

Symons's Meteorological Magazine.

No. 611.

DECEMBER, 1916.

VOL. LI.

GREAT RAINFALL AT KILLARNEY

THE rainfall of 5·35 in. recorded at the District Asylum, Killarney, on October 21st, was published without comment in our Table of the Rainfall of October in last month's magazine. This did not imply that the occurrence was an every-day matter to be expected in a wet country like Ireland. It is the practice of the Editors of "British Rainfall" to make very searching enquiries regarding every phenomenon reported to them that borders on the incredible or even approaches the distinction of being very rare. It necessarily happens that "record" falls of rain in a given time are those regarding which a sceptical attitude is the wisest until they have been established by corroborative evidence. Causes of error are numerous, though big falls are rare. It often happens that a decimal point gets astray in copying and ·53 may inadvertently be put down by the copyist as 5·3 and on going over the report he may complete the figure by making it 5·30. But 5·35 could not find its way into a note-book in this way. Remembering, however, that the ordinary rain-measuring glass contains just ·50 in. one can imagine an Observer surprised by a well filled rain gauge to count the number of full glasses—one, two, three, four, five; then measure a residue of ·35 and innocently write down the 5·35 as total. Hence we always examine neighbouring records before accepting a big fall. Now if several Observers in the neighbourhood had observed quantities of about 2·85 in. for the day in question we should feel it necessary to look for evidence that the mistake of reading glass-fuls as inches did not take place. Killarney was an extremely important rainfall station for the mere fact that no other rain gauges were known to exist within a good many miles of it, and although the nearest Observers recorded between 2 and 3 inches they were so far away that they did not necessarily suggest that the Killarney Observer had made this mistake. Still the facts made investigation more imperative. Many rain gauges cannot hold so much as five inches and if an Observer with a small gauge tells us that it was not over-

flowing when he measured over five inches, his own statement would correct his own record. Again a big fall of rain must produce marked effects in the way of floods or damage to property, and we have before now discovered a slip of the pen of $\cdot 90$ for $\cdot 09$ by the Observer remembering that the day on which he made the record was a fine day with only a slight shower. (We have also found that an illiterate Observer was in the habit of writing hundredths, as, for example, $\cdot 9$, while the clerk who copied his results to send in added a zero to keep the list in order with two figures to the right of the decimal point, but knowing more of decimals than the ways of primitively-minded men he made the figure $\cdot 90$ instead of $\cdot 09$. This, however, is a digression).

The possibility of an error induced us to write to Dr. Griffin, of Killarney, for particulars as to his remarkable reading, and to our great satisfaction his reply absolutely confirmed the correctness of the record. It runs as follows :—

“ In reply to yours of the 9th inst., I beg to say that as far as I can ascertain there is no doubt whatever about the amount of rainfall recorded here on the morning of the 22nd of October. The Observer, Mr. Galvin, is a very careful man, and he was assisted on that occasion by the Deputy Head Attendant as they both suspected that the rainfall would be extraordinary on that morning. The amount recorded here was only a few points more than that registered by an electrical engineer, Mr. McDonnell, at Flesk Mills, two miles distant from here. The body of the gauge holds 9.45 in. and inside this body we keep a bottle into which the funnel fits which we find convenient for measuring the ordinary rainfall. This bottle holds 2.10 inches, and we very rarely have a rainfall on any one day greater than this. The last date on which this amount was exceeded was on the morning of the 23rd August, 1916, and the body of the gauge was emptied on that occasion so that no residue was left.

“ The rain was of a tropical kind, came down vertically, and there was no wind. It rained continuously for 24 hours, and the oldest inhabitants never remember such a continuous and heavy rainfall. There was not much damage done in this immediate neighbourhood as it is well drained by the Rivers Flesk and Dinagh, but several bridges were swept away between Killarney and Killorglin, and also near Caragh Lake. The River Main overflowed its banks, and cattle were swept away and drowned. I am also informed that considerable damage was done in Glencar district—bridges and cattle, turf and potatoes were swept away. As far as I am aware no one tampered with the gauge.”

E. W. GRIFFIN.

This letter shows first that the gauge was of ample size, that the Observer was so alert to avoid mistakes that he took an assistant

with him to check the observations, and best of all that another rainfall station of which we had not previously heard existed in the neighbourhood, only two miles away. It is one of the chief advantages of extraordinary rains that they serve to bring new Observers to light. We lost no time in communicating with Mr. McDonnell, and he replied as follows :—

“ I am in receipt of your letter of the 21st inst. *re* rainfall records.

“ I am taking observations of rainfall daily as our generating station at Flesk Mills is driven by water power.

“ If my records are of interest I shall be very glad to send you copies at any time and enclose herewith monthly records from 10th March, 1914 to December, 1915, together with rough tracing showing location of my gauge in relation to Killarney railway station.

“ I, personally, take the reading each morning between 9 a.m. and 9.30 a.m., and enter same on Station Log Sheets, so that I have the daily record since 10th March, 1914.

“ My records are so extremely high that I had a doubt as to their accuracy, but on the occasions on which I have compared notes with Dr. Griffin our readings have been very close.

“ With reference to the heavy rainfall of October. My log sheets show 5.02 in. on the 21st, *i.e.*, rainfall, 9.30 a.m. 21st to 9.30 a.m. 22nd.

“ This rain came from north-west to west, and did not affect the river more than usual. We had a rise of 54 inches at our observation point. Since then we registered 3.24 in. on 16th November from south-west to south, and observed a rise of no less than 13 feet in the river. A heavier flood has not been witnessed by any person with whom I was able to get into communication.”

D. E. McDONNELL.

As a matter of fact although Ireland has a higher general rainfall than England the variations are less, and very heavy falls appear much more rare. How far this is due to the smaller number of rainfall stations in Ireland it is not easy to say; but the fact is remarkable that until the Killarney fall of October 21st, falls of 5 inches or over had only twice been recorded in one day, and in both cases at the very exceptional station of Glen-na-Smoel on the mountain border between Cos. Dublin and Wicklow; confirmation of these falls was it must be allowed, much less complete than in the Killarney case. The greatest fall in one day hitherto reported from Co. Kerry was 4.28 in., at Derreen, Kenmare, on October 18th, 1882.



Alexander Ivanovitch Voeikof.

Moscow, 1842—1916.

THIS year has seen the removal of many of the ancient landmarks of Meteorology, men to whose labours we owe the great advances of the science in the later half of the nineteenth century in all parts of the world, and we have now to record the loss of the great Russian climatologist Voeikof, which took place last January in his seventy-fifth year.

After his earlier education in Russia he studied at Göttingen, where he took the degree of Doctor of Philosophy in 1865. He travelled widely, gaining first hand knowledge of the climates of the world. He took the degree of Doctor in Physical Geography at Moscow in 1880, and settled down at the University of Petrograd as lecturer in Physical Geography in 1884, becoming an Ordinary Professor of that subject two years later. He had been an Honorary Member of the Royal Meteorological Society since 1879.

Voeikof was a voluminous writer; his principal works were two important books dealing respectively with Climatology and Meteorology. The former, under the title of "The Climates of the Earth," was published in Russian in 1884, and in a German translation in 1887; the latter, in Russian only, appeared in 1904 under the simple title of "Meteorology."

In his extensive travels Voeikof made friends in all countries of the world, and left a store of pleasant memories.

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### THE WETTEST MONTH ON RECORD IN MELBOURNE.

THE rainfall at Melbourne during September, 1916, 7.93 in., constitutes a record for any month during 61 years, the previous highest being 7.61 in., in October, 1869. Continuous steady rain for 63 hours without ceasing and for 9 days almost continuous rain; the latter six had periods of fine weather. All the rivers in Victoria were flooded and were over the banks; many cattle were lost, and a few cases of death by drowning, mostly of children, have been recorded. At Balook, in South Gippsland, the total rainfall for the month was 22.25 in. The following are the daily falls of rain.

|           |    |    | <i>Melbourne.</i> | <i>Balook.</i> |
|-----------|----|----|-------------------|----------------|
| September | 21 | .. | .01               |                |
| "         | 22 | .. | .83               | .08            |
| "         | 23 | .. | 2.31              | 1.69           |
| "         | 24 | .. | 1.97              | 1.26           |
| "         | 25 | .. | .24               | .19            |
| "         | 26 | .. | .59               | 5.32           |
| "         | 27 | .. | .91               | 7.23           |
| "         | 28 | .. | .06               | 2.08           |
| "         | 29 | .. | .08               | 1.13           |
| "         | 30 | .. | .20—Total 7.20.   | .82—19.80      |

## ROYAL METEOROLOGICAL SOCIETY.

THE first Ordinary Meeting of the 1916-17 Session was held at 70, Victoria Street, S.W., on November 15th, Major H. G. Lyons, F.R.S., President, in the Chair.

Mr. C. E. P. Brooks, M.Sc., read a paper entitled, "A Meteorologist in China," dealing with the work of the late Captain L. H. Tamplin, who for some years maintained a very fully equipped meteorological station at Wu-hu, and later at Chinkiang, on the Yangtse river. The situation of these two stations is west of the great Chinese meteorological and magnetic observatory at Zi-ka-wei and not far distant from the Lu-kia-pang Observatory, the records from which were published in a recent number of this magazine. For the last eighteen months Captain Tamplin's records were made at Amoy, near Hong-kong. The whole series covered the period from 1902 to 1915 with one or two short breaks, and included records of pressure, temperature, precipitation, and wind direction. By means of a series of wind roses Mr. Brooks was able to bring out in a very clear manner the characteristic climatic features at various seasons. These are of the typical monsoonal type with a great preponderance of south-easterly wind in summer and a complete absence of rainfall with west wind in winter.

The President, Captain Wilson-Barker, Sir Napier Shaw, Mr. J. E. Clark and Mr. Carle Salter took part in the discussion in which Captain Tamplin's meteorological work was very highly spoken of.

A paper, by Lieut. A. E. M. Geddes, on the Storm of November 11th-13th, 1915, was read by Mr. R. G. K. Lempfert in the absence of the author. For the purpose of this investigation synoptic charts were prepared for intervals of two hours throughout the three days, enabling the track of the depression and the weather associated with its passage to be discussed in great detail. The storm exhibited many points of similarity with that of November 11th-13th, 1901, studied by Sir Napier Shaw and Mr. Lempfert, and described in their memoir "The Life History of Surface Air Currents" (M.O. No. 174). The depression of November, 1915, moved at a speed of approximately 30 miles per hour from a point near Valencia, through Falmouth, and eastward along the English Channel, through the Straits of Dover to Denmark. The lowest recorded pressure was at Scilly, where the barometer fell to 958.3 mb. (28.30 in.) at 6 p.m. on the 12th. The temperature sequence appears to have been normal, and the most unusual feature of the storm was the remarkably heavy rainfall which occurred principally in a broad belt stretching from the west of Ireland to East Anglia. The largest falls recorded exceeded 5 inches during the 3 days. The storm was remarkable for the wide area in front of the centre in which rain was falling at a given moment.

The trajectories of some of the surface winds during the storm

were worked out showing that two distinct supplies of air came respectively from the south or south-west and from the north. Trajectories were also traced out for the geostrophic winds, at a height of, say, 2,000 feet, showing an influx of air at that altitude from the south-west, and an easterly flow on the northern side of the path. The conclusions lent support to the hypothesis of rain formation put forward in the "Life History of Surface Air Currents," namely, that the warm southerly winds are forced to ascend by being lifted upon dense masses of air from more northerly quarters, and supply the rain, which may fall through a northerly or easterly surface wind.

Mr. Carle Salter exhibited a large-scale map of the rainfall of November 11th-12th, 1915, prepared from several thousand observations for *British Rainfall* and called attention to the details of rainfall distribution in relation to the cyclone track, some of which did not appear to be adequately explained by the hypothesis put forward. He considered it advisable to investigate the pressure distribution in greater detail. Sir Napier Shaw gave a further explanation of the reasoning by which he had been led to abandon the purely convectional theory of rain formation in cyclonic systems in favour of that described above and supported by the paper.

After the ordinary meeting a short general meeting of the Society was held in the course of which proposals were put forward and adopted to suspend the by-laws in order to enable the period of office of the Presidents and Vice-Presidents to be extended beyond the prescribed period of two years. Col. Mellish, in moving the principal amendment said that it was the wish of the Council to ask Major Lyons to accept nomination as president for a third year

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### Correspondence.

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

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#### AN UNUSUAL FOG BOW.

THERE was visible here to-day for about 4 hours opposite to the sun, and upon a film of thin lofty cirrus spread over a sky far more blue than not, a bright bow, having the appearance of a solar halo which had by mistake got into the position of a rainbow.

Prismatic colouring was faintly visible, and the bow was brightest where the cloud film was thickest, but there hardly could have been a sky less suggestive of rain. It was at its best at 12.30 p.m., and at 2 p.m. I looked several times to see whether there were any signs of a solar halo on the precisely similar sky in the west and south-west, but could detect none.

I do not remember ever to have seen such a bow before.

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

*North Cadbury Rectory, Somerset, November 28th.*

WHAT I presume to have been a brilliant fog bow or arch spanned the northern sky on Tuesday, November 28th, 11.50 a.m. to 0.55 p.m. (65 minutes). There was no rain within some hours of the event and, at the time, the southern region of the firmament was involved in fog through which the sun struggled with a sickly light. The prismatic colours were slightly displayed in the bow at times though it greatly varied both in tone and tint and for short intervals it presented a colourless luminosity which suggested the aspect of "the ghost of a rainbow" as one of the spectators remarked.

The bow was projected upon pale blue sky slightly interspersed with very thin films of whitish vapour. Denser clouds began to gather over the sun at 0.53 p.m., and the object quickly disappeared. It may have been visible for a considerable time before I first detected it and it will be interesting to learn whether it was observed elsewhere and for how long?

From letters, in the local press, relating to the phenomenon it seems that it was seen as early as 10.55 a.m. from Bristol, and that it remained plainly visible from Kelston, near Bath, until between 3 and 3.15 p.m. The majority of the observers describe it as presenting a nearly colourless aspect; the inner margin of the bow appeared, however, generally bluish, while the outer fringe exhibited an orange tint, the hues were feebly manifested.

W. F. DENNING.

*Bristol, November 28th, 1916.*

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### THE COMING WINTER.

THE statement (p. 154) that I predict a mild winter for Greenwich is not quite accurate. What I tried to show was that, given a certain antecedent condition (a matter still in doubt, perhaps), there would be reason to expect that winter would have a preponderance of warm months. Failing this condition, there is nothing to be said.

Facetious criticism (if the term applies), is sometimes appropriate and amusing: but a reasoned estimate of the future in the light of the past is not necessarily disposed of in that way, and it may fairly claim better treatment. Meet argument with argument, and let us see how things pan out. The problem of long-range forecasting presses increasingly for solution; and it would be unscientific to dismiss it as insoluble. I venture to predict (at pretty long range) that some of the rising generation will see a Meteorological Office including forecasts of months, seasons, etc., as part of its regular duties.

A.B.M.

*Bridge of Allan, 23rd November, 1916.*

[We regret that the correspondent who sent the material for the note complained of is seriously ill and cannot therefore be asked to furnish the newspaper notice on which the remark was based. We much regret that the opinions of A. B. M. were referred to as a forecast, since he explains that they were not so meant.—  
EDITOR, *S.M.M.*]

### WINTER THUNDERSTORMS.

I SHOULD be much obliged if any of your readers would kindly send me reports of thunder or lightning observed between January 1st 1917, and March 31st, 1917. The reports should be sent as soon as possible by letter or post-card, addressed to Captain C. Cave, R.E., Meteorological Office, South Farnborough, Hants.

The points on which information is desired are the following :—

- (1.) Time when storm was nearest or overhead.
- (2.) Direction of storm, when first observed, and time.
- (3.) Direction when last observed, and time.
- (4.) Note if there was change of wind during the storm, and if there was a drop of temperature.
- (5.) Any other information as to heavy rain, hail, or snow, or any remarkable feature.
- (6.) If an Observer has accurate time, a list of the times of occurrence of flashes would be useful.

Information on these points would be of use, but, as many observers might not have time or opportunity to observe them all, I should be grateful for information on even one point; No. 1 is the most important.

I wish to take this opportunity of thanking those of your readers who sent information in the first three months of 1916. I had nearly one thousand reports from all sources and was unable to reply to each one. I wish to assure Observers that every report sent in was of use.

More reports from the North of Scotland would be particularly useful.

C. CAVE.

*Meteorological Office, South Farnborough, Hants.*

### PERMANENT SNOW BEDS IN SCOTLAND.

I WELCOME Mr. Dansey's investigations on this subject not only as a particular aspect of the general study of British snowfall, the importance of which I have lately drawn attention to, but also in their general climatic bearing. As the highest ground in the Highlands obviously cannot fall very far short of the snow-line, it was

only to be expected that small beds of permanent snow should exist here and there, and the facts which Mr. Dansey has brought to line in recent years show how broad statements in geographical text-books to the effect that there are no permanent snows in Britain must only be accepted in a general sense. As a curt generalization it is, perhaps, truer to say that there are no permanent snows than that there are. Just below the definite snow-line in mountain regions there comes a belt where snow is liable to lie permanently in isolated patches where local conditions favour accumulation, and it is just within this outlier region that the Scottish Highlands seem to come.

Similarly in travelling sometimes in winter from a part of England where snow is not lying to where it lies deep one first of all traverses an intermediate zone beginning with a few small encrustations of snow here and there which increase in frequency and size as the uniform snow cover is approached.

L. C. W. BONACINA.

*November 26th, 1916.*

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### REMARKABLE SHOWERS.

BETWEEN 5 and 6 p.m. on November 7th we had here two brief but extremely heavy showers, the one following the other after an interval of a few minutes, which produced effects such as I had never before seen, although heavy rains are not rare in the district. The wind was westerly, and the path of the deluge appears in each case to have been very narrow from north to south; I saw the second shower approaching and was struck by its appearance—a long narrow belt of dense black cloud, of low altitude, each end of which was sharply defined, coming from about W.S.W.; its length from N. to S. could not have been more than  $45^\circ$ , and its greatest thickness I judged as  $10^\circ$ ; there was not much cloud above it, and below it the sky was comparatively bright. The rain speedily followed, and as soon as the downpour had (abruptly) ceased, I went out and found the roads everywhere flooded, with water spurting into them through the hedges (even from newly-ploughed land) in a way I had never seen before. On fairly level ground there was a strong current on both sides of the road, but where there was a moderately steep gradient the word "roaring" could fairly have been applied to the noise made by the rushing torrent. Unfortunately it was too dark to make measurements, but the disintegrated state of the roads amply testifies to the violence of the floods, which, I may add, began to abate very quickly. Next morning I found 1.49 in. of rain in my gauge, and I estimate that at least five-sixths of that amount must have fallen in those two showers, whose total duration was less than a quarter of an hour.

R. H. CURTIS.

*14th November, 1916.*

## REVIEW.

*Eleventh Annual Report of the Meteorological Committee to the Lords Commissioners of His Majesty's Treasury, for the year ended March 31st, 1916.* London, H.M. Stationery Office. Size,  $9\frac{1}{2} \times 6$ . Pp. 16. Price 1d.

By a drastic process of elimination the eleventh annual report of the Meteorological Committee is reduced in size to a pamphlet of 16 pages, of which only 5 are devoted to letterpress. The work of the year was mainly concerned with further organization on a war basis, involving among other activities the issue of four weather reports daily for the hours of 1 a.m., 7 a.m., 1 p.m. and 6 p.m., G.M.T. A separate unit of the Royal Engineers has been created for meteorological work at the front, the service in France being under the command of Major E. Gold, R.E., D.S.O., and that in the Eastern Mediterranean under Capt. E. M. Wedderburn. In connection with these services great assistance has been received from Major H. G. Lyons, R.E., who has been in charge of that department of the Office since May, 1915.

Attention has also been given to the co-ordination of meteorological observations in connection with aeronautics, and Major G. T. Taylor, R.F.C., late Schuster Reader in Meteorology, has been appointed Professor of Meteorology to the Royal Flying Corps.

The special publications of the Office during the year include Sir Napier Shaw's "The Weather Map," and we are interested to note that the preparation of a Handbook or Text Book of Meteorology is in progress. But for the official reports the publications have been restricted to the requirements of the Naval and Military services. The completion is announced of the first issue of the Réseau Mondial, dealing with the Meteorology of the globe, an account of which was given in a lecture before the Royal Meteorological Society by Sir Napier Shaw in March, 1916. (See this Magazine, April, 1916, p. 42). Unfortunately the issue of this work has been delayed through the destruction by fire of the printed-off copies of the letterpress.

Mention is made of a special investigation carried out by Capt. C. J. P. Cave, R.E., in charge of the South Farnborough branch of the Office, into the occurrence of thunderstorms with a view to anticipating their arrival in threatened localities. We are glad to hear from Capt. Cave that he has received great assistance in this work from reports sent in from a large number of readers of this magazine and Observers of the British Rainfall Organization.

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## METEOROLOGICAL NEWS AND NOTES.

THE LATE MR. GEORGE SEARLE, of Edith Road, West Kensington; who was a rainfall Observer for more than thirty years, has left a legacy of £200 to the British Rainfall Organization, which, however, is not payable until the end of the war. The bequest, when received, will go to the Endowment Fund of the Organization, the proceeds of which are available for supplementing the income derived from subscriptions to the publications, a source which has necessarily suffered somewhat during the last two years.

METEOROLOGICAL OBSERVATIONS ON ELEPHANT ISLAND in the South Shetlands were, we are glad to learn, kept up by the scientific staff of Sir Ernest Shackleton's expedition in the *Endurance* during the whole period of their stay on the island.

DECEMBER AS THE FIRST WINTER MONTH is not only a convenience to meteorologists, but an ancient belief in England. The daily press recently called attention to the fact that on December 1st, following a medieval custom, the Town Crier of Colchester ushered in "Winter" by walking through the town ringing his bell and declaiming the lines:—

Cold December hath come in,  
Poor people's backs are clothed thin,  
The trees are bare, the birds are mute,  
A pot and toast would very well suit.

MR. J. GLASSPOOLE, assistant computer in the office of the British Rainfall Organization, attested under the Derby Scheme, and, when called up for military service a few months ago, was allowed exemption to enable him to take the examinations at the University of London for which he had been preparing. He has now passed for the degree of B.Sc. in Mathematics and Chemistry, and has been appointed as assistant chemist in a Government establishment engaged on war work.

RAINFALL OBSERVING IN THE EGYPTIAN DESERT apparently offers some attractions to the hard-worked members of the R.A.M.C. now stationed somewhere thereabouts. One of these writes to us:—"I should think about the easiest job in this part of the world would be that of Rainfall Observer. For ten months of the year he could sleep in peace, waken up in November, get the rain gauge out, set it up in a suitable place, and then lie down again keeping one eye open in case the rain *should* come on. And then in the middle of January he would demobilize the gauge, measure the minute fraction of an inch of water, send in his report, and curl up for another long sleep."

## RAINFALL TABLE FOR NOVEMBER, 1916.

| STATION.                          | COUNTY.              | Lat.<br>N. | Long.<br>W.<br>[*E.] | Height<br>above<br>Sea.<br>ft. | RAINFALL<br>OF MONTH.          |              |
|-----------------------------------|----------------------|------------|----------------------|--------------------------------|--------------------------------|--------------|
|                                   |                      |            |                      |                                | Aver.<br>1875—<br>1909.<br>in. | 1916.<br>in. |
| Camden Square.....                | London.....          | 51 32      | 0 8                  | 111                            | 2'34                           | 4'67         |
| Tenterden.....                    | Kent.....            | 51 4       | *0 41                | 190                            | 3'07                           | 4'87         |
| Arundel (Patching).....           | Sussex.....          | 50 51      | 0 27                 | 130                            | 3'54                           | 4'77         |
| Fordingbridge (Oaklands).....     | Hampshire.....       | 50 56      | 1 38                 | 135                            | 3'41                           | 5'20         |
| Oxford (Magdalen College).....    | Oxfordshire.....     | 51 45      | 1 15                 | 186                            | 2'25                           | 2'94         |
| Wellingborough (Swanspool).....   | Northampton.....     | 52 18      | 0 41                 | 155                            | 2'22                           | 3'33         |
| Bury St. Edmunds (Westley).....   | Suffolk.....         | 52 15      | *0 40                | 226                            | 2'40                           | 3'25         |
| Geldeston [Beccles].....          | Norfolk.....         | 52 27      | *1 31                | 38                             | 2'49                           | 3'12         |
| Polapit Tamar [Launceston].....   | Devon.....           | 50 40      | 4 22                 | 315                            | 4'07                           | 6'44         |
| Rousdon [Lyme Regis].....         | ".....               | 50 41      | 3 0                  | 516                            | 3'51                           | 4'36         |
| Stroud (Field Place).....         | Gloucestershire..... | 51 44      | 2 13                 | 226                            | 2'77                           | 2'86         |
| Church Stretton (Wolstaston)..... | Shropshire.....      | 52 35      | 2 48                 | 800                            | 2'94                           | 2'76         |
| Boston.....                       | Lincolnshire.....    | 52 58      | 0 1                  | 11                             | 2'05                           | 3'21         |
| Worksop (Hodsock Priory).....     | Nottinghamshire..... | 53 22      | 1 5                  | 56                             | 1'98                           | 3'16         |
| Mickleover Manor.....             | Derbyshire.....      | 52 54      | 1 32                 | 280                            | 2'21                           | 3'21         |
| Macclesfield.....                 | Cheshire.....        | 53 15      | 2 7                  | 501                            | 3'00                           | ...          |
| Southport (Hesketh Park).....     | Lancashire.....      | 53 39      | 2 59                 | 38                             | 3'16                           | 2'63         |
| Arneliffe Vicarage.....           | Yorkshire, W.R.....  | 54 8       | 2 6                  | 732                            | 6'12                           | 6'38         |
| Goldsborough Hall.....            | ".....               | 54 0       | 1 25                 | 119                            | 2'33                           | 2'64         |
| Hull (Pearson Park).....          | " E.R.....           | 53 45      | 0 20                 | 6                              | 2'34                           | 2'68         |
| Newcastle (Town Moor).....        | Northumberland.....  | 54 59      | 1 38                 | 201                            | 2'63                           | 3'38         |
| Borrowdale (Seathwaite).....      | Cumberland.....      | 54 30      | 3 10                 | 423                            | 13'59                          | 20'71        |
| Cardiff (Ely).....                | Glamorgan.....       | 51 29      | 3 13                 | 53                             | 4'08                           | 3'18         |
| Haverfordwest.....                | Pembroke.....        | 51 48      | 4 58                 | 90                             | 5'16                           | 4'52         |
| Aberystwyth (Gogerddan).....      | Cardigan.....        | 52 26      | 4 1                  | 83                             | 4'50                           | 3'00         |
| Llandudno.....                    | Carnarvon.....       | 53 20      | 3 50                 | 72                             | 3'19                           | 2'58         |
| Cargen [Dumfries].....            | Kirkcudbright.....   | 55 2       | 3 37                 | 80                             | 4'35                           | 5'13         |
| Marchmont House.....              | Berwick.....         | 55 44      | 2 24                 | 498                            | 3'21                           | 5'37         |
| Girvan (Pinmore).....             | Ayr.....             | 55 10      | 4 49                 | 207                            | 5'24                           | 4'86         |
| Glasgow (Queen's Park).....       | Renfrew.....         | 55 53      | 4 18                 | 144                            | 3'63                           | 3'19         |
| Islay (Eallabus).....             | Argyll.....          | 55 47      | 6 15                 | 68                             | 5'33                           | 6'42         |
| Mull (Quinish).....               | ".....               | 56 34      | 6 13                 | 35                             | 6'24                           | 8'63         |
| Balquhider (Stronvar).....        | Perth.....           | 56 21      | 4 23                 | 422                            | 7'87                           | ...          |
| Dundee (Eastern Necropolis).....  | Forfar.....          | 56 28      | 2 57                 | 199                            | 2'62                           | 3'86         |
| Braemar.....                      | Aberdeen.....        | 57 0       | 3 24                 | 1114                           | 3'76                           | 6'08         |
| Aberdeen (Cranford).....          | ".....               | 57 8       | 2 7                  | 120                            | 3'29                           | 3'64         |
| Gordon Castle.....                | Moray.....           | 57 37      | 3 5                  | 107                            | 2'85                           | 2'85         |
| Drumadrochit.....                 | E. Inverness.....    | 57 20      | 4 29                 | 138                            | 3'41                           | 3'61         |
| Fort William.....                 | ".....               | 56 49      | 5 6                  | 171                            | 7'55                           | 11'79        |
| Loch Torridon (Bendamph).....     | W. Ross.....         | 57 32      | 5 32                 | 20                             | 8'90                           | 10'98        |
| Dunrobin Castle.....              | Sutherland.....      | 57 59      | 3 56                 | 14                             | 3'25                           | 2'37         |
| Killarney (District Asylum).....  | Kerry.....           | 52 4       | 9 31                 | 178                            | 5'54                           | 11'20        |
| Waterford (Brook Lodge).....      | Waterford.....       | 52 15      | 7 7                  | 104                            | 3'80                           | 6'15         |
| Nenagh (Castle Lough).....        | Tipperary.....       | 52 54      | 8 24                 | 120                            | 3'88                           | 5'09         |
| Ennistymon House.....             | Clare.....           | 52 57      | 9 18                 | 37                             | 4'62                           | 7'48         |
| Gorey (Courtown House).....       | Wexford.....         | 52 40      | 6 13                 | 80                             | 3'41                           | 3'88         |
| Abbey Leix (Blandsfort).....      | Queen's County.....  | 52 56      | 7 17                 | 532                            | 3'28                           | 5'42         |
| Dublin (Fitz William Square)..... | Dublin.....          | 53 21      | 6 14                 | 54                             | 2'64                           | 5'77         |
| Mullingar (Belvedere).....        | Westmeath.....       | 53 29      | 7 22                 | 367                            | 3'38                           | 4'69         |
| Crossmolina (Enniscoie).....      | Mayo.....            | 54 4       | 9 16                 | 74                             | 5'75                           | 7'64         |
| Cong (The Glebe).....             | ".....               | 53 33      | 9 16                 | 112                            | 5'00                           | 6'83         |
| Collooney (Markree Obsy.).....    | Sligo.....           | 54 11      | 8 27                 | 127                            | 4'02                           | 7'48         |
| Seaforde.....                     | Down.....            | 54 19      | 5 50                 | 180                            | 3'86                           | 4'20         |
| Ballymena (Harryville).....       | Antrim.....          | 54 52      | 6 13                 | 150                            | 3'95                           | 4'12         |
| Omagh (Edenfel).....              | Tyrone.....          | 54 36      | 7 18                 | 280                            | 3'66                           | 4'34         |

RAINFALL TABLE FOR NOVEMBER, 1916—continued.

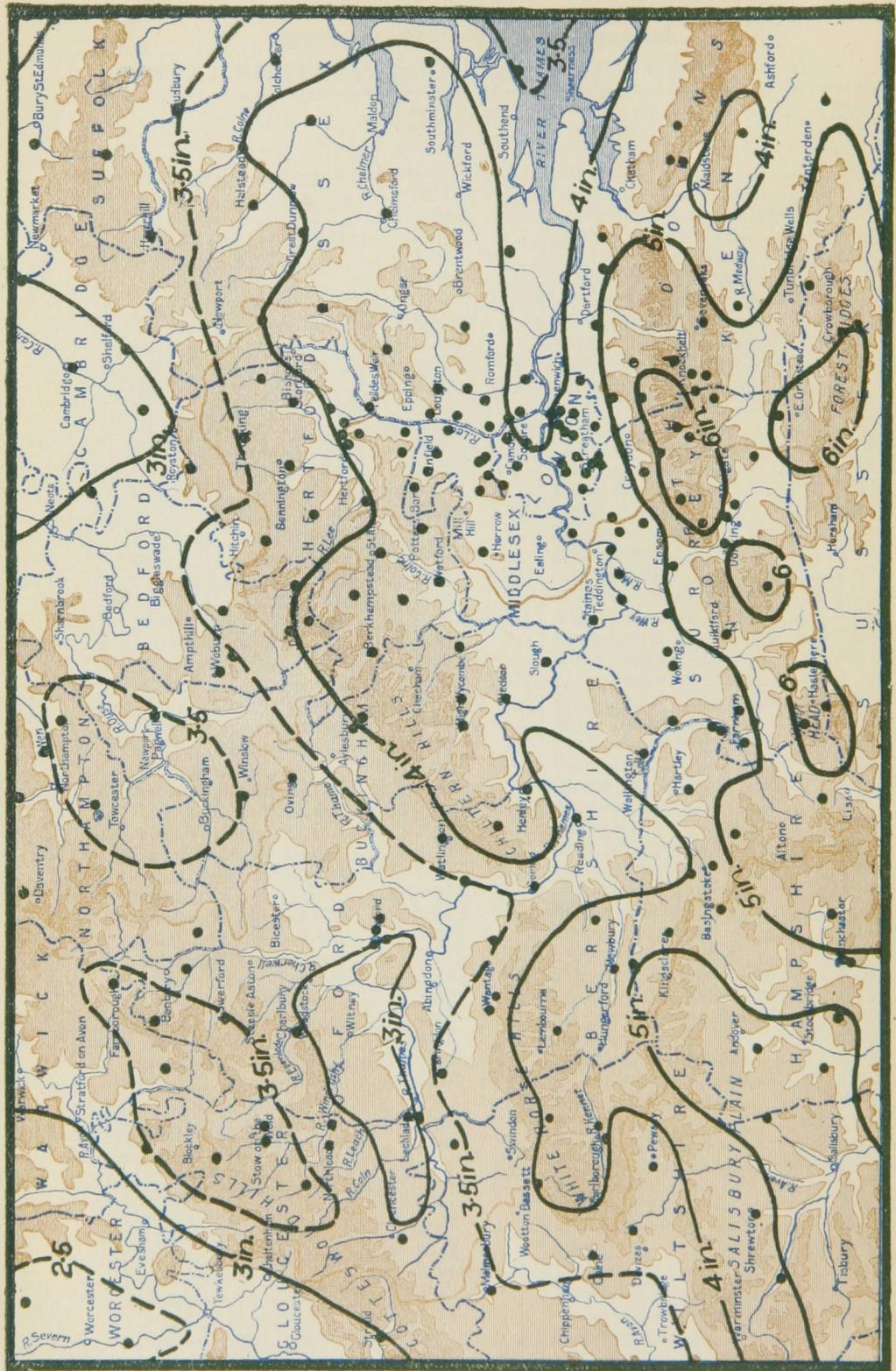
| RAINFALL OF MONTH (con.) |          |                   |       | RAINFALL FROM JAN. 1. |                      |           |                      | Mean Annual 1875-1909. | STATION. |                   |
|--------------------------|----------|-------------------|-------|-----------------------|----------------------|-----------|----------------------|------------------------|----------|-------------------|
| Diff. from Av. in.       | % of Av. | Max. in 24 hours. |       | No. of Days           | Aver. 1875-1909. in. | 1916. in. | Diff. from Aver. in. |                        |          | % of Av.          |
|                          |          | in.               | Date. |                       |                      |           |                      |                        |          |                   |
| +2.33                    | 200      | .87               | 7     | 12                    | 22.98                | 31.46     | +8.48                | 137                    | 25.11    | Camden Square     |
| +1.80                    | 159      | 1.08              | 19    | 17                    | 24.87                | 29.49     | +4.62                | 119                    | 27.64    | Tenterden         |
| +1.23                    | 135      | .73               | 5     | 14                    | 27.57                | 32.85     | +5.28                | 119                    | 30.48    | Patching          |
| +1.79                    | 153      | .93               | 6     | 23                    | 27.71                | 35.96     | +8.25                | 130                    | 31.06    | Fordingbridge     |
| + .69                    | 131      | .77               | 18    | 14                    | 22.52                | 26.90     | +4.38                | 119                    | 24.58    | Oxford            |
| +1.11                    | 150      | .84               | 18    | 16                    | 23.07                | 24.01     | + .94                | 104                    | 25.20    | Swanspool         |
| + .85                    | 135      | .59               | 19    | 16                    | 23.26                | 30.06     | +6.80                | 129                    | 25.40    | Westley           |
| + .63                    | 125      | .70               | 18    | 22                    | 21.66                | 24.51     | +2.85                | 113                    | 23.73    | Geldeston         |
| +2.37                    | 158      | .83               | 4     | 22                    | 33.81                | 37.04     | +3.23                | 110                    | 38.27    | Polapit Tamar     |
| + .85                    | 124      | .85               | 7     | 18                    | 29.86                | 33.18     | +3.32                | 111                    | 33.54    | Rousdon           |
| + .09                    | 103      | .61               | 7     | 17                    | 27.10                | 31.15     | +4.05                | 115                    | 29.81    | Stroud            |
| - .18                    | 94       | .41               | 25    | 17                    | 29.42                | 30.02     | + .60                | 102                    | 32.41    | Wolstaston        |
| +1.16                    | 157      | .87               | 18    | 16                    | 21.47                | 26.05     | +4.58                | 121                    | 23.35    | Boston            |
| +1.18                    | 159      | 1.17              | 18    | 14                    | 22.29                | 22.30     | + .01                | 100                    | 24.46    | Hodsock Priory    |
| +1.00                    | 145      | .96               | 18    | 15                    | 24.27                | 28.37     | +4.10                | 117                    | 26.65    | Mickleover        |
| ...                      | ...      | ...               | ...   | ...                   | 31.38                | ...       | ...                  | ...                    | 34.73    | Macclesfield      |
| - .53                    | 83       | .33               | 6     | 18                    | 29.60                | 28.90     | - .70                | 98                     | 32.70    | Southport         |
| + .26                    | 104      | 1.00              | 18    | 21                    | 54.74                | 63.68     | +8.94                | 116                    | 61.49    | Arncliffe         |
| + .31                    | 113      | .71               | 18    | 18                    | 25.00                | 26.68     | +1.68                | 107                    | 27.29    | Goldsborough Hall |
| + .34                    | 115      | .92               | 18    | 19                    | 24.10                | 25.76     | +1.66                | 107                    | 26.42    | Hull              |
| + .75                    | 128      | 1.27              | 18    | 17                    | 25.48                | 27.28     | +1.80                | 107                    | 27.94    | Newcastle         |
| +7.12                    | 153      | 4.88              | 26    | 14                    | 114.34               | 131.36    | +17.02               | 115                    | 129.48   | Seathwaite        |
| - .90                    | 78       | .68               | 6     | 23                    | 37.58                | 44.24     | +6.66                | 118                    | 42.28    | Cardiff           |
| - .64                    | 88       | .77               | 6     | 22                    | 41.63                | 39.02     | -2.61                | 94                     | 46.81    | Haverfordwest     |
| -1.50                    | 67       | .53               | 7     | 21                    | 40.80                | 42.32     | +1.52                | 104                    | 45.46    | Goggerddan        |
| - .61                    | 81       | .40               | 25    | 17                    | 27.52                | 28.39     | + .87                | 103                    | 30.36    | Llandudno         |
| + .78                    | 118      | 1.03              | 3     | 20                    | 38.63                | 48.79     | +10.16               | 126                    | 43.47    | Cargen            |
| +2.16                    | 167      | 1.21              | 18    | 22                    | 30.93                | 41.11     | +10.18               | 133                    | 33.76    | Marchmont         |
| - .38                    | 93       | .95               | 3     | 21                    | 44.29                | 45.55     | +1.26                | 103                    | 49.77    | Girvan            |
| - .44                    | 88       | .70               | 24    | 20                    | 32.02                | 39.38     | +7.36                | 123                    | 35.97    | Glasgow           |
| +1.09                    | 120      | .75               | 24    | 27                    | 43.06                | 49.00     | +5.94                | 114                    | 48.79    | Eallabus          |
| +2.39                    | 138      | 1.08              | 3     | 26                    | 49.98                | 48.91     | -1.07                | 98                     | 56.57    | Quinish           |
| ...                      | ...      | ...               | ...   | ...                   | 64.94                | ...       | ...                  | ...                    | 73.77    | Stronvar          |
| +1.24                    | 147      | .89               | 19    | 18                    | 25.97                | 36.91     | +10.94               | 142                    | 28.64    | Dundee            |
| +2.32                    | 162      | 1.18              | 3     | 18                    | 31.80                | 44.08     | +12.28               | 139                    | 34.93    | Braemar           |
| + .35                    | 111      | .78               | 4     | 18                    | 29.30                | 32.05     | +2.75                | 109                    | 32.73    | Aberdeen          |
| .00                      | 100      | .41               | 28    | 19                    | 27.62                | 33.83     | +6.21                | 122                    | 30.34    | Gordon Castle     |
| + .20                    | 106      | .93               | 24    | 20                    | 32.37                | 45.33     | +12.96               | 140                    | 36.13    | Drumadrochit      |
| +4.24                    | 156      | 1.61              | 10    | 26                    | 66.39                | 77.01     | +10.62               | 116                    | 75.80    | Fort William      |
| +2.08                    | 123      | 1.47              | 23    | 23                    | 74.07                | 78.81     | +4.74                | 106                    | 83.93    | Bendamph          |
| - .88                    | 77       | .30               | 20    | 18                    | 28.81                | 32.34     | +3.53                | 112                    | 31.90    | Dunrobin Castle   |
| +5.66                    | 202      | 3.52              | 16    | 27                    | 47.89                | 64.67     | +16.78               | 135                    | 54.81    | Killarney         |
| +2.35                    | 162      | 1.30              | 4     | 20                    | 35.25                | 36.67     | +1.42                | 104                    | 39.57    | Waterford         |
| +1.21                    | 131      | .98               | 3     | 21                    | 35.09                | 39.53     | +4.44                | 113                    | 39.43    | Castle Lough      |
| +2.86                    | 162      | 1.79              | 16    | 26                    | 41.49                | 49.26     | +7.77                | 119                    | 46.52    | Ennistymon        |
| + .47                    | 114      | .76               | 6     | 21                    | 31.57                | 34.76     | +3.19                | 110                    | 34.99    | Courtown Ho.      |
| +2.14                    | 165      | .92               | 17    | 20                    | 32.51                | 37.51     | +5.00                | 115                    | 35.92    | Abbey Leix        |
| +3.13                    | 219      | 1.56              | 17    | 19                    | 25.41                | 35.88     | +10.47               | 141                    | 27.68    | Dublin            |
| +1.31                    | 139      | .70               | 18    | 25                    | 32.76                | 42.85     | +10.09               | 131                    | 36.15    | Mullingar         |
| +1.89                    | 133      | 1.43              | 16    | 28                    | 46.76                | 56.56     | +9.80                | 121                    | 52.87    | Enniscoe          |
| +1.83                    | 137      | 1.18              | 16    | 27                    | 43.48                | 50.81     | +7.33                | 117                    | 48.90    | Cong              |
| +3.46                    | 186      | 1.25              | 17    | 28                    | 38.37                | 50.49     | +12.12               | 132                    | 42.71    | Markree           |
| + .34                    | 109      | .72               | 4, 18 | 19                    | 35.14                | 38.24     | +3.10                | 109                    | 38.91    | Seaforde          |
| + .17                    | 104      | .64               | 25    | 23                    | 36.87                | 40.69     | +3.82                | 110                    | 40.84    | Ballymena         |
| + .68                    | 119      | .62               | 3     | 26                    | 35.47                | 40.05     | +4.58                | 113                    | 39.38    | Omagh             |

## SUPPLEMENTARY RAINFALL, NOVEMBER, 1916.

| Div.  | STATION.                      | Rain inches. | Div.   | STATION.                        | Rain inches. |
|-------|-------------------------------|--------------|--------|---------------------------------|--------------|
| II.   | Warlingham, Redvers Road..    | 6·94         | XI.    | Lligwy .....                    | 3·65         |
| „     | Ramsgate .....                | 3·54         | „      | Douglas, Isle of Man .....      | ...          |
| „     | Hailsham .....                | 5·26         | XII.   | Stoneykirk, Ardwell House...    | 3·19         |
| „     | Totland Bay, Aston House...   | 3·25         | „      | Carsphairn, Shiel .....         | 7·95         |
| „     | Stockbridge, Ashley .....     | 5·18         | „      | Beattock, Kinnelhead .....      | 6·05         |
| „     | Grayshott .....               | 6·23         | „      | Langholm, Drove Road .....      | 6·12         |
| III.  | Harrow Weald, Hill House...   | 4·14         | XIII.  | Selkirk, The Hangingshaw..      | 5·05         |
| „     | Pitsford, Sedgebrook .....    | 3·29         | „      | North Berwick Reservoir...      | 3·63         |
| „     | Woburn, Milton Bryant .....   | 3·42         | „      | Edinburgh, Royal Observatory... | 3·17         |
| „     | Chatteris, The Priory .....   | 2·10         | XIV.   | Maybole, Knockdon Farm ...      | 4·20         |
| IV.   | Elsenham, Gaunts End .....    | 3·96         | XV.    | Buchlyvie, The Manse .....      | ...          |
| „     | Shoeburyness .....            | 3·47         | „      | Ballachulish House .....        | 13·01        |
| „     | Colchester, Hill Ho., Lexden  | 3·78         | „      | Oban .....                      | 7·23         |
| „     | Ipswich, Rookwood, Copdock    | 4·21         | „      | Campbeltown, Witchburn ..       | 5·14         |
| „     | Aylsham, Rippon Hall .....    | 3·11         | „      | Holy Loch, Ardnadam .....       | 8·59         |
| „     | Swaffham .....                | 2·99         | „      | Tiree, Cornaigmore .....        | 5·00         |
| V.    | Bishops Cannings .....        | 3·68         | XVI.   | Dollar Academy .....            | 5·48         |
| „     | Wimborne, St. John's Hill ... | 5·48         | „      | Glenlyon, Meggernie Castle..    | 11·51        |
| „     | Ashburton, Druid House .....  | 8·54         | „      | Blair Atholl .....              | 5·68         |
| „     | Cullompton .....              | 5·32         | „      | Coupar Angus .....              | 4·03         |
| „     | Lynmouth, Rock House .....    | 3·75         | „      | Montrose, Sunnyside Asylum.     | ...          |
| „     | Okehampton, Oaklands .....    | 7·06         | XVII.  | Alford, Lynturk Manse .....     | 4·61         |
| „     | Hartland Abbey .....          | 5·00         | „      | Fyvie Castle .....              | 3·98         |
| „     | St. Austell, Trevarna .....   | 8·37         | „      | Keith Station .....             | 3·70         |
| VI.   | North Cadbury Rectory .....   | 5·10         | XVIII. | Rothiemurchus .....             | 4·33         |
| „     | Clifton, Stoke Bishop .....   | 2·81         | „      | Loch Quoich, Loan .....         | 21·95        |
| „     | Ledbury, Underdown .....      | 2·80         | „      | Skye, Dunvegan .....            | 9·67         |
| „     | Shifnal, Hatton Grange .....  | 1·72         | „      | Lochmaddy, Bayhead .....        | 2·42         |
| „     | Droitwich .....               | 2·44         | „      | Fortrose .....                  | 1·93         |
| VII.  | Blockley, Upton Wold .....    | 3·76         | „      | Glencarron Lodge .....          | 8·77         |
| „     | Grantham, Saltersford .....   | 3·55         | XIX.   | Altnaharra .....                | 5·65         |
| „     | Market Rasen .....            | 2·71         | „      | Melvich .....                   | 4·68         |
| „     | Bawtry, Hesley Hall .....     | 2·76         | „      | Loch More, Achfary .....        | 12·32        |
| „     | Derby, Midland Railway .....  | 2·94         | XX.    | Dunmanway, The Rectory ...      | 12·60        |
| VIII. | Buxton .....                  | 4·07         | „      | Glanmire, Lota Lodge .....      | 7·80         |
| „     | Nantwich, Dorfold Hall .....  | 2·51         | „      | Mitchelstown Castle .....       | 7·66         |
| „     | Chatburn, Middlewood .....    | 3·43         | „      | Darrynane Abbey .....           | ...          |
| IX.   | Lancaster, Strathspey .....   | 3·83         | „      | Clonmel, Bruce Villa .....      | 7·09         |
| „     | Langsett Moor, Up. Midhope    | 5·27         | „      | Broadford, Hurdlestown .....    | 5·84         |
| „     | Scarborough, Scalby .....     | 3·37         | XI.    | Enniscorthy, Ballyhyland...     | 5·41         |
| „     | Ingleby Greenhow .....        | 4·47         | „      | Rathnew, Clonmannon .....       | 5·35         |
| X.    | Mickleton .....               | 4·70         | „      | Ballycumber, Moorock Lodge      | 3·37         |
| „     | Bellingham, High Green Manor  | 7·02         | „      | Balbriggan, Ardgillan .....     | 5·04         |
| „     | Ilderton, Lilburn Cottage ... | 4·60         | „      | Castle Forbes Gardens .....     | 4·63         |
| „     | Keswick, The Bank .....       | 9·21         | XXII.  | Ballynahinch Castle .....       | 10·03        |
| XI.   | Llanfrechfa Grange .....      | 4·16         | „      | Woodlawn .....                  | 4·21         |
| „     | Treherbert, Tyn-y-waun .....  | 10·28        | „      | Westport, St. Helens .....      | 8·40         |
| „     | Carmarthen, The Friary .....  | 5·10         | „      | Dugort, Slievemore Hotel ...    | 10·06        |
| „     | Fishguard, Goodwick Station.  | 4·00         | XXIII. | Enniskillen, Portora .....      | 3·92         |
| „     | Crickhowell, Tal-y-maes ..... | 4·50         | „      | Dartrey [Cootehill] .....       | 4·15         |
| „     | New Radnor, Ednol .....       | 4·31         | „      | Warrenpoint, Manor House ..     | 4·01         |
| „     | Birmingham WW., Tyrmynydd     | 5·60         | „      | Belfast, Cave Hill Road .....   | 3·74         |
| „     | Lake Vyrnwy .....             | 6·06         | „      | Glenarm Castle .....            | 4·34         |
| „     | Llangynhafal, Plas Drâw ..... | 3·41         | „      | Londonderry, Creggan Res...     | 5·02         |
| „     | Dolgelly, Bryntirion .....    | 5·58         | „      | Dunfanaghy, Horn Head ...       | 5·46         |
| „     | Bettws-y-Coed, Tyn-y-bryn...  | 5·31         | „      | Killybegs .....                 | 7·56         |



# THAMES VALLEY RAINFALL. — NOVEMBER, 1916.



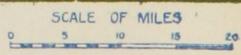
Rainfall Stations reporting isotherms.

Watershed of River Thames above Teddington, and River Lee above Faldes Wals.

Bymost's Meteorological Magazine.

ALTITUDE SCALE

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



## WEATHER OF NOVEMBER.

UNTIL the closing week the weather of November was exceedingly wet and stormy, and in the first fortnight, when equatorial winds predominated, it was also very mild. The worst gales of the month occurred respectively between the 3rd and 5th, and between the 17th and 19th. Shortly after mid-day on the 3rd increasing winds from S. and S.E. set in on all our northern coasts, and in the course of the next two days the entire kingdom was involved in a storm of considerable severity. The greatest violence was experienced on the 5th and over the southern half of the kingdom, where most of the anemometers recorded wind velocity of considerably over 60 miles an hour. At Brighton the extreme force, in gusts, was 74 miles per hour, at Dover 78 miles, and at Plymouth 81 miles. On the west coast the gale resulted in the loss, by collision on the 4th, of the steamer *Connemara*, off Greenore.

The mild weather reached its maximum intensity between the 10th and 13th, when shade temperatures slightly above 60° were recorded at many stations in nearly all parts of the kingdom. At Carrick-on-Suir the thermometer on the 10th reached 64°, and on the following day it rose to 63° at Geldeston, and as far north as Gordon Castle.

The second important storm of the month, that of the 17th to 19th, came from the E. or S.E. and was attended by weather of an essentially wintry character. The violence of the wind was not as great as in the earlier instance, but there were several records of gusts varying between 55 and 60 miles per hour. Round the north and north-east coasts of Great Britain, where the on-shore wind raised a tremendous sea, an extreme wind velocity of 65 miles per hour was recorded at Dyce, and 67 miles at Aberdeen. At the mouth of the Channel, the velocity in gusts reached 69 miles per hour at Scilly and at Penderennis Castle, Falmouth. The weather at the time was bitterly cold and on the 18th and 19th snow or sleet fell in nearly all districts. Some rather sharp night frosts occurred between the 19th and 22nd, but the lowest temperatures recorded in the screen were not more than 5° or 6° below freezing point. A thunderstorm passed over Bognor and Brighton on the 21st.

A brief recurrence of mild stormy weather took place between the 22nd and 25th, but in the closing days of the month the atmosphere became much quieter and temperature fell decidedly. On the coldest night, that of the 27th-28th, the screened thermometer fell to about 10° below the freezing point at a number of places in eastern, central and southern England; while on the surface of the grass the minima were as low as 11° at Hampstead, 13° at Wisley, and 15° at Marlborough and Tunbridge Wells.

Aurora was seen at Aberdeen on the 1st, 2nd, 17th and 25th, at Crieff on the 21st, at Edinburgh on the 25th, and at many northern stations on the 29th. A brisk air motion served to keep the atmosphere as a rule fairly clear, but on the evening of the 13th a thick fog settled over London, and traffic in the streets became at once difficult and dangerous.

The total rainfall was in excess of the average practically everywhere and was more than 50 per cent. above the average in the south of England, the east Midlands, and the greater part of Ireland. In London the fall was exactly double the average, the total at Camden Square being the greatest recorded in November since observations commenced in 1858. The rainfall exceeded 6 inches in the west and south of Ireland, over the West Highlands, and the southern uplands of Scotland. The six-inch areas in England and Wales were not abnormally extensive, but the appearance of 6-inch splashes in Surrey and Sussex is an unusual occurrence in November.

The general rainfall expressed as a percentage of the average was :—England and Wales, 124 per cent.; Scotland, 124 per cent.; Ireland, 148 per cent.; British Isles, 131 per cent. At Camden Square the duration of sunshine was 49.4 hours, the duration of rainfall 82.2 hours, and the total evaporation from a free water surface was, .34 in.

## Climatological Table for the British Empire, June, 1916.

| STATIONS.<br><i>(Those in italics are South of the Equator.)</i> | Absolute. |       |          |       | Average. |      |            |                    | Absolute.    |                | Total Rain |       | Aver.<br>Cloud. |
|------------------------------------------------------------------|-----------|-------|----------|-------|----------|------|------------|--------------------|--------------|----------------|------------|-------|-----------------|
|                                                                  | Maximum.  |       | Minimum. |       | Max.     | Min. | Dew Point. | Humidity.<br>0-100 | Max. in Sun. | Min. on Grass. | Depth.     | Days. |                 |
|                                                                  | Temp.     | Date. | Temp.    | Date. |          |      |            |                    |              |                |            |       |                 |
| London, Camden Square                                            | 73·6      | 22    | 40·3     | 17    | 65·0     | 47·9 | 46·9       | 75                 | 125·8        | 39·1           | 2·19       | 16    | 8·0             |
| Malta ... ..                                                     | 96·4      | 27    | 63·3     | 8     | 78·1     | 70·3 | ...        | 72                 | 145·0        | ...            | ·06        | 1     | 0·8             |
| Lagos ... ..                                                     | 88·4      | 8     | 70·2     | 9     | 84·7     | 74·3 | 73·2       | 82                 | 156·2        | 69·0           | 18·84      | 22    | 8·6             |
| Cape Town ... ..                                                 | 66·8      | 25    | 33·3     | 5     | 59·9     | 47·5 | 48·1       | 82                 | ...          | ...            | 4·14       | 14    | 5·1             |
| Johannesburg ... ..                                              | 69·5      | 12    | 37·8     | 6     | 62·8     | 43·4 | 27·7       | 47                 | ...          | 30·0           | ·00        | 0     | 0·6             |
| Mauritius ... ..                                                 | 78·8      | 2     | 58·8     | 23    | 75·4     | 64·2 | 62·2       | 79                 | ...          | 50·5           | 1·79       | 18    | 4·9             |
| Bloemfontein . ...                                               | 72·8      | 14    | 21·9     | 19    | 63·7     | 30·2 | 26·6       | 58                 | ..           | ...            | ·00        | 0     | 1·5             |
| Calcutta... ..                                                   | 95·2      | 1     | 74·3     | 29    | 88·9     | 78·7 | 74·5       | 85                 | ...          | 72·5           | 16·99      | 17    | 9·1             |
| Bombay... ..                                                     | 89·9      | 6     | 76·2     | 21    | 87·1     | 79·4 | 77·9       | 84                 | 130·2        | 69·8           | 23·55      | 29    | 8·7             |
| Madras ... ..                                                    | 104·5     | 7     | 74·6     | 1     | 99·8     | 80·5 | 70·0       | 61                 | 165·9        | 74·5           | 3·41       | 11    | 6·7             |
| Colombo, Ceylon ...                                              | 87·2      | 1     | 72·4     | 13*   | 85·0     | 76·6 | 74·3       | 84                 | 153·0        | 69·9           | 7·97       | 21    | 8·2             |
| Hongkong ... ..                                                  | 89·1      | 30    | 71·5     | 8     | 83·4     | 76·5 | 74·8       | 86                 | ...          | ...            | 32·18      | 25    | 8·9             |
| Sydney ... ..                                                    | ...       | ...   | ...      | ...   | ...      | ...  | ...        | ...                | ...          | ...            | ...        | ...   | ...             |
| Melbourne ... ..                                                 | 66·6      | 1     | 32·5     | 16    | 56·2     | 43·9 | 42·1       | 73                 | 107·7        | 24·6           | 1·62       | 19    | 6·4             |
| Adelaide ... ..                                                  | 64·8      | 5     | 39·5     | 18    | 58·5     | 46·9 | 47·5       | 83                 | 120·8        | 30·1           | 8·58       | 24    | 6·6             |
| Perth ... ..                                                     | 68·0      | 1     | 38·0     | 20    | 62·3     | 55·5 | 47·4       | 74                 | 126·4        | 31·1           | 7·67       | 18    | 6·0             |
| Coolgardie ... ..                                                | 67·8      | 1     | 36·0     | 20†   | 59·4     | 44·0 | 41·0       | 64                 | 129·0        | 28·0           | 1·27       | 9     | 4·6             |
| Hobart, Tasmania ...                                             | 61·4      | 13    | 31·3     | 16    | 52·5     | 40·3 | 38·7       | 72                 | 109·0        | 24·0           | 2·56       | 22    | 6·2             |
| Wellington ... ..                                                | 62·0      | 1     | 35·4     | 27    | 57·6     | 48·0 | 45·7       | 78                 | 86·8         | 27·0           | 1·33       | 10    | 6·4             |
| Auckland ... ..                                                  | ...       | ...   | ...      | ...   | ...      | ...  | ...        | ...                | ...          | ...            | ...        | ...   | ...             |
| Jamaica, Kingston ...                                            | 94·1      | 22    | 71·3     | 2     | 89·4     | 73·5 | 71·6       | 75                 | ...          | ...            | 1·53       | 7     | ...             |
| Grenada ... ..                                                   | 88·0      | 14*   | 71·0     | 17‡   | 85·0     | 74·0 | ...        | 77                 | 135·0        | ...            | 7·13       | 20    | ...             |
| Toronto ... ..                                                   | 78·0      | 13    | 39·8     | 1     | 69·1     | 51·2 | 53·6       | 82                 | 141·4        | 35·9           | 4·29       | 18    | 6·1             |
| Fredericton ... ..                                               | 81·2      | 27    | 39·0     | 2     | 69·7     | 50·1 | 53·5       | 77                 | ...          | ...            | 6·31       | 12    | 6·1             |
| St. John, N.B. ... ..                                            | 74·0      | 7     | 40·3     | 16    | 63·1     | 48·8 | 50·3       | 80                 | 136·2        | 39·0           | 5·33       | 16    | 6·8             |
| Victoria, B.C. ... ..                                            | 80·8      | 16    | 43·3     | 6     | 64·2     | 48·5 | 47·0       | 74                 | 139·0        | 24·0           | ·52        | 8     | 4·6             |

\* 20. † 22. ‡ 30.

MALTA.—Exceptionally hot, with prevalence of east winds.

LAGOS.—On the 25th, 6·14 in. of R fell.

Johannesburg.—Bright sunshine, 295·5 hours.

COLOMBO CEYLON.—Mean temp. 80°·8, or 0°·9 below, dew point 0°·5 below, and R ·21 in. below, averages. Mean hourly velocity of wind 6·9 miles.

HONGKONG.—Mean temp. 79°·6, mean hourly velocity of wind 15·1 miles. Bright sunshine 125·3 hours.

Melbourne.—Mean temp. 0°·4 below, and R ·47 in. below, averages.

Adelaide.—Mean temp. 0°·7 below, and R 5·54 in. above, averages. The wettest month on record in the whole of the 77 years' record.

Coolgardie.—Temperature 0°·9 below the average. R about normal.

Wellington.—Mean temp. 3°·4 above, and R 3·75 in., below averages. Bright sunshine 122·3 hours.