

# SYMONS'S METEOROLOGICAL MAGAZINE.

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## THE BRITISH RAINFALL ORGANIZATION.

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### THE RETIREMENT OF MR. SOWERBY WALLIS.

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

I HAVE received so many letters expressing regret for my ill health and appreciation of the great work founded by the late G. J. Symons in which we have been associated during the last few years, that it is impossible to answer all in writing.

I shall therefore be glad, if you will allow me in the pages of the *Meteorological Magazine*, to express my most hearty thanks for all the kind references to myself and my grateful acknowledgment of the testimony to the value of the British Rainfall Organization.

H. SOWERBY WALLIS.

*6, Hilldrop Road, Camden Road, London, N.  
5th September, 1903.*

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ON August 31st, Mr. Sowerby Wallis retired from the charge of the British Rainfall Organization, after a connexion with the work extending over more than thirty years, and Dr. H. R. Mill, who had during the last three years shared Mr. Wallis's labours, has succeeded to the sole responsibility. The occasion is one which justifies a few lines of retrospect and anticipation.

Early in 1859 George James Symons, then a youth of twenty, began collecting records of rainfall, having realized, thus early, the importance of obtaining very numerous data in order to study the distribution of rain. In the following year he joined the staff of the Meteorological Office, then a department of the Board of Trade, and his interest in the subject did not diminish, though it did not form part of his official work. From the hunt for old records he went on to the collection of actual observations. Towards the end of 1860 Mr. Symons sent out to all observers of whom he knew in England, a circular commencing with an almost prophetic forecast of the work he set before him—

"Observations of rainfall have been made in various parts of the British Isles for upwards of a century, yet no one has, I believe, attempted the somewhat herculean labour of collecting the published and unpublished results . . . . This investigation I have commenced."

The result was the publication of a four-page quarto pamphlet, entitled "English Rainfall, 1860," in which 168 stations were included. In the few lines of introduction Mr. Symons said that he had "commenced an extensive investigation," though how extensive it was ultimately to prove he could then have had little idea. Next year the publication referred to both 1860 and 1861, and took the style and title it has since retained—"British Rainfall." It included 360 records from England, 11 from Wales, 115 from Scotland, and 21 from Ireland, a total of 507, and the little volume was published on February 15th, 1862.

By 1863 the hobby of his leisure had grown to such dimensions that Symons left the Meteorological Office and deliberately set himself to the collection and discussion of rainfall statistics as his serious life work. As the number of observers grew under the enthusiastic care of the organizer, the expense of collection and publication grew also, and although at first he himself bore it all, later, and by degrees, a greater and greater proportion of the ever growing amount was contributed by observers and friends of meteorological science. Thus in ten years the annual volume of statistics demanded not the leisure which a government clerk could find after office hours in six weeks, but the whole time of an experienced man of uncommonly quick and accurate eye and hand, working for five months without intermission. The work had assumed national proportions, and observations from 1500 stations were being published annually. Although national in scope and purpose, Mr. Symons felt that unless the support of the State could be given without any hampering conditions, he could develop the work best as an organization under private direction, the results of which were presented to the public as fully as the funds supplied by the public permitted.

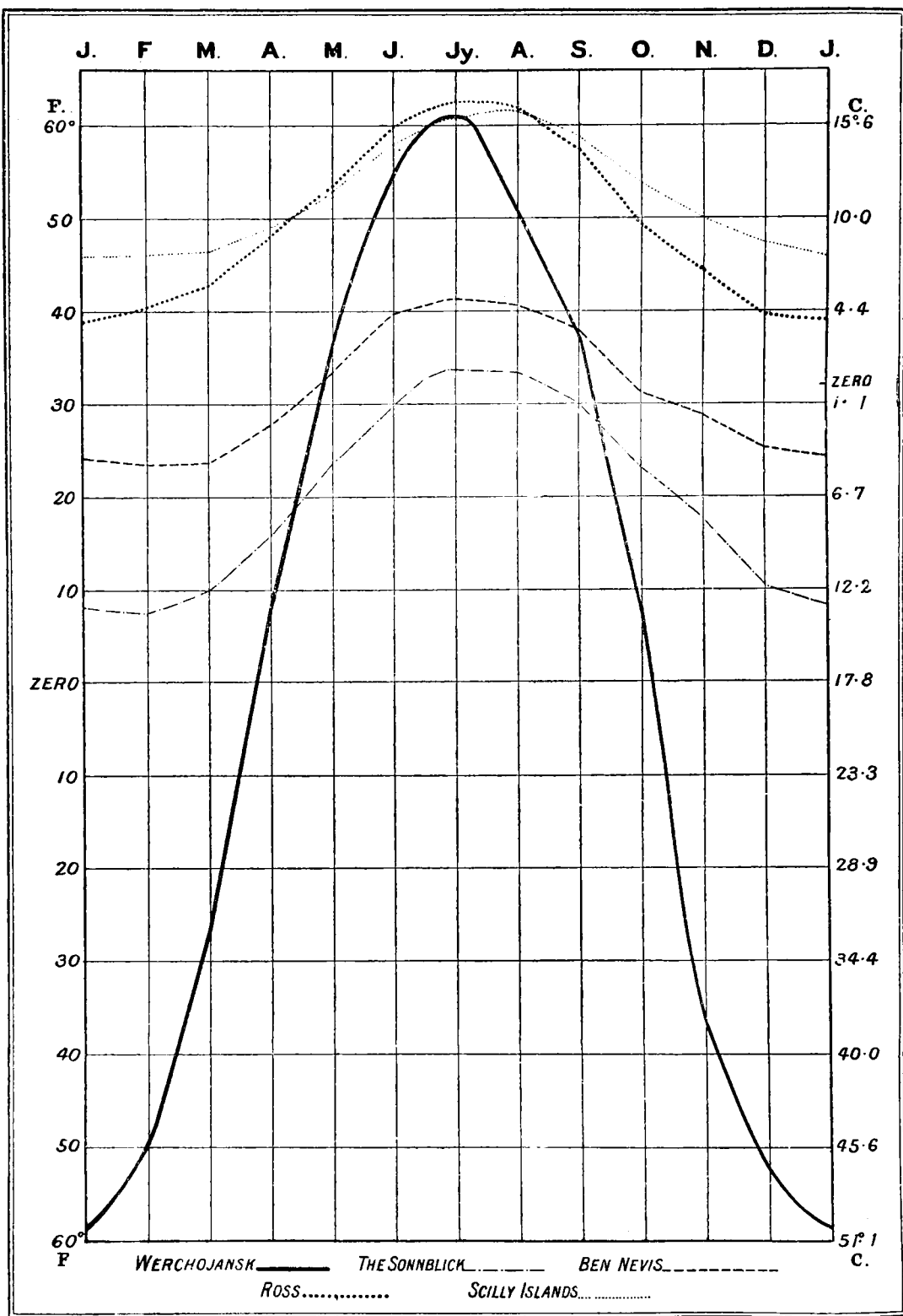
A serious illness in 1871 brought home to Mr. Symons's mind the necessity of making some provision for the future of the enterprise which he had brought so far. In the annual circular, at the end of 1871, he said :—

"I thankfully acknowledge the assistance whereby I have been enabled to raise the system of rainfall observation to its present unequalled position, but I should very much prefer that its maintenance did not depend on the frail thread of one man's life. To secure this a successor must be trained."

A remarkable gift which Mr. Symons possessed, in a perfection rarely seen, was the power of initiation in a form so complete that subsequent development rarely or never required any alteration. For example the page of *British Rainfall* in 1860 hardly differed in



# TYPICAL TEMPERATURE CURVES.



E. G. ALDRIDGE, 25th APRIL 1902

arrangement from that at the present day. An equally remarkable gift was his power of appreciating character. He set out to train a successor, and Mr. Sowerby Wallis, then a very young man, was his choice.

Mr. Wallis began work as Mr. Symons's assistant at Camden Square in 1872, the wettest year which ever rained over the British Isles so far as our records can tell. He adapted himself so quickly and completely to his duties that he soon became indispensable to Mr. Symons, and so far as his rainfall work was concerned practically inseparable from him. Few indeed could tell, after a few years had elapsed, from which of the two pens an unsigned article came.

By 1890 the number of stations dealt with in the annual volume reached 3,000, and it was impossible to issue it before the beginning of July—a year earlier, by the way, than similar publications are usually issued by Government offices. In the preface to *British Rainfall*, 1890, Mr. Symons says:—

“I am glad to acknowledge how much I owe to Mr. Sowerby Wallis, who has now been helping me for nearly twenty years, working as those only do whose hearts are in their work, until he is as familiar with the details and routine as I am. And that is why in this, my thirtieth annual issue, I have asked him to let me put his name along with mine on the title page.”

From that time onward the name of Mr. Sowerby Wallis has appeared on the annual volume, in the preparation of which he took an increasing part. The sudden death of Mr. Symons in March, 1900, threw upon Mr. Wallis an amount of work which would have overwhelmed most men. He grappled with the task, and the punctual appearance of the annual and monthly publications was never interrupted, or even delayed, although at the same time there was a vast amount to be done (and it was all done) in the removal of Mr. Symons's unique library from Camden Square to the Royal Meteorological Society, in winding up all the affairs of a man of the most multifarious interests, and in adapting the Rainfall Organization to its new conditions. The great task was accomplished, but at a price. Mr. Wallis's health suffered severely from successive attacks of influenza, and the rest necessary for complete recovery was never taken. Though for nearly three years the work of the Organization was shared with his successor, Mr. Wallis could never stop working, nor could he work except with all his might. At length repeated warnings decided him that the time had come when he must be free from the responsibilities which he had never shirked during the many years he bore them, and we are sure that all our readers will join us in the confident hope that the leisure thus secured before it is too late, will enable Mr. Wallis to re-establish his health, and that a long and useful life still lies before him.

Dr. H. R. Mill has acquired the historic rainfall house, 62, Camden Square, London, N.W., and the rainfall records and instruments which have been accumulated there. If the lapse of time has made

some changes in detail desirable, these changes will no doubt be made, but in all essentials the Rainfall Organization will continue to move in the straight course which its founder impressed upon it. The three assistants trained by Mr. Symons and Mr. Wallis remain to give the Organization the benefit of their valued experience.

The time seems now to have come when a critical comparison of the rainfall of the British Isles from year to year may be commenced with reasonable certainty of success. For this it is necessary to arrive at some standard for comparison, so that one year may be studied in relation to another more fully and systematically than is possible when working with the short average that must be used in the annual volume. The work would be a heavy one, and if it extended to the preparation of a complete series of monthly as well as of annual rainfall maps, it would be almost too great to attack, still it seems that the study of maps on which all the results for individual years, or shorter periods, are plotted is the most promising field for rainfall research at the present moment. Hence it is more than ever necessary to secure new observers in the desert places of our islands where gauges are most thinly scattered. In scientific work there is no standing still; when research in one direction is systematized into routine, a new field is always opening in which experiment and new forms of observation are required. We hope that our readers will continue to help us in the future as in the past by their suggestions, for even when advice cannot be adopted completely, it is often of immense value in suggesting practicable improvements. We feel strongly that this Magazine could be made more useful than it is, and we know that it can be made much fuller and more interesting if only the number of readers were increased two or threefold. We are not justified in attempting any permanent enlargement until it becomes clear that the Magazine will not be a burden on the resources of the Rainfall Organization; it ought instead to be a source of strength.

In entering on the new arrangement we hope to retain the cordial co-operation of the great volunteer army of observers whose work has in the past produced such fine results, and on our part we will keep before us the steady purpose of helping all observers to the utmost of our ability, and of maintaining the great traditions established by the founders of the Organization; though they have left little room for improvement, there is abundant scope for advance.

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#### BOOKS RECEIVED.

- Quarterly Record of the Royal Botanic Society of London. No. 92. Vol. VIII. London. Size  $8\frac{1}{2} \times 5\frac{1}{2}$ . Pp. 16.
- The Weather of 1902 at Hodsock Priory, Worksop. By H. Mellish. Size  $8\frac{1}{2} \times 5\frac{1}{2}$ . Pp. 5 and one table.
- Hull Corporation Waterworks. Sixth Annual Report of the Water and Gas Engineer. By F. G. Bancroft. 1903. Size  $9\frac{1}{2} \times 6$ . Pp. 12, one plate and one table.

## THE RAINFALL OF THE SUMMER OF 1903.

LONDON is the journalistic as well as the political capital of the British Isles, and consequently occurrences in and around London are apt to acquire an importance all over the country out of proportion to their real magnitude. It is so with the rainfall of the summer of 1903, which was so exceptionally severe in the lower Thames Valley as to create a general impression that the condition was widespread. The accompanying Table, giving the rainfall at 51 well-distributed stations for June, July and August, shows that in North Wales, Lancashire, and the extreme west of Ireland, the summer was actually rather drier than the average, and by far the greater part of the British Isles showed a total rainfall for the three months less than 25 per cent. in excess of the average. The centre of Ireland showed an excess of a little over 30 per cent.; the middle of Scotland had an excess of from 40 to 50 per cent., while the Highlands and the Southern Uplands had scarcely more than the average fall. Indeed, were it not for the curious state of matters in the south east of England, the rainfall of the summer of 1903 would hardly call for remark. Eastward from the borders of Cornwall and Wales to the North Sea the excess of rainfall much exceeded 50 per cent., and within a roughly circular area with a radius of about 40 miles from London the excess was greater than 100 per cent., in other words, more than twice the normal amount. June was the wettest and August the least wet of the three months as a rule. The most striking cases, reduced to percentages, are as follows: Camden Square, average fall for three summer months, 6.25 in.; actual fall, 15.87 in., or if the average rainfall is taken as 100, that for last summer was no less than 254, or two-and-a-half times as great; at Hitchin the ratio was 222, at Winslow 194, and at Hartley Wintney 180.

The high rainfall in this particular district was accompanied, as our recent numbers have shown, by an exceptional number of heavy falls on rainfall days, without, however, many violent thunderstorms. Up till 1903, the only year in which so many as five days had a rainfall each exceeding one inch at Camden Square was 1878; but up to September 4th, 1903, there had been seven days with falls exceeding one inch, and more than a quarter of the year has still to run.

The table of aggregate rainfall for the eight months, January to August inclusive, taking account of the wet spring in Scotland and the north of England, shows a fairly uniform excess of rainfall for the year so far as it has gone. The average excess is about 40 per cent., the greatest being 88 per cent. in London, the least 9 per cent. at Clifden, in the west of Ireland, but no other station is nearly so low.

August was everywhere a rainy month, even the two instances in which the total fall was slightly below the average for the month, had an unusually large number of rainy days.

*Three Months' Summer Rainfall, June—August, 1903.*

STATIONS.	June.	July.	August.	Total of 3 Months, 1903.	Total of 3 Months' Average.	Difference.
	in.	in.	in.	in.	in.	in.
London .....	6·43	5·20	4·24	15·87	6·25	+9·62
Tenterden .....	3·56	3·67	3·63	10·86	7·23	+3·63
Hartley Wintney .....	5·55	3·40	2·98	11·93	6·66	+5·27
Hitchin .....	6·40	4·16	3·46	14·02	6·32	+7·70
Winslow .....	5·17	3·47	3·85	12·49	6·45	+6·04
Westley .....	3·11	3·82	3·78	10·71	7·35	+3·36
Brundall .....	2·45	5·37	2·72	10·54	7·26	+3·28
Alderbury .....	3·28	2·73	3·70	9·71	6·50	+3·21
Ashburton .....	2·70	5·02	5·19	12·91	9·39	+3·52
Polapit Tamar .....	1·80	3·54	4·55	9·89	8·75	+1·14
Stroud .....	4·12	3·89	3·83	11·84	7·15	+4·69
Woolstaston .....	3·16	3·13	5·23	11·52	7·31	+4·21
Boston .....	1·59	2·53	4·57	8·69	5·75	+2·94
Hesley Hall .....	1·42	2·23	3·69	7·34	5·85	+1·49
Derby .....	1·26	2·20	4·86	8·32	6·48	+1·84
Bolton .....	2·34	3·77	5·67	11·78	12·18	— ·40
Wetherby .....	2·48	3·24	2·42	8·14	6·65	+1·49
Arncliffe .....	2·34	5·04	8·63	16·01	14·25	+1·76
Hull .....	1·74	2·68	3·19	7·61	6·91	+ ·70
Newcastle .....	3·06	4·73	2·24	10·03	7·48	+2·55
Seathwaite .....	3·96	10·25	21·14	35·35	27·91	+7·44
Cardiff .....	2·09	4·58	6·00	12·67	9·74	+2·93
Haverfordwest .....	2·13	3·75	5·66	11·54	9·33	+2·21
Gogerddan .....	2·26	5·09	6·61	13·96	10·21	+3·75
Llandudno .....	1·11	2·56	3·51	7·18	7·35	— ·17
Dumfries .....	1·84	5·01	5·02	11·87	10·20	+1·67
Lilliesleaf .....	1·48	4·36	3·53	9·37	8·16	+1·21
Colmonell .....	1·99	3·49	4·72	10·20	9·86	+ ·34
Glasgow .....	1·74	3·74	6·28	11·76	9·19	+2·57
Inveraray .....	2·96	4·63	10·95	18·54	15·28	+3·26
Islay .....	·94	3·59	7·13	11·66	10·11	+1·55
Mull .....	2·34	5·00	8·08	15·42	12·66	+2·76
Loch Leven .....	2·87	5·41	4·78	13·06	9·11	+3·95
Dundee .....	2·20	4·40	5·30	11·90	7·00	+4·90
Braemar .....	1·42	3·42	4·31	9·15	8·77	+ ·38
Aberdeen .....	1·59	5·27	4·29	11·15	8·07	+3·08
Cawdor .....	2·38	3·63	3·03	9·04	8·89	+ ·15
Glencarron .....	3·90	6·81	12·31	23·02	21·18	+1·84
Dunrobin .....	1·36	5·23	3·94	10·53	7·29	+3·24
Darrynane .....	4·12	4·35	5·88	14·35	11·31	+3·04
Waterford .....	5·31	3·63	4·62	13·56	9·92	+3·64
Broadford .....	1·33	4·59	5·21	11·13	8·97	+2·16
Carlow .....	3·15	4·58	5·06	12·79	8·65	+4·14
Dublin .....	2·49	4·02	2·80	9·31	7·46	+1·85
Mullingar .....	1·20	5·53	6·68	13·41	10·37	+3·04
Ballinasloe .....	2·04	4·58	6·69	13·31	9·85	+3·46
Clifden .....	2·32	6·57	10·11	19·00	19·92	— ·92
Crossmolina .....	·94	5·12	7·68	13·74	11·57	+2·17
Seaforde .....	2·97	4·92	4·26	12·15	9·05	+3·10
Londonderry .....	·87	4·88	6·93	12·68	11·26	+1·42
Omagh .....	1·95	4·36	7·92	14·23	10·80	+3·43



# THE INTERNATIONAL METEOROLOGICAL COMMITTEE.

THE members of the International Meteorological Committee, which held its meeting at Southport simultaneously with the British Association, gathered in London on September 7th, and on that evening they were entertained to dinner in the Trocadero Restaurant by Dr. W. N. Shaw, F.R.S., who invited a number of meteorologists and representatives of allied sciences to meet the foreign guests. The following were present :—

Mr. F. Campbell Bayard,  
Sec. R. Met. Soc.  
Dr. von Bebbler, Hamburg.  
M. Teisserenc de Bort, Paris.  
Mr. C. V. Boys, F.R.S.  
Dr. C. Chree, F.R.S., Kew.  
Mr. F. W. Dyson, Greenwich.  
Dr. R. T. Glazebrook, F.R.S.  
Prof. G. Hellmann, Berlin.  
Captain Campbell Hepworth, C.B.  
Prof. H. Hergesell, Strasburg.  
Prof. H. Hildebrandsson, Upsala.  
Prof. J. Larmor, Sec. R.S.  
Mr. R. G. K. Lempfert.  
Sir Norman Lockyer, K.C.B., F.R.S.  
Dr. W. J. S. Lockyer.  
M. Mascart, Paris.

Mr. E. Mawley.  
Dr. H. R. Mill.  
Prof. H. Mohn, Christiania.  
Prof. Willis Moore, Washington.  
Prof. A. F. W. Paulsen, Copenhagen.  
Prof. J. M. Pernter, Vienna.  
Mr. A. Laurence Rotch, Blue Hill  
Observatory.  
Prof. Rykatcheff, St. Petersburg.  
Prof. A. Schuster, F.R.S, Manchester.  
Dr. R. H. Scott, F.R.S.  
Dr. W. N. SHAW, F.R.S., the host.  
Prof. M. Snellen, Utrecht.  
Captain Tizard, R.N., F.R.S.  
Prof. H. H. Turner, F.R.S., Oxford.  
Dr. Theodore Williams.  
Mr. C. T. R. Wilson, Cambridge.

In welcoming the guests after dinner, Dr. W. N. Shaw said that in any other country any such international committee as that about to meet at Southport would be formally welcomed by a Grand Duke or at least a Minister of State ; but here science was not held in such esteem in government circles, and scientific men were left to greet their scientific colleagues. On behalf of the leading scientific institutions of this country he could bid the members of the Committee welcome, and he expressed regret that some of the number were unable to be present, naming especially Professor Palazzo, of Rome, and Dr. Billwiller, of Berne. The Chairman then proposed the toast of the Foreign Members of the International Committee, coupled with the names of M. Mascart and Professor Willis Moore, who replied. Professor Pernter proposed the toast of the old masters of Meteorology, former members of the Committee ; and to this Dr. R. H. Scott responded, remarking that only Hann, von Neumeyer, Buchan and himself now survived of those who met at Leipzig in 1872. Sir Norman Lockyer and Dr. Larmor welcomed the visitors on the part of the British Association and the Royal Society respectively. Professor Willis Moore, in replying, spoke of the admirable work done by the Meteorological Office on an utterly inadequate grant of public money, observing that as much was spent on the local weather services of Boston and New York alone as on the whole British system.

There was opportunity for much general conversation, and an excellent foundation was laid for the serious work of the Committee at Southport.

## Correspondence.

## THE STUDY OF SUNSPOT CYCLES.

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

MUCH attention is now being given to meteorological correlations with the sun-spot cycle of eleven years' mean.

To ensure absolute comparisons it is plainly important that all who are working in this field should give the same value to the same years. Since the actual cycles vary so greatly (14 years to 10 years from min. to min. ; 3 to 6 from min. to max. ; 11 to 3 years from max. to min.), it is absolutely necessary to "doctor" the years to compare cycle with cycle on the basis of mean values (11 years min. to min. ; 5 years min. to max. ; 6 years max. to min.)

Is not the most logical way to treat the years of each cycle as if printed on an elastic ribbon, fixed at years 1 and 12 for minima and 6 for the maximum? If, then, the intervening years are more or less than the normal 4 between min. and max. and 5 between max. and min., the years will be puckered or stretched out respectively over the intervening space.

The appended table represents one that I have been using, so far as the last century is concerned.\* The letters C, D, E, &c., and Roman numerals I., II., III., &c., afford means of easy reference. It will be noted as a necessary, but important, consequence of the system that the years next each critical date remain undoctored.

Could some such scale be generally accepted it would surely be an important gain.

*Year Plan for Reduction of Years to Mean Sunspot Cycle Curve.*

Cycle.		Min.											Max.		Min.
		I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.			
1798·3—1810·6	C	98	9	0	1-2	3	04	5	6	7	8	9	10		10
1810·6— 23·3	D	10	1	2-3	3-4	5	16	7	8	9-10	1	2	23		23
23·3— 33·9	E	23	4	5-6	7-8	9	30	1	1	1-2	2	2	33		33
33·9— 43·5	F	33	4	4-5	5-6	6	37	8	9	0	1	2	43		43
43·5— 56·0	G	43	4	4-5	5-6	6	47	8	9-0	1	2-3	4	55		55
56·0— 67·2	H	55	6	6-7	7-8	8	59	0	1-2	3	4-5	6	67		67
67·2— 78·9	K	67	8	8-9	8-9	9	70	1	2-3	4	5-6	7	78		78
78·9— 89·6	L	78	9	0	1	2	83	4	5	5-6	6-7	8	89		89
89·6—(?)01·5	M	89	0	1	1-2	2	93	4	5-6	7	8-9	0	01		01
	N	01	2												

J. EDMUND CLARK.

*Lile Garth, Ashburton Road, Croydon, Sept. 3rd, 1903.*

[We should be glad to hear the opinion of our readers on the foregoing suggestion.—ED. *S.M.M.*]

\* As the investigation was confined to the three months August to September, a careful comparison with Wolf's and Wolfer's unreduced sunspot values caused the adoption of 1799 and 1888 as years for minima.

# HEAVY RAINFALL ON JULY 23RD.

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

A SHOWER of rain fell about midday on Thursday, the 23rd July, to the extent of  $\cdot 20$  of an inch. After that rain fell as shown below, the readings being cumulative :—

Hour.	Gauge reading. in.	Amount. in.
6.40 p.m.....	Zero	—
7.5 .....	$\cdot 23$	$\cdot 23$ in 25 min.
7.15 .....	$\cdot 58$	$\cdot 35$ „ 10 „
7.23 .....	$\cdot 83$	$\cdot 25$ „ 8 „
7.35 .....	1.03	$\cdot 20$ „ 12 „
7.50 .....	1.34	$\cdot 31$ „ 15 „
8.5 .....	1.80	$\cdot 46$ „ 15 „
8.50 .....	1.97	$\cdot 17$ „ 45 „
10.0 .....	2.55	$\cdot 58$ „ 70 „
11.30 .....	3.02	$\cdot 47$ „ 90 „
12.30 (midnight) .....	3.29	$\cdot 27$ „ 60 „
12.45 a.m.....	3.37	$\cdot 08$ „ 15 „
5 .....	3.89	$\cdot 52$
7 .....	4.01	$\cdot 12$
8 .....	4.05	$\cdot 04$

The total rainfall in the 24 hours being **4.25** ins.

W. B. BRYAN.

*Lea Bridge, Clapton, N.E., 24th August, 1903.*

## THE WET SUMMER.

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

THE local rainfall for the past month of August, measured this day at 9 a.m., amounts to **4.42** ins. It was 3.32 in. for August, 1902, 1.65 in. for August, 1901, and 3.36 in. for August, 1900. The total rainfall for the three months, June, July and August, amounts to 18.14 in., and for eight months, January to August, 26.31 in., all recorded under the same conditions.

### *Comparisons.*

Periods.	1903. in.	1902. in.	1901. in.	1900. in.
January to May .....	8.17	6.38	6.40	7.88
June to August .....	18.14	7.38	5.47	7.87
Eight months .....	26.31	13.76	11.87	15.75
September to December .....		4.70	7.31	6.26
Twelve months .....		18.46	19.18	22.01

A. J. WILMSHURST.

*6, Albany Road, Manor Park, E., 1st Sept., 1903.*

## EXCESSIVE RAINFALL IN SHORT PERIODS.

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

IN your Magazine for August you draw attention to the necessity of measuring quickly after a heavy fall of rain has occurred, with the view of discovering whether the amount be exceptional or no.

Bearing this in mind, after a recent series of heavy downpours, I measured directly after the cessation of each fall, with the following results:—On the 24th of August heavy rain commenced at 3 p.m., and continued till 5 p.m., during which period 0·81 in. fell, but between 8.25 and 8.35 the same evening a veritable torrent deposited 0.57 in. in the gauge in the 10 minutes, causing much flooding in this neighbourhood.

I may add that the rainfall for the three summer months, June, July and August, has amounted at this station to 16·90 inches, with *five* occasions in the period on which an inch or more was precipitated in less than 24 hours.

D. W. HORNER.

*Clapham Park, S. W., Sept. 2nd, 1903.*

P.S.—Since the above was written, yet another fall of over one inch has occurred in a space of less than 24 hours, viz., 1·24 in., measured at 9 a.m. September 5th.—D.W.H.

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

REFERRING to the records of rainfall on or about the 23rd and 24th ult., in your number for August, I venture to send you the enclosed from my sister, Mrs. Eliot Howard, of Ardmore, Buckhurst Hill, Essex (on the border of Epping Forest), as the figures she mentions appear to exceed any of those named by your correspondents. She is a careful observer, and has worked with a gauge for many years.

F. F. TUCKETT.

*Frenchay, near Bristol, August 18th, 1903.*

“I wonder whether your rain record is like ours. We had 4·35 between 6.30 p.m. on Thursday, July 23rd, and 7 and 8 on Friday, 24th, morning—say 13 hours; then again last night (Saturday, 25th July) ·95 in.”

## AUGUST RAINFALL—AN EXCEPTIONAL CASE.

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

A PARAGRAPH in *The Times* states “The rainfall during August was nearly double that in the same month last year.”

This was doubtless the case in many places, but not here, where the total fall was 3·49 in. against 4·29 in. last year, or less by ·80 in. I may add that there was no thunderstorm this year, and only one last year, which gauged ·69 in.

CHARLES S. PRINGLE.

*Whitekirk, Southbourne, Hants.*

# AUGUST RAINFALL IN IRELAND.

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

YOU may like to compare the rainfall at Cloondra, Longford, for other wet months with that for August, 1903, which was the heaviest since the commencement of records in May, 1892.

1892, August.....	5·78 in.	1896, July .....	5·82 in.
1895, July .....	5·01 „	1903, July .....	5·08 „
„ August.....	5·05 „	„ August.....	6·32 „

These are the only instances during 11 years in which the monthly fall was 5 inches or over.

F. DUDLEY FLETCHER.

*Shannon Navigation Office, Limerick, 1st Sept., 1903.*

## CURVES OF MONTHLY MEAN TEMPERATURES FOR VERKHOFYANSK (SIBERIA), THE SONNBLICK (AUSTRIAN ALPS), BEN NEVIS, ROSS, AND THE SCILLY ISLES.

By EDWARD G. ALDRIDGE, F.R.Met.Soc., F.G.S.

### VERKHOFYANSK.

THE Verkhoyansk\* curve has been laid down from the means of 13 to 15 years, the observations there being often interrupted. The values have been supplied by Professor Wocikof. They were calculated in 1897; are derived from observations taken daily at 7 a.m., 1 p.m., and 9 p.m.; and have been reduced to the level of the sea by adding 1°·3 for a somewhat doubtful altitude of 470 ft. (Dr. Hann's ratio). It will be understood that the *actual* values are 1°·3 less than those given by the curve. The mean annual temperature, reduced to the sea-level, is 2°·7 (—16°·3 C.). It may be noticed that the mean temperature of April exceeds that of October, while June is considerably warmer than August. Probably the explanation of these very un-English results is to be found in the fact that in April and June the length of the day is greater than in October and August respectively. At Verkhoyansk there is little or no marine influence. The temperature has several times reached 96°, but not in the period stated. Frost in July is slight. The “jumps” of the monthly mean temperatures are truly marvellous, and, if I may coin a word, “kangaruvine.” The fall (43°·6) of mean temperature between October and November is nearly twice and thrice that from the warmest month to January at Ross and in the Scilly

\* The Russian alphabet is transliterated phonetically in different languages, thus in German *w* has the sound of the English *v*, *ch* has the sound of the Scottish *ch* in loch, the nearest English equivalent of which is *kh*, and *j* has the sound of *y*; hence, a German copies the sound of the Russian name by Verchojansk, while an Englishman gives exactly the same sound by Verkhoyansk. Neither spelling is wrong, although one is given on the diagram, another in the text.—ED. S.M.M.

Islands respectively. If the mean annual range ( $119\frac{1}{2}^{\circ}$ ) of monthly mean temperature at Verkhoyansk be represented by 100, that of the Scilly Isles is only about 13. The lat. and long. of Verkhoyansk are  $67^{\circ} 34' N.$  and  $133^{\circ} 51' E.$

#### THE SONNBLICK.

The curve for the Sonnblick (Sun-glimpse) has been prepared from the means of the period from October, 1886, to December, 1900. The values are contained in a printed report entitled *Neunter Jahresbericht des Sonnblick-Vereines für das Jahr 1900*, and this has been sent to me from Vienna. The means are obtained from observations taken daily at 7 a.m., 2 p.m. and 9 p.m., the last reading being used twice. They have not been reduced to the sea-level. The mean annual temperature at an elevation of 3,112 metres (10,210 ft.) is  $20^{\circ} \cdot 3$  ( $-6^{\circ} \cdot 5 C.$ ). The Sonnblick is believed to have the highest regular observatory in Europe. It may be seen that, notwithstanding the great altitude of the mountain, the continentality of its climate in respect of mean temperature, as compared with that of Ben Nevis, is well maintained. Absolute extremes =  $55^{\circ} \cdot 4$  in July, 1894, and  $-30^{\circ} \cdot 3$  in March, 1890.

#### BEN NEVIS.

The Ben Nevis curve has been drawn from the means of the period from 1884 to 1901. They have been sent to me by Mr. R. T. Omond, Honorary Secretary of the Scottish Meteorological Society, and are derived from twenty-four hourly observations daily. They have not been reduced to the level of the sea. The mean annual temperature at an altitude of 1,343 metres (4,406 ft.) is  $31^{\circ} \cdot 5$  ( $-0^{\circ} \cdot 3 C.$ ). The absolute minimum temperature ( $0^{\circ} \cdot 7$  on the 6th January, 1894) is  $1^{\circ} \cdot 7$  higher than that experienced at Mobile, Alabama, in February, 1899, when enormous damage was done to the orange-groves of Florida. This minimum of  $-1^{\circ}$  is  $13^{\circ}$  below the previous lowest. It is safe to say, I think, that this temperature is the minimum during the Ben Nevis period of 18 years. Mobile is in N. lat.  $30^{\circ} 41'$ ; the elevation of the thermometers may be about 100 ft. A report from Jacksonville, Florida, mentions that the minimum over the western district of the State was as low as  $-4^{\circ}$ . The absolute maximum on the Inverness-shire mountain is  $66^{\circ} \cdot 2$  on the 24th June, 1887. The mean of May is about the same as that of August on the Sonnblick; the mean of September corresponds fairly well with that of January at Ross. The annual mean is perhaps equivalent to that of the autumnal equinox at Verkhoyansk.

#### ROSS.

The Ross (Herefordshire) curve has been sketched in from the means of the period from 1875 to 1901. They are obtained by dividing by 2 the sum of the mean daily maximum and the mean daily minimum temperature. They have been reduced to the sea-level by

adding  $0^{\circ}7$  for a height of 217 ft. (Herschel's ratio). The mean annual temperature at the sea-level is practically  $50^{\circ}$  ( $10^{\circ}$  C.). Ross, in N. lat.  $51^{\circ} 55'$  and in W. long.  $2^{\circ} 35'$ , has been selected to represent a thoroughly rural and agricultural district of England. The values have been supplied by Mr. H. Southall of that town. Absolute extremes =  $95^{\circ}0$  on the 16th July, 1876, and  $2^{\circ}9$  on the 21st January, 1881. At Greenwich the mean temperature of October considerably surpasses, I believe, that of the year: at Ross October is  $0^{\circ}7$  colder than the year. The Greenwich warmth at this season may be due to the influence of a tidal river.

### THE SCILLY ISLES.

The curve for these islands has been obtained from the means of the period from 1871 to 1900. These have been worked out from values given in the publications of the Meteorological Office, and are derived in the same manner as those of Ross. They have been reduced to the sea-level by adding  $\frac{1}{4}^{\circ}$  for 75 ft. (Herschel's ratio). The mean annual temperature at the sea-level is  $52^{\circ}5$  ( $11^{\circ}4$  C.). The islands have been chosen as affording the warmest climate, and one of the most equable, in the United Kingdom. Absolute extremes =  $75^{\circ}$  in July, 1886, June and August, 1893, and August, 1899; and  $25^{\circ}$  in January, 1894. The temperature during the period has never fallen below  $30^{\circ}$  in March and December. November is  $1^{\circ}$  warmer than April, October  $1^{\circ}$  warmer than May, and September about  $1^{\circ}$  warmer than June. The mean of May is about the same as that of the whole year. March is but little warmer than January. In December the mean daily minimum is nearly equivalent to the mean daily maximum at Ross.

*Temperature Table.*

Months	Verkhoyansk.			Sonn- blick.	Ben Nevis.	Ross.			Scilly Isles.		
	Abso- lute Max.	Abso- lute Min.	Mean (unre- duced).	Mean.	Mean.	Mean Daily Max.	Mean Daily Min.	Mean.	Mean Daily Max.	Mean Daily Min.	Mean.
Jan....	—8.9	—90.0	—59.8	8.1	24.1	43.3	33.0	38.2	48.8	42.5	45.7
Feb....	14.2	—93.6	—51.0	7.5	23.7	45.7	33.8	39.8	49.0	42.5	45.8
Mar....	37.6	—77.4	—27.6	10.0	23.9	49.7	34.5	42.1	49.7	42.3	46.0
April..	48.0	—46.5	7.5	16.0	27.8	56.1	38.5	47.3	52.6	45.0	48.8
May...	68.0	—29.6	35.2	23.9	33.3	62.6	43.1	52.8	56.6	48.4	52.5
June...	88.7	18.9	53.6	29.8	39.8	69.0	49.4	59.2	61.8	53.4	57.6
July...	92.7	29.7	59.7	33.6	41.3	71.4	52.6	62.0	64.9	56.5	60.7
Aug...	86.2	19.8	49.3	33.4	40.7	70.4	52.1	61.2	65.3	57.1	61.2
Sept...	69.1	4.1	36.0	30.0	38.0	65.3	48.1	56.7	62.4	54.9	58.6
Oct....	48.4	—38.6	5.9	23.0	31.3	55.7	41.6	48.6	56.9	50.1	53.5
Nov...	20.5	—72.4	—37.7	17.8	28.9	49.2	38.1	43.7	53.0	46.6	49.8
Dec....	—3.5	—82.8	—53.7	10.4	25.2	44.4	33.9	39.2	50.3	43.8	47.0

*For Curves see diagram facing p. 129*

## REVIEWS.

*Regenkarte der Provinzen . . . . (Sachsen, Schleswig-Holstein und Hannover, Hessen Nassau und Rheinland, Westfalen u.s.c.) mit erläuterndem Text und Tabellen.* In amtlichen Auftrage bearbeitet von PROFESSOR DR. G. HELLMANN. [Four numbers]. Berlin, Dietrich Reimer (Ernst Vohsen), 1902 and 1903. Size  $10\frac{1}{2} \times 6\frac{1}{2}$ . Pp. 32, 44, 56, 30. *Maps.*

WE have to notice together four new parts of Professor Hellmann's series of rainfall maps of the provinces of Prussia, referring respectively to Saxony and the Thuringian States, Schleswig-Holstein and Hanover, Hesse-Nassau and the Rhineland and to Westphalia with some small neighbouring principalities. Each map represents the mean rainfall for ten years, but not for exactly the same ten years in each case. Between 1890 and 1892 the number of rain observing stations in Prussia was greatly extended, and more than ten years' records from a large number of stations being now available the results are set forth in a form likely to prove practically useful to the residents in each province.

We have only space to touch on one of the many points of interest in these admirable little memoirs and we select the maximum falls in a rainfall day (for Prussia the 24 hours ending at 7 a.m.). There were 22 instances noted (in the four memoirs under review) of falls exceeding 4 in. (101 mm.) in a day, particulars for those over 4.50 in. being :—

Harzburg, <i>Brunswick</i> .....	3rd Aug., 1896...	156 mm. or 6.25 in.
Schlanstedt, <i>Saxony</i> .....	16th May, 1889...	153 „ „ 6.00 „
Schmücke, <i>Saxe-Coburg Gotha</i> ...	24th Nov., 1890...	137 „ „ 5.40 „
Oberhof, „ „ „ „ .....	„ „ „ „ .....	127 „ „ 5.00 „
Lautenthal, <i>Harz Mts.</i> .....	11th July, 1898...	122 „ „ 4.85 „
Mücheln, <i>Saxony</i> .....	7th June, 1896...	120 „ „ 4.75 „
Scharfenstein, <i>Harz Mts.</i> .....	11th July, 1898...	119 „ „ 4.70 „
Ahliden .....	25th July, 1901...	117 „ „ 4.60 „
Zweifallshammer, <i>Rhine Prov.</i> ...	11th June, 1898...	115 „ „ 4.50 „

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*Is it going to rain? Popular weather prognostics, selected and reliable, with notes by* EDWARD VERNON, M.A. Edinburgh: Macniven and Wallace. 1903. Size  $6\frac{1}{2} \times 4\frac{1}{2}$ . Pp. 106. Price 1s. net.

A DAINILY got up little book in paper covers, bearing the design of a sceptical old gentleman looking at a barometer. The prognostics of rain dealt with are few, but carefully selected, and the explanations of them have a tendency to be rather more “cock-sure” than a meteorologist could altogether approve. It is not easy to find anything new to say of weather prognostics, but the author has managed to clothe his remarks with grace and a touch of humour. This is just the sort of book to send to an intelligent young friend in the country; it will bore no one and may stimulate the cultivation of observant habits.



*Ergebnisse der Arbeiten am Aëronautischen Observatorium (Results of the work at the Aeronautical Observatory) in den Jahren 1900 und 1901* von RICHARD ASSMANN und ARTHUR BERSON. Berlin: A. Asher & Co., 1892. Size 13 × 10. Pp. 280. Price 15 m.

*Bericht über die Erforschung der freien Atmosphäre mit Hilfe von Drachen. (Report on the exploration of the free atmosphere by means of kites.)* Von Prof. Dr. W. KÖPPEN, *Aus dem Archiv der Deutschen Seewarte.* Hamburg: 1902. Size 11½ × 9. Pp. 104. Plates.

DR. KÖPPEN gives a brief history of the kite as an aid to meteorological research, and describes in much detail the theory and practice of kite-flying as specially employed by the German Marine Observatory at Hamburg.

Messrs. Assman and Berson produce an even more exhaustive report also touching on the history and theory of kite-flying; but mainly concerned with a most interesting account of the Aeronautical Observatory of the Royal Prussian Meteorological Institute in Berlin. It describes the Observatory, its equipment of kites, kite-balloons, and unmanned balloons, and gives an account of the researches carried on by means of these appliances during the first year of work.

## THE EIGHT MONTHS' RAINFALL OF 1903.

*Aggregate Rainfall for January—August, 1903.*

Stations.	Diff. from Aver.	Per cent. of Aver	Stations.	Diff. from Aver.	Per cent. of Aver.	Stations.	Diff. from Aver.	Per cent. of Aver.
	in.			in.			in.	
London .....+	12·31	188	Arncliffe ...+	15·08	140	Braemar ...+	10·24	149
Tenterden .....+	+5·00	131	Hull .....+	+2·59	117	Aberdeen .....+	+6·16	132
Hartley Wintney ..	+9·45	162	Newcastle.....	+2·78	117	Cawdor .....+	+4·86	126
Hitchin .....+	11·57	182	Seathwaite +	30·49	139	Glencarron +	17·73	132
Winslow .....+	+9·62	167	Cardiff .....+	+8·64	137	Dunrobin .....+	+5·70	131
Westley.....	+3·93	125	Haverfordwest	+8·72	135	Darrynane ...	+5·52	119
Brundall.....	+3·01	120	Gogerddan ...	+8·62	134	Waterford ...	+7·85	133
Alderbury .....+	+8·08	150	Llandudno ...	+4·96	129	Broadford...+	+8·55	141
Ashburton .....+	+9·38	133	Dumfries ...+	12·84	149	Carlow .....+	10·46	150
Polapit Tamar ...	+7·03	133	Lilliesleaf .....+	+8·57	146	Dublin .....+	+4·62	127
Stroud .....+	10·29	162	Colmonell .....+	+4·67	118	Mullingar...+	10·52	145
Woolstaston .....+	+9·71	155	Glasgow ...+	16·98	177	Ballinasloe ...	+9·40	141
Boston .....+	+5·78	146	Inveraray ...+	15·19	136	Clifden .....	+4·48	109
Hesley Hall .....+	+3·36	126	Islay .....+	+8·02	130	Crossmolina +	10·21	133
Derby.....	+5·60	139	Mull .....+	10·08	130	Seaforde .....+	+7·84	135
Bolton .....+	+6·16	114	Loch Leven +	14·65	166	Londonderry..	+5·15	120
Wetherby .....+	+7·07	148	Dundee .....+	+6·76	140	Omagh .....+	12·02	149

## RAINFALL AND TEMPERATURE, AUGUST, 1903.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL.					Days on which 101 or more fell.	TEMPERATURE.				No. of Nights below 32°.	
		Total Fall.	Differ- ence from average 1890-9.	Greatest Fall in 24 hours.		Max.		Min.					
				Dpth	Date								
										Deg.	Date		
		inches.	inches.	in.									
I.	London (Camden Square) ...	4.24	+ 2.14	1.17	24	18	80.6	8	45.4	11	0	0	
II.	Tenterden .....	3.63	+ 1.19	.90	14	15	75.7	8	42.0	23	0	0	
III.	Hartley Wintney .....	2.98	+ .63	.76	11	21	75.0	8	40.0	23b	0	0	
IV.	Hitchin .....	3.46	+ 1.33	.94	11	19	74.0	8	43.0	21	0	0	
V.	Winslow (Addington) .....	3.85	+ 1.72	.70	24	19	76.0	8	39.0	22	0	0	
VI.	Bury St. Edmunds (Westley) .....	3.78	+ 1.38	.92	11	14	72.0	13a	44.0	18c	0	0	
VII.	Norwich (Brundall) .....	2.72	+ .35	.65	11	17	74.0	13	44.4	22	0	0	
VIII.	Winterborne Steepleton .....	5.51	...	1.03	11	16	70.0	8	38.0	22	0	0	
IX.	Torquay .....	3.41	...	.82	13	14	70.1	8	47.5	22	0	0	
X.	Polapit Tamar [Launceston]..	4.55	+ 1.21	1.06	23	20	69.8	8	38.0	22	0	0	
XI.	Stroud (Upfield) .....	3.83	+ 1.29	.69	23	21	76.0	8	46.0	25	0	0	
XII.	Church Stretton (Woolstaston) ..	5.23	+ 2.39	.90	24	23	71.5	8	45.5	22	0	0	
XIII.	Worcester (Diglis Lock) .....	3.49	+ 1.34	.51	23	20	...	...	...	...	...	...	
XIV.	Boston .....	4.57	+ 2.62	1.54	18	15	72.0	4	44.0	22	0	0	
XV.	Hesley Hall [Tickhill] .....	3.69	+ 1.48	1.07	18	12	75.0	8	40.0	23	0	0	
XVI.	Derby (Midland Railway) .....	4.86	+ 2.74	1.20	24	15	75.0	1	40.0	21	0	0	
XVII.	Bolton (The Park) .....	5.67	+ 1.19	.75	2	24	69.1	8	43.6	22	0	0	
XVIII.	Wetherby (Ribston Hall) ...	2.42	+ .15	.65	17	20	...	...	...	...	...	...	
XIX.	Arncliffe Vicarage .....	8.63	+ 3.14	1.12	15	24	...	...	...	...	...	...	
XX.	Hull (Pearson Park) .....	3.19	+ .57	.82	24	15	73.0	8	46.0	17d	0	0	
XXI.	Newcastle (Town Moor) .....	2.24	— .67	.38	30	25	...	...	...	...	...	...	
XXII.	Borrowdale (Seathwaite) .....	21.14	+ 9.74	3.95	27	28	67.8	25	41.4	12	0	0	
XXIII.	Cardiff (Ely) .....	6.00	+ 1.83	.68	23	21	...	...	...	...	...	...	
XXIV.	Haverfordwest .....	5.66	+ 2.00	.62	17	21	68.6	8	43.0	12	0	0	
XXV.	Aberystwith (Gogerddan) ...	6.61	+ 2.66	.91	19	18	76.0	8	35.0	11	0	0	
XXVI.	Llandudno .....	3.51	+ .71	.71	17	20	71.0	8	48.0	12	0	0	
XXVII.	Cargen [Dumfries] .....	5.02	+ .88	.83	26	18	70.0	1	39.0	22	0	0	
XXVIII.	Edinburgh (Royal Observatory) ..	2.56	...	.73	1	22	64.8	27	44.4	30	0	0	
XXIX.	Colmonell .....	4.72	+ .73	.66	14	25	71.0	18	37.0	21	0	0	
XXX.	Tighnabruach .....	9.45	...	1.15	14	24	63.0	2	42.0	21	0	0	
XXXI.	Mull (Quinish) .....	8.08	+ 2.96	1.23	26	28	...	...	...	...	...	...	
XXXII.	Loch Leven Sluices .....	4.78	+ 1.12	.95	31	18	...	...	...	...	...	...	
XXXIII.	Dundee (Eastern Necropolis) ..	5.30	+ 2.49	.95	30	20	70.6	12	39.6	25e	0	0	
XXXIV.	Braemar .....	4.31	+ .64	.60	14	27	63.2	2	35.4	30	0	4	
XXXV.	Aberdeen (Cranford) .....	4.29	+ .99	.66	14	26	70.0	27	36.0	22	0	0	
XXXVI.	Cawdor (Budgate) .....	3.03	— .12	.44	30	24	...	...	...	...	...	...	
XXXVII.	Strathconan [Beaully] .....	6.76	+ 2.36	.85	15	15	...	...	...	...	...	...	
XXXVIII.	Glencarron Lodge .....	12.31	+ 3.77	1.22	26	29	66.0	8	41.3	13	0	0	
XXXIX.	Dunrobin .....	3.94	+ 1.39	.88	30	16	65.0	9	40.0	30	0	0	
XL.	S. Ronaldshay (Roeberry) ...	...	...	...	...	...	...	...	...	...	...	...	
XLI.	Darrynane Abbey .....	5.88	+ 1.39	1.05	13	28	...	...	...	...	...	...	
XLII.	Waterford (Brook Lodge) ...	4.62	+ .69	.90	16	22	69.0	4	39.0	22	0	0	
XLIII.	Broadford (Hurdlestown) ...	5.21	+ 1.63	.81	26	27	66.0	8, 30	43.0	23	0	0	
XLIV.	Carlow (Browne's Hill) .....	5.06	+ 1.63	.74	23	25	...	...	...	...	...	...	
XLV.	Dublin (Fitz William Square) ..	2.80	— .16	.47	13	26	70.9	30	46.1	21	0	0	
XLVI.	Ballinasloe .....	6.69	+ 2.76	.89	2	31	66.0	8, 30	40.0	7, 22	0	0	
XLVII.	Clifden (Kylemore) .....	10.11	+ 2.21	1.70	14	23	...	...	...	...	...	...	
XLVIII.	Seaforde .....	4.26	+ .96	.46	14	27	74.0	5, 11	39.0	11	0	0	
XLIX.	Londonderry (Creggan Res.) ..	6.93	+ 2.51	.86	9	29	...	...	...	...	...	...	
L.	Omagh (Edenfel) .....	7.92	+ 3.68	.95	30	28	66.0	8	38.0	21	0	0	

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

a and 27. b and 26. c and 25. d and 19, 24. e and 30.

SUPPLEMENTARY RAINFALL, AUGUST, 1903.

Div.	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			in.
I.	Uxbridge, Harefield Pk..	...	XI.	Llandefaelog-fach.....	5.15
II.	Dorking, Abinger Hall .	5.97	,,	New Radnor, Ednol.....	6.38
,,	Sheppey, Leydsdown .....	2.25	,,	Rhayader, Nantgwilt...	8.55
,,	Hailsham .....	4.04	,,	Lake Vyrnwy .....	7.51
,,	Crowborough.....	4.76	,,	Ruthin, Plâs Drâw .....	3.71
,,	Ryde, Beldornie Tower..	3.71	,,	Criccieth, Talarvor .....	5.69
,,	Bournemouth, Kempsey	3.65	,,	I. of Anglesey, Lligwy..	3.87
,,	Emsworth, Redlands ...	5.59	,,	Douglas, Woodville.....	3.95
,,	Alton, Ashdell .....	3.76	XII.	Stoneykirk, Ardwell Ho.	4.13
,,	Newbury, Welford Park	3.90	,,	Dalry, Old Garroch .....	8.95
III.	Oxford, Magdalen Coll..	3.78	,,	Moniaive, Maxwellton Ho.	7.66
,,	Banbury, Bloxham .....	3.51	,,	Lilliesleaf, Riddell .....	3.53
,,	Pitsford, Sedgebrook ...	3.56	XIII.	N. Esk Res. [Penicuik]	4.85
,,	Huntingdon, Bampton.	3.05	XIV.	Dalry, Blair .....	9.38
,,	Wisbech, Bank House...	3.47	,,	Glasgow, Queen's Park..	6.28
IV.	Southend .....	2.60	XV.	Inveraray, Newtown ...	10.95
,,	Colchester, Lexden .....	3.87	,,	Ballachulish, Ardsheal...	11.94
,,	Saffron Waldon, Newport	3.08	,,	Campbeltown, Redknowe	6.69
,,	Rendlesham Hall .....	3.70	,,	Islay, Eallabus.....	7.13
,,	Swaffham .....	3.32	XVI.	Dollar.....	5.49
V.	Salisbury, Alderbury ...	3.70	,,	Balquhider, Stronvar...	10.69
,,	Bishop's Cannings .....	3.47	,,	Coupar Angus Station...	4.19
,,	Ashburton, Druid House	5.19	,,	Blair Atholl ...	5.32
,,	Okehampton, Oaklands.	4.94	,,	Montrose, Sunnyside ...	4.46
,,	Hartland Abbey .....	5.38	XVII.	Alford, Lynturk Manse..	3.80
,,	Lynmouth, Rock House	4.63	,,	Keith H.R.S.....	4.72
,,	Probus, Lamellyn .....	4.08	XVIII.	Fearn, Lower Pitkerrie..	3.34
,,	Wellington, The Avenue	2.92	,,	S. Uist, Askernish .....	5.38
,,	North Cadbury Rectory	3.27	,,	Invergarry.....	9.19
VI.	Clifton, Pembroke Road	4.39	,,	Aviemore, Alvie Manse.	4.03
,,	Ross, The Graig .....	3.53	,,	Loch Ness, Drumnadrochit	3.29
,,	Shifnal, Hatton Grange	4.82	XIX.	Invershin .....	5.96
,,	Wem Rectory .....	4.43	,,	Bettyhill .....	5.75
,,	Cheadle, The Heath Ho.	5.43	,,	Watten H.R.S.....	5.57
,,	Coventry, Kingswood ...	3.67	XX.	Cork, Wellesley Terrace	4.46
VII.	Market Overton .....	5.00	,,	Killarney, District Asyl.	4.64
,,	Grantham, Stainby .....	4.89	,,	Glenam [Clonmel] .....	4.76
,,	Horncastle, Bucknall ...	4.28	,,	Ballingarry, Hazelfort...	4.59
,,	Workop, Hodsck Priory	5.01	,,	Miltown Malbay .....	6.76
VIII.	Neston, Hinderton .....	3.11	XXI.	Gorey, Courtown House	4.22
,,	Southport, Hesketh Park	4.18	,,	Moynalty, Westland ...	6.05
,,	Chatburn, Middlewood.	...	,,	Athlone, Twyford .....	6.46
,,	Duddon Val., Seathwaite Vic.	10.36	,,	Mullingar, Belvedere ...	6.68
IX.	Langsett Moor, Up. Midhope	5.10	XXII.	Woodlawn .....	8.07
,,	Baldersby .....	2.09	,,	Westport, Murrisk Abbey	9.24
,,	Scalby, Silverdale .....	2.39	,,	Crossmolina, Enniscoe ...	7.68
,,	Ingleby Greenhow Vic..	2.10	,,	Collooney, Markree Obs.	7.58
,,	Middleton, Mickleton ...	3.80	XXIII.	Enniskillen, Portora ...	5.13
X.	Beltingham .....	3.66	,,	Warrenpoint.....	4.81
,,	Bamburgh .....	3.37	,,	Banbridge, Milltown ...	5.08
,,	Keswick, The Bank .....	8.10	,,	Belfast, Springfield .....	...
,,	Melmerby Rectory .....	4.43	,,	Bushmills, Dundarave..	5.28
XI.	Llanfrechfa Grange .....	5.89	,,	Stewartstown .....	5.96
,,	Treherbert, Tyn-y-waun	13.45	,,	Killybegs .....	11.68
,,	Castle Malgwyn .....	5.48	,,	Horn Head .....	6.56

## METEOROLOGICAL NOTES ON AUGUST, 1903.

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

## ENGLAND.

LONDON, CAMDEN SQUARE.—Another wet and cool month, for the greater part stormy and inclement. Thundery weather prevailed on the 9th and 10th, and exceptionally heavy R occurred on 11th and 24th. Mean temp.  $60^{\circ}7$ , or  $1^{\circ}4$  above the average.

ABINGER HALL.—A very remarkable month, with a record fall of 1.98 in. on 24th, 1.62 in. falling from 9 a.m. to 5 p.m. Harvest operations were much hindered and corn discoloured.

TENTERDEN.—The first week was fine and the rest mostly wet and very bad for harvest. A great deal of wind at times. TSS on 10th.

SHEPPEY, LEYSDOWN.—Altogether cheerless and sunless. Fine during the first week, then rainy and unsettled.

CROWBOROUGH.—Heavy R, high winds and storms, doing damage to crops. Sharp gale on 20th. Mean temp.  $57^{\circ}7$ , or  $2^{\circ}3$  below the average.

ENSWORTH, REDLANDS.—R 3.13 in. in excess of the average of 19 years. On 24th 1.02 in. of R fell in 55 minutes. Continuous gales.

HARTLEY WINTNEY.—Cold and wet, with R almost daily and rough S.W. winds. TS on 11th. This month completes the average total R for the year.

BURY ST. EDMUNDS, WESTLEY.—Most unfavourable for harvest work. Corn was not so much damaged as last year, the month being cold and windy.

NORWICH, BRUNDALL.—Mean temp.  $1^{\circ}8$  below the average. Although it was a cool and unsettled month, the mean temp. was  $0^{\circ}8$  higher than in August, 1902, and the R .65 in. less.

SWAFFHAM.—On the 1st .33 in. of R fell in about 15 minutes.

WINTERBOURNE STEEPLTON.—The R was the highest and the mean temp. the lowest during eleven years' observations. The weather was nearly as bad for the harvest as in 1902, when 4.39 in. of R fell in August.

TORQUAY, CARY GREEN.—R .77 in. above the average. Duration of sunshine 196.3 hours, or 10.0 hours below the average. Mean temp.  $59^{\circ}9$ , or  $1^{\circ}7$  below the average. Mean amount of ozone 4.9; max. 7.0 on 15th with W. wind and on 27th with S.W. wind; min. 2.0 on 2nd with N.W. wind.

OKEHAMPTON, OAKLANDS.—Very wet and unseasonable, with low temp. Most unfavourable for harvest work.

WELLINGTON, THE AVENUE.—Very stormy and unsettled almost throughout, the wind at times being very violent. Only on four days did the temp. rise to  $70^{\circ}$ . R, although very frequent, only .25 in. above the normal.

NORTH CADBURY RECTORY.—Most miserable. A rainy and cloudy month. The max. temp. was below  $70^{\circ}$  on 14 days, and there were many cool nights. The amount of wind was very great.

ROSS, THE GRAIG.—Till the 12th fine and pleasant, only .14 in. of R falling in a fortnight. The next 12 days were just the contrary, with great R, blackness and gloom, and disastrous for corn harvest.

WEN, THE RECTORY.—A very melancholy month; cold, damp and almost sunless.

BOLTON, THE PARK.—Changeable, with frequent R and low temp. Mean temp.  $54^{\circ}8$ , or  $2^{\circ}5$  below the average. Bright sunshine on 24 days, the total being 133 hours 50 mins., or 4 hours 50 mins. below the average. Severe TS with vivid L on 14th.

HULL, PEARSON PARK.—Mild and genial early in the month, but from 14th very unsettled with frequent R and much wind. Very cloudy throughout.

BAMBURGH.—Very unsettled. High N.W. winds and few warm days.

## WALES AND THE ISLANDS.

HAVERFORDWEST.—Remarkable for the number of wet days, absence of sunshine and low temp., which not once reached  $70^{\circ}$  and seldom exceeded  $63^{\circ}$ .

One of the wettest Augusts of recent years. Crops much damaged. Duration of sunshine 154 hours.

DOUGLAS, WOODVILLE.—Probably the worst month of a generally disastrous summer. Cold, wet and unsettled, with remarkably low bar. R fell on 24 days, but the total was not excessive. Gales were unusually frequent, doing much damage. L on 14th and T on 24th.

## SCOTLAND.

CARGEN [DUMFRIES].—Cold, wet and changeable. Harvest prospects poor. T and L on 14th and 23rd and T on 6th.

TIGHNABRUAICH.—The clouds were highly charged with electricity and sheet lightning was a common phenomenon. The R exceeded all records for a summer month.

BALLACHULISH, ARDSHEAL.—The wettest August recorded at this station. R 5·11 in. above the average.

STRONVAR.—Only one dry day and everything in the way of crops is far backward.

COUPAR ANGUS.—August, generally the wettest month, has been no exception this year. TSS were numerous and in some cases severe. Mean temp.  $54^{\circ}\cdot 0$ , or  $3^{\circ}\cdot 5$  below the average; the lowest since 1888.

ABERDEEN, CRANFORD.—Wet, with little sunshine. T and L almost every day.

DRUMNADROCHIT.—R 1·10 in. above the average, while the number of rainy days beats the record for the month.

BETTYHILL.—With the exception of a few days and an occasional half-day of sunshine, this was a very wet month.

## IRELAND.

CORK, WELLESLEY TERRACE.—Critically speaking, we had no summer, the mean temp. having been little over that of autumn. Owing to the excessive R and low temp. the harvest prospects are very unfavourable. R '97 in. above the average.

DARRYNANE ABBEY.—Very wet and harvest very backward. Hay and oats still in the fields and much damaged.

MILTOWN MALBAY.—More or less R every day, a visitation almost unexampled. Harvest business in a deplorable state.

DUBLIN, FITZWILLIAM SQUARE.—Unsettled, cool, rainy and windy. The R was remarkable for frequency rather than quantity, and the force of the wind was unusual for the time of year. Severe TS on 24th, with T and L of exceptional violence. Mean temp.  $58^{\circ}\cdot 4$ , or  $1^{\circ}\cdot 3$  below the average. The shade temp. rose above  $70^{\circ}$  on one day only. High winds were noted on 18 days, reaching the force of a gale on 5.

BALLINASLOE.—This was the first time in 32 years that R fell on every day of the month.

MARKREE OBSERVATORY.—Very wet; at times very heavy R fell with frequent TSS. Some high wind, reaching the force of a gale on 5 or 6 days.

KILLYBEGS.—The R has only been exceeded since 1886 by that of November, 1890, when 12·36 in. fell.

HORN HEAD.—On the 8th 32 in. of R fell in 15 minutes, accompanied by T.

OMAGH, EDENFEL.—The R of the past month, 7·92 in., was the heaviest ever registered in the same period, and brought the R of the 8 months to 36·39 in., almost exactly the full average fall for a whole year. Every other characteristic of the weather was equally unsettled and unfavourable; in fact, August, 1903, will be remembered as the most unsummerlike summer month ever recorded here.

## CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, MARCH, 1903.

STATIONS.  (Those in italics are South of the Equator.)	Absolute.				Average.				Absolute.		Total Rain.		Aver. Cloud.
	Maximum.		Minimum.		Max.	Min.	Dew Point.	Humidity.	Max. in Sun.	Min. on Grass.	Depth.	Days.	
	Temp.	Date.	Temp.	Date.									
	°		°		°	°	°	0-100	°	°	inches		
London, Camden Square	67·9	25	29·9	11 <sup>a</sup>	53·9	39·5	39·7	78	102·9	23·5	2·30	13	5·3
Malta	67·9	26	45·0	10	61·8	51·0	48·4	79	119·6	39·3	·88	8	3·3
Lagos, W. Africa	93·0	8	70·0	19	90·3	78·4	76·9	78	143·0	70·0	1·86	3	...
Cape Town	88·0	15	50·0	7, 20	74·7	57·6	53·0	66	...	...	1·34	6	3·3
Durban, Natal	90·7	1, 30	55·6	21	82·7	64·4	...	...	146·3	...	4·13	12	4·1
Mauritius	87·6	5, 6	70·8	31	84·7	74·5	73·3	83	155·5	65·6	7·49	22	6·7
Calcutta	99·9	30	62·1	10	91·1	70·0	64·9	61	151·1	55·9	·77	2	2·3
Bombay	87·7	29	64·3	9	83·8	70·6	66·9	73	133·0	55·3	·17	1	0·6
Madras	98·6	31	67·2	4	89·9	72·6	72·1	78	141·9	63·3	·00	0	1·2
Kodaikanal	74·5	23	46·9	2	70·6	51·4	41·6	53	144·8	32·2	·29	1	2·7
Colombo, Ceylon	94·0	14	72·8	9	82·4	75·6	73·3	75	152·4	70·8	2·53	5	1·9
Hongkong	79·8	11	56·2	1	70·1	63·0	63·1	89	130·7	...	2·66	14	8·8
Melbourne	99·8	2	43·2	24	77·1	55·4	53·0	66	155·0	33·1	2·93	9	5·8
Adelaide	97·5	1	46·9	25	79·2	59·0	50·7	52	153·3	40·9	2·20	8	4·4
Coolgardie	100·3	2	43·2	8	84·5	56·0	47·0	44	166·2	37·2	·00	0	1·9
Sydney	94·1	23	59·4	15	78·2	66·6	63·8	78	135·0	53·0	3·78	18	5·9
Wellington	74·0	6	43·0	22	65·6	52·6	49·5	71	126·0	29·0	1·95	12	5·4
Auckland	76·5	11	49·0	13	69·9	56·3	51·3	65	150·0	44·0	1·38	8	3·6
Jamaica, Negril Point.	89·4	1	61·9	16	85·1	68·9	68·6	75	...	...	·57	3	...
Trinidad	...	...	...	...	...	...	...	...	...	...	...	...	...
Grenada	87·8	31	69·6	13	84·3	73·0	69·2	73	157·2	...	2·48	12	2·5
Toronto	68·4	19	15·9	1	46·5	32·7	33·9	80	80·0	13·7	1·83	11	7·2
Fredericton, N.B.	58·2	14	—4·4	3	43·8	22·8	22·0	59	...	...	6·07	12	5·8
Winnipeg	41·1	11	—10·3	14	27·9	7·7	...	...	...	...	1·08	10	5·9
Victoria, B.C.	55·7	23	26·4	12	47·0	35·5	...	...	...	...	2·71	13	5·6
Dawson	34·8	18	—31·8	9	16·9	—4·5	...	...	...	...	·60	4	4·1

α—and 12.

Lagos	January	92·0	20, 22	68·0	1	88·9	77·2	...	...	142·0	...	·00	0	...
	February	32·0	25, 31	69·0	1	87·2	74·7	74·0	78	137·0	...	3·41	3	...

MALTA.—Mean temp. of air 55°·4, or 0°·5 below and mean hourly velocity of wind 10·9 or 0·2 below, averages. Mean temp. of sea 61°·6.

MAURITIUS.—Mean temp. of air 1°·5 and dew point 2°·5 above, and R ·71 in. below, averages. Mean hourly velocity of wind 10·2 miles, or 0·3 below average; extremes 24·7 on 10th and 1·6 on 31st; prevailing direction E.

KODAIKANAL.—Mean temp. of air 59°·0. Mean velocity of wind 275 miles per day. Bright sunshine 250·9 hours.

COLOMBO.—Mean temp. of air 83°·8, or 1°·8 above, of dew point 0°·1 above, and R 2·29 in. below, averages. Mean hourly velocity of wind 5·7 miles, mean direction S.W.

HONGKONG.—Mean temp. of air 66°·3 or 4°·1 above, R 0·60 in. below, averages. Sunshine 64·3 hours. Mean hourly velocity of wind 15·0 miles; prevailing direction E.

ADELAIDE.—Mean temp. of air 1°·2 below, R 1·14 in. above, 46 years' average. Cool, with good agricultural rains during the first week.

SYDNEY.—Mean temp. of air 3°·1 above and R 1·31 in. below, averages.

WELLINGTON.—Mean temp. of air 3°·0 below, and R 1·59 in. below, averages.