

# SYMONS'S MONTHLY METEOROLOGICAL MAGAZINE.

CCCLV.]

AUGUST, 1895.

[PRICE FOURPENCE,  
or 5s. per ann. post free.]

## THE RAINFALL OF BELGIUM.\*

OUR continental friends excel in drawing up programmes. The young and vigorous Geological Society of Belgium has not merely decided that Hydrology comes within its purview, but has drawn up a programme for the hydrological section of the Society, which seems to us well worthy of translation and publication as a type of what ought to be done.

- (1) To determine how and in what quantities the rain falls over the country.
- (2) What proportion runs off the surface, and how much penetrates?
- (3) What becomes of the water that penetrates, how does it circulate, how does it accumulate in water-bearing strata, of large or small area, free or under pressure?
- (4) What improvements, changes, or deteriorations can the water undergo in its course through the soil?
- (5) How, in what quantities, and with what qualities more or less variable according to climatic or other influences, will it come out of the soil and return to the surface. What are the volumes and characters of the springs, brooks and rivers thus produced?
- (6) What supplies either above or below ground feed the principal rivers?
- (7) What has been the history of the modifications and changes in river waters in the past, how are they now used, and how could they be improved?
- (8) What are the origin, volume, properties, and variations of the mineral waters, and for what are they useful, either in medicine or for trade purposes?

This is a grand programme, and we may all wish the society the power and the patience necessary for its complete fulfilment.

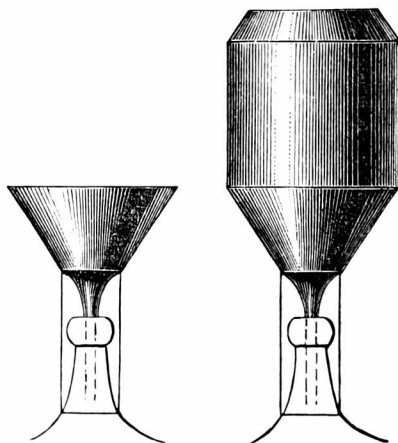
\* *La Pluie en Belgique*, par A. Lancaster, Météorologiste-inspecteur à l'Observatoire royal, Membre-correspondant de l'Académie des Sciences. Premier Fascicule [Publication de la Société Belge de Géologie, de Paléontologie, et d'Hydrologie], Hayez, Bruxelles, 1894. 8vo, 224 pages, one plate and one large map.

It has certainly begun well. Acting on the well known principle, that if you want a heavy task well done you should give it to the busiest man that you know, the society asked M. Lancaster to deal with the first item. All that has yet been issued is now before us, and though this deals with only one part of the first item, it is quite sufficient to show that M. Lancaster is going to make it as good as is reasonably possible, and a very interesting work.

This first portion of the work consists of four sections :—

- (1) The monthly fall at each station (arranged alphabetically) up to 1890 with the means for each month, and a few particulars as to the position of the gauges. We wish that these could have given more details—we miss any reference to the pattern or size of rain gauge, and (with few exceptions) to the height of the receiving surface above the ground. Another feature which we do not understand is the reason for sometimes placing the records together, as at Alost on page 3, and Anvers on page 7, and sometimes separating them, as at Bruxelles on page 21 and page 22.

With reference to the Brussels observations, we are much surprised to read, “Deux pluviomètres conjugués, ayant même ouverture rectangulaire (20 centimètres sur 10) ont constamment servi aux observations.” We think that M. Lancaster will find that the Brussels’ record, like many others, requires breaking up. If he will refer to Quetelet’s *Météorologie de la Belgique*, 1867, p. 140, he will find that the gauges then in use were of the pattern shown in the following engraving, and he will, we think, find in the



foot note an indication of the origin of the rectangular gauges. It is to us a cause both of surprise and of regret that so distinguished a meteorologist as Quetelet should have made this change in the mode of observation without

(as far as appears) having established a series of observations so as to ensure the continuity of the record.

We are afraid that the effect of this change has been serious, and that the Brussels record cannot be trusted as any guide to secular change, because we find that there is a considerable increase in the mean fall after about 1867. We have taken out the mean fall for fifty years, and the means are as under :—

|                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|
| 1840-9.<br>28·35 | 1850-9.<br>27·88 | 1860-9.<br>27·99 | 1870-9.<br>30·28 | 1880-9.<br>30·04 |
| 28·07            |                  |                  | 30·16            |                  |

If we assume that the change was made in 1867 (the date of publication of the work above quoted) and take the means in two groups, we have—

|                                |                           |
|--------------------------------|---------------------------|
| Before (1833-66).<br>27·68 in. | After (1867-90).<br>30·39 |
|--------------------------------|---------------------------|

It is impossible to say how much of this difference is due to change of pattern of gauge and how much to secular variation, but a change of 50 mm. in the means for such long periods as 30 and 20 years is at least ground for very close investigation.

- (2) This gives the details for the years 1891 and 1892 which had been received before the printing of the earlier years had been completed, and therefore are given so as to strengthen the data on which the calculations and the map are based.
- (3) This section may be described as the commencement of the text—it is entitled “Geographical distribution of rain in Belgium,” and consists of an explanation of the mode of calculation employed, tabular statements as to the monthly seasonal and annual rainfall at 283 stations, and a general summary of the results graphically shown on the coloured map.
- (4) The map is printed upon an index sheet to the Government maps, and is a handsome one about 3 feet by 2 feet, being on the scale of  $\frac{1}{400,000}$ , or about  $6\frac{1}{2}$  miles to an inch, with twelve degrees of intensity of blue colouring, one for each increase of 100 mm. (4 inches) of rain, so that all the features of the distribution are shown with great clearness. The map has several very good features—for instance, no place names are put upon the map except where observations have been made, and the place names are made to indicate the duration of the observations, thus—

|                    |     |               |
|--------------------|-----|---------------|
| Less than 5 years  | ... | Leuze.        |
| Five to 10 „       | ... | Uccle.        |
| Ten to 15 „        | ... | HEYST.        |
| More than 15 years | ... | <b>ALOST.</b> |

As regards the distribution, those interested should procure a copy

of this valuable work, we can here indicate only the principal characteristics, viz. : a rainfall of between 20 and 30 inches over the W. and N. of the country, and from 30 to 40 inches over the whole of the S.E., exceeding 40 inches in the Ardennes and in two districts, one (the wettest of all) a few miles S.E. of Verviers, where we find Hockai, at an altitude of 1,762 feet, with a mean rainfall of 52·36 inches, and the other at Paliseul in the Ardennes with a fall of 48·03 inches, at 1,348 feet.

M. Lancaster rightly calls attention to the anomaly that, whereas in the British Isles it is the western shores on which the rainfall is large, it is exactly the reverse in Belgium. The matter must be further investigated, and it may prove to add one more to the many climatic features of Western Europe which are dependent on the course of the Gulf stream.

We congratulate the Geological Society of Belgium and M. Lancaster on the successful completion of the first instalment of their work.

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## AQUEOUS VAPOUR AND TEMPERATURE.

*To the Editor of the Meteorological Magazine.*

SIR,—The tables below give the result of an investigation I have been making, with the object of determining the effect of the aqueous vapour in the air on the range of temperature, in this part of the world. The method first adopted was to determine the dew-point at 8 p.m., by means of the wet and dry bulb thermometers and Glaisher's tables; against this, placing the fall in air temperature from 8 p.m. to the succeeding minimum. This was done for every absolutely clear night in the year ending June 30th, 1895, neglecting even those nights showing a trace of cloud on the horizon. The various dew-points were then arranged in a horizontal row, every corresponding fall of temperature placed in vertical columns below, and the average taken. The result is shown in Table 1. Col. 1 shows the dew points arranged in order from 26° and under to 58° and over; col. 2 shows the number of clear nights on which the respective dew-points occurred; col. 3 shows the range of fall, *i.e.*, the least and greatest falls observed corresponding to any given dew-point; col. 4 the average. To all appearance the result establishes nothing in particular. At the least it gives no support to the results arrived at by Tyndall in experimenting on the absorption of heat by aqueous vapour. [*Heat, a Mode of Motion.* Lect. xiii.]

The relative humidities were next tried in the same way, and apparently with better success. Table II. is the result. Col. 1 shows the various humidity-ratios arranged in order from 25 per cent. and under to 80 per cent. and over; cols. 2, 3, 4, as before; col. 5 shows the averages arranged in sets, 30 per cent. and under, 30 per cent. to 40 per cent., 40 per cent. to 50 per cent., and so on.

TABLE 1.

| Dew-point at 8 p.m. | No. of times Observed. | Range of Fall. | Average fall of Temp. to Min. |
|---------------------|------------------------|----------------|-------------------------------|
| Degrees.            |                        | Degrees.       | Deg.                          |
| 26 & under .....    | 7                      | 8 to 19        | 13·4                          |
| 26 to 27·9 .....    | 10                     | 8 „ 18         | 13·7                          |
| 28 „ 29·9 .....     | 9                      | 9 „ 20         | 13·4                          |
| 30 „ 31·9 .....     | 12                     | 6 „ 17½        | 11·5                          |
| 32 „ 33·9 .....     | 10                     | 11 „ 19        | 14·7                          |
| 34 „ 35·9 .....     | 15                     | 9½ „ 25        | 16·2                          |
| 36 „ 37·9 .....     | 16                     | 8 „ 22         | 15·3                          |
| 38 „ 39·9 .....     | 19                     | 7 „ 26         | 17·3                          |
| 40 „ 41·9 .....     | 14                     | 9 „ 28         | 17·5                          |
| 42 „ 43·9 .....     | 11                     | 9 „ 25¼        | 15·4                          |
| 44 „ 45·9 .....     | 8                      | 6¾ „ 18        | 13·6                          |
| 46 „ 47·9 .....     | 13                     | 11½ „ 24       | 14·5                          |
| 48 „ 49·9 .....     | 11                     | 10½ „ 19       | 14·5                          |
| 50 „ 51·9 .....     | 5                      | 10 „ 13        | 11·0                          |
| 52 „ 53·9 .....     | 7                      | 4¾ „ 21        | 13·4                          |
| 54 „ 55·9 .....     | 6                      | 4½ „ 16        | 10·7                          |
| 56 „ 57·9 .....     | 1                      | ...            | 9·5                           |
| 58 & over .....     | 1                      | ...            | 12·0                          |

TABLE II.

| Humidity at 8 p.m. | No. of times Observed. | Range of Fall. | Average fall of Temp. to Min. | Grouped Averages. |
|--------------------|------------------------|----------------|-------------------------------|-------------------|
| Per cent.          |                        | Degrees.       | Deg.                          | Deg.              |
| 25 & under.....    | 5                      | 14 to 21       | 18·2                          | 18·4              |
| 26 to 27.....      | 4                      | 13 „ 21        | 19·0                          |                   |
| 28 „ 29.....       | 3                      | 13 „ 24        | 18·0                          |                   |
| 30 „ 31.....       | 4                      | 18 „ 25        | 21·2                          |                   |
| 32 „ 33.....       | 5                      | 16 „ 26        | 20·0                          | 18·6              |
| 34 „ 35.....       | 5                      | 15 „ 20        | 17·6                          |                   |
| 36 „ 37.....       | 5                      | 10 „ 28        | 18·4                          |                   |
| 38 „ 39.....       | 11                     | 10 „ 23        | 17·7                          |                   |
| 40 „ 41.....       | 3                      | 14 „ 18        | 16·0                          | 15·9              |
| 42 „ 43.....       | 12                     | 11 „ 25        | 14·8                          |                   |
| 44 „ 45.....       | 12                     | 6 „ 22         | 16·4                          |                   |
| 46 „ 47.....       | 4                      | 14 „ 19        | 16·2                          |                   |
| 48 „ 49.....       | 6                      | 11 „ 25        | 16·5                          | 13·6              |
| 50 „ 51.....       | 7                      | 12 „ 24        | 15·2                          |                   |
| 52 „ 53.....       | 8                      | 10 „ 20        | 13·5                          |                   |
| 54 „ 55.....       | 13                     | 9 „ 21         | 14·0                          |                   |
| 56 „ 57.....       | 5                      | 10 „ 18        | 14·2                          | 12·9              |
| 58 „ 59.....       | 12                     | 7 „ 18         | 12·0                          |                   |
| 60 „ 61.....       | 6                      | 8 „ 16         | 12·3                          |                   |
| 62 „ 63.....       | 11                     | 8 „ 19         | 13·9                          |                   |
| 64 „ 65.....       | 7                      | 5 „ 18         | 12·1                          | 11·6              |
| 66 „ 67.....       | 6                      | 11 „ 16        | 13·5                          |                   |
| 68 „ 69.....       | 3                      | 7 „ 13         | 10·3                          |                   |
| 70 „ 71.....       | 4                      | 8 „ 15         | 12·5                          |                   |
| 72 „ 73.....       | 1                      | ...            | 11·0                          | 9·0               |
| 74 „ 75.....       | 1                      | ...            | 12·0                          |                   |
| 76 „ 77.....       | 2                      | 9 „ 11         | 10·0                          |                   |
| 78 „ 79.....       | 5                      | 10 „ 13        | 11·6                          |                   |
| 80 & over .....    | 5                      | 4½ „ 12        | 9·0                           |                   |

TABLE III.

| Month.    |            | Range. | Diff. between<br>Max. and Min. | Number of<br>Clear Nights. | Percentage<br>of Sunshine. |
|-----------|------------|--------|--------------------------------|----------------------------|----------------------------|
|           |            | Deg.   | Deg.                           |                            | Per cent.                  |
| July,     | 1894 ..... | 56     | 35½                            | 20                         | 85                         |
| August    | „ .....    | 52     | 34                             | 23                         | 82                         |
| September | „ .....    | 56     | 34                             | 11                         | 80                         |
| October   | „ .....    | 59½    | 35½                            | 15                         | 71                         |
| November  | „ .....    | 57½    | 35                             | 14                         | 80                         |
| December  | „ .....    | 51     | 32                             | 12                         | 73                         |
| January,  | 1895 ..... | 47½    | 32                             | 10                         | 76                         |
| February  | „ .....    | 45     | 29                             | 10                         | 70                         |
| March     | „ .....    | 47     | 26                             | 9                          | 60                         |
| April     | „ .....    | 50     | 27                             | 14                         | 68                         |
| May       | „ .....    | 58     | 30                             | 18                         | 83                         |
| June      | „ .....    | 50     | 33                             | 19                         | 88                         |

Here a very marked progression is evident, and granting the method of procedure to be trustworthy, it follows that the relative amount, rather than the absolute amount of water vapour, is the important factor in determining the energy of radiation here.

The matter may be summed up thus :—Given an air-temperature  $x$ , a corresponding dew-point  $y$ , with a humidity-ratio  $z$ . Also another air-temperature  $x^1$ , a corresponding dew-point  $y^1$ , with a humidity-ratio  $z^1$ . Let  $y^1$  be greater than  $y$ ; but  $z$  greater than  $z^1$ . Then according to Tyndall the fall of temperature following upon  $y$  will be greater than that following upon  $y^1$ , and moreover will be independent of  $x$  and  $z$ ; whereas the figures here given seem to show that the fall of temperature in this case will be the other way about—since  $z$  is greater than  $z^1$ ; in other words that the energy of radiation is independent of  $x$  and  $y$ , and varies as  $z$ .

There is one weak spot, at any rate, in my results : *e.g.*, the nights are not, of course, of the same length in summer and in winter. But on the other hand, the average humidity is higher in the winter, and assuming that, other things being equal, the total fall of temperature will be greater the longer the time given for it to take place in, it is clear that if the summer nights could be lengthened we should have a greater fall of temperature (corresponding to a low humidity-ratio) than is actually shown.

I hope later on to go into this matter somewhat more accurately and closely with a series of hourly observations, meanwhile this may be taken for what it is worth.

To make the investigation complete, it seems necessary to determine whether, under given conditions as to quantity of moisture, pressure, and wind, the fall of temperature will vary with its magnitude: for example, given a vapour tension of .5 inch, a barometric pressure of 26.200 inches, and a N. wind, at 8 p.m.—

will the temperature fall more rapidly from, say,  $70^{\circ}$  to  $60^{\circ}$ , than from  $50^{\circ}$  to  $40^{\circ}$ . This I am undertaking. But it ought to take some years to finish satisfactorily.

Table III. is designed to explain any small points which may arise out of Tables I. and II. Col. 1 is the month; col. 2 gives the total range of temperature in any month; col. 3 gives the difference between mean maximum and mean minimum; col. 4 the number of clear nights; col. 5 the approximate percentage of sunshine to the greatest amount possible.

The two hygrometers made use of are in a large louver-boarded screen, with their bulbs three feet above the ground. Long.,  $24^{\circ} 27' E.$ ; lat.,  $28^{\circ} 42' S.$ , approximately 3,900 feet above sea-level.

J. R. SUTTON, B.A. Cantab.

*The Kenilworth Observatory, Kimberley, South Africa, July 12th, 1895.*

[It is extremely satisfactory to find that accurate records are being kept at a locality of the climate of which so few data exist.—ED.]

## A WHIRLWIND IN LA HAUTE-MARNE.

WE translate the following from a recent French newspaper because we wish to know whether any further details can be obtained respecting the fall of the barometer. We believe that when a whirlwind passes over a barometer, the latter (if of a kind capable of recording a sudden depression—which many are not) will give a record which will, to many persons, be a great surprise. A Richard barograph (of which there are many thousands now at work) ought to give such a record; but the difficulty is to secure one that shall be exactly in the centre of the track, and yet not be damaged by the storm. We call particular attention to the line printed in *italics*.

CHAUMONT,

*July 30th, 1895, 4 p.m.*

The news from the region devastated by the cyclone is most distressing, the disaster is greater than had been supposed. The cyclone ravaged the Canton of Poissons and afterwards entered the department of la Meuse near Gondrecourt.

Throughout its course all the crops were destroyed by the hail, though it lasted only 10 minutes. Trees were broken or torn up, and houses unroofed. At Champcourt, the church tower was overthrown, and the church thereby damaged.

*The barometer fell suddenly from 760 mm. to 750 mm. (29.92 in. to 29.53 in.)*

Happily no personal injury is reported. The sous-préfet of Wassy (on the 29th) visited the localities in the valley of the Blaise which seem to have suffered most severely.

## REVIEWS.

*Pubblicazioni della Specola Vaticana.* Volume IV. Turin, 1894.  
4to. xxvii.—620 pages, 42 photographic and other plates.

THIS sumptuous volume maintains in appearance the high level of merit which the series has taken from the very first, and of which we have already spoken.\*

We think that we may claim credit for having suggested the first article. In connection with Mr. Wood's translation of Theophrastus we heard of a "Table of the winds" in the Museo Pio Clementino; we wrote to Padre Denza; with characteristic promptitude and kindness he found it, had it photographed and sent us both photographs and casts of it—but a photograph and several pages of comments are given in Theophrastus,† so we need not repeat the story here. Suffice it to say that we are glad to see the photograph again in this volume, accompanying a short memoir upon it by Padre Giuseppe Lais. The memoir does not profess to be an exhaustive discussion of the nomenclature of the winds, and excellent as was Mr. Wood's note upon the subject, we think that the last word has not yet been said. Padre Lais refers to papers by D'Averache, Gosselin and Bertelli; and there is altogether, in our opinion, ample material for careful study. This article seems to us to have been written or printed in a hurry; in the copy of the inscription wherever the Greek capital  $\Lambda$  (*i.e.*  $\Lambda$ ) occurs it is printed  $\mathbf{A}$  making the words look ridiculous; and two pages later we have N.W.E. for N.N.E.—a mere accident undoubtedly, but as a rule the printing of the *Pubblicazioni* is extremely good, and therefore we adhere to our inference that this article was printed in a hurry. However, it contains several useful references, and must not be ignored when, if ever, a complete monograph upon the nomenclature of the winds is prepared.

This article is followed by a note by Padre Denza on three old celestial globes; and then comes the ordinary commencement of the volume, with the report of the Annual Meeting of the Council of Direction, the speeches and reports as to progress, the state of the library, the visitors to the Observatory, &c. 115 pages are then devoted to astronomical work and 36 to terrestrial magnetism.

We cannot stop to notice all the meteorological articles but we have a suspicion that the very strange differences shown in the article by Prof. G. Busti entitled "Confronto dell'acqua caduta a diverse altezze" are capable of easy explanation. We believe that the two rain gauges are read at different hours, and thus the daily amounts are not comparable. But these tables on pages 286 to 289 evidently need examination for the figures do not agree with those

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\* *Met. Mag.*, Vol. xxviii. p. 154.

† "Theophrastus of Eresus on Winds and on Weather Signs," by J. G. Wood, M.A. 8vo. Stanford, London, 1894.



in the monthly tables on pages 307 to 353, and on page 289 there is the obvious error of printing the values of December 1891 instead of those of Dec , 1892, as will be seen by referring to pages 287 or 353. But there are many errors all through this article, *e.g.* on May 13th, 1892, the record at the Specola should be 17·7 not 17·4, and it is quite certain that the amount in the garden on that day was forgotten to be entered. Moreover in the tables of differences the + and - signs are hopelessly mixed. We do not recollect ever seeing such bad work. To judge by the portion that we have tested there must be about 20 errors on each page. It is a comfort to think that Padre Denza has been spared having to examine it.

Nothing could surpass the beauty of the illustrations, and of the whole get up of the volume; but we are so disappointed at the result of examining this article, and it so discredits the parts of the book which we cannot test, that we have not the heart to go on with our notice.

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*The Clyde Sea Area*, by HUGH R. MILL, D.Sc., F.R.S.E., Part III. "Distribution of Temperature." [Excerpt Trans., Roy. Soc., Edinb.] Edinburgh, Grant & Son, 1894. 4to, 162 pages; 32 plates (mostly coloured).

THIS is the concluding part of the great work which Dr. Mill has been doing in the lovely Lochs of the South-West of Scotland. The observations were mostly made in 1886, '87 and '88; the results as regards salinity and specific gravity were published in 1892, and noticed in these pages in March 1894. The still heavier part of the work, that relating to the temperature of the water, was published in November 1894, and is now before us.

At the outset we wish to say a word as to the brilliancy and accuracy of register in the colour-printing of the plates accompanying this memoir. Keith Johnston used to send us beautiful specimens of his work, and these plates show that Edinburgh has equal reason to be proud of Bartholomew's.

As regards the paper, we cannot pretend in the limits at our disposal to give an exhaustive criticism. We adhere to the opinion which we expressed in our previous notice as to the seriousness of the omission of complete records of the winds, and we do not remember seeing, either in this or the previous part, any records of surface movements by bottles, as in Prof. Harrington's experiments upon the American lakes. We recognise to the full the labour which Dr. Mill devoted both to making the observations and to preparing this elaborate paper, also the impossibility of his printing *in extenso* the tens or hundreds of thousands of observations which he must have made, and yet without them it is not easy to decide upon the acceptance of all the propositions enunciated; some of them extremely difficult, *e.g.*, the estimation of the proportion of the increase in the

temperature of the water in summer, which is due to direct solar radiation, and that due to the entry of warm water from the Atlantic. As regards the diagrams, we think that the disproportion between the ordinates and abscissæ is too great. In plate viii. it seems to be about 2,700 to 1, and we also think that it would have been better to have adhered to one ratio throughout; whereas a depth of 100 fathoms corresponds to 50 miles on plate viii., to 15 miles on plates xii. and xix., and to 7 miles on plates xvi. and xvii. Most authors would resent the fixing of definite ratios for use in diagrams, but it would render them much more useful; say, for instance, that in barometric charts 1 inch of height should always correspond to 1 hour, or 1 day, or 1 month. As it is, the ratio is usually determined by the size of the page. In Dr. Mill's exquisite charts the bottom of the main channel suggests a section through the Cañons of the Rocky Mountains rather than the undulating base of a Scottish loch.

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#### A SHOWER OF FISH ON JUNE 15TH.

In early times, records of the occurrence of showers of fish, corn, &c., were regarded as alarming portents.

Then came the time when they were regarded as fictitious—like the African lakes, Albert and Victoria Nyanza, which were erased from the maps for nearly 100 years—to be restored in the present century.

So with the fishes. We now know that the records of their falling are true, and we know where they come from. A whirlwind sucks up the water of a stream or pond, the water and the fishes are carried aloft—like the hay out of a field—and dropped down, a veritable shower of water and fish.

Here is the record from our observer, Mr. W. C. V. Burton, J.P., of Carrigaholt Castle, County Clare, Ireland:—

“On the 15th, a very hot day, some heavy heat drops fell about midday, when a number of small fishes (mostly about  $1\frac{1}{2}$  or 2 inches long) fell in the pleasure grounds, where some men were working. I sent a sample to the English and Irish *Times*, but I think that no notice was taken of them. I have a large one in spirits, and several people saw the fish.”

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#### THE HEAT IN SOUTHERN RUSSIA.

The Odessa Correspondent of the *Daily News* writes on August 5th: The oppressive heat continues unabated over the whole of Southern Russia and the Crimea. Yesterday the temperature on the South Crimean coast was 106 deg. Fahr. in the shade at 8 o'clock in the morning. At Kieff it was 104 deg. in the shade. Here, from

day to day, one looks vainly for the merest fleck of cloud in the lurid expanse of sky and horizon in the hope of discovering some sign of coming rain or thunderstorm. The country has a scorched and withered appearance, except in such happy oases and thinly-scattered patches where vegetation is kept alive by irrigation. The wells are drying up, and in many districts water-famine is added to the miseries of the general drought. The cattle have no green fodder, and the usual aftermath of hay is this season an entirely absent quantity. It is more than six weeks since we had rain, and during that period the weather has been gradually growing hotter day and night. To-day our temperature at noon was 108 deg. Fahr.

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### A TIDAL WAVE ?

“One of those sudden and violent disturbances of the sea which the late Mr. R. Edmonds, of Plymouth and Penzance, attributed to submarine earthquakes, was witnessed on the north shores of Mount's Bay from 4.45 to 5.30 on Saturday evening, 10th. A tidal wave unexpectedly swept into the harbour of Penzance and Newlyn. At the latter place the pilchard fleet were under sail. One craft was swept against a steamer ; others were hurried from the middle to the inner parts of the port. At Penzance boys who were pulling boats in the harbour were bewildered on finding themselves swirled helplessly hither and thither, and even the small steamers could barely stem the rush. It will be interesting to compare the disturbance with any others reported from the sea or the land.”—*Western Mercury*, August 12th, 1895.

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### STORM CENTRES IN SWITZERLAND.

Professor Hess, of Frauenfeld, has published two interesting essays upon storm centres in Switzerland. His materials are partly taken from 4,000 weather reports issued by the Swiss Meteorological Institute, and partly from 200 observations of storms made by himself during the year 1892. He finds that the greater proportion of storms, 35 per cent., have their starting-point in the Swiss “middleland,” that is, between the Alps and the Jura ; 28½ per cent. in the region of the fore Alps, or Pilatus, Rigi, Niesen, &c. ; 25 per cent. in the Jura ; while only 11½ per cent. have their “Ausgangspunkt” in the high Alps. The “thickest” storm-centre, that is the greatest brooding spot of Swiss storms, lies in the Basler and Solothurner-Jura district. The second “thickest” is the upper part of the Lake Zürich, and the third is about the foot of the Sentis in the lands of Appenzell and St. Gallen.

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## CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, JANUARY, 1895.

| STATIONS.<br><br>(Those in italics are<br>South of the Equator.) | Absolute. |       |          |                 | Average. |       |               |           | Absolute.       |                   | Total Rain. |       | Aver. |
|--|-----------|-------|----------|-----------------|----------|-------|---------------|-----------|-----------------|-------------------|-------------|-------|-------|
|  | Maximum.  |       | Minimum. |                 | Max.     | Min.  | Dew<br>Point. | Humidity. | Max. in<br>Sun. | Min. on<br>Grass. | Depth.      | Days. |       |
|  | Temp.     | Date. | Temp.    | Date.           |          |       |               |           |                 |                   |             |       |       |
|  | °         |       | °        |                 | °        | °     | °             | 0-100     | °               | °                 | inches      |       |       |
| England, London .....  | 51·9      | 20    | 17·2     | 29              | 38·1     | 29·1  | 30·6          | 88        | 69·1            | 16·2              | 1·96        | 16    | 6·5   |
| Malta.....   | 67·5      | 17    | 39·3     | 30              | 60·2     | 48·3  | 44·9          | 79        | 119·1           | 33·0              | 1·91        | 10    | 5·7   |
| <i>Mauritius</i> .....   | 87·5      | 12    | 70·1     | 5               | 85·4     | 74·7  | 69·2          | 73        | 137·3           | 62·8              | 2·14        | 17    | 6·2   |
| Calcutta.....  | 84·0      | 12    | 49·1     | 20              | 77·1     | 55·8  | 56·0          | 73        | 135·0           | 41·5              | ·00         | 0     | 1·0   |
| Bombay.....  | 84·1      | 4     | 60·8     | 23              | 80·7     | 66·8  | 63·5          | 70        | 132·1           | 51·0              | ·00         | 0     | 0·9   |
| Ceylon, Colombo .....  | 90·7      | 29    | 66·8     | 31              | 86·9     | 72·4  | 69·4          | 75        | 149·5           | 55·0              | 5·00        | 12    | 4·7   |
| <i>Melbourne</i> .....   | 99·0      | 24    | 49·5     | 16              | 77·0     | 56·6  | 53·6          | 63        | 148·1           | 39·8              | 1·81        | 4     | 4·7   |
| <i>Adelaide</i> .....  | 104·5     | 12    | 51·7     | 16              | 84·9     | 62·9  | 51·0          | 45        | 174·0           | 43·9              | 1·22        | 4     | 3·7   |
| <i>Sydney</i> .....  | 90·3      | 25    | 59·0     | 27              | 74·3     | 64·8  | 61·3          | 77        | 151·1           | 54·0              | 8·07        | 25    | 7·7   |
| <i>Wellington</i> .....  | 79·0      | 25    | 47·0     | 22              | 72·6     | 57·5  | 55·7          | 72        | 145·0           | 35·0              | 6·04        | 12    | 4·2   |
| <i>Auckland</i> .....  | 79·5      | 27    | 57·0     | 17 <sup>a</sup> | 74·8     | 61·9  | 62·2          | 81        | 142·0           | 54·0              | 2·72        | 15    | 5·3   |
| Jamaica, Kingston.....   | 88·6      | 31    | 63·6     | 6               | 86·2     | 66·7  | 65·6          | 76        | ...             | ...               | ·05         | 1     | 2·0   |
| Grenada.....   | 84·6      | 5     | 69·0     | 29 <sup>b</sup> | 81·3     | 72·0  | 68·8          | 73        | 165·0           | ...               | 5·09        | 21    | 3·7   |
| Toronto .....  | 42·2      | 21    | —0·6     | 29              | 28·1     | 14·0  | 19·0          | 83        | ...             | —6·0              | 4·65        | 20    | 7·2   |
| New Brunswick,<br>Fredericton .....                              | 41·1      | 12    | —12·7    | 26              | 24·7     | 5·1   | 14·0          | 83        | ...             | ...               | 4·50        | ...   | 5·4   |
| Manitoba, Winnipeg ..  | 26·0      | 19    | —37·9    | 30              | 2·2      | —17·3 | ...           | ...       | ...             | ...               | 1·54        | 14    | 4·9   |
| British Columbia,<br>Esquimalt .....                             | 53·6      | 12    | 25·2     | 3               | 41·0     | 32·9  | 35·0          | 90        | ...             | ...               | 6·94        | 21    | 8·1   |

<sup>a</sup>—and 20. <sup>b</sup>—and 30.

## REMARKS.

MALTA.—Adopted mean temp. (53°·3), 0°·3 below the average. Mean hourly velocity of wind 13·1 miles. Thunderstorms on 2nd and 3rd, and lightning on 4 other days. Hail on 6 days. Sea temp. fell to 55°·5, the lowest recorded.

J. F. DOBSON.

*Mauritius*.—Mean temp. of air 1°·1 above, dew point 0°·6 below, and rainfall 5·11 in. below, their respective averages. Mean hourly velocity of wind 12·7 miles, or 1·3 above the average; extremes, 38·8 on 13th and 1·9 on 7th; prevailing direction, E.S.E. to E. by N. Thunder on 12th.

C. MELDRUM, F.R.S.

CEYLON, COLOMBO.—Thunderstorms on 14th, 15th, 19th and 22nd, and lightning on 12th, 13th and 20th.

D. G. MANTELL.

*Adelaide*.—Mean temp. 0°·5 below the average of 38 years. Rainfall 40 in. above the average, and nearly all falling on one day, the 4th.

C. TODD, F.R.S.

*Sydney*.—Mean temp. 2°·3 below, humidity 4·5 above, and rainfall 4·32 in. above, their respective averages. Very heavy S. to S.E. gale, and tremendous seas at the end of the month.

H. C. RUSSELL, F.R.S.

*Wellington*.—Heavy rain during the early part of the month, 1·15 in. falling on 3rd, and 2·25 in. on 9th, and showery up to 12th, after which generally fine and pleasant weather, with moderate winds from N.W. Mean temp. 2°·4, and rainfall 2·14 in. above the average,

R. B. GORE

*Auckland*.—Mean temp. and rainfall very close to the average of 28 years.

T. F. CHEESEMAN.

JAMAICA, KINGSTON.—Mean hourly velocity of wind 4·6 miles. In Kingston the rainfall was nearly 1·50 in. below the average, and over the island generally was only 35 per cent. of the average.

R. JOHNSTONE.

# SUPPLEMENTARY TABLE OF RAINFALL, JULY, 1895.

[For the Counties, Latitudes, and Longitudes of most of these Stations,  
 see *Met. Mag.*, Vol. XIV., pp. 10 & 11.]

| Div.  | STATION.                 | Total<br>Rain.<br>in. | Div.   | STATION.                   | Total<br>Rain. |
|-------|--------------------------|-----------------------|--------|----------------------------|----------------|
| II.   | Dorking, Abinger Hall.   | 5·71                  | XI.    | Lake Vyrnwy .....          | 5·79           |
| "     | Birchington, Thor .....  | 3·29                  | "      | Corwen, Rhug .....         | ...            |
| "     | Hailsham .....           | 3·60                  | "      | Carnarvon, Cocksidia ...   | 4·97           |
| "     | Ryde, Thornbrough .....  | 3·84                  | "      | I. of Man, Douglas .....   | 3·18           |
| "     | Emsworth, Redlands ...   | 4·67                  | XII.   | Stoneykirk, Ardwell Ho.    | 2·48           |
| "     | Alton, Ashdell .....     | 4·90                  | "      | New Galloway, Glenlee      | 6·11           |
| III.  | Oxford, Magdalen Col...  | 3·54                  | "      | Melrose, Abbey Gate ...    | 5·83           |
| "     | Banbury, Bloxham .....   | 3·22                  | XIII.  | N. Esk Res. [Penicuik]     | 4·00           |
| "     | Northampton, Sedgebrook  | 2·72                  | "      | Edinburgh, Blacket Pl.     | 4·66           |
| "     | Alconbury .....          | 3·15                  | XIV.   | Glasgow, Queen's Park.     | 3·81           |
| "     | Wisbech, Bank House..    | 1·68                  | XV.    | Inverary, Newtown .....    | 5·31           |
| IV.   | Southend .....           | 2·83                  | "      | Islay, Gruinart School..   | 3·66           |
| "     | Harlow, Sheering ...     | 4·00                  | XVI.   | Dollar .....               | 5·59           |
| "     | Colchester, Lexden ..... | 3·67                  | "      | Balquhider, Stronvar..     | 5·58           |
| "     | Rendlesham Hall .....    | 3·86                  | "      | Ballinluig .....           | 2·59           |
| "     | Diss .....               | 3·61                  | "      | Dalnaspidal H.R.S. ...     | 4·90           |
| "     | Swaffham .....           | 3·63                  | XVII.  | Keith H.R.S. ....          | 3·56           |
| V.    | Salisbury, Alderbury...  | 3·13                  | "      | Forres H.R.S. ....         | 2·37           |
| "     | Bishop's Cannings .....  | ...                   | XVIII. | Fearn, Lower Pitkerrie.    | 2·75           |
| "     | Blandford, Whatcombe ..  | 3·05                  | "      | Loch Shiel, Glenaladale    | ...            |
| "     | Ashburton, Holne Vic.... | 4·31                  | "      | N. Uist. Losh Maddy ...    | 6·06           |
| "     | Okehampton, Oaklands.    | 4·06                  | "      | Invergarry .....           | 4·46           |
| "     | Hartland Abbey .....     | 3·37                  | "      | Aviemore H.R.S. ....       | 2·85           |
| "     | Lynmouth, Glenthorne.    | 3·99                  | "      | Loch Ness, Drumnadrochit   | 2·14           |
| "     | Probus, Lamellyn .....   | 3·26                  | XIX.   | Invershin .....            | 4·33           |
| "     | Wellington, Sunnyside..  | ...                   | "      | Scourie .....              | 3·32           |
| "     | Wincanton, Stowell Rec.  | 3·63                  | "      | Watten H.R.S. ....         | 2·48           |
| VI.   | Clifton, Pembroke Road   | 3·37                  | XX.    | Dunmanway, Coolkelure      | 7·05           |
| "     | Ross, The Graig .....    | 2·59                  | "      | Fermoy, Gas Works ...      | 6·11           |
| "     | Wem, Clive Vicarage ...  | 3·36                  | "      | Killarney, Woodlawn ...    | 5·86           |
| "     | Cheadle, The Heath Ho.   | 4·99                  | "      | Caher, Duneske .....       | 2·98           |
| "     | Worcester, Diglis Lock   | 3·33                  | "      | Ballingarry, Hazelfort...  | 3·57           |
| "     | Coventry, Coundon .....  | 3·14                  | "      | Limerick, Kilcornan ...    | 3·95           |
| VII.  | Ketton Hall [Stamford]   | 2·78                  | "      | Ennis .....                | 3·35           |
| "     | Grantham, Stainby .....  | 2·65                  | "      | Miltown Malbay .....       | 5·40           |
| "     | Horncastle, Bucknall ... | ...                   | XXI.   | Gorey, Courtown House      | 2·86           |
| "     | Worksop, Hodsck Priory   | 3·79                  | "      | Athlone, Twyford .....     | 4·89           |
| VIII. | Neston, Hinderton .....  | 3·99                  | "      | Mullingar, Belvedere ...   | 5·77           |
| "     | Preston, Haighton ...    | ...                   | "      | Longford, Currygrane...    | 4·40           |
| "     | Broughton-in-Furness..   | 6·66                  | XXII.  | Woodlawn .....             | 5·32           |
| IX.   | Ripon, Mickley .....     | 4·72                  | "      | Crossmolina, Enniscoe..    | 6·00           |
| "     | Melmerby, Baldersby ...  | 5·77                  | "      | Collooney, Markree Obs.    | 5·03           |
| "     | Scarborough, South Cliff | 4·85                  | "      | Ballinamore, Lawderdale    | ...            |
| "     | Middleton, Mickleton..   | 6·87                  | XXIII. | Lough Sheelin, Arley ..    | 4·76           |
| X.    | Haltwhistle, Unthank..   | 4·77                  | "      | Warrenpoint .....          | 3·91           |
| "     | Bamburgh .....           | 4·43                  | "      | Seaforde .....             | 4·31           |
| "     | Keswick, The Beeches...  | ...                   | "      | Belfast, Springfield ..... | 5·84           |
| XI.   | Llanfrechfa Grange ..... | 4·17                  | "      | Bushmills, Dundarave...    | 3·09           |
| "     | Llandovery .....         | 5·38                  | "      | Stewartstown .....         | 3·79           |
| "     | Castle Malgwyn .....     | 4·24                  | "      | Buncrana .....             | 4·36           |
| "     | Builth, Abergwessin Vic. | 6·85                  | "      | Lough Swilly, Carrablagh   | 5·10           |
| "     | Rhayader, Nantgwilt..    | 5·06                  |        |                            |                |

JULY, 1895.

| Div.     | STATIONS.<br>[The Roman numerals denote the division of the Annual Tables to which each station belongs.] | RAINFALL.      |   |                                 |      |      | Days on which<br>"0.1 or more fell. | TEMPERATURE. |      |           |           |      |       | No. of<br>Night<br>below<br>32°. |  |
|----------|---|----------------|---|---------------------------------|------|------|-------------------------------------|--------------|------|-----------|-----------|------|-------|----------------------------------|--|
|          |   | Total<br>Fall. | Differ-<br>ence<br>from<br>average<br>1880-9. | Greatest<br>Fall in<br>24 hours |      | Max. |                                     | Min.         |      | In shade. | On grass. |      |       |                                  |  |
|          |   |                |   | Dpth                            | Date |      |                                     | Deg.         | Date |           |           | Deg. | Date. |                                  |  |
|          |   | inches.        | inches.                                       | in.                             |      |      |                                     |              |      |           |           |      |       |                                  |  |
| I.       | London (Camden Square) ...  | 3.42           | + .74   | .57                             | 27   | 12   | 82.0                                | 8            | 47.7 | 7         | 0         | 0    |       |                                  |  |
| II.      | Maidstone (Hunton Court)...   | 4.87           | + 2.69  | 1.80                            | 20   | 12   | ...                                 | ...          | ...  | ...       | ...       | ...  |       |                                  |  |
| III.     | Strathfield Turgiss .....   | 4.03           | + 1.64  | .63                             | 27   | 19   | 80.3                                | 17           | 43.5 | 8         | 0         | 0    |       |                                  |  |
| IV.      | Hitchin .....   | 4.78           | + 2.06  | 1.10                            | 21   | 14   | 82.0                                | 8            | 42.0 | 31        | 0         | 0    |       |                                  |  |
| V.       | Winslow (Addington) .....   | 3.63           | + .34   | .76                             | 20   | 15   | 83.0                                | 8            | 43.0 | 13        | 0         | 0    |       |                                  |  |
| VI.      | Bury St. Edmunds (Westley)  | 4.39           | + 1.82  | .93                             | 21   | 17   | 74.0                                | 8            | 49.0 | 13        | 0         | 0    |       |                                  |  |
| VII.     | Norwich (Brundall) .....  | 3.21           | ...   | .66                             | 27   | 16   | 81.0                                | 8            | 46.0 | 6         | 0         | 0    |       |                                  |  |
| VIII.    | Weymouth (Langton Herring)  | 2.38           | + .23   | .57                             | 19   | 12   | 71.0                                | 26           | 49.0 | 15        | 0         | ...  |       |                                  |  |
| IX.      | Torquay (Cary Green) ...  | 2.73           | ...   | .73                             | 23   | 12   | 70.7                                | 28           | 50.2 | 5         | 0         | 0    |       |                                  |  |
| X.       | Polapit Tamar [Launceston]..  | 3.68           | + .27   | .70                             | 18   | 17   | 72.0                                | 8            | 42.4 | 5         | 0         | 0    |       |                                  |  |
| XI.      | Stroud (Upfield) .....  | 2.83           | + .74   | .55                             | 19   | 12   | 78.0                                | 9            | 50.0 | 4         | 0         | ...  |       |                                  |  |
| XII.     | Churchstretton (Woolstaston)  | 2.42           | + .55   | .45                             | 23   | 16   | 74.0                                | 8            | 44.0 | 13        | 0         | ...  |       |                                  |  |
| XIII.    | Tenbury (Orleton) .....   | 2.58           | + .28   | .74                             | 21   | 13   | 79.0                                | 8            | 41.0 | 13        | 0         | 0    |       |                                  |  |
| XIV.     | Leicester (Barkby) .....  | 2.95           | + .04   | 1.35                            | 18   | 15   | 84.5                                | 8            | 38.0 | 5         | 0         | 0    |       |                                  |  |
| XV.      | Boston .....  | 1.95           | + .84   | .35                             | 23   | 17   | 85.0                                | 7            | 45.0 | 30        | 0         | ...  |       |                                  |  |
| XVI.     | Hesley Hall (Tickhill).....   | 4.08           | + 1.41  | 1.11                            | 18   | 17   | 81.0                                | 8            | 44.0 | 5         | 0         | ...  |       |                                  |  |
| XVII.    | Manchester (Plymouth Grove)   | 4.48           | + .69   | 1.12                            | 25   | 19   | 77.0                                | 8            | 43.0 | 29        | 0         | ...  |       |                                  |  |
| XVIII.   | Wetherby (Ribston Hall) ...   | 4.36           | + 1.18  | 1.03                            | 19   | 15   | ...                                 | ...          | ...  | ...       | ...       | ...  |       |                                  |  |
| XIX.     | Skipton (Arncliffe) .....   | 7.88           | + 2.24  | 2.66                            | 25   | 22   | ...                                 | ...          | ...  | ...       | ...       | ...  |       |                                  |  |
| XX.      | Hull (Pearson Park) ...   | 5.61           | + 3.02  | 1.62                            | 25   | 17   | 82.0                                | 8            | 42.0 | 5         | 0         | ...  |       |                                  |  |
| XXI.     | Newcastle (Town Moor) .....   | 4.37           | + .85   | 1.23                            | 25   | 19   | ...                                 | ...          | ...  | ...       | ...       | ...  |       |                                  |  |
| XXII.    | Borrowdale (Seathwaite).....  | 9.15           | + 1.84  | 1.96                            | 25   | 22   | ...                                 | ...          | ...  | ...       | ...       | ...  |       |                                  |  |
| XXIII.   | Cardiff (Ely) .....   | 4.76           | + .70   | .74                             | 23   | 16   | ...                                 | ...          | ...  | ...       | ...       | ...  |       |                                  |  |
| XXIV.    | Haverfordwest .....   | 3.89           | + .32   | .71                             | 25   | 17   | 73.5                                | 8            | 43.8 | 5         | 0         | ...  |       |                                  |  |
| XXV.     | Aberystwith (Gogerddan) ...   | 6.47           | ...   | .95                             | 24   | 13   | 77.0                                | 6            | 34.0 | 4         | 0         | ...  |       |                                  |  |
| XXVI.    | Llandudno .....   | 4.44           | + 1.44  | .98                             | 18   | 19   | 74.0                                | 8            | 47.0 | 5         | 0         | ...  |       |                                  |  |
| XXVII.   | Cargen [Dumfries] .....   | 5.99           | + 2.06  | 1.76                            | 26   | 18   | 70.0                                | 6            | 42.0 | 5         | 0         | ...  |       |                                  |  |
| XXVIII.  | Jedburgh (Sunnyside) .....  | 5.48           | + 2.04  | 1.94                            | 26   | 17   | 74.0                                | 8            | 41.0 | 30        | 0         | ...  |       |                                  |  |
| XXIX.    | Colmonell .....   | 4.18           | ...   | 1.25                            | 21   | 17   | 80.0                                | 6            | 37.0 | 4         | 0         | ...  |       |                                  |  |
| XXX.     | Lochgilthead (Kilmory).....   | 4.32           | + .02   | 1.19                            | 26   | 16   | ...                                 | ...          | 40.0 | 13        | 0         | ...  |       |                                  |  |
| XXXI.    | Mull (Quinish) .....  | 5.12           | + 1.07  | .73                             | 7    | 19   | ...                                 | ...          | ...  | ...       | ...       | ...  |       |                                  |  |
| XXXII.   | Loch Leven Sluices .....  | 4.50           | + .88   | 1.00                            | 27   | 14   | ...                                 | ...          | ...  | ...       | ...       | ...  |       |                                  |  |
| XXXIII.  | Dundee (Eastern Necropolis)   | 4.20           | + .74   | .75                             | 18   | 19   | 79.6                                | 7            | 43.9 | 30        | 0         | ...  |       |                                  |  |
| XXXIV.   | Braemar .....   | 3.19           | + .02   | .56                             | 18   | 21   | 71.0                                | 6, 7         | 38.3 | 16        | 0         | 1    |       |                                  |  |
| XXXV.    | Aberdeen (Cranford) ...   | 3.55           | ...   | .70                             | 26   | 18   | 75.0                                | 6, 7         | 40.0 | 4         | 0         | ...  |       |                                  |  |
| XXXVI.   | Strathconan [Beaully] .....   | 5.50           | + 2.00  | 1.00                            | 3    | 17   | ...                                 | ...          | ...  | ...       | ...       | ...  |       |                                  |  |
| XXXVII.  | Glencarron Lodge .....  | 7.42           | ...   | 1.06                            | 21   | 24   | 67.0                                | 8            | 37.5 | 19        | 0         | ...  |       |                                  |  |
| XXXVIII. | Cawdor [Nairn] .....  | 3.11           | + .19   | .55                             | 19   | 20   | ...                                 | ...          | ...  | ...       | ...       | ...  |       |                                  |  |
| XXXIX.   | Dunrobin .....  | 3.94           | + 1.09  | 1.15                            | 23   | 22   | 71.2                                | 7            | 43.5 | 29        | 0         | ...  |       |                                  |  |
| XL.      | S. Ronaldsay (Roeberry).....  | 2.41           | + .05   | .58                             | 9    | 17   | 73.0                                | 7            | 46.0 | 25        | 0         | ...  |       |                                  |  |
| XLI.     | Darrynane Abbey .....   | 5.44           | ...   | .91                             | 25   | 21   | ...                                 | ...          | ...  | ...       | ...       | ...  |       |                                  |  |
| XLII.    | Waterford (Brook Lodge) ...   | 4.06           | + .53   | 1.02                            | 25   | 16   | 71.0                                | 12           | 45.0 | 23        | 0         | ...  |       |                                  |  |
| XLIII.   | O'Briensbridge (Ross) .....   | 3.42           | ...   | .48                             | 25   | 19   | ...                                 | ...          | ...  | ...       | ...       | ...  |       |                                  |  |
| XLIV.    | Carlow (Browne's Hill) .....  | 3.14           | + .38   | 1.15                            | 24   | 15   | ...                                 | ...          | ...  | ...       | ...       | ...  |       |                                  |  |
| XLV.     | Dublin (Fitz William Square)  | 4.50           | + 1.82  | 1.26                            | 25   | 16   | 73.8                                | 6            | 48.1 | 4         | 0         | 0    |       |                                  |  |
| XLVI.    | Ballinasloe .....   | 4.36           | + .81   | 1.17                            | 25   | 16   | 67.0                                | 26           | 37.0 | 4         | 0         | ...  |       |                                  |  |
| XLVII.   | Clifden (Kylemore) .....  | 8.97           | ...   | 1.70                            | 7    | 23   | ...                                 | ...          | ...  | ...       | ...       | ...  |       |                                  |  |
| XLVIII.  | Waringstown .....   | 4.48           | + .96   | .76                             | 2    | 21   | 79.0                                | 6            | 43.0 | 14        | 0         | ...  |       |                                  |  |
| XLIX.    | Londonderry (Creggan Res.)..  | 5.16           | + 1.04  | 1.16                            | 26   | 22   | ...                                 | ...          | ...  | ...       | ...       | ...  |       |                                  |  |
| L.       | Omagh (Edenfel) .....   | 4.43           | + .71   | .83                             | 21   | 22   | 73.0                                | 6            | 42.0 | 16        | 0         | ...  |       |                                  |  |

+Shows that the fall was above the average ; —that it was below it.

# METEOROLOGICAL NOTES ON JULY, 1895.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; TS for Thunderstorm; R for Rain; H for Hail; S for Snow.

## ENGLAND.

STRATHFIELD TURGISS.—In the early part of the month the weather was showery and unsettled; towards the middle it was more generally fine and dry. A wave of high temperature succeeded, but the end of the month brought heavy R storms, with T and L on the 21st and T on the 22nd.

ADDINGTON.—The long dry period was fairly broken on the 18th, and more or less R fell on every day until the 28th. The temp. was moderately high and vegetation of all kinds improved rapidly. T on 19th and 22nd, TS on 21st.

BURY ST. EDMUNDS, WESTLEY.—A wet month but the R came too late for the corn crops, which are the lightest remembered in West Suffolk. Vegetation made rapid growth, and the look out for stock is much improved. T on 1st, 19th, 21st, and 22nd. TS on 4th.

NORWICH, BRUNDALL.—Chiefly very fine and warm during the first fortnight, but very unsettled from the 18th to the end with copious rains. Mean temp.  $61^{\circ}\cdot4$ , or exactly the same as in July, 1893 and 1894, and in close agreement with the average. R about a quarter of an inch above the average. Slight TS on 19th, distant T on 21st. Sharp TSS on 22nd.

LANGTON HERRING.—Very high wind on the 2nd; from the 3rd to the 16th inclusive, fine bright weather; wet and unsettled from 17th to 27th. Distant T on the 19th. Dense fogs on the 24th, 25th and 26th. Mean temp. at 9 a.m.  $1^{\circ}\cdot6$  below the average. The variations of temp. were very slight throughout the month. The average max.,  $67^{\circ}\cdot9$ , was slightly below that of June.

TORQUAY, CARY GREEN.—Rainfall  $\cdot07$  in. below the average. Mean temp.  $60^{\circ}\cdot2$ , or  $1^{\circ}\cdot1$  below the average. Duration of sunshine 179 hours 10 minutes, being 3 hours less than the average; 2 sunless days.

POLAPIT TAMAR.—Very free from strong winds throughout, but wetter than the average. The nights from the 17th to 26th inclusive were very close and hot, but the month altogether was decidedly cooler than June. Heavy TSS on 1st and 19th.

STROUD, UPFIELD.—Prevailing winds, N.W. and S.W. T on the 19th.

WOOLSTASTON.—The dry weather continued till the 16th and the want of water was severely felt, pastures being quite burnt up. In the latter part of the month, R fell almost daily. Mean temp.  $58^{\circ}\cdot2$ .

TENBURY, ORLETON.—The first half of the month was dry and warm, but from the 16th to the end there was a considerable amount of R and very stormy unsettled weather. By a curious coincidence there was a considerable fall of R on the 1st, as was the case in both May and June. The temp. of the month was a little below the average. Frequent T—very heavy on the 21st—with a great fall of R for 20 minutes.

LEICESTER, BARKBY.—Continued drought till the 18th. T on 2nd, 19th, 21st, 26th and 27th. Mean temp.  $62^{\circ}$ .

MANCHESTER, PLYMOUTH GROVE.—The weather during the whole of the month was unsettled and cold. A great storm occurred on the 25th, and at Collyhurst the river wall of the Irk fell in and destroyed a small building; the rush of water was so great that a youth of 16 who was at work was swept away into the river and drowned. T and L and very stormy on 26th. Mean temp.  $59^{\circ}\cdot5$ .

HULL, PEARSON PARK.—T on 19th, 21st, 22nd, 25th and 26th.

## WALES.

HAVERFORDWEST.—The first few days were wet, followed by sunshine and warmth up to the 9th; damp days succeeded but it was again fine and bright

from the 11th to the 15th. From that date to the 27th almost constant R prevailed, although some of the days were fine with several hours of sunshine, the R falling at night. The last four days were beautifully fine and summer like. Stormy weather prevailed from 16th to 21st, causing heavy seas in the Irish Channel. Corn crops and cereals much improved by the damp warm weather, and grass lands looking well. Prevailing winds, S.W., S.E. and N.W.

GOGERDDAN.—Very stormy throughout the month, but “growing” weather.

#### SCOTLAND.

CARGEN.—A cold rainy sunless month. In only three years since 1860, viz., 1862, 1888 and 1890 has there been a lower mean temp. or less sunshine recorded at this station during the month of July. On the 25th and 26th a total fall of 2·88 in. of R was registered—yet another “record” in 1895,—the heaviest fall hitherto during two consecutive days being 2·60 in. on 13th and 14th July, 1882. The R caused a great improvement in pastures, hitherto hardly deserving that title but came too late to benefit the hay—barely half an average crop—the harvesting of which it made tedious and difficult. Cereals made good progress. T on 1st and 21st. T and L on 2nd and 26th.

JEDBURGH.—The weather was very variable and wet and vegetation advanced quickly. Cereal crops look well on the whole. Hay good but short, turnips are very good.

COLMONELL.—Rainfall ·75 in., above the average of 19 years. Mean temp. 57°·9 or 0°·7, below average.

MULL, QUINISH.—The drought of the last two months broke up on July 1st, and the month was very favourable for vegetation and crops. The R came too late to improve the rye grass but other crops improved immensely.

ABERDEEN, CRANFORD.—The frequent R was disastrous to the strawberry crops in this quarter which would have been “grand.” Strong gales from N.W. on 10th and on 15th. N. and E. winds prevailed after the 16th.

ROEBERY.—A fair month upon the whole but colder than July, 1894 by 2°·7. Mean temp. 54°·6.

#### IRELAND.

DARRYNANE ABBEY.—A very wet and cold month. 1·05 in. of R fell in seven hours on 17th.

O'BRIENSBRIDGE, ROSS.—Fair until 15th, but temp. low for the season, a fortnight of continuous R to the 27th, without sunshine and with still lower temp. Occasional T and L but not serious.

DUBLIN.—A cool, changeable month, setting in with heavy rains. Then high and squally S.W. to N.W. winds. Frequent rains from 15th to 25th inclusive. Fine, but cloudy at the close. TSS occurred on 19th and 21st; H fell on the 19th.

WARINGSTOWN.—The heavy rains although rather interfering with hay-making were most beneficial to the crops generally, which in this district promise to be very good, except upland hay which of course is short; turnips are making up for lost time rapidly.

EDENFEL.—A generally cloudy and unsettled month with temp. about the average and R considerably above it which—except by increasing the labour of saving the hay still in the fields—was of great benefit to grass and all crops.