

Symons's Meteorological Magazine.

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THE NEW CONSTITUTION OF THE METEOROLOGICAL OFFICE.

WE are now able to give on official authority the new arrangements made by the Government for carrying on the meteorological service of the United Kingdom. The information was contained in a Treasury Minute dated May 20th, 1905, which, after a question on the subject was asked in the House of Commons by Sir J. Batty Tuke, M.P. for the Universities of Edinburgh and St. Andrews, was issued on June 21st as a Parliamentary Paper under the reference number [Cd. 2559.]

The Minute runs as follows :—

My lords resume consideration of the report of the committee presided over by Sir Herbert Maxwell on the administration of the Meteorological Office.

Since the issue of the report my lords have been in communication with the Royal Society, the Board of Admiralty, the Board of Trade, and the Board of Agriculture and Fisheries, and they are now in a position to place on record the conclusions at which they have arrived.

1. The Meteorological Office will, as from the 1st April, 1905, be placed under the management of a committee constituted as follows :—

The director of the Meteorological Office.

Two members nominated by the Royal Society.

The hydrographer of the Navy.

One member nominated by the Board of Trade.

One member nominated by the Board of Agriculture and Fisheries.

One member nominated by the Treasury.

The members of the committee will be appointed by the Treasury and, subject to the discretion of the authorities by which they are respectively nominated, will hold office for a period not exceeding five years, but will be eligible for re-appointment.

2. The director will be appointed by the Treasury, and will receive out of the grant-in-aid a salary of £800, rising after five years to £1,000 per annum, without a title to pension. He will hold office for a period of five years, but, like the other members of the committee, will be eligible for reappoint-

ment until he attains the age of 65. The present director will receive the *maximum* of the scale, namely, £1,000 per annum, from the 1st April, 1905.

3. Subject to the general control of the committee and to such regulations as may be laid down by the Treasury, the director will be responsible for the administration of the office.

4. The director will act as chairman of the committee, and will summon it at such times as he considers it desirable; but four meetings at least shall be held during the year.

5. The members of the committee will not receive remuneration for their services, but travelling and subsistence expenses will be allowed in the case of members not residing in the metropolis.

6. My lords will ask Parliament annually to vote a grant-in-aid of the expenses of the office. For the present this grant is fixed at £15,300.

7. The grant will be administered by the committee, who may, with the consent of the Treasury, delegate to the director such powers of expenditure as they consider proper. All cheques will be signed by the director and countersigned by a member of the committee.

8. The committee will make an annual report for presentation to Parliament, and will at the same time transmit to the Treasury a statement of their accounts in such form as may be prescribed. In December of each year the committee will submit a statement showing the manner in which it is proposed to apply the grant for the ensuing financial year.

9. The staff will be appointed and their salaries fixed by the committee on the recommendation of the director.

10. In the absence of the director the committee may appoint one of its members to act as interim director.

11. My lords are pleased to appoint the following gentlemen to be members of the committee:—

Mr. W. N. Shaw, Sc.D., F.R.S., Director.

Capt. Arthur M. Field, R.N., Hydrographer to the Navy.

Capt. A. J. G. Chalmers, Professional Officer of the Marine Department, Board of Trade.

Mr. W. Somerville, Sc.D., Assistant Secretary of the Board of Agriculture and Fisheries.

Professor G. H. Darwin, F.R.S., University of Cambridge.

Professor Arthur Schuster, F.R.S., University of Manchester.

Mr. G. L. Barstow, nominated by the Treasury.

The result is to abolish the exclusive control exercised by the Royal Society through the Meteorological Council, to do away with the anomalous and undignified constitution of the Council as a limited company with dummy shareholders, and greatly to simplify the working of the Meteorological Office. So far the recommendations of Sir Herbert Maxwell's Committee* have been carried out; but they have not been carried out fully. The Meteorological Office is not placed under the Board of Agriculture and Fisheries as was recommended, and the staff of the Office are denied the status and privileges of civil servants, though accorded the civil service liability to compulsory retirement at an age-limit (without the pension that

* See this Magazine, vol. 39, p. 101.

reconciles the privileged official to conclude his active service). The Office is now under the control, though we gather that this control is advisory and not executive, of a composite Committee representing one learned society and four different government departments. So far as the composition of the new Committee is concerned it is simply the old Meteorological Council with the place of the unofficial meteorologists, who were formerly upon it, taken by government officials, and with the former Secretary as Chairman. We consider that it is a blot on the re-organization that the Royal Meteorological Society is not recognized so far as to be invited to nominate one member of the Committee. Apart from this we have no criticisms to offer. The gentlemen who form the Committee are of the highest standing and of tried administrative ability. The Director, the Hydrographer, and Professors Darwin and Schuster can be trusted to preserve all that was best in the old Council of which they were members. Professor Schuster said in evidence to the Treasury Committee that he became a member of the Meteorological Council reluctantly "and should not in future remain one if the constitution of the office were not reorganised," indicating that the Committee should be advisory and the Director of the Office given more freedom. As he is a member of the new body we take it that these reforms have been made. The Marine Department of the Board of Trade is rightly represented since so very large a share of the meteorological observations at sea are made by captains of the mercantile marine. The Board of Agriculture and Fisheries contains no official better fitted for a place on the Committee than Dr. Somerville, whose distinguished career as Lecturer on Forestry and Professor of Agriculture successively in the Universities of Edinburgh, Durham and Cambridge, has given him exceptional opportunities for appreciating the bearings of meteorology on agriculture. Mr. Barstow acquired a thorough knowledge of the working of the old Council and of the views of those who wished for reform when he acted as Secretary of Sir Herbert Maxwell's Committee.

The most satisfactory feature in the Committee is the Director, who as chairman, and no longer as secretary, will be more favourably placed for applying his experience and knowledge to the improvement of the weather service in all its branches, including, we have reason to hope, a great development of meteorological research.

Although the opportunity has not been fully utilized and further changes will be necessary in the future, we gladly recognize that the action of the Government has started a movement in the right direction.

Though looking forward to the achievements of the new body we must not forget a backward glance at the old Meteorological Council, the members of which, and especially the Chairman, General Sir Richard Strachey, did good service in their generation, and we miss any expression of thanks to them in the Treasury Minute which we have re-printed.

Correspondence.

To the Editor of Symons's Meteorological Magazine.

A LOW FREEZING POINT.

I HAVE occasionally exposed vessels of clear rain water upon the grass during cold winter nights when the atmospheric conditions were quiet enough. The lowest temperature I have ever observed in these without freezing is as nearly as possible 27° . There is some uncertainty in the exact temperature because a very small movement of the thermometer causes the water to change at once into ice at or near 32° . I have also exposed water in bottles which has remained liquid at temperatures below 30° , but which has changed to ice during the act of pouring it out. From these, and previous experiments described by others, I had a notion that under ordinary atmospheric conditions a water temperature below 26° was probably not to be expected. On Friday night, June 9th, at 11.45 p.m., however, the sky being clear and the air quite still, a radiation thermometer lying on the grass and reading $23^{\circ}\cdot 5$ was covered with what was undoubtedly dew. A quarter of an hour later the reading had fallen to $22^{\circ}\cdot 8$, and the dew had changed to thick hoar frost. The thermometer was quite accurate and in good order. Do you know of any observations similar to this?

J. R. SUTTON.

Kenilworth, Kimberley, June 12th, 1905.

[In this Magazine for February, 1897 (Vol. 32, p. 1), a description is given of experiments made in order to account for the water in a wet-bulb glass remaining unfrozen at 28° even when stirred; and having probably been cooled to 25° , or nearly so, without freezing. The laboratory experiments showed that ordinary distilled water could be cooled to $12^{\circ}\cdot 3$ F. without freezing, "then the whole froze with a sort of flash, and temp. rose to $31^{\circ}\cdot 8$." The cooling of water far below the freezing point without solidifying is referred to in most books on chemical physics, 10° F. being the extreme we have noted.—ED. S.M.M.]

PARTIAL DROUGHT.

A PARTIAL drought lasted here from May 3rd to June 17th inclusive, the amount registered being $\cdot 34$ in. in 46 days, measurable quantities falling on 12 days. On the 40 days May 8th to June 16th inclusive $\cdot 16$ in. only fell; and on the 14 days from June 2nd to 15th inclusive there was no measurable rain. The record for May 2nd was $\cdot 29$ in., and for June 18th, $\cdot 57$ in. On this latter date there were two thunderstorms (without lightning), which is the first record of either thunder or lightning at this station since August 30th, 1904. Total fall September, 1904, to May, 1905, inclusive, $11\cdot 02$ ins. being $7\cdot 84$ in. less than the average. T. W. BACKHOUSE.

West Hendon House, Sunderland, June 19th, 1905.

ON the 1st inst. I reported to you a partial drought of 28 days—very rare in these parts.

Since then it has become a partial drought of 44 days reaching from 3 p.m. on the 3rd May to 8.30 a.m. on 17th June—or 44 days—17½ hours.

Our rainfall in that period has been :—

	in.
May 7	·011
„ 10	·018
„ 23	·010
„ 25	·011
„ 31 (falling on June 1)	·120
June 1	·153
„ 2	·036
„ 6	·006
„ 7	·007
„ 10	·004
„ 12	·063
Total ...	·439

We are thankful to-day at last to welcome rain though it may spoil the hay harvest.

EDWARD PEARSON.

Parkside, Wilmslow, June 17th, 1905.

HEAVY RAIN IN JUNE AT HASLEMERE.

THE rain during June, 1905, has been unusually heavy, and may be worth a record in the *Meteorological Magazine*. On the 5th rain began to fall at 7 a.m., and when the observations were taken at 8 a.m., there was ·07 in. in the gauge; the rain continued all day and night; at 8 a.m. on the 6th 1·75 in. was recorded; rain and drizzle continued during the 6th, but it was at no time heavy. It was a wet week, as the following will show :—

June 4th	in.	} practically continuous
„ 5th	·07	
„ 6th	1·75	
„ 7th	·43	
„ 8th	·24	
„ 9th	·03	
„ 10th	·20	
„ 11th	·51	
„ 12th	·14	
„ 12th	1·57 (Whit Monday)	
Total of nine days...	4·94 in.	

Whit Monday morning was misty and rainy, clearing to bright, hot sunshine about 2 o'clock; numbers of people were tempted out in summer clothes to local festivities. About 4 p.m. heavy rain began, accompanied, half an hour later, by thunder and lightning. At 5.30 p.m. there was 1·30 in. in the gauge. Mr. Penfold writes of

this storm, at Courts Hill, one mile S.E. from Hazellhurst, "The heavy rain was from 4.0 to 5.5 p.m.; 1.50 in. must have fallen in that time along this side of the valley." His record for the 24 hours is 2.48 in. The Hazellhurst fall was 1.57 in.; a difference of nearly an inch within a distance of one mile. The road was flooded in one place 4 feet deep, and much injury has been done to roads in the district where the rain was heaviest. Mr. Penfold reports 5.80 in. for the nine days.

On turning back for wet periods of eight days, I find that 4.94 in. in nine days has only once been exceeded at Hazellhurst, viz., in 1899, when from November 2nd to 9th (eight days) 6.63 in. fell.

The average rainfall of June (1891-1900) is 2.26 in.: the total of June, 1905, was 6.47 in., exceeding the average by 4.21 in.

Falls of 2 inches or above have occurred as under:—

July 29th, 1894	.....	in. 2.00 (Hazellhurst)
September 1st, 1896	.....	2.06 (")
September 29th, 1898	.....	2.17 (")
November 23rd, 1898	.....	2.35 (")
November 3rd, 1899	.....	2.11 (")
June 12th, 1905	.....	2.48 (Courts Hill)

T. P. NEWMAN.

Hazellhurst, Haslemere, Surrey.

RAINFALL OF JULY 9th.

I THINK the rainfall on Sunday, July 9th, during a severe thunder-storm, may interest you. The fall for the 24 hours amounted to 1.67 in., and I add particulars:—

Storm began 3.8 p.m.

3.8 to 4.8	.....	1.14 in.
4.8 to 5.28	.....	.10 "
5.30 to 6.30	.....	.39 "
6.30 to 7.20 (rain ceased)	.....	.03 "
During night	.....	.01 "
		Total
		1.67 "

G. C. LAWSON.

Mayfield House, nr. Ashbourne, Derbyshire, July 10th 1905.

RAINFALL at Hill House, Harrow Weald, was yesterday 2.21 in., which fell between 11.50 a.m. and 4.30 p.m., 1.18 in. fell between 11.50 and 1.30 p.m., and 1.03 in. between 3.30 and 4.30. It was the heaviest fall during the last 15 years.

ALEX. CROSSMAN.

10th July, 1905.

THE rain to-day commenced at 1 p.m. here, and in 50 minutes we had a fall of 2.44 in. It resumed at 3.30 p.m. and added .11 in.; total 2.55 in. We seem to have been near the centre as two neighbours, 500 yards away in different directions, had under 2 inches.

JOHN MCEWAN.

Carisbrooke, Enfield, 9th July, 1905.

A FEW particulars of the exceptional storm in this district yesterday (Sunday) may be of interest. :—

The morning was a very sultry one, the shade temp. reading being as high as 82° by 11 a.m. At this time large massive cumuli were rapidly forming, and about 11.20 a.m., thunder was first heard in the S.W., and from this time until 6 p.m. thunder and lightning were more or less incessant at greater or less distances. At 12.40 p.m. the first rain fell, the sky being almost completely overcast, the exception being to the N.E., where the sky was clear, the surface wind at the time being easterly, strong and gusty in force. Rain continued in moderate showers until 1 p.m., the measurement then being .11 in. At 1 p.m. the wind suddenly calmed, the sky being very black at the time and the storm burst right overhead, the first flash of lightning being of exceptional intensity, the thunder, following immediately, being very loud and "crackly." From this time (1 p.m.) until 1.30 p.m. the storm was practically overhead, rain falling to the amount of .64 in. At 1.30 p.m., for a brief moment the wind shifted to S.W. and lulled to a calm. This, however, was but very temporary, as the storm immediately afterwards burst with terrific fury, the wind shifting to the S.E. and blowing with hurricane force, while rain and hail fell with almost indescribable fury, the latter coming down in an apparently solid sheet, the stones being large, but not exceptionally so. At 1.49 p.m. the storm suddenly ceased, the wind calmed and the clouds passed away to the N.E. On examining the gauge it was found that between 1.30 and 1.49 p.m., or a period of 19 minutes, 1.05 in. had been collected therein, but so violent was the hail, and so terrific the force of the rain and wind that it is highly probable that the gauge did not collect anything like the amount that actually fell in this time, not because of the gauge *overflowing*, but by reason of the hail and rain (the drops were abnormally large) striking the gauge with such force as to bounce out again, this of course applying especially to the hail, which even when it falls in slight showers is very difficult to measure. As a check to the measurement of the rain gauge, a tank, which before the storm was quite empty, was measured and found to contain 32 ins. of rainfall when measured in usual glass for 5 in. rain gauge. This tank is elliptical in shape, has an outside circumference of 70 ins, and stands on wheels, slightly raised from the ground, while the distance from the *top* of the tank to the ground is 32 ins., the tank itself being 22½ ins. deep and perfectly level.

Perhaps, from the foregoing details you will be able to make out what the actual rainfall was, as registered by the tank. I would ask you to note carefully that the 32 ins. of rain collected by the tank fell between 12.40 p.m. and 6 p.m., while the amount collected by the ordinary gauge during that time was 1.96 in., made up as follow:—

Time.	Inches.
12.40 to 1 p.m. ....	.11
1 ,, 1.30 p.m. ....	.64
1.30 ,, 1.49 ,,	1.05
	<hr/>
	1.80
3.40 ,, 4 ,, ....	.03
4.57 ,, 5.10 ,, ....	.12
5.30 ,, 6.10 ,, ....	.01
	<hr/>
Total...	1.96

As before stated, at 1.49 p.m. the storm passed away to the N.E., but for the rest of the day until 6 p.m., thunder and lightning were never very far from us, and as will be seen from the table above, several showers fell during the afternoon.

During the storm temp. fell from 82° to 56° but afterwards rose considerably. There was much flooding in this district; the cellars of this house were flooded. Great damage was also done by the hail.

HAROLD E. FREIR.

Bylock Hall, Ponders End, July 10th, 1905.

AT Camden Square the lightning was extremely vivid, and the thunder remarkably loud and continuous, but the rainfall was comparatively small. The total for the day was .31 in. with a total duration of 1 hour, the fall occurring in three well defined showers, the first at 0.50 p.m., being short and sharp, the second from 1.10 to 1.20 p.m. giving a greater fall with rather less intensity, and the third at 5.15 p.m. being comparatively slight.

The rain varied greatly, and little or none was recorded in the western suburbs. The storm raged with great fury on Hampstead Heath and in the suburbs, where a considerable amount of damage was done by lightning and two lives were lost. Thunderstorms appear to have occurred on this day in all parts of Great Britain.—
H. R. M.

A SMALL WHIRLWIND.

A SOMEWHAT unusual phenomenon occurred here yesterday at 11.45 a.m. I was seated on a piece of sloping ground, 250 yards west of Newton Racecourse, when there was a sudden noise as of an explosion, and on looking to the direction of the Grand Stand (east)

I heard all the doors banging, and windows rattling, and people coming helter skelter towards me. The wind had suddenly gathered in a sort of huge whirlwind all the dust, paper, and light materials, and was whirling it round and round at a terrific rate within a 50 yards circle. I was not more than ten yards from the edge of the wind's operations, and some pieces of paper were carried a quarter of a mile, at an altitude of fully 100 feet. The air was soft and the breeze quiet before the incident occurred. Immediately afterwards, there came over a shivering coldness in the atmosphere, but during the next hour the original conditions were gradually restored. I enquired of men whom I saw coming from the direction the disturbance pursued, and they all testified that they had not before seen anything like it.

T. E. CLOUGH.

Town Hall, Earlestown, June 5th, 1905.

ROYAL METEOROLOGICAL SOCIETY.

THE final Meeting of the session was held on Wednesday afternoon, June 21st, at the Society's rooms, 70, Victoria Street, Westminster, Mr. Richard Bentley, President, in the chair.

Mr. George C. Simpson read a paper on the "Normal Electrical Phenomena of the Atmosphere." In no branch of physics has the discovery of ions, electrons, and radio-activity produced a greater revolution than in that devoted to atmospheric electricity. Mr. Simpson in this paper stated with striking clearness the chief lines along which investigations have been made during the last few years and the conclusions arrived at, and also pointed out some of the problems awaiting solution. The amount of radio-active emanation in the lower regions of the atmosphere is increased by all those meteorological conditions which tend to keep the air stagnant over the Earth's surface. The meteorological conditions which either cause or often accompany stagnant air are calm, low temperature and high relative humidity; while, on the contrary, high winds, high temperature and low humidity generally accompany the mixing of large masses of air. This all agrees with the observed facts that the atmospheric radio-activity increases with falling temperature, rising humidity, and increasing wind strength. Mr. Simpson is of the opinion that a solution of the problems of atmospheric electricity can only be expected from the results of extended measurements in the atmosphere itself, and from laboratory experiments directed towards the problems.

The President, Dr. W. N. Shaw, Mr. W. B. Tripp, Captain A. Carpenter, Mr. R. Strachan, and Mr. C. Beadle, took part in the discussion, and Mr. Simpson was heartily thanked for his paper.

A paper by Mr. S. P. Fergusson on "Two New Meteorological Instruments," was, in the absence of the author, read by the Secretary. The instruments described were: An Automatic Polar Star Light

Recorder, for measuring the amount of cloudiness at night by the obscuration of the pole-star; and an Ombroscope for determining with great exactness the time of commencement and the duration of rain. Both of these instruments are in use at the Blue Hill Observatory, Mass., U.S.A.

Dr. S. M. W. Bodie, Mr. L. A. Crosse, Mr. R. M. Kerr, Captain H. G. Lyons and Mr. F. Sadler were elected Fellows of the Society.

METEOROLOGY AND AGRICULTURE.

IN the May number of this Magazine reference was made to a scheme which the Council of the Royal Meteorological Society had under consideration for the extension of the knowledge of Meteorology amongst Local Scientific and other Societies. A practical demonstration of the utility of such a scheme was given at the Royal Agricultural Society's Show, at Park Royal, from June 27th to 30th.

An Agricultural Education and Forestry Exhibition has been held in connection with the last few annual Shows. This year it was decided to include a section of Meteorology, and the Royal Meteorological Society was invited to undertake the arrangements for this new departure.

A typical climatological station was set out in the grounds adjoining the Exhibition, an enclosure twenty feet square being railed off and the following instruments placed in position: viz.—1. Stevenson Thermometer Screen, fitted with dry bulb, wet bulb, maximum and minimum thermometers; 2. Snowdon Rain gauge; 3. Black and bright bulb solar radiation thermometers; 4. Grass minimum thermometer; 5. Campbell-Stokes' Sunshine recorder; and 6. Earth thermometers (1 and 4 feet). The visitors were greatly interested in watching the sunshine recorder at work, and in learning that the temperature of the soil at a depth of 4 feet was 10° lower than at 1 foot.

In the Exhibition there was arranged an interesting collection of diagrams, maps, charts and photographs lent by the Royal Meteorological Society, Dr. W. N. Shaw, Dr. H. R. Mill, and Mr. W. Marriott. A number of self-recording and other instruments used for meteorological purposes were lent by Messrs. Negretti and Zambra, Mr. J. J. Hicks, and Mr. F. L. Halliwell. A specially drawn Weather Map, together with the Forecasts, was posted up about noon each day.

Mr. W. Marriott gave an address each afternoon on "Meteorology in relation to Agriculture."

On Tuesday the Prince of Wales spent some time in looking over the exhibits, and on Wednesday the King and the Princess Victoria visited the Show and were much interested in the meteorological part of it.

SIX MONTHS' RAINFALL OF 1905.

Aggregate Rainfall for January—June, 1905.

Stations.	Total Rain.	Per cent. of Aver.	Stations.	Total Rain.	Per cent. of Aver.	Stations.	Total Rain.	Per cent. of Aver.
	in.			in.			in.	
London	12·45	117	Bolton	16·88	101	Braemar	14·51	97
Tenterden	14·36	124	Wetherby	8·87	76	Aberdeen	11·74	86
Hartley Wintney	12·42	107	Arncliffe	23·45	89	Cawdor	14·30	120
Hitchin	12·07	118	Hull	9·06	81	Invergarry	29·72	120
Winslow	10·23	91	Newcastle	7·28	64	Bendamph	39·37	109
Westley	12·14	118	Seathwaite	56·94	99	Dunrobin	15·25	113
Brundall	10·78	107	Cardiff, Ely	15·77	92	Killarney	23·15	89
Alderbury	15·03	121	Haverfordwest	18·54	94	Waterford	16·93	98
Winterbourne	13·53	83	Gogerddan	19·40	110	Broadford	15·32	108
Torquay	13·57	90	Llandudno	11·37	93	Carlow	13·41	89
Polapit Tamar	15·28	99	Cargen	18·03	92	Dublin	10·21	86
Bath	11·13	85	Lilliesleaf .....	...	..	Mullingar	14·39	93
Stroud, Upfield	13·43	105	Colmonell	16·37	87	Ballinasloe	13·16	83
Woolstaston	13·34	93	Glasgow	11·73	79	Clifden	30·31	88
Bromsgrove	9·28	88	Inveraray	31·54	119	Crossmolina	21·00	97
Boston	10·13	104	Islay, Eallabus	21·69	111	Seaforde	14·14	84
Hodsock Priory	7·80	72	Mull	25·03	105	Londonderry	16·80	98
Derby	8·13	71	Dundee	8·75	72	Omagh	17·17	108

REVIEW.

Twenty Years on Ben Nevis. By WM. T. KILGOUR. Paisley : Alexander Gardner. Size 7 × 5. Pp. 154. Price 1s. 6d. net.

A PLEASANTLY written popular account of life and work at the high level Observatory. The illustrations are numerous and well chosen. We quote with some sympathy the author's closing words of preface :—

“Doubly repaid would the Author deem himself if, as a result of the publication of this small work, an indulgent public would agitate for the re-opening of Ben Nevis Observatory, the abandonment of which in this enlightened age when other countries are devoting so much of their wealth towards the propagation of meteorological research, is, to Britons, alike discreditable and unpatriotic.”

We do not, however, consider that public agitation will do any good. The public ceased to care enough about the subject to find the money for continuing the work, otherwise it would never have stopped.

RAINFALL AND TEMPERATURE, JUNE, 1905.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables in <i>British Rainfall</i> to which each station belongs.]	RAINFALL.				Days on which 1/10 or more fell.	TEMPERATURE.				No. of Nights below 32°.		
		Total Fall.	Diff. from average, 1870-99.	Greatest in 24 hours.			Max.		Min.				
				Depth.	Date.		Deg.	Date.	Deg.	Date.	Shade	Grass	
I.	London (Camden Square) ...	4.39	+ 2.30	.87	5	17	81.9	22	46.2	7	0	0	0
II.	Tenterden.....	5.26	+ 3.30	1.47	29	17	75.0	22a	48.0	7	0	0	0
„	Hartley Wintney	4.69	+ 2.80	.96	5	15	79.0	22, 25	45.0	7	0	0	0
III.	Hitchin	3.29	+ 1.40	.94	6	12	...	...	...	...	...	...	...
„	Winslow (Addington)	3.18	+ 1.19	.81	6	14	81.0	27	45.0	7, 9c	0	0	0
IV.	Bury St. Edmunds (Westley)	4.24	+ 2.20	1.20	17	14	78.0	27	45.0	15	0	0	0
„	Brundall	3.13	+ 1.24	1.00	5	16	77.3	16	42.6	1	0	0	0
V.	Alderbury	4.23	+ 2.14	1.23	6	14	86.0	22	35.0	14	0	0	0
„	Winterbourne Steepleton	1.93	- .39	.79	5	14	76.5	25	42.0	14	0	0	0
„	Torquay (Cary Green)	2.77	+ .64	.61	16	17	75.9	25	46.9	9	0	0	0
„	Polapit Tamar [Launceston]	1.72	- .40	.34	29	20	75.0	22b	36.0	14	0	0	0
„	Bath	3.48	+ 1.17	.72	12	16	78.0	22	44.0	9	0	0	0
VI.	Stroud (Upfield)	4.15	+ 1.92	1.08	30	19	78.0	25	45.0	8	0	0	0
„	Church Stretton (Woolstaston)	3.18	+ .72	.90	30	16	77.0	23	36.0	9	0	0	0
„	Bromsgrove (Stoke Reformatory)	2.35	+ .28	1.04	30	11	79.0	22	40.0	4, 9	0	0	0
VII.	Boston	2.66	+ .72	1.57	17	15	80.0	27	45.0	10	0	0	0
„	Workshop (Hodsock Priory)	2.41	+ .17	1.13	17	11	77.4	25	35.6	5	0	5	5
„	Derby (Midland Railway)	2.39	- .31	.76	17	14	84.0	25	43.0	4, 9	0	0	0
VIII.	Bolton (The Park)	2.93	- .28	1.18	17	12	78.5	25	42.6	9	0	1	1
IX.	Wetherby (Ribston Hall)	1.05	- 1.33	.50	17	6	...	...	...	...	...	...	...
„	Arncliffe Vicarage	2.42	- 1.27	.90	17	7	...	...	...	...	...	...	...
„	Hull (Pearson Park)	2.28	+ .16	.94	30	10	78.0	22	41.0	10	0	0	0
X.	Newcastle (Town Moor)	1.19	- .84	.72	18	8	...	...	...	...	...	...	...
„	Borrowdale (Seathwaite)	5.94	- 1.03	3.10	20	8	80.8	23	38.5	9, 11	0	0	0
XI.	Cardiff (Ely)	4.12	+ 1.59	.75	29, 30	19	...	...	...	...	...	...	...
„	Haverfordwest (High St.)	2.28	- .33	.59	19	12	79.8	25	41.1	14	0	3	3
„	Aberystwyth (Gogerddan)	2.35	- .58	.65	20	12	85.0	23	35.0	3	0	0	0
„	Llandudno	1.94	- .06	.77	17	11	77.0	23	44.0	11	0	0	0
XII.	Cargen [Dumfries]	2.00	- .68	.92	20	5	82.6	23	38.0	9	0	0	0
„	Lilliesleaf (Riddell) .....	...	...	...	...	...	...	...	...	...	...	...	...
XIII.	Edinburgh (Royal Observatory) .....	.91	...	.39	27	9	76.8	27	42.5	12	0	2	2
XIV.	Colmonell	1.76	- .95	.47	18	6	83.0	23	35.0	10	0	0	0
XV.	Tighnabruaich	1.09	- 2.67	.28	20	7	73.0	23	40.0	5, 6c	0	0	0
„	Mull (Quinish)	1.24	- 2.31	.69	19	7	...	...	...	...	...	...	...
XVI.	Dundee (Eastern Necropolis) .....	.85	- 1.30	.30	27	8	77.5	27	39.7	7	0	0	0
XVII.	Braemar	1.41	- 1.03	.40	20	9	79.3	25	33.7	11	0	0	0
„	Aberdeen (Cranford) .....	.76	- 1.33	.19	27	7	70.0	19, 27	32.0	10	1	1	1
„	Cawdor (Budgate)	1.31	- .93	.31	4	12	...	...	...	...	...	...	...
XVIII.	Invergarry	2.21	- .64	1.16	5	5	...	...	...	...	...	...	...
„	Bendamph.	2.24	- 2.54	.74	20	9	...	...	...	...	...	...	...
XIX.	Dunrobin Castle .....	.86	- 1.28	.34	18	8	69.5	24	40.0	1	0	0	0
„	Castletown .....	.79	...	.28	15	8	74.0	24, 27	40.0	9, 10d	0	0	0
XX.	Killarney	2.10	- 1.19	.46	21	13	80.0	25	41.0	7	0	0	0
„	Waterford (Brook Lodge)	1.88	- .73	.46	19	10	77.0	26	38.0	4	0	0	0
„	Broadford (Hurdlestown)	2.09	- .43	.54	18	13	83.0	25	42.0	6	0	0	0
XXI.	Carlow (Browne's Hill)	1.35	- .97	.31	20	10	...	...	...	...	...	...	...
„	Dublin (Fitz William Square)	1.18	- .77	.36	18	11	77.0	26	46.2	5, 11	0	0	0
XXII.	Ballinasloe	2.49	- .20	.66	18	13	83.7	25	35.0	4	0	0	0
„	Clifden (Kylemore House)	3.07	- 2.26	1.00	21	9	...	...	...	...	...	...	...
XXIII.	Seaforde	3.08	+ .36	1.49	18	10	85.0	23, 24	37.0	10	0	0	0
„	Londonderry (Creggan Res.)	1.66	- 1.26	.87	18	13	...	...	...	...	...	...	...
„	Omagh (Edenfel)	2.05	- .83	.70	19	10	80.0	23, 26	40.0	5	0	0	0

+ Shows that the fall was above the average; - that it was below it. a and 27. b and 23, 25. c and 10. d and 15.

SUPPLEMENTARY RAINFALL, JUNE, 1905.

Div.	STATION.	Rain. inches	Div.	STATION.	Rain. inches
II.	Dorking, Abinger Hall	5·61	XI.	New Radnor, Ednol	3·10
„	Ramsgate, West Cliff.....	4·14	„	Rhayader, Nantgwilt .....	...
„	Hailsham	3·52	„	Lake Vyrnwy	5·13
„	Crowborough	4·39	„	Ruthin, Plás Drâw.....	1·92
„	Osborne.....	4·29	„	Criccieth, Talarvor.....	1·69
„	Emsworth, Redlands.....	3·65	„	Anglesey, Lligwy	2·10
„	Alton, Ashdell	5·11	„	Douglas, Woodville	3·22
„	Newbury, Welford Park ...	4·74	XII.	Stoneykirk, Ardwell House	1·51
III.	Harrow Weald	3·26	„	Dalry, Old Garroch	3·32
„	Oxford, Magdalen College..	3·51	„	Langholm, Drove Road.....	2·35
„	Banbury, Bloxham Grove...	2·96	„	Moniaive, Maxwellton House	3·10
„	Pitsford, Sedgebrook	3·34	XIII.	N. Esk Reservoir [Penicuik]	1·45
„	Huntingdon, Brampton.....	3·18	XIV.	Maybole, Knockdon Farm..	1·59
„	Wisbech, Bank House	3·59	„	Glasgow, Queen's Park	·79
IV.	Southend	3·57	„	Campbeltown, Redknowe...	2·44
„	Colchester, Lexden.....	3·23	XV.	Inveraray, Newtown	2·05
„	Saffron Waldon, Newport...	3·13	„	Ballachulish House.....	3·78
„	Rendlesham Hall	3·83	„	Islay, Eallabus	1·42
„	Swaffham	2·81	XVI.	Dollar	·65
„	Blakeney	3·08	„	Loch Leven Sluices	·38
V.	Bishops Cannings	3·86	„	Balquhidder, Stronvar .....	...
„	Ashburton, Druid House ...	3·79	„	Coupar Angus Station	·91
„	Okehampton, Oaklands.....	2·61	„	Blair Atholl.....	2·71
„	Hartland Abbey	1·47	„	Montrose, Sunnyside.....	·56
„	Lynmouth, Rock House	3·21	XVII.	Alford, Lynturk Manse ...	·51
„	Probus, Lamellyn	2·41	„	Keith	·47
„	Wellington, The Avenue	3·21	XVIII.	N. Uist, Lochmaddy	1·36
„	North Cadbury Rectory ..	3·69	„	Aviemore, Alvey Manse ...	·95
VI.	Clifton, Pembroke Road ...	4·28	„	Loch Ness, Drumnadrochit.	·68
„	Moreton-in-Marsh, Longboro'	4·54	„	Glencarron Lodge	2·33
„	Ross, The Graig	3·69	„	Fearn, Lower Pitkerrie.....	·61
„	Shifnal, Hatton Grange.....	1·78	XIX.	Invershin	·74
„	Wem Rectory	2·59	„	Altnaharra	2·44
„	Cheadle, The Heath House.	1·94	„	Bettyhill	·76
„	Coventry, Kingswood	3·66	„	Watten	·72
VII.	Market Overton	4·21	XX.	Cork, Wellesley Terrace ...	2·42
„	Market Rasen	1·28	„	Darrynane Abbey	3·86
„	Bawtry, Hesley Hall.....	2·22	„	Glenam [Clonmel]	2·22
VIII.	Neston, Hinderton.....	2·56	„	Ballingarry, Gurteen	1·35
„	Southport, Hesketh Park...	1·87	„	Miltown Malbay.....	1·95
„	Chatburn, Middlewood	3·47	XXI.	Gorey, Courtown House ...	1·46
„	Cartmel, Flookburgh	2·63	„	Moynalty, Westland	2·41
IX.	Langsett Moor, Up. Midhope	2·58	„	Athlone, Twyford	1·45
„	Scalby, Silverdale	·64	„	Mullingar, Belvedere.....	1·79
„	Ingleby Greenhow	1·49	XXII.	Woodlawn	1·55
„	Middleton, Mickleton	·60	„	Westport, Murrisk Abbey..	1·85
X.	Beltingham	1·34	„	Crossmolina, Enniscooe	2·15
„	Font Reservoir, Fallowlees.	1·70	„	Collooney, Markree Obsy...	1·83
„	Ilderton, Lilburn Cottage..	·50	XXIII.	Enniskillen, Portora	2·20
„	Keswick, The Bank	2·98	„	Warrenpoint .....	...
XI.	Llanfrechfa Grange.....	3·61	„	Banbridge, Milltown	2·76
„	Treherbert, Tyn-y-waun ...	8·59	„	Belfast, Springfield	3·82
„	Carmarthen, Friary	2·86	„	Bushmills, Dundarave	1·47
„	Castle Malgwyn	3·29	„	Stewartstown	2·85
„	Plynlimon.....	4·30	„	Killybegs	1·54
„	Tallyllyn	1·70	„	Horn Head	2·12

METEOROLOGICAL NOTES ON JUNE, 1905.

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 AND WALES.

LONDON, CAMDEN SQUARE.—In spite of the persistent heavy R of the first half and the last two days of the month, there was a considerable amount of pleasant weather and brilliant sunshine. It was, however, seldom hot, the shade temp. reaching 80° on two days only. TS on 10th and T on 15th. Duration of sunshine 157.6 hours,* and of R 77.9 hours, the latter being 49.8 hours in excess of the average. Mean temp. $61^{\circ}.4$, or $1^{\circ}.0$ above the average.

TENTERDEN.—By far the largest fall in June since 1860, the most before being 3.87 in. in 1896, whilst only five other Junes had over 3 inches. Duration of sunshine 179† hours; 8 sunless days. Wind N. or E. on 20 days. Max. temp. below 60° on 5 days. TS on 27th, with .24 in. of R in 8 minutes.

CROWBOROUGH.—A dripping June, changing the deficiency for the year into an excess of .11 in. compared with the average of 34 years. The day and night temp. was high notwithstanding the E and N. and N.E. winds on 18 days, and there were many days of brilliant sunshine. TSS on 27th and 30th. Mean temp. $57^{\circ}.9$.

OSBORNE.—The R exceeded that of any June since 1860, when 5.38 in. fell.

HARTLEY WINTNEY.—A repetition of June, 1903. Cold and cheerless with R and wind storms till 18th, but afterwards a delightful spell of summer weather. Ozone on 19 days with a mean of 3.1. Hay crops very scanty.

ADDINGTON MANOR.—In a TS on 15th a large elm was struck by L.

RENDLESHAM HALL.—Heavy R to 10th, then nice showers to the end with hot sunny periods. Heavy TSS on 27th and 30th.

BURY ST. EDMUNDS.—The wettest June since 1860, when 4.40 in. of R fell. A very growing month. The old saying, "A dripping June brings everything in tune," came true this month, and the country was lovely.

BRUNDALL.—Heavy R at times and an unusual amount of T, some of the storms being severe and destructive. Mean temp. $59^{\circ}.8$, or $1^{\circ}.4$ above the average, and higher than in any June since 1897.

WINTERBOURNE STEEPLETON.—A dry month, following the previous shortage, made the deficiency for the year considerable. T on 14th and 16th.

TORQUAY.—Duration of sunshine $167^{\circ}.2^*$ hours, or 64.0 hours below the average. Mean temp. $58^{\circ}.4$, or $0^{\circ}.3$ below the average. Mean amount of ozone 5.2; max. 8.0 on 5th with N.W. wind; min. 2.0 on 4th with E.S.E. wind.

HARTLAND ABBEY.—The district suffered much from the drought of May and the heat of June.

NORTH CADBURY.—A pleasant and beneficial June. The bountiful R from 5th to 12th saved the hay crop. There was a remarkable continuous cold R from 5th to 8th, like that of June, 1903.

CLIFTON.—Unsettled and rainy except from 22nd to 28th. Close and thunder with heavy R from 14th to 20th and on the last two days. R nearly 2 inches above the average, and the greatest in June since 1879, when 5.29 in. fell.

BOSTON.—The dry period and continuous N.E. winds ended on 17th with a heavy TS and 1.57 in. of R. Afterwards there were several partial TSS.

BOLTON.—Fine and bright. Mean temp. $57^{\circ}.2$, or $1^{\circ}.2$ above the average. Duration of sunshine 166.2* hours, or 5.4 hours above the average.

SOUTHPORT.—Chiefly characterized by prevalence of N.E. and E. winds, occasioning an abnormally dry atmosphere. Little cloud, much sunshine, and the largest mean daily range of temp. yet recorded. Mean temp. $1^{\circ}.3$ above the average. Duration of sunshine 33* hours above the average. R .33 in. below the average. T and L on 18th and T on 19th. Several buildings struck by L on 18th.

LILBURN.—Again remarkable for small R and extreme heat. The total R for the first six months of the year was only 7·05 in., and the country suffered severely from drought.

LLANFRECHFA GRANGE.—R wanted early in the month, the ground being very dry and hard. Cereal and root crops backward. Meadow grass short.

HAVERFORDWEST.—A fine month; cool at first, but hot from 11th to the end. Crops generally good but late. Duration of sunshine 184·0* hours. No TSS.

GOGERDDAN.—Very hot and trying. Good R in the third week came just in time to save the crops from failure.

SCOTLAND.

LANGHOLM.—R 1·01 in. below the average of 28 years.

TIGHNABRUAICH.—A delightful summer month, with very little R but heavy dews. Mean temp. 55°·3.

INVERARAY.—Remarkably dry, and the last ten days unusually warm.

MULL.—The driest June since 1895, when only ·77 in. of R fell. High temp. and heavy dews. Springs drying up and R much needed. No T.

COUPAR ANGUS.—The month may be divided into a cold and a warm period, the mean temp. before the 20th being 11° lower than that of the last eleven days. Mean temp. 56°·2. R about half the average.

ABERDEEN.—Fine, dry and warm, being the driest June since 1891, when the R was ·35 in.

LYNTURK.—Fine but exceedingly dry, the R being the lowest in any month in five years. There were TSS in the neighbourhood but none here.

DRUMNADROCHIT.—R 1·44 in., and rainy days 5, below the average of 19 years, the fall being the least in June in that period, except in 1889, when it was only ·33 in. There was much damage from extraordinary cloud-bursts in the vicinity. One of these took place on the higher course of this river, which rose so suddenly that several children were only saved with difficulty.

DUNROBIN CASTLE.—Dry easterly winds most of the month, crops on light soils suffering from drought.

ALTAHARRA.—Intensely warm throughout, with exceptional continuance of sunshine and drought. Heavy local showers about the end.

IRELAND.

DARRYNANE ABBEY.—Fine and warm on the whole. R ·05 in. below the average of 25 years.

MILTOWN MALBAY.—Little R, cold dry winds and sunny days in the first half; the second half opened with three days of copious R, followed by a heat wave to the end.

DUBLIN.—A beautiful month, dry and bright, with a large preponderance of N.E. and E. winds. The only heavy R was on 16th, with T, and on 18th. Warm from 21st to 27th, the max. being above 70° each day. Duration of sunshine 237·5 hours. R since January 1st 1·86 in., and rainy days 3, below the average of 30 years.

BELFAST.—The R was almost an inch above the average, but of great benefit to the land. Excessive heat on 5 days.

OMAGH.—A remarkably fine and favourable month. A damp spell at the beginning was followed on 5th by 11 days without rain, fine and cloudless. Then 5 days of most welcome R, which gave place on 21st to 10 days of magnificent summer weather, the shade temp. reaching 80° on 23rd and 26th.

* Campbell-Stokes.

† Jordan.

Climatological Table for the British Empire, January, 1905.

STATIONS. <i>(Those in italics are South of the Equator.)</i>	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.									
London, Camden Square	54·3	6	21·2	16	43·5	32·7	53·9	83	69·9	18·1	1·34	8	5·6
Malta.....	60·4	17	38·7	4, 5	55·4	46·3	41·4	74	108·7	33·0	3·03	16	5·6
Lagos.....	...	...	...	...	...	...	...	...	...	...	...	...	...
Cape Town	98·1	16	53·3	2	77·7	61·1	60·5	73	...	...	·60	5	3·1
Durban, Natal	89·8	8	62·1	1	83·7	69·0	...	...	150·1	...	4·44	17	6·2
Johannesburg	81·2	13	51·5	19	75·3	55·8	54·6	75	146·0	49·2	3·28	17	5·0
Mauritius.....	88·5	21	71·0	12	84·6	74·1	73·7	85	156·4	67·4	21·09	31	8·4
Calcutta.....	83·7	29	47·8	27	75·8	55·4	55·7	71	136·4	42·2	·94	2	3·1
Bombay.....	86·9	8	56·1	31	80·9	66·6	62·0	69	137·8	48·3	·00	0	1·7
Madras	87·2	24	57·4	29	83·2	65·2	64·6	75	140·8	52·8	1·92	3	2·3
Kodaikanal	67·4	30a	39·8	29	61·3	44·9	43·3	75	121·4	23·2	·56	5	3·9
Colombo, Ceylon.....	91·2	27	67·2	14	86·8	72·2	70·4	78	150·7	61·5	4·05	7	3·3
Hongkong.....	79·3	23	46·8	31	69·0	60·7	58·4	79	131·1	...	1·80	4	6·9
Melbourne.....	108·5	11b	45·6	24	81·2	57·3	52·7	60	165·4	36·0	1·47	9	5·8
Adelaide	109·7	12	51·3	31	87·4	62·3	52·0	44	164·0	43·1	1·51	6	4·0
Coolgardie	108·5	20	47·2	2	94·0	61·8	54·5	45	175·0	41·2	·46	3	1·8
Sydney	87·5	2	55·6	24	79·1	66·0	62·2	68	128·9	45·4	1·74	10	5·0
Wellington	75·6	17	41·9	2	64·8	52·6	50·2	74	139·0	37·0	2·12	11	7·3
Auckland	78·5	19	48·0	3	67·6	55·4	51·9	71	140·0	38·0	2·79	12	4·8
Jamaica, Negril Point..	88·0	31	62·9	27	83·0	69·4	68·3	78	...	...	·81	4	...
Grenada.....	86·4	27	69·0	28c	81·9	71·9	68·5	71	149·2	...	2·92	15	3·3
Foronto.....	42·2	1	-7·1	26	25·3	10·4	15·8	84	49·8	-10·0	3·28	18	7·4
Tredericton	43·9	1	-33·5	15	22·9	-3·4	-6·0	60	...	...	6·62	12	4·4
Winnipeg	29·5	18	-39·1	10	5·7	-16·0	...	...	...	...	·20	3	3·8
Victoria, B.C.	53·0	24	27·4	13	44·6	37·4	...	...	...	...	3·34	18	7·0
Dawson .....	...	...	...	...	...	...	...	...	...	...	...	...	...

a—and 31. b—and 13. c—and 29.

MALTA.—Mean temp. of air 50°·6, or 2°·7 below average, mean hourly velocity of wind 12·4 miles, or 1·2 above average. Mean temp. of sea 56°·0. L on 8th. H on 3rd, 4th, and 28th.

Mauritius.—Mean temp. of air 0°·2 below, dew point 3°·6, and R 11·78 in., above averages. Mean hourly velocity of wind 8·0 miles, or 3·1 miles below average.

MADRAS.—On the 29th the min. temp. was 57°·4, the lowest ever recorded, except 57°·3 in 1895. Bright sunshine 228·9 hours.

KODAIKANAL.—Bright sunshine 205 hours.

COLOMBO.—Mean temp. of air 79°·2, or 0°·1 above, of dew point 0°·4 above, and R ·49 in. above, averages. Mean hourly velocity of wind 7·8 miles; prevailing direction N. W. and N.

HONGKONG.—Mean temp. of air 64°·3. Bright sunshine 142·9 hours. Mean hourly velocity of wind 11·5 miles; mean direction E. 11° S.

Adelaide.—Mean temp. of air 0°·8 above, and R ·60 in. above 45 years' average.

Sydney.—Mean temp. of air 1°·1 above, R 1·79 in. below, and humidity 2·6 below, averages.

Wellington.—Mean temp. of air 4°·1 below, and R 1·42 in. below, averages.