may be constantly applied—especially in the monthly and yearly records—and methods are kept in mind by constant use.

Accuracy being an essential point, we are most careful in obtaining the daily reading; just before 9 o'clock every morning two children are selected (volunteers are quite numerous) to take the measuring glass out to the rain gauge, and obtain the record for the day. In order to impress the children with the absolute need for accuracy, the teacher checks the report of the boys, by examining the measuring glass with the water in it, and it is very rarely that he finds an error in the reading. All the children of the First Class enter this record, while school registers are being marked, in their books, each being provided with a book for the purpose. We allow an extra fifteen minutes at the end of the month for making out *monthly records*.

The monthly returns we require consist of:—(a) Total rainfall. (b) Average rainfall per day. (c) Number of rain days. (d) Percentage of rain days.

It may be mentioned that a "rain day" is a day on which at least  $\cdot 01$  of an inch of rain is recorded; a faint mark on the measure shows half of  $\cdot 01$ , and if the reading is nearer  $\cdot 01$  than nothing, the record is inserted as  $\cdot 01$ , and the day is a rain day. The record is always the *nearest figure*.

A diagrammatic representation of the month's rainfall is also made. An ordinary scale drawing book is used—one page is blank for the figured table, and the next is ruled out in small squares; two squares along the length of the book are taken for each day of the month, while each square in the width of the page represents  $\cdot 02$  of an inch of rain. The total rainfall for the month is shown again at the end of the month. This is quite as valuable for educative purposes as the figured record. Yearly tables may also be prepared following very much the same lines as the monthly tables.

On commencing the use of a rain gauge, and occasionally afterwards, we thought it well to show the ratio of the area of the receiver to that of the measuring glass (diameter  $^2 \times \cdot 7854$  of each). Thus by a simple practical application of a somewhat abstruse rule, we are able to demonstrate the connection between the gauge and the measure, and show the truth of the markings on the latter. It interests the children to study how the evaporation of water is checked by the form and material of the gauge, and the best time for collection. We also teach them to sketch the instrument as a model, and in section.

The reading of the measure is so simple as to need no comment. Attention should be drawn, however, to the *two* apparent levels of the water, and in explaining this we have another valuable illustration of a natural law.

Problems for the mental and written arithmetic of the class are suggested by the use of the rain gauge, and will be the more practical as bearing on the records. It is well to know that for all practical purposes an inch of rain is equivalent to 100 tons of water per acre.

Our rain gauge is firmly fixed, one foot above ground, in the master's garden, so that it cannot be tampered with, and in order that he may take the records on Saturdays, Sundays, and holidays; but it is easily accessible from the school. It is clear of trees or buildings so as to give the true rainfall of the district.

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### Correspondence.

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

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### PHOTOGRAPHY AND METEOROLOGY.

WHEN was photography first applied to meteorological instruments? Apparently as far back as 1838; a time when the art was, one may say, in its birth, when Daguerre and Fox-Talbot were making their important discoveries.

In the early part of that year, Mr. Thos. B. Jordan, philosophical instrument maker, of Falmouth, and father of Mr. James B. Jordan, a name well known in instrumental meteorology, read a paper on the

subject to the Royal Cornwall Polytechnic Society, of which he was secretary. The plan was to furnish each instrument with a cylinder covered with Talbot's photographic paper, and revolved by clockwork behind the index of the instrument. In the barometer, *e.g.*, the paper was affected by the shadow of the varying mercury column (see the sixth Annual Report of the Society, p. 184). Mr. Jordan also described what he called a "heliograph" for registering the intensity of solar light; an inner fixed cylinder covered with sensitised paper, chloride of silver being the agent, and an outer one rotated by clockwork, and having a hole kept always opposite the sun's place. The outer cylinder was on a screwed axis, so as to give a spiral record of several days. A very similar arrangement by M. Eiffel was lately described in the *Bulletin* of the French Astronomical Society. A modification introduced later (7th Report, 1839, p. 115) consisted of a triangular opening cut the whole length of the outer cylinder, with graduated scale of metal foil admitting the light through cross slits. This instrument was placed in Kew Observatory.

A "magnetometer" was also described, registering photographically the diurnal variations of the needle.

At a meeting of the French Academy in June, 1840, M. Hubert brought forward a proposal very similar to Mr. Jordan's (see *Comptes Rendus*, 1840, Vol. 10, p. 876); and in October of that year Mr. Talbot called attention in the Academy to what Mr. Jordan had already done in that way, and gave an extract from the paper of 1838 above referred to (*Comptes Rendus*, 1840, Vol. 11, p. 574).

Some details of those early researches will be found in Prof. Hunt's work on Photography, in the "Encyclopædia Metropolitana," 1853, p. 153.

This bit of history, perhaps not widely known, was to me at least both interesting and surprising. How many of your readers, I wonder, if asked the question with which I began, would have given a date seventy years back for the development in question?

A.B.M.

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### JULY WEATHER.

THE *Standard* has recently quoted you as saying "We always expect heavy rain about July 25th: about an inch and a half as a rule."

In view of this statement I have analysed my record, 1897-1909, with the following result. The entire rainfall for the 13 Julys was 22·53 inches, of this total—

July 22nd had 2·48 inches.	July 27th had 1·74 inches.
July 25th ,, 3·15 ,,	July 28th ,, 1·61 ,,
July 26th ,, 1·88 ,,	July 29th ,, 1·56 ,,

so that 55 per cent. of the total fell on those 6 days, and 44 per cent. on the 5 days, July 25th-29th.

Taking the 11 years, 1897-1907, I find that—

The first 24 days produced only 8·80 in. and the last 7 days 9·19 in.
,, 21 ,, ,, 5·47 ,, ,, 10 ,, 12·52 ,,

Taking the 13 years, 1897-1909, and thus including 1908, in which year no rain fell after July 17th, I still find that—

The first 24 days produced 11·86 in. and the last 7 had 10·67 in.

„ 21 „ 8·33 „ „ 10 „ 14·20 „

The last 10 days of July exceeded the first 21 in 10 years out of 13.

„ 7 „ „ „ 24 „ 7 „ „

The large amounts credited to the last decade, or last week of July, would seem to be something more than fortuitous.

July, 1909, is the only July in the 13 years which has *not* had at least one clear week of bright hot weather. It is the only July which has not had a maximum of 80°, and which *has* had a maximum below 60°, viz., on 27th, when rain fell continuously for 18 hours from 6 a.m.—1·07 in. in all.

H. A. BOYS, F.R.Met.Soc.

*North Cadbury Rectory, August 2nd, 1909.*

[No doubt there is great probability of a severe thunderstorm occurring in the south of England in the last week of July, and near London it has often come on the 25th; but we would caution our readers against undertaking any laborious researches on the strength of a casual reference in the press. We are sometimes called up on the telephone on a Sunday afternoon, far from our records, by an enterprising journalist, who, perhaps, omits to mention the conditions of the interview, and, perhaps, fails to hear saving clauses.

—Ed., *S.M.M.*]

## SUMMER SUNSHINE.

AN editorial wish, expressed in the last number of the Magazine, induces me to send in from Jersey, as a health resort, the following records of bright sunshine of May and June. At St. Louis' Observatory the observations are taken with the photographic Jordan's recorder, and they are *completed* by personal observation for the earlier and later hours of sunshine. As many days of June were here absolutely fine from the sunrise to the sunset, it will not be amazing that the total amount of bright sunshine exceed even that of Ilfracombe, recorded as 286·6 hours during the period of April 30th to May 21st.

### SUNSHINE AT JERSEY.

From April 30th to May 21st...	294·7 hrs.		
Record of April .....	259·0 „	...	63·3 per cent.
„ May .....	382·2 „	...	80·9 „
„ June .....	259·2 „	...	53·7 „

MARC DECHEVRENS, S.J.

*Observatoire St. Louis, Jersey, July 18th, 1909.*

## SUMMER FROSTS.

I NOTICE that at New Malden (the district where the summer hours of my boyhood were spent) the first June frost in 6 years has been recorded. Here on the Birmingham Plateau, June frosts are of frequent occurrence, and in the present summer we have experienced frost in June, July and August. Below are the dates on which frost has been registered by the exposed thermometer in the Birmingham district:—

	Min. on Grass at Sparkhill.		Min. on Grass at Edgbaston.
June 8th .....	30°	.....	33°·6
„ 13th .....	28°	.....	24°·8
„ 15th .....	32°	.....	32°·4
July 2nd .....	31°	.....	29°·5
August 3rd .....	33°	.....	30°·8

*Sparkhill, August 4th, 1909.*

DAVID HILL OWEN.

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## THE AGRICULTURAL EDUCATION AND NATURE STUDY EXHIBITION AT GLOUCESTER.

FOR some years past the Journal and Education Committee of the Royal Agricultural Society have organized an Educational Exhibition in connection with the Annual show of the Society. Such exhibitions enable the general public who attend the Shows, to see the latest scientific methods of dealing with the agricultural problems, and also the steps that are being taken in the elementary schools to impart knowledge on these questions, through the Nature Study course. Meteorology is fully recognized in these exhibitions, and for the past three years the Royal Meteorological Society has co-operated by organizing a special exhibit.

The Education Exhibition at the Show, held at Gloucester in June, was the best of the series, and it afforded grounds for believing that some educational authorities are at last waking up to the fact that Meteorology has some claims to be placed in the school curriculum. The Royal Meteorological Society had a large exhibit presenting a great deal of useful information in a popular form. There were diagrams relating to temperature, rainfall, wind, sunshine, the influence of weather on crops, and on health, and a large collection of photographs and lantern slides of Meteorological phenomena. Various patterns of self-recording and other meteorological instruments were shown, among which, were two new self recording rain gauges, made public for the first time, viz:—Messrs. Casella & Co's tipping bucket pattern, recording to .005 in., and Messrs. Negretti and Zambra's Hyetograph.

In the grounds adjoining the Exhibition Shed, a Climatological Station was arranged, and Mr. Marriott gave daily demonstrations on

the method of taking weather observations. Advantage was taken to familiarize the public with the latest phase of meteorological work—the Investigation of the Upper Atmosphere, Mr. Marriott's addresses on the first three days of the Show being followed by the ascent of a ballon-sonde carrying a meteorograph, and on the closing days by the ascent of pilot balloons. We understand that two of the meteorographs sent up, were recovered with good records before July 10th.

Among the exhibits from the Agricultural Colleges, was one from the Harper-Adams' College showing the results of experiments that are being made, including the amount of Nitrogen as ammonia and nitrates brought down by Rain. The Wye Agricultural College showed some illustrations of the experiments being carried out for the protection of fruit trees from spring frosts.

The Nature Study exhibit of the County Councils Associations from the schools in the Counties of Gloucester, Hereford, Monmouth, Oxford, Somerset, Warwick, Wilts, and Worcester contained many specimens of meteorological work. Some of the note books contained a very full and detailed daily account of the weather phenomena observed, from which many official observers might with advantage take a lesson. There were several examples of home-made instruments, some of which were very ingenious, whilst others would come under the category of "curiosities." One of the exhibits was labelled "Simple Rain-gauge," specification; pickle-bottle, funnel, and measuring-glass: cost—funnel 2d., measuring-glass 2½d., total cost 4½d. The teacher in this case gets his boys to measure the rain in cubic centimetres and then convert the amount measured into inches, thus taking advantage to instruct his boys in English and metric measures as well as rainfall observing. It is not suggested that this instrument would receive the approval of the Editor, or that clumsy and complicated home-made makeshifts should take the place of simple and accurate standard patterns; but the spirit which expounds the principles of apparatus, is worthy of all encouragement.

On Friday, June 25th, a conference of teachers and others interested in Nature Study was held. Prof. Ainsworth Davis, Principal of the Cirencester Agricultural College, delivered an address on Nature Study, and he mentioned Meteorology amongst the subjects which he urged should be included in a Nature Study course. Mr. Marriott also spoke on the desirability of teachers imparting some knowledge of Meteorology to their scholars.

There is certainly a desire on the part of many teachers to take up the subject, but they want just such a lead in the right direction as is being supplied by the Royal Meteorological Society.





This map shows the group of Counties in each of the twenty-three divisions used in the Supplementary Rainfall Tables and in *British Rainfall*.

## RAINFALL TABLE FOR JULY, 1909.

| STATION.                           | COUNTY.            | Lat.<br>N. | Long.<br>W.<br>[*E.] | Height<br>above<br>Sea.<br>ft. | RAINFALL<br>OF MONTH.    |              |
|------------------------------------|--------------------|------------|----------------------|--------------------------------|--------------------------|--------------|
|                                    |                    |            |                      |                                | Aver.<br>1870-99.<br>in. | 1909.<br>in. |
| Camden Square.....                 | London.....        | 51 32      | 0 8                  | 111                            | 2'49                     | 3'49         |
| Tenterden.....                     | Kent.....          | 51 4       | *0 41                | 190                            | 2'26                     | 3'92         |
| West Dean.....                     | Hampshire.....     | 51 3       | 1 38                 | 137                            | 2'62                     | 2'69         |
| Hartley Wintney.....               | ".....             | 51 18      | 0 53                 | 222                            | 2'38                     | 2'77         |
| Hitchin.....                       | Hertfordshire..... | 51 57      | 0 17                 | 238                            | 2'55                     | 3'25         |
| Winslow (Addington).....           | Buckinghamsh..     | 51 58      | 0 53                 | 309                            | 2'77                     | 3'48         |
| Bury St. Edmunds (Westley).....    | Suffolk.....       | 52 15      | *0 40                | 226                            | 2'91                     | 3'46         |
| Brundall.....                      | Norfolk.....       | 52 37      | *1 26                | 66                             | 2'70                     | 2'85         |
| Winterbourne Steepleton.....       | Dorset.....        | 50 42      | 2 31                 | 316                            | 2'78                     | 4'14         |
| Torquay (Cary Green).....          | Devon.....         | 50 28      | 3 32                 | 12                             | 2'73                     | 2'19         |
| Polapit Tamar [Launceston].....    | ".....             | 50 40      | 4 22                 | 315                            | 2'93                     | 2'22         |
| Bath.....                          | Somerset.....      | 51 23      | 2 21                 | 67                             | 2'83                     | 1'95         |
| Stroud (Upfield).....              | Gloucestershire..  | 51 44      | 2 13                 | 226                            | 2'90                     | 2'56         |
| Church Stretton (Wolstaston).....  | Shropshire.....    | 52 35      | 2 48                 | 800                            | 2'66                     | 2'95         |
| Coventry (Kingswood).....          | Warwickshire.....  | 52 24      | 1 30                 | 340                            | 2'75                     | 3'87         |
| Boston.....                        | Lincolnshire.....  | 52 58      | 0 1                  | 25                             | 2'44                     | 4'20         |
| Workshop (Hodsock Priory).....     | Nottinghamshire    | 53 22      | 1 5                  | 56                             | 2'51                     | 3'57         |
| Derby (Midland Railway).....       | Derbyshire.....    | 52 55      | 1 28                 | 156                            | 2'63                     | 3'01         |
| Bolton (Queen's Park).....         | Lancashire.....    | 53 35      | 2 28                 | 390                            | 4'12                     | 7'08         |
| Wetherby (Ribston Hall).....       | Yorkshire, W.R.    | 53 59      | 1 24                 | 130                            | 2'61                     | 3'46         |
| Arneliffe Vicarage.....            | ".....             | 54 8       | 2 6                  | 732                            | 4'97                     | 9'01         |
| Hull (Pearson Park).....           | " E.R.             | 53 45      | 0 20                 | 6                              | 2'50                     | 4'11         |
| Newcastle (Town Moor).....         | Northumberland     | 54 59      | 1 38                 | 201                            | 2'91                     | 2'78         |
| Borrowdale (Seathwaite).....       | Cumberland.....    | 54 30      | 3 10                 | 423                            | 9'37                     | 16'75        |
| Cardiff (Ely).....                 | Glamorgan.....     | 51 29      | 3 13                 | 53                             | 3'52                     | 3'06         |
| Haverfordwest (High Street).....   | Pembroke.....      | 51 48      | 4 58                 | 95                             | 3'70                     | 4'16         |
| Aberystwyth (Gogerddan).....       | Cardigan.....      | 52 26      | 4 1                  | 83                             | 4'27                     | 5'02         |
| Llandudno.....                     | Carnarvon.....     | 53 20      | 3 50                 | 72                             | 2'61                     | 3'89         |
| Cargen [Dumtries].....             | Kirkcudbright..... | 55 2       | 3 37                 | 80                             | 3'30                     | ...          |
| Hawick (Braxholm).....             | Roxburgh.....      | 55 24      | 2 51                 | 457                            | 3'34                     | 2'59         |
| Edinburgh (Royal Observatory)..... | Midlothian.....    | 55 55      | 3 11                 | 442                            | ...                      | 3'32         |
| Girvan (Pinmore).....              | Ayr.....           | 55 10      | 4 49                 | 207                            | 3'60                     | 7'70         |
| Glasgow (Queen's Park).....        | Renfrew.....       | 55 53      | 4 18                 | 144                            | 3'36                     | 3'58         |
| Inveraray (Newtown).....           | Argyll.....        | 56 14      | 5 4                  | 17                             | 4'43                     | 5'91         |
| Mull (Quinish).....                | ".....             | 56 36      | 6 13                 | 35                             | 4'38                     | 4'73         |
| Dundee (Eastern Necropolis).....   | Forfar.....        | 56 28      | 2 57                 | 199                            | 3'03                     | 2'71         |
| Braemar.....                       | Aberdeen.....      | 57 0       | 3 24                 | 1114                           | 2'89                     | 3'20         |
| Aberdeen (Cranford).....           | ".....             | 57 8       | 2 7                  | 120                            | 3'02                     | 5'00         |
| Cawdor.....                        | Nairn.....         | 57 31      | 3 57                 | 250                            | 3'34                     | 4'44         |
| Fort Augustus (S. Benedict's)..... | E. Inverness.....  | 57 9       | 4 41                 | 68                             | 3'10                     | 3'91         |
| Loch Torridon (Bendamph).....      | W. Ross.....       | 57 32      | 5 32                 | 20                             | 6'46                     | 5'70         |
| Dunrobin Castle.....               | Sutherland.....    | 57 59      | 3 56                 | 14                             | 2'82                     | 1'90         |
| Castletown.....                    | Caitness.....      | 58 35      | 3 23                 | 100                            | ...                      | 2'33         |
| Killarney (District Asylum).....   | Kerry.....         | 52 4       | 9 31                 | 178                            | 3'99                     | 3'39         |
| Waterford (Brook Lodge).....       | Waterford.....     | 52 15      | 7 7                  | 104                            | 3'10                     | 3'08         |
| Broadford (Hurdlestown).....       | Clare.....         | 52 48      | 8 38                 | 167                            | 2'94                     | 3'50         |
| Abbey Leix (Blandsfort).....       | Queen's County..   | 52 56      | 7 17                 | 532                            | 3'05                     | 2'97         |
| Dublin (Fitz William Square).....  | Dublin.....        | 53 21      | 6 14                 | 54                             | 2'63                     | 3'32         |
| Mullingar (Belvedere).....         | Westmeath.....     | 53 29      | 7 22                 | 367                            | 3'47                     | 2'99         |
| Ballinasloe.....                   | Galway.....        | 53 20      | 8 15                 | 160                            | 3'31                     | 2'31         |
| Crossmolina (Enniscoe).....        | Mayo.....          | 54 4       | 9 18                 | 74                             | 3'59                     | 3'78         |
| Collooney (Markree Obsy.).....     | Sligo.....         | 54 11      | 8 27                 | 127                            | 3'65                     | 3'13         |
| Seaforde.....                      | Down.....          | 54 19      | 5 50                 | 180                            | 3'40                     | 3'70         |
| Londonderry (Creggan Res.).....    | Londonderry.....   | 54 59      | 7 19                 | 320                            | 3'47                     | 4'81         |
| Omagh (Edenfel).....               | Tyrrone.....       | 54 36      | 7 18                 | 280                            | 3'39                     | 3'48         |

RAINFALL TABLE FOR JULY, 1909—continued.

| RAINFALL OF MONTH (con.) |          |                   |       |             | RAINFALL FROM JAN. 1. |           |                      |          | Mean Annual 1870-1899. | STATION.           |
|--------------------------|----------|-------------------|-------|-------------|-----------------------|-----------|----------------------|----------|------------------------|--------------------|
| Diff. from Av. in.       | % of Av. | Max. in 24 hours. |       | No. of Days | Aver. 1870-99. in.    | 1909. in. | Diff. from Aver. in. | % of Av. |                        |                    |
|                          |          | in.               | Date. |             |                       |           |                      |          |                        |                    |
| +1.00                    | 140      | 1.14              | 27    | 18          | 13.12                 | 15.03     | +1.91                | 115      | 25.16                  | Camden Square      |
| +1.66                    | 173      | 1.36              | 4     | 19          | 13.81                 | 15.30     | +1.49                | 111      | 28.36                  | Tenterden          |
| + .07                    | 103      | 1.25              | 27    | 17          | 15.23                 | 14.52     | - .71                | 95       | 29.93                  | West Dean          |
| + .39                    | 116      | .88               | 27    | 18          | 13.97                 | 15.71     | +1.74                | 113      | 27.10                  | Hartley Wintney    |
| + .70                    | 127      | .59               | 27    | 19          | 12.81                 | 15.99     | +3.18                | 125      | 24.66                  | Hitchin            |
| + .71                    | 126      | .69               | 27    | 19          | 14.05                 | 14.22     | + .17                | 101      | 26.75                  | Addington          |
| + .55                    | 119      | .60               | 27    | 16          | 13.23                 | 13.66     | + .43                | 103      | 25.39                  | Westley            |
| + .15                    | 106      | .69               | 27    | 20          | 12.82                 | 12.21     | - .61                | 95       | 25.40                  | Brundall           |
| +1.36                    | 149      | 2.85              | 27    | 14          | 19.14                 | 18.79     | - .35                | 98       | 39.00                  | Winterbourne Stptn |
| - .54                    | 80       | 1.11              | 27    | 12          | 17.78                 | 16.84     | - .94                | 95       | 35.00                  | Torquay            |
| - .71                    | 76       | .60               | 9     | 19          | 18.38                 | 17.76     | - .62                | 97       | 38.85                  | Polapit Tamar      |
| - .88                    | 69       | .50               | 27    | 19          | 15.86                 | 13.38     | -2.48                | 84       | 30.75                  | Bath               |
| - .34                    | 88       | .70               | 9     | 18          | 15.73                 | 14.33     | -1.40                | 91       | 29.85                  | Stroud             |
| + .29                    | 111      | 1.50              | 27    | 17          | 16.97                 | 16.58     | - .39                | 98       | 33.04                  | Wolstaston         |
| +1.12                    | 141      | 1.34              | 27    | 16          | 15.31                 | 15.17     | - .14                | 99       | 29.21                  | Coventry           |
| +1.76                    | 172      | 1.02              | 27    | 19          | 12.20                 | 14.56     | +2.36                | 119      | 23.30                  | Boston             |
| +1.06                    | 142      | .88               | 27    | 17          | 13.32                 | 14.47     | +1.15                | 109      | 24.70                  | Hodsock Priory     |
| + .38                    | 114      | 1.11              | 27    | 19          | 14.11                 | 13.59     | - .52                | 96       | 26.18                  | Derby              |
| +2.96                    | 172      | 1.20              | 30    | 24          | 20.87                 | 25.32     | +4.45                | 121      | 42.43                  | Bolton             |
| + .85                    | 133      | .66               | 15    | 21          | 14.24                 | 16.95     | +2.71                | 119      | 26.96                  | Ribston Hall       |
| +4.04                    | 181      | 1.25              | 20    | 22          | 31.44                 | 35.94     | +4.50                | 114      | 60.96                  | Arncliffe Vic.     |
| +1.61                    | 164      | .58               | 30    | 18          | 13.74                 | 15.63     | +1.89                | 114      | 27.02                  | Hull               |
| - .13                    | 96       | .63               | 30    | 20          | 14.26                 | 17.43     | +3.17                | 122      | 27.99                  | Newcastle          |
| +7.38                    | 179      | 2.48              | 20    | 25          | 66.73                 | 65.92     | - .81                | 99       | 132.68                 | Seathwaite         |
| - .46                    | 87       | .75               | 27    | 19          | 20.71                 | 16.77     | -3.94                | 81       | 42.81                  | Cardiff            |
| + .46                    | 112      | .91               | 27    | 18          | 23.37                 | 20.30     | -3.07                | 87       | 47.88                  | Haverfordwest      |
| + .75                    | 118      | 1.30              | 9     | 25          | 21.86                 | 20.55     | -1.31                | 94       | 45.41                  | Gogerddan          |
| +1.28                    | 149      | .73               | 16    | 21          | 14.79                 | 15.12     | + .33                | 102      | 30.98                  | Llandudno          |
| ...                      | ...      | ...               | ...   | ...         | 22.05                 | ...       | ...                  | ...      | 43.43                  | Cargen             |
| - .75                    | 78       | 1.13              | 25    | 18          | 18.00                 | 18.88     | + .88                | 105      | 34.80                  | Branxholm          |
| ...                      | ...      | 1.34              | 25    | 17          | ...                   | 17.00     | ...                  | ...      | ...                    | Edinburgh          |
| +4.10                    | 214      | 1.76              | 26    | 24          | 24.12                 | 27.93     | +3.81                | 116      | 48.87                  | Girvan             |
| + .22                    | 107      | 1.10              | 25    | 17          | 18.30                 | 21.64     | +3.34                | 118      | 35.80                  | Glasgow            |
| +1.48                    | 134      | 1.08              | 23    | 26          | 31.00                 | 33.00     | +2.00                | 106      | 57.90                  | Inveraray          |
| + .35                    | 108      | 1.02              | 15    | 22          | 28.22                 | 25.31     | -2.91                | 90       | 57.53                  | Quinish            |
| - .32                    | 89       | .98               | 25    | 16          | 15.12                 | 16.40     | +1.28                | 108      | 28.95                  | Dundee             |
| + .31                    | 111      | ...               | ...   | ...         | 17.83                 | 17.50     | - .33                | 98       | 36.07                  | Braemar            |
| +1.98                    | 166      | 2.00              | 25    | 19          | 16.71                 | 20.30     | +3.59                | 121      | 33.01                  | Aberdeen           |
| +1.10                    | 133      | 1.49              | 29    | 13          | 15.26                 | 17.28     | +2.02                | 113      | 29.37                  | Cawdor             |
| + .81                    | 126      | .69               | 30    | 20          | 22.40                 | 18.50     | -3.90                | 83       | 43.71                  | Fort Augustus      |
| - .76                    | 88       | .67               | 22    | 26          | 42.50                 | 38.19     | -4.31                | 90       | 86.50                  | Bendamph           |
| - .92                    | 67       | .29               | 15    | 15          | 16.27                 | 17.62     | +1.35                | 108      | 31.60                  | Dunrobin Castle    |
| ...                      | ...      | .40               | 6,20  | 21          | ...                   | 16.04     | ...                  | ...      | ...                    | Castletown         |
| - .60                    | 85       | .98               | 24    | 18          | 29.98                 | 24.85     | -5.13                | 83       | 58.11                  | Killarney          |
| - .02                    | 99       | .98               | 24    | 15          | 20.29                 | 19.63     | - .66                | 97       | 39.30                  | Waterford          |
| + .56                    | 119      | .76               | 9     | 25          | 17.06                 | 22.14     | +5.08                | 130      | 33.47                  | Hurdlestown        |
| - .08                    | 97       | .54               | 24    | 21          | 18.25                 | 20.08     | +1.83                | 110      | 35.19                  | Abbey Leix         |
| + .69                    | 126      | .53               | 24    | 22          | 14.51                 | 15.37     | + .86                | 106      | 27.75                  | Dublin             |
| - .48                    | 86       | .89               | 30    | 15          | 18.97                 | 20.23     | +1.26                | 107      | 36.48                  | Mullingar.         |
| -1.00                    | 70       | .51               | 30    | 25          | 19.23                 | 17.70     | -1.53                | 92       | 37.04                  | Ballinasloe        |
| + .19                    | 105      | .96               | 30    | 26          | 25.33                 | 24.99     | - .34                | 99       | 50.50                  | Enniscoie          |
| - .52                    | 86       | .64               | 30    | 25          | 21.16                 | 20.53     | - .63                | 97       | 41.83                  | Markree Obsy.      |
| + .30                    | 109      | .60               | 30    | 21          | 20.32                 | 23.03     | +2.71                | 113      | 38.61                  | Seaford            |
| +1.34                    | 139      | .57               | 23    | 25          | 20.54                 | 24.93     | +4.39                | 121      | 41.20                  | Londonderry        |
| + .09                    | 103      | .38               | 3     | 24          | 19.25                 | 21.16     | +1.91                | 110      | 37.85                  | Omagh              |

## SUPPLEMENTARY RAINFALL, JULY, 1909.

| Div.  | STATION.                     | Rain inches | Div.   | STATION.                     | Rain inches |
|-------|------------------------------|-------------|--------|------------------------------|-------------|
| II.   | Warlingham, Redvers Road     | 3.98        | XI.    | Rhayader, Tyrmynydd .....    | 5.08        |
| „     | Ramsgate .....               | 2.88        | „      | Lake Vyrnwy .....            | 4.21        |
| „     | Steyning.....                | 2.99        | „      | Llangyhanfal, Plás Draw....  | 2.36        |
| „     | Hailsham .....               | 2.61        | „      | Llwydiarth Esgob .....       | 5.69        |
| „     | Totland Bay, Aston House.    | 2.34        | „      | Snowdon, Cwm Dyli .....      | 9.69        |
| „     | Stockbridge, Ashley .....    | 2.96        | „      | Lligwy .....                 | 4.37        |
| „     | Grayshott.....               | 3.03        | „      | Douglas, Woodville .....     | 4.88        |
| „     | Reading, Calcot Place.....   | 2.64        | XII.   | Stoneykirk, Ardwell House    | 4.74        |
| III.  | Harrow Weald, Hill House.    | 3.44        | „      | Dalry, The Old Garroch ...   | 6.32        |
| „     | Oxford, Magdalen College..   | 2.19        | „      | Langholm, Drove Road.....    | 4.51        |
| „     | Pitsford, Sedgebrook .....   | 2.57        | „      | Moniaive, Maxwellton House   | 4.79        |
| „     | Huntingdon, Brampton.....    | 3.40        | XIII.  | N. Esk Reservoir [Penicuick] | 4.70        |
| „     | Woburn, Milton Bryant.....   | 3.25        | XIV.   | Maybole, Knockdon Farm..     | 6.30        |
| „     | Wisbech, Monica Road.....    | 3.18        | XV.    | Campbeltown, Witchburn...    | 4.46        |
| IV.   | Southend Water Works.....    | 3.27        | „      | Glenreasdell Mains.....      | 5.60        |
| „     | Colchester, Lexden .....     | 3.66        | „      | Ballachulish House.....      | ...         |
| „     | Newport, The Vicarage.....   | 2.86        | „      | Islay, Eallabus .....        | 6.02        |
| „     | Rendlesham.....              | 2.60        | XVI.   | Dollar Academy .....         | 3.69        |
| „     | Swaffham .....               | 3.47        | „      | Loch Leven Sluice .....      | 4.26        |
| „     | Blakeney .....               | 3.69        | „      | Balquhidder, Stronvar .....  | 3.28        |
| V.    | Bishops Cannings .....       | 3.02        | „      | Perth, The Museum .....      | 3.38        |
| „     | Ashburton, Druid House ...   | 2.83        | „      | Coupar Angus .....           | 2.74        |
| „     | Honiton, Combe Raleigh ...   | 3.48        | „      | Blair Atholl .....           | 2.91        |
| „     | Okehampton, Oaklands.....    | 2.65        | „      | Montrose, Sunnyside Asylum   | 4.25        |
| „     | Hartland Abbey .....         | 2.34        | XVII.  | Alford, Lynturk Manse ...    | 4.15        |
| „     | Lynmouth, Rock House ...     | 2.02        | „      | Keith Station .....          | 2.90        |
| „     | Probus, Lamellyn .....       | 2.48        | XVIII. | N. Uist, Lochmaddy .....     | 3.51        |
| „     | North Cadbury Rectory .....  | 2.90        | „      | Alvey Manse .....            | 3.90        |
| VI.   | Clifton, Pembroke Road ...   | 3.30        | „      | Loch Ness, Drumnadrochit.    | 3.65        |
| „     | Ross, The Graig .....        | 1.61        | „      | Glencarron Lodge .....       | 6.21        |
| „     | Shifnal, Hatton Grange.....  | 3.40        | „      | Fearn, Lower Pitkerrie.....  | 1.64        |
| „     | Blockley, Upton Wold .....   | 2.88        | XIX.   | Invershin .....              | 2.61        |
| „     | Worcester, Boughton Park.    | 3.19        | „      | Altnaharra .....             | 2.98        |
| VII.  | Market Overton .....         | 3.64        | „      | Bettyhill .....              | 2.13        |
| „     | Market Rasen .....           | 4.44        | XX.    | Dunmanway, The Rectory..     | 1.61        |
| „     | Bawtry, Hesley Hall.....     | 3.54        | „      | Cork .....                   | .97         |
| „     | Buxton.....                  | 5.12        | „      | Mitchelstown Castle .....    | 3.03        |
| VIII. | Neston, Hinderton Lodge...   | 3.04        | „      | Darrynane Abbey .....        | 3.86        |
| „     | Southport, Hesketh Park...   | 4.99        | „      | Glenam [Clonmel] .....       | 1.98        |
| „     | Chatburn, Middlewood .....   | 6.19        | „      | Nenagh Traverstown .....     | 2.78        |
| „     | Cartmel, Flookburgh .....    | 6.52        | „      | Miltown Malbay.....          | 3.32        |
| IX.   | Langsett Moor, Up. Midhope   | 4.70        | XXI.   | Gorey, Courtown House ...    | 4.07        |
| „     | Scarborough, Scalby .....    | 3.03        | „      | Moynalty, Westland .....     | 3.56        |
| „     | Ingleby Greenhow .....       | 2.82        | „      | Athlone, Twyford .....       | 2.41        |
| „     | Mickleton.....               | 2.27        | XXII.  | Woodlawn .....               | 3.33        |
| X.    | Bardon Mill, Beltingham ...  | 3.53        | „      | Westport, St. Helens .....   | 3.69        |
| „     | Ewesley, Font Reservoir ...  | 2.85        | „      | Mohill .....                 | 3.05        |
| „     | Ilderton, Lilburn Cottage... | 1.77        | XXIII. | Enniskillen, Portora .....   | 3.28        |
| „     | Keswick, The Bank .....      | 6.22        | „      | Dartrey [Cootehill].....     | 3.99        |
| XI.   | Llanfrechfa Grange.....      | 2.57        | „      | Warrenpoint, Manor House     | 3.17        |
| „     | Treherbert, Tyn-y-waun ...   | 6.33        | „      | Banbridge, Milltown .....    | 3.03        |
| „     | Carmarthen, The Friary.....  | 3.47        | „      | Belfast, Springfield .....   | 4.37        |
| „     | Castle Malgwyn [Llechryd].   | 2.95        | „      | Bushmills, Dundarave .....   | 4.68        |
| „     | Plylimon.....                | 12.20       | „      | Ston House .....             | 3.70        |
| „     | Crickhowell, Ffordlas.....   | 3.70        | „      | Killybegs .....              | 8.52        |
| „     | New Radnor, Ednol .....      | 3.95        | „      | Horn Head ... ..             | 5.74        |

## METEOROLOGICAL NOTES ON JULY, 1909.

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

LONDON, CAMDEN SQUARE.—Changeable weather prevailed throughout, fine, bright days alternating with cloud and R. A sharp TS occurred at 3.45 p.m. on 13th, when .27 in. of R fell in 4 minutes, and on 27th R fell for 14.0 hours. Duration of sunshine, 163.0\* hours, and of R 53.3 hours. Mean temp. 61.4, or 1.9 below the average. Shade max. 77.6 on 18th; min. 44.1 on 1st. F 0, f 0.

TENTERDEN.—Cold and wet month, bad for haymaking and fruit. Severe TS on 4th, when 1.36 in. of R fell. Duration of sunshine 182.8† hours. Shade max. 74.0 on 18th; min. 43.0 on 1st. F 0, f 0.

TOTLAND BAY.—Duration of sunshine, 181.8\* hours, and the least recorded in July. Shade max. 70.0 on 19th; min. 38.1 on 2nd. F 0, f 0.

PITSFORD.—R 1.04 in. below the average. Mean temp. 59.5. Shade max. 74.6 on 17th; min. 41.3 on 1st. F 0.

TORQUAY.—Duration of sunshine, 233.4\* hours, or 7.2 hours above the average. Mean temp. 61.1, or 0.6 below the average. Shade max. 73.9 on 20th; min. 50.2 on 11th. F 0, f 0.

NORTH CADBURY.—The cloudiest, by far the windiest, and by day the coldest July in 13 years. Only once was there as much as three days together of decent haymaking weather. Shade max. 79.0 on 2nd; min. 46.0 on 1st and 24th. F 0, f 0.

ROSS.—Shade max. 73.8 on 3rd; min. 44.4 on 2nd. F 0, f 0.

BOLTON.—Duration of sunshine, 154.3\* hours, or 6.9 hours above the average. Mean temp. 55.3, or 2.1 below the average. Shade max. 70.9 on 2nd; min. 42.2 on 1st. F 0, f 0.

SOUTHPORT.—R 2.00 in. above the average and the heaviest for 20 years. Duration of sunshine 167.7\* hours, or 43.7 below the average. Duration of R 70.4 hours. Mean temp. 58.0, or 1.7 below the average. Windiest July in 40 years. Shade max. 70.9 on 2nd; min. 42.6 on 1st. F 0, f 0.

HULL.—Notable for the meagre amount of sunshine and heavy R. Shade max. 73.0 on 15th; min. 46.0 on 2nd. F 0, f 0.

CARMARTHEN.—Dull, cloudy and misty, with cold nights. R below the average and water supplies very low. Bad hay harvest due to the unsettled weather and T showers.

HAVERFORDWEST.—Duration of sunshine 185.4\* hours. Shade max. 70.9 on 1st; min. 44.2 on 9th. F 0, f 0.

LLANDUDNO.—Duration of sunshine 164.4\* hours. Shade max. 71.2 on 2nd and 3rd; min. 48.0 on 1st. F 0, f 0.

MAXWELTON HOUSE.—Cold and stormy with little sunshine. Severe TS and flood on 25th, when 1.96 in. of R fell. Shade max. 74.0 on 31st; min. 33.0 on 1st. F 0.

EDINBURGH.—Shade max. 69.5 on 8th; min. 42.3 on 1st. F 0, f 0.

DUNDEE.—Shade max. 73.2 on 16th; min. 39.4 on 1st. F 0.

FORT AUGUSTUS.—Shade max. 68.3 on 8th; min. 39.0 on 12th. F 0.

WATERFORD.—Shade max. 71.5 on 13th; min. 45.0 on 12th and 27th.

DUBLIN.—Mean temp. 59.2. Shade max. 73.2 on 3rd; min. 45.1 on 28th. F 0, f 0.

MARKREE.—Showery, with low temp. and N. and N.W. winds most of the month. Gales and slight H on a few occasions. Shade max. 71.0 on 1st; min. 36.8 on 28th. F 0, f 1.

WARRENPOINT.—Shade max. 69.0 on 1st, 17th, and 22nd; min. 44.0 on 27th. F 0, f 0.

\* Campbell-Stokes.

† Jordan.

Climatological Table for the British Empire, February, 1909.

| STATIONS.<br><br>(Those in italics are South of the Equator.) | Absolute. |       |          |       | Average. |       |            |           | Absolute.    |                | Total Rain |       | Aver.<br>Cloud. |
|---------------------------------------------------------------|-----------|-------|----------|-------|----------|-------|------------|-----------|--------------|----------------|------------|-------|-----------------|
|                                                               | Maximum.  |       | Minimum. |       | Max.     | Min.  | Dew Point. | Humidity. | Max. in Sun. | Min. on Grass. | Depth.     | Days. |                 |
|                                                               | Temp.     | Date. | Temp.    | Date. |          |       |            |           |              |                |            |       |                 |
| London, Camden Square                                         | 55°9      | 4     | 20°6     | 23    | 43°6     | 30°3  | 34°3       | 86        | 77·8         | 13°6           | ·50        | 8     | 7·5             |
| Malta ... ..                                                  | 60·4      | 28    | 43·1     | 19    | 55·7     | 48·2  | 42·3       | 77        | 127·6        | ...            | 2·24       | 18    | 6·9             |
| Lagos ... ..                                                  | 91·0      | 11*   | 71·0     | 25    | 87·4     | 75·7  | 74·8       | 78        | 153·0        | 68·0           | 5·27       | 5     | 8·6             |
| Cape Town ... ..                                              | 90·0      | 17    | 54·3     | 12    | 81·0     | 62·3  | 57·3       | 64        | ...          | ...            | ·06        | 3     | 2·6             |
| Durban, Natal                                                 | 87·1      | 2, 3  | 61·8     | 18    | 81·4     | 67·5  | ...        | ...       | 149·6        | ...            | 4·27       | 18    | 6·1             |
| Johannesburg ... ..                                           | 75·1      | 16    | 49·0     | 21    | 69·7     | 55·4  | 57·1       | 90        | 150·7        | 49·1           | 6·57       | 18    | 7·8             |
| Mauritius ... ..                                              | 88·5      | 4     | 69·6     | 19    | 86·1     | 73·4  | 73·0       | 82        | 160·8        | 64·2           | 7·60       | 22    | 7·              |
| Calcutta... ..                                                | 93·2      | 24    | 52·3     | 9     | 85·3     | 60·2  | 57·0       | 60        | 148·2        | 46·0           | ·10        | 0     | 2·3             |
| Bombay... ..                                                  | 86·2      | 28    | 65·1     | 1     | 82·7     | 68·2  | 65·3       | 73        | 130·2        | 56·9           | ·00        | 0     | 0·7             |
| Madras ... ..                                                 | 89·4      | 16    | 66·2     | 27    | 86·6     | 69·5  | 69·1       | 77        | 138·2        | 62·1           | ·05        | 1     | 3·0             |
| Kodaikanal ... ..                                             | 68·3      | 22    | 43·3     | 6     | 65·5     | 47·1  | 40·7       | 58        | 129·5        | 26·2           | ·08        | 1     | 3·1             |
| Colombo, Ceylon                                               | 92·8      | 11    | 69·0     | 2     | 88·6     | 72·7  | 70·8       | 74        | 162·2        | 63·1           | 1·02       | 4     | 4·3             |
| Hongkong ... ..                                               | 73·4      | 3     | 48·7     | 8     | 64·3     | 57·0  | 54·8       | 81        | 126·9        | ...            | 1·66       | 9     | 8·0             |
| Melbourne ... ..                                              | 101·5     | 23    | 48·0     | 5     | 77·3     | 56·5  | 50·9       | 56        | 154·3        | 41·0           | 1·47       | 5     | 4·0             |
| Adelaide ... ..                                               | 102·0     | 9     | 47·7     | 4     | 83·7     | 57·8  | 50·0       | 48        | 162·0        | 41·4           | ·22        | 3     | 3·4             |
| Coolgardie ... ..                                             | ...       | ...   | ...      | ...   | ...      | ...   | ...        | ...       | ...          | ...            | ...        | ...   | ...             |
| Perth ... ..                                                  | ...       | ...   | ...      | ...   | ...      | ...   | ...        | ...       | ...          | ...            | ...        | ...   | ...             |
| Sydney ... ..                                                 | 83·5      | 15    | 55·8     | 8     | 74·9     | 62·3  | 58·9       | 73        | 126·1        | 48·5           | 7·32       | 26    | 6·3             |
| Wellington ... ..                                             | 74·8      | 4, 5  | 47·2     | 25    | 67·0     | 55·3  | 53·0       | 75        | 124·0        | 40·0           | 2·99       | 6     | 6·0             |
| Auckland ... ..                                               | 81·0      | 15    | 56·0     | 13‡   | 74·0     | 60·7  | 58·1       | 73        | 141·0        | 52·0           | ·00        | 0     | ...             |
| Jamaica, Kingston                                             | 89·5      | 21    | 64·2     | 8     | 86·5     | 67·1  | 63·8       | 69        | ...          | ...            | ·03        | 1     | 3·7             |
| Trinidad ... ..                                               | 88·0      | 4†    | 65·0     | 16    | 85·1     | 68·1  | 71·4       | 83        | 155·0        | 52·0           | 2·43       | 12    | ...             |
| Grenada ... ..                                                | 83·4      | 21    | 70·0     | 23    | 81·2     | 71·9  | 62·1       | 71        | 144·0        | ...            | 5·15       | 22    | 4·5             |
| Toronto ... ..                                                | 45·6      | 6     | -8·7     | 1     | 33·7     | 19·7  | ...        | ...       | 58·8         | -10·6          | 3·18       | 14    | 7·1             |
| Fredericton ... ..                                            | 46·0      | 6     | -23·0    | 2     | 26·5     | 3·6   | ...        | 80        | ...          | ...            | 2·37       | 5     | 5·8             |
| St. John's, N.B.                                              | 46·0      | 11    | -7·3     | 2     | 30·9     | 12·8  | ...        | ...       | ...          | ...            | 5·05       | 11    | 5·9             |
| Victoria, B.C. ... ..                                         | 53·5      | 16    | 28·2     | 11    | 45·9     | 36·8  | ...        | 84        | ...          | ...            | 2·20       | 19    | 8·0             |
| Dawson ... ..                                                 | 13·2      | 27    | -53·0    | 14    | -17·3    | -32·1 | ...        | ...       | ...          | ...            | ·48        | 5     | 5·6             |

\* and 16. † and 6, 26. ‡ and 19. || and 26.

MALTA.—Mean temp. of air 49°·8. Average sunshine 4·8 hours per day.

Johannesburg.—Bright sunshine 144·6 hours.

Mauritius.—Mean temp. of air 0°·6, of dew point 2°·1, and R ·25 in., above averages. Mean hourly velocity of wind 7·3 miles, or 3·7 below average.

KODAIKANAL.—Bright sunshine 252 hours. Hoar frost on 5 days.

COLOMBO.—Mean temp. of air 79°·8, or 0°·4 below, of dew point 0°·3 above, and R 1·01 in. below averages. Mean hourly velocity of wind 4·7 miles. TS on 10th and 21st.

HONGKONG.—Mean temp. of air 60°·4, or 2°·4 above average. Bright sunshine 85·6 hours. Mean hourly velocity of wind 14·2 miles.

Melbourne.—Mean temp. of air 0°·3 below, and R ·25 in. below, averages.

Adelaide.—Mean temp. of air 3°·3 below, and R ·37 in. below averages.

Sydney.—Mean temp. of air 2°·4 below, and R 2·55 in. above, averages.

Wellington.—Mean temp. of air 1°·1 below, and R ·23 in. below, averages. Bright sunshine 251·1 hours.

Auckland.—An absolutely rainless month and the only one recorded in Auckland.

TRINIDAD.—R ·88 in. above 46 years' average.



RAINFALL OF THAMES VALLEY — AUGUST, 1909.



Isohyetal

Viewed of River Thames above Teddington, and River Lee above Felides Weir

Symons's Meteorological Magazine.

