

# Symons's Meteorological Magazine.

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VOL. XLV.

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## THE BRITISH RAINFALL ORGANIZATION.

### A NEW DEVELOPMENT.

WHEN George James Symons was twenty years of age he was struck by the fact that if the distribution of rainfall over the country were ever to be ascertained far more numerous observations would be necessary than for the determination of temperature or pressure. He also saw that the average person was more interested in rainfall than in any of the other elements of climate, because it touches the comfort of all who have to be out of doors, and the interests of those who have to do directly or indirectly with agriculture, water-supply, canal navigation, and public health. As the Meteorological Department of the Board of Trade, in which Symons was an assistant fifty years ago, did not see that it was necessary to deal in greater detail with rainfall than with the other meteorological data, he commenced himself to collect observations and in February, 1861, he published a four-page pamphlet "English Rainfall, 1860," giving the total rainfall at 168 stations. In the following year he published a pamphlet of 18 pages "British Rainfall, 1860—61," and gave the rainfall recorded in all parts of the British Isles by 507 observers. From that time forward each year showed a substantial increase in the number of records dealt with, this exceeded 1,000 in 1865, 2,000 in 1877, and 3,000 in 1894. Mr. Symons not only collected records, he investigated the best forms of apparatus, the best methods of recording, and worked strenuously to increase the accuracy and the uniformity of the work all over the country. As the number of records increased and the quality improved, he introduced various discussions of the data into the annual volumes of British Rainfall, and pointed out the great practical importance which might accrue from the united work of the multitude of scattered observers. In 1858 he initiated the Camden Square meteorological station, which has had a longer life than any other existing private meteorological observatory, and he established this magazine in 1866 as the development of an earlier "Monthly Rain Circular."

As the years went on the issue of "British Rainfall" gradually receded farther from the end of the year with which it dealt, the month of publication, originally February, was by degrees displaced to August, and was only stopped there by the employment of addi-

tional assistants. Mr. Symons and the rainfall observers interested in the scientific and public aspects of the work, found the money for carrying it on. For a time help was received from the British Association, but that ceased in 1876, and as Mr. Symons's accumulated experience began to assume a considerable professional value in advising water-works engineers, and in other practical matters, he was able, when occasion required, to make up any deficit which might arise.

On his death, in 1900, Mr. Symons bequeathed all the rainfall records he had accumulated during more than 40 years, the instruments and an option to purchase the leasehold of 62, Camden Square, to his colleague, Mr. H. Sowerby Wallis, who had worked with him from 1872, and had been associated in the editorship of *British Rainfall* since 1890. In 1901 Dr. H. R. Mill joined Mr. Wallis in carrying on the Organization, and when the latter was obliged to retire on account of ill-health, in 1903, Dr. Mill purchased the leasehold of the historic rainfall house, 62, Camden Square; the instruments in use there and the whole collection of records accumulated up to that date. By 1905 the number of observers had reached 4,000 and now they have almost reached 5,000. The volume of work has been greatly increased by the introduction of detailed cartographic treatment of the returns and by the increase in the number of records received monthly from about 200 to about 1,000. In place of the single assistant, who, with Mr. Symons, was once able to overtake the whole work, and to publish the volume of *British Rainfall* in June, five assistants are now required to complete the volume in time for publication in September. The British Rainfall Organization has, in fact, attained a magnitude which makes its direction a heavy burden for any individual, and it has long been recognized that the risk of so large and complex a system depending on a single life is too great to be prudently run.

Whereas, when the Organization was younger, the whole expenses were met, and rather more than met, by the subscriptions of observers, these subscriptions have increased very slowly while the expenses have increased very rapidly and there is now a substantial deficit to be met annually by the Director. It is impossible to have any sort of endowment, or to receive legacies towards the improvement of the financial position while the Organization remains a personal enterprise, and in the fiftieth year of its existence the time seems to have come for making a change which has long been contemplated and anxiously considered. Dr. Mill always intended to leave the records and the house as a bequest to the nation, for it seemed right that the freely rendered services of the great army of observers in these islands should be recognized by placing the result at the disposal of the community; but he felt that the transition from private to public ownership could be made with less risk of altering the character of the Organization if it were carried out under his own supervision so that the continuity of the work would be fully

preserved. He accordingly requested nine representative rainfall observers to join him as Trustees, and, on June 8th, formally transferred the whole of the property he had acquired in connection with the Rainfall Organization, as a gift to the new body of which he became the Chairman, while continuing to act as Director as before. The nucleus of an Endowment Fund has been formed by a few friends, and with the sums promised, it amounts at present to £800. It is vested in the Trustees, with Mr. F. Druce as Treasurer, and is kept distinct from the General Fund, which is, as before, under the sole charge of the Director. During Dr. Mill's tenure of the office of Director the responsibility of the Trustees is confined to the care of the Endowment Fund; but the duty of appointing a new Director will devolve on them, and by the Trust Deed they are empowered to exercise the fullest discretion as to the future management of the Organization, the one purpose for which they have come into existence being to maintain it in perpetuity in a state of efficiency. Should the Endowment Fund eventually attain such proportions as to secure the free development of the Organization as an unofficial body of an entirely voluntary nature, the wishes of the founder will be most fully met; but should the Trustees at any time see it to be advantageous to unite with any other body of kindred aims, or to adopt any other means of securing continuity and efficiency, they are free to do so.

The Trustees who have agreed to act are :—

Dr. H. R. Mill.

Mr. Francis Druce, London.

Sir John Murray, Edinburgh.

Sir Alexander Binnie, Past President of the Institution of Civil Engineers, London.

Mr. Henry Mellish, President of the Royal Meteorological Society, Hodsock Priory, Worksop.

Mr. Douglas W. Freshfield, Wych Cross Place, Surrey.

Mr. J. G. Wood, Barrister-at-Law, London.

Mr. Charles L. Brook, Meltham, Yorks.

Mr. Charles J. P. Cave, Ditcham Park, Sussex.

Mr. R. M. Barrington, Fasseroe, Bray, Co. Wicklow.

All of these are old friends of the Organization, and the names of most of them are familiar to our readers as frequent contributors to these pages. Mr. J. G. Wood is one of the very small band of surviving observers whose records appeared in the first volume of *British Rainfall*, for 1860–61, and as a life-long friend of Mr. Symons, he serves in a special way as a link between the past and the future of the Organization.

There will be no change in the work of the Organization, or in its staff or publications; but the existence of the Trustees removes any anxiety as to the future of the Organization which may have been felt hitherto.

## INTERNATIONAL BALLOON ASCENTS, JANUARY 2nd, 3rd & 4th, 1908.

By W. H. DINES, F.R.S.

IN accordance with the article published last month, we now commence the series of records of international meteorological balloon meteorological ascents beginning with January, 1908.

This was one of the small series of ascents on three consecutive days that are arranged three times in each year. The figures are of a somewhat unusual character, inasmuch as the beginning of the isothermal column was very badly defined over the whole area, and the temperature in many cases was lowest at the point where the balloons burst. This partly accounts for the differences in the height of the commencement of the isothermal between neighbouring stations—Brussels and Paris, for example, and Pyrton Hill and Petersfield, on January 3rd—since the gradual change in the temperature gradient makes it hard to define the precise point. Also the currents of air, shown by the directions the balloons took, are very various and discordant; however, it must be borne in mind that the ascents were not strictly simultaneous.

A strong N.E. wind prevailed in England at the time, with cold weather.

*Barometric conditions.*—On the 1st an extensive anticyclone lay over Scandinavia, and a depression over the Mediterranean. On the next day a depression approached from the Arctic Ocean, so that on the 4th a deep cyclone lay over west Russia and the north of Scandinavia, while a band of high pressure stretched from the British Isles to the Black Sea, and a shallow depression prevailed on the Mediterranean coasts.

### *January 2nd, 1908.*

Starting Point.	Lat.	Long.	A	B	C	D	E	F	G
	° /	° /	in.	miles.	° F.	miles.	° F.	miles.	
Manchester ....	53 30 N.	2 14 W.	..	5·8	—51	9·0	—61	47	S.W.
Trappes .....	48 50 N.	2 20 E.	30·12	6·3	—71	9·2	—74	40	S.E.
Strassburg ....	48 36 N.	7 42 E.	30·20	6·0	—71	9·0	—76	14	S.S.E.
Munich .....	48 9 N.	11 37 E.	30·16	6·7	—83	8·9	—74	26	N. by E.
Pavia .....	45 11 N.	9 9 E.	30·08	5·4	—78	5·9	—78	26	E. by S.

### *January 3rd, 1908.*

Pyrton Hill....	51 48 N.	1 0 W.	30·20	8·1	—76	11·9	—81	45	W. by S
Ditcham Park..	51 0 N.	1 0 W.	30·12	6·9	—69	7·5	—69	20	S.
Uccle.....	50 51 N.	4 22 E.	30·28	7·5	—72	9·1	—78	24	W.S.W.
Lindenberg ....	52 12	..	30·52	6·4	—81	7·5	—76	22	S.W.byW.
Trappes .....	48 50 N.	2 20 E.	30·08	6·2	—72	7·4	—72	58	S.S.E.
Strassburg ....	48 36 N.	7 42 E.	30·20	6·2	—74	6·9	—74	15	N. by E.
Munich .....	48 9 N.	11 37 E.	30·16	5·7	—71	8·3	—73	15	S.S.E.
Vienna .....	48 12 N.	16 23 E.	30·36	6·1	—82	6·8	—81	4	S.S.E.
Pavia.....	44 11 N.	9 9 E.	30·20	6·9	—90	10·6	—80	51	S.E. by E.

# RAINFALL OF THAMES VALLEY — MAY, 1910.



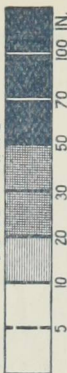
Symons's Meteorological Magazine. Watershed of River Thames above Teddington, and River Lee above Felddes Weir. Isohyetals Rainfall stations reporting.



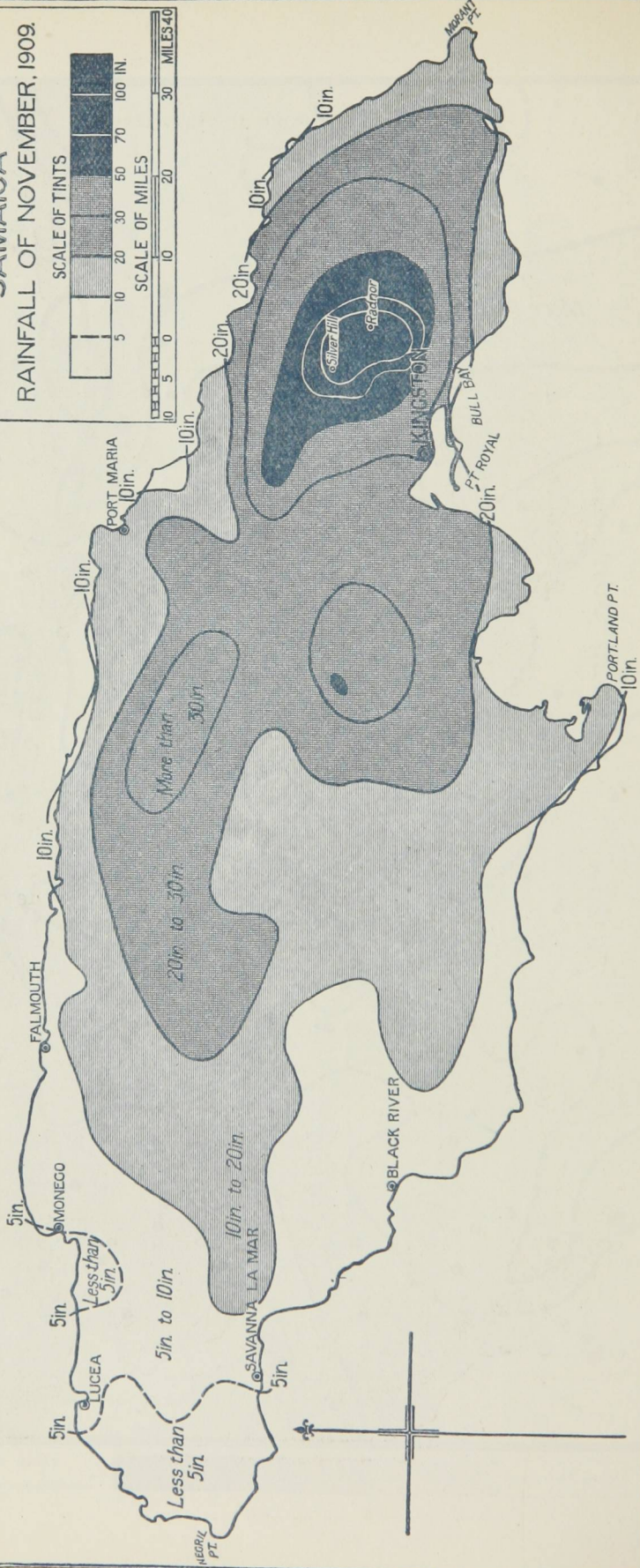
# JAMAICA

RAINFALL OF NOVEMBER, 1909.

SCALE OF TINTS



SCALE OF MILES



*January 4th, 1908.*

Starting Point.	Lat.	Long.	A	B	C	D	E	F	G
	° /	° /	in.	miles.	° F.	miles.	° F.	miles.	
Manchester....	53 30 N.	2 14 W.	?	..	..	6·9	—67	67	N.W.byN.
Pyrton Hill....	51 48 N.	1 0 W.	30·24	8·1	—69	11·0	—72	62	N.W.
Ditcham Park..	51 0 N.	1 0 W.	30·24	7·5	—56	8·1	—56	55	N.W.byW.
Trappes .....	48 50 N.	2 20 E.	30·08	6·9	—78	8·5	—82	11	N.
Munich .....	48 9 N.	11 37 E.	30·16	7·1	—78	9·2	—78	32	S. by W.
Pavia.....	44 11 N.	9 9 E.	30·16	6·1	—80	6·3	—80	9	S.E. by E.

A=Approximate barometric pressure reduced to sea-level.

B=Height in miles of commencement of isothermal column.

C=Temperature, F., at bottom of column.

D=Greatest height of reliable record in miles.

E=Temperature, F., at greatest height.

F=Distance in miles of point where balloon fell.

G=Bearing of falling from starting point.

## THE RAINFALL OF JAMAICA IN NOVEMBER, 1909.

By CARLE SALTER.

IN the February issue of this Magazine we published a note referring to the extraordinary rainfall which occurred in Jamaica during the month of November, 1909, but in the absence of fuller information we were not at that time able to give any details. We have now received a copy of the official report dealing with the meteorology of the month in question, and containing the total rainfall as measured at nearly two hundred stations. These figures we have plotted on a map of the island, with the exception of a few which we have not been able to locate; lines have been drawn in the usual way to indicate the distribution of rainfall for the month, and the map is reproduced here. We have no information respecting the exposure of the instruments, but judging from the smooth way in which the lines run, and the remarkably rare instances in which any figure appeared out of harmony with its neighbours, there can be little doubt that the data may be accepted with confidence as fully comparable one with another. The normal rainfall of Jamaica in November is not a small one, amounting on the average to seven inches, but at many mountain stations much larger falls take place, and at one place, Fellowship, in the east of the island, the average is mentioned as 26·76 in. The rainfall in November, 1909, was, generally speaking, below the average only in the extreme west. It increased steadily towards the east, and more than twenty inches fell over practically the whole of the eastern half of the island. A marked falling off took place towards the coast on all sides and the bulk of the heavy rainfall was concentrated in three large patches in the interior, in each of which more than 30 inches fell. It was in the eastern of these three patches that the most remarkable and destructive downpours took place.

The following is an excerpt from the official report issued by Mr. Maxwell Hall, Government Meteorologist.

The excessive rains were due to a remarkable disturbance between November 4th and 11th. The rains were chiefly confined to the eastern end of the island and to the highest mountains. At Silver Hill, near Hardware Gap, 135 in. were recorded from 4th to 11th, and at Farm Hill, near Radnor, in the same neighbourhood, rather more to the south, 120·87 in. from 1st to 16th, as follows :—

SILVER HILL.			FARM HILL.		
		in.			in.
November 4	.....	6·50	November 1	.....	3·00
„ 5	.....	21·00	„ 2	.....	·55
„ 6	.....	30·50	„ 3	.....	...
„ 7	.....	27·00	„ 4	.....	4·20
„ 8	.....	18·00	„ 5	.....	7·70
„ 9	.....	18·00	„ 6	.....	23·80
„ 10	.....	8·00	„ 7	.....	28·50
„ 11	.....	6·00	„ 8	.....	21·00
			„ 9	.....	22·58
			„ 10	.....	...
			„ 11	.....	6·62
			„ 12	.....	..
			„ 13	.....	...
			„ 14	.....	1·45
			„ 15	.....	...
			„ 16	.....	1·47
For 8 days.....		135·00	For 16 days.....		120·87

Referring chiefly to the east end of the island, rain set in from the north during the night of the 4th, and continued till 7th, with a slowly rising barometer. The wind was very strong on 7th and following days, and S.S. *Bradford*, at Port Antonio, and some sloops elsewhere were driven ashore. The rains continued till 12th, with a falling barometer, and the weather then became suddenly fine, not only in Jamaica but throughout this part of the Caribbean Sea.

These excessive rains had disastrous results in the eastern parishes, and there was loss of life and property; the damage to the latter including the destruction of roads, bridges, railways, intakes for water and electric supplies, houses, coffee works, coffee plantations, telegraphs, and even submarine cables. The cable belonging to the Direct West Indian Cable Company, laid about three miles off Bull Bay in about 600 fathoms of water, was broken, probably by landslides, and twisted into knots as it was after the great earthquake of 1907. The West Indian and Panama Telegraph Company's cable was also broken in the same way, and the wires connecting Kingston with Holland Bay being down, Jamaica was for several days isolated. Much of the damage done was by landslides, which blocked the gullies and forced the enormous floods to find a vent by unusual channels. The suggestion is made that these landslides were the result of the earthquake of 1907, since during the hurricanes of October 17th to 19th, 1815, the rainfall among the mountains was probably equally heavy, and there are no notes of landslides occurring on that occasion.



## ROYAL METEOROLOGICAL SOCIETY.

THE first of the afternoon meetings for the present session, which had been postponed on account of the death of His Majesty King Edward VII., was held on Wednesday, May 25th, at 70, Victoria Street, Westminster, Mr. H. Mellish, President, in the chair.

The President moved that a loyal and dutiful address of condolence and homage be presented to King George V., and on the motion being carried the Address was read, the audience standing.

A paper by Mr. W. C. Nash on the "Daily Rainfall at the Royal Observatory, Greenwich, 1841-1903," was read by the Secretary. From his analysis of the 63 years' observations the author found that the day with the maximum number of rain days is December 5th; while the days with the least number of rain days are April 18th, 19th, June 27th and September 13th. There were 94 occasions on which the rainfall exceeded one inch in the day, and 7 of these exceeded two inches in amount, the heaviest fall being 3·666 in. on July 26th, 1867. The recurrence of heavy falls on or about certain days is remarkable; excessive falls having occurred four times on August 23rd, and three times on June 10th, July 11th, August 17th and October 30th.

The following are some of the more important average monthly results:—

Month.	Rainfall.	No. of rain days.	Percentage.		Mean Fall.	
			Rain days.	Rainless days.	Per day.	Per rain day.
	in.		%	%	in.	in.
January .....	1·88	14·8	47·6	52·4	·061	·128
February .....	1·48	12·4	44·0	56·0	·052	·119
March .....	1·49	13·2	42·4	57·6	·048	·113
April .....	1·57	12·0	40·0	60·0	·052	·131
May .....	1·92	12·4	39·8	60·2	·062	·156
June .....	2·02	11·6	38·7	61·3	·067	·174
July .....	2·43	12·6	40·5	59·5	·078	·193
August .....	2·36	12·9	41·7	58·3	·076	·182
September .....	2·16	12·3	41·1	58·9	·072	·175
October .....	2·83	15·1	48·8	51·2	·091	·187
November .....	2·21	14·0	46·8	53·2	·074	·158
December .....	1·84	14·2	45·8	54·2	·059	·130
Year .....	24·19	157·5	43·1	56·9	·066	·154

Mr. Nash said that the fallacy of the popular belief in the "St. Swithin's" legend has been repeatedly pointed out, and has received ample confirmation by the result of this investigation.

An interesting discussion followed, in which Mr. W. W. Bryant, Mr. F. J. Brodie, Mr. C. Salter, Col. H. E. Rawson, Mr. E. Gold. Mr. R. H. Hooker, Mr. J. Hopkinson and the President, took part.

Mr. L. C. W. Bonacina read a paper on "Low Temperature Periods during the Winters of 1908-9 and 1909-10," in which he referred to the remarkable frosts of (1) December, 1908, in the south of England ; (2) March, 1909, in the south of England ; (3) November, 1909, in Scotland and Ireland ; and (4) January, 1910, in Scotland and the north of England. The author's generalisations touching the subject of hard frost are : (a) The lowest temperatures in the United Kingdom occur in the north-east of Scotland in the neighbourhood of Aberdeenshire ; (b) There is no portion of the British Isles, except the Scilly Isles, where the temperature of the air does not occasionally fall below 20° F. ; (c) The severest frosts occur, as a rule, not in anti-cyclonic conditions as commonly supposed, but when the distribution of pressure is irregular and complex and favourable to heavy falls of snow ; and (d) Although the hardest frosts certainly tend to occur in the most inland districts of England, Scotland and Ireland, the relation is frequently to a greater or less extent masked by other factors.

Mr. R. Corless read a paper on "The Rate of Rainfall at Kew in 1908," in which he described a method of obtaining information about the rate of fall of rain from the records obtained from a self-recording rain-gauge of the Beckley, Halliwell, or similar type, which yields a continuous trace showing, by the position of the pen, the amount of rain fallen.

The following new Fellows were elected :—Mr. A. D. Linklater, Capt. A. C. Scott, R.N., Mr. T. V. Staton, Mr. C. Stoeckel, M.A., Mr. T. Taylor, and Mr. C. Wilkinson.

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## Correspondence.

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

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### HALLEY'S COMET AND THE ATMOSPHERE.

AT the suggestion of Mr. Cave, a series of balloon ascents was arranged by the President of the International Commission in connection with the passage of the earth through the tail of Halley's comet.

Owing to the fortunate prevalence of a S.E. current of air, most of the balloons sent up from Ditcham Park and Pyrton Hill have been found, and I have examined cursorily ten records obtained between May 17th and 21st. As Mr. Cave, and, I think, most of us expected, the result is a negative one. The records show the average conditions of temperature up to 10 miles height, the approximate values above six miles ranging from —60° F. to —80° F., but very rapid fluctuations of temperature within these limits were occurring. These fluctuations, though unusual, have been noted on several previous

occasions ; and are, perhaps, to be ascribed to the thunderstorms and generally disturbed condition of the weather that prevailed during the week.

It appears that owing to our ignorance as to the amount of curvature in the comet's tail, we do not know the precise time of the earth passage through it ; the balloons were sent up at 7 a.m. and 9 p.m. on Wednesday ; at 2 a.m., 7 a.m. and 7 p.m. on Thursday ; and at 7 a.m. on Friday.

W. H. DINES.

*Pyrton Hill, Watlington, Oxon.*

### FIREBALL IN SUNSHINE ON MAY 10th.

THE brilliant fireball which appeared on October 6th, 1909, at 9.40 a.m., and formed quite a conspicuous feature even in the presence of the sun, was referred to in *Symons's Magazine* for October and November last. An object of similar character has now to be chronicled, for on May 10th, at 7.52 a.m., many observers were surprised by the appearance of an almost dazzlingly luminous meteor sailing across the sunlit sky with a somewhat slow motion. Its head formed an elongated mass of flame—several of the spectators describe it as kite-shaped—of a bluish colour, and a stream of red sparks followed it.

Descriptions of the fireball have been received from 16 places, chiefly in the Midlands, and among these may be mentioned Leeds, Lichfield, Birmingham, Walsall, Hereford, Fordham in Cambridgeshire, Alderley Edge, Cheshire, Tunstall, Staffordshire, Ferry Bridge, Yorks, &c.

But the accounts are for the most part vague and incomplete, so that it is difficult to derive the real height and direction of the phenomenon. The meteor could not have been a fragment of Halley's comet, though the earth was comparatively near the comet's orbit at the time, for the radiant point of the latter was in due south altitude about 38 degrees and the luminous flight, as approximately recorded, is not in conformity with this position.

Even at night, with a myriad stars affording useful reference points, it is often impossible to accurately record the apparent paths of meteors, but in the daytime with only the sun and blue expanse visible it is incomparably more difficult.

It is certain, however, that the meteor of May 10th passed over the counties of York or Lincoln to Lancashire.

Readers of your Magazine who witnessed its descent may be able to describe its position and enable the details of its course in the air to be correctly deduced.

W. F. DENNING.

*Bristol, May, 18th, 1910.*

P.S., June 10th.—The probable height of the fireball was 83 to 32 miles, descending along a path of 100 miles, at a velocity of 17 miles per second. The radiant point was near the bright star Capella in Auriga.

## THE LATEST WINTER SNOW SPOT IN ENGLAND AND WALES.

I WONDER where the above spot exists. I have investigated the Snowdonian Range for several years, and find it, not at Snowdon, the highest mountain on the range, but at a place near Carned Llewelyn, 500 ft. lower than Snowdon, in a gully locally known as "Y ffaes ddyfn" (The deep cut). The conditions for the accumulation of snow at Carned Llewelyn, like that for rain at Snowdon, are unique, viz. :— High elevation of 3,000 ft., a large gathering ground, the fact that the drift is blown during every snowstorm towards the gully from all points except S.E., and that the gully or cut is situated on the



THE SNOW-SPOT ON CARNED LLEWELYN.

edge of the sloping ground, with the result that the accumulation of the winter drifts lasts generally into July, being, as a rule, a month later than those at Snowdon. The only unfavourable factor, and that a very powerful one, is that the snow faces the sun most of the day in spring and summer. Except for this, I believe it would last until August, and some years all the year round.

As a great height is not the only feature for a late snow, perhaps there are spots existing in Cumberland or other places in England where similar favourable conditions prevail as at Carned Llewelyn, with the extra advantage of being in the sun-shade ; and as summer

is now well advanced, would it not be possible to ascertain through your Magazine the date of the disappearance of the last winter accumulation in the English heights?

I was on the summit of Carned Llewelyn on Whit Monday last, 16th May, and found the gully nearly full, the quantity remaining being larger than usual in the middle of May, and from its present appearance from a distance on this date (June 1st), will last with average weather another four or six weeks. Most likely there are some drifts still on the English heights, and before the summer is over, I am sure the readers of this Magazine will be greatly interested to know the dates for comparison of the last disappearances at various places in the country. For this purpose, I will keep my eye on the Welsh spot: will English friends do the same in England? I hope that this question will be solved even in the July number.

J. R. GETHIN JONES.

*Bodgethin, Dolgarog, Taly Cafn, June 1st, 1910.*

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### DEW PONDS.

IN his interesting contribution to your Magazine of last month on the subject of Dew-ponds, Mr. Herbert Gibson says: "The term dew-pond is a misnomer. It is a rain-pond. It might with propriety be called a down pond."

Those who in recent years have interested themselves in the subject, will doubtless agree with Mr. Gibson that the term down-pond is appropriate, while that of dew-pond is not; but is the supply of water to these ponds attributable solely to rain?

I suggest that the humid equatorial winds which blow in front of advancing depressions add largely to the supply. Upon a ship at sea the equatorial wind deposits a considerable amount of moisture, so much at times that from the cool surfaces of iron, polished wood, &c., exposed on deck the water drips quite freely. This may occur in daytime as well as at night. The same obtains on land, although in a less degree perhaps. Even if the water in a dew-pond were much warmer in the night than the surrounding air—a premise which Mr. Gibson thinks may be accepted without proof—the deposit of moisture from vapour-laden air upon the water surely is not impossible. But is the water always warmer than the air? I think not, because the wind circulating in front of a depression is a warm wind, and the temperature of the water at the surface of a comparatively shallow pond is readily cooled.

CAMPBELL HEPWORTH.

*2, Anherst Road, Castle Bar, Ealing, W., May 16th, 1910.*

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## METEOROLOGICAL NEWS.

THE ROYAL METEOROLOGICAL SOCIETY is arranging a Meteorological Section in the Agricultural Education Exhibition at the Royal Agricultural Society's Show, which is to be held at Liverpool, from Tuesday to Saturday, June 21st to 25th. At the Climatological station in connection with this section, an address on a meteorological subject will be given each day, at 3 p.m., by Mr. W. Marriott, which will be followed by the ascent of a registering-balloon. It is probable that similar balloons will be sent up at the same time at Pyrton Hill, Oxfordshire, and the University, Manchester. We hope that rainfall observers visiting the Show will not fail to inspect the Meteorological Section; and if they make themselves known to Mr. Marriott or his assistants, we are sure that any matters of special interest to them will be fully and courteously explained.

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### THE THUNDERSTORMS OF JUNE 5th—9th, 1910.

WHILE going to press we are receiving a mass of correspondence dealing with the disturbed weather conditions of this June, much of which we should have printed in full, but which we are obliged at the last moment to touch on very briefly.

At almost any time from June 5th to 9th thunderstorms seem to have been in progress in some part of the south of England. So far as we can gather, the main characteristic of the storms lay in the violence of the thunder and lightning; the rainfall appears to have been very heavy only at isolated spots. The storms of the night of the 5th to 6th affected chiefly the south-east of the country, and a great many instances of damage by lightning were reported from Sussex, where the storm lasted from eight to ten hours, and was accompanied by a severe north-east gale. More than an inch of rain fell at Horsham (1·78 in.), Brighton, Hoddington, Bath, North Cadbury, Clifton and Wraxall. On the 7th the chief disturbances took place in the neighbourhood of the Thames Valley, where, at many places, three distinct thunderstorms occurred. Extremely heavy rain also fell at Whatlington, near Battle, where Miss Gripper writes that 2·84 in. fell in about three hours. At Wantage the lightning struck a field tearing up the ground for some yards. The most remarkable rainfalls were:—Battle, 2·84 in.; Hoddington, 2·02 in.; Wantage, 1·77 in.; Swerford, 1·26 in.; Fairford, 2·07 in.; Stow-on-the-Wold, 3·55 in.; Hidecote, 1·39 in., and Mickleton, 1·05 in. On 9th 2·50 in. of rain, accompanied by hail stones as large as walnuts, fell in an hour and 10 minutes at Caversham, causing much flooding. At Pyrton Hill 1·93 in. fell, and 1·48 in. at Forest Row, and there was much damage by lightning and hail. A newspaper reports 4·55 in. of rain in 4½ hours at Wheatley, in Oxfordshire.

## WIND WAVES IN WATER, SAND AND SNOW.

(Continued.)

Dr. Cornish explained and defended the statement of navigators that waves from 80 to 100 feet high had been encountered in the North Atlantic. He said the observations were usually made quite conscientiously by the officers on the great liners and the distorted height was due to several causes. The ship might be ploughing through a very heavy sea and be in the trough of a huge wave when it strikes the vessel. The added upward tendency thus given to the mass of rising water has sometimes caused it to damage the look-out tower, which under normal conditions would perhaps be 80 feet above sea level, and so the navigator is led to believe the wave far steeper than it really is.

In his second lecture on Waves in Sand, Dr. Cornish said they were always of a forced nature and could only move so long as the wind or water producing them continues its action. In showing some pictures of sand waves along the Lancashire coast, the lecturer said that he had found that the ratio of length to height was 18 to 1 and it was interesting to note that this ratio was the same with the great sand waves caused by the strong desert winds. These great sand waves, or *dunes*, are composed of the heavier sand of the desert, for neither the dust nor the small stones are easily piled into great dunes. They sometimes attain a height of several hundred feet with a steep slope on the lee side and a gentle slope on the weather side. A tremendous vertical wind circulation about a horizontal axis takes place on the lee side and this is entirely responsible for the steeper gradient on that side. The veering of the wind sometimes causes the dunes to alter their formation until they appear of confused shape but Dr. Cornish when measuring over a large and apparently confused area, found that the average ratio of length to height of 18 to 1 was maintained, the deficiency in some cases being exactly balanced by the excess in others. Some remarkable pictures showed sand waves in a brook moving up-stream when both the sand particles and the water were running down stream. In this case sand is ever being added on the weather side and depleted on the leeward side of the wave.

In his lecture on Waves in Snow, Dr. Cornish stated that snow might be classed under two heads:—(1). That which falls at a temperature of 32° F or thereabouts, which is the variety generally experienced in great Britain, and (2) that which falls at or below zero F. The first variety—owing to its adhesive nature—is not easily rippled, but the striking feature about the waves when formed is that the steep side invariably faces the wind. This peculiarity is often observed in the snow drifts of the Scottish Highlands. Dr. Cornish traversed Canada in winter, in order to study the dry sand waves, for on the Canadian prairie the snow is usually of the second variety. His most noteworthy observations were made in the Selkirk

Mountains of British Columbia. Snow waves were observed travelling at such a rate as to make their movement quite perceptible to the eye. The ratio of length to height of these snow waves is about 40 to 1, thus they are about half the steepness of the sand waves. A striking fact is that when the wind drops the snow sets hard and the wave formation is simultaneously stopped. This, in a great measure, accounts for the fact that snow does not pile intself into great dunes like the sand of the African desert, although a good deal of slipping goes on which also materially prevents the growth of the waves. Dr. Cornish said that snow never falls for more than a few minutes in any particular way. There is usually a lull probably followed by an accelerated fall. During the lull a wind springs up which marks or ripples the snow, and when the wind ceases this marking sets. Thus the second fall of snow does not fall on a level, but on a hard and rippled surface. This latter fall is in turn rippled and sets, and thus goes on a process of stratification which often continues for a considerable time with most interesting and striking results. While in Winnipeg, the lecturer had observed snow falling heavily on the prairie to the north of the town, accompanied by a stiff N. breeze which in the usual way would have caused extensive drifting outside the town. In the town no snow had fallen and business proceeded without hindrance, but on the southern side snow fell gently. The atmosphere had a strange appearance, and it was obvious that ice particles were passing over the town. Careful observation showed that the snow on the northern side was gently wafted upward by the breeze—probably aided by a warm upper current of air—and passed right over the town, falling again when reaching the colder air on the southern side. Dr. Cornish observed that snow drifts in the neighbourhood of obstacles assumed various shapes while the eddy-space was being filled, but when sufficient snow had fallen to fill the space, the vertical section of the drift was always fish-shaped with a blunt head and tapering tail, this being the form of least eddy-making resistance. In the Selkirk mountains the annual snow fall amounts to about 50 feet, and not infrequently as much as one foot falls in an hour.

Dr. Cornish concluded his lecture with some remarks on cloud ripples, and in showing the negative of one picture pointed out the striking similarity with the sand ripples discussed in his second lecture. The blue sky between the clouds—not the clouds themselves—is the true aërial ripplemark.

The lectures were largely attended, and at the close Sir George Darwin warmly thanked Dr. Cornish for his very interesting and instructive discourses.

H.E.C.



## THE WEATHER OF MAY.

By FRED. J. BRODIE.

EXCEPTING in the fourth week the weather was influenced almost entirely by cyclonic systems, which appeared, in the first instance, off our northern coasts, and, subsequently over the more southern parts. One of the most striking features was the frequency of thunderstorms, which occurred in one place or another almost every day. At the commencement, when a mild south-westerly breeze extended over the north, the thermometer rose to  $65^{\circ}$  in the north-east of England and the north and east of Scotland; the readings in the south being at the same time mostly below  $60^{\circ}$ . Later on, in the rear of depressions which moved from Iceland to Scandinavia, cool winds from between west and north-west prevailed, with showers of hail or sleet and frequent thunderstorms, especially in England. A sharp ground frost occurred rather extensively between the nights of the 2nd and 4th, the exposed thermometer falling to a minimum of  $21^{\circ}$  at Crathes,  $22^{\circ}$  at Llangammarch Wells, and  $23^{\circ}$  at Sheffield, Hereford and Cambridge. On the 8th and 9th, when the wind veered temporarily to the northward, a keener frost was experienced, shade temperatures of  $5^{\circ}$  to  $7^{\circ}$  below freezing being recorded in many places, and a reading as low as  $22^{\circ}$  at West Linton. On the grass the minima were as low as  $18^{\circ}$  at Cambridge,  $19^{\circ}$  at Hereford, and  $20^{\circ}$  at Birmingham, Rauceby, and Llangammarch Wells.

Between the 12th and 19th the weather was mainly easterly, the British Islands lying about midway between an anticyclone, which hovered between northern Russia and the oceanic region lying between Iceland and Scandinavia, and a large area of low pressure which spread up from southern Europe. The thermometer was at first low, but afterwards rose gradually in all but our north-eastern districts, where the east wind, blowing in from the sea, produced much fog and mist and a continued low temperature, the daily maxima being in many cases very little above  $50^{\circ}$ . In the west the weather on the 16th and 17th was much warmer than in the east, or even in the south, the thermometer exceeding  $70^{\circ}$  in several places, and reaching  $75^{\circ}$  at Bettws-y-Coed and  $78^{\circ}$  at Killarney. A day or two later a shift of wind from east to south-east resulted in the extension of warm air from the Continent, the thermometer on the 20th rising to between  $75^{\circ}$  and  $80^{\circ}$  in many parts of England. On our north-east coasts the maximum temperatures on the same day were about  $30^{\circ}$  lower than in the inland districts. In the fourth week the conditions were mainly anticyclonic, the days fairly warm, but the nights cold, with a ground frost in many districts on the 25th and 26th. On the 23rd and 24th shade temperatures of  $75^{\circ}$  were registered in several places. After about the 27th cyclonic systems began to skirt our northern coasts, and cool westerly winds set in, with showery thundery weather. The mean temperature was rather above the average in the south, and rather below the average in the north and east. Bright sunshine was below normal only in the south-west.

## RAINFALL TABLE FOR MAY, 1910.

STATION.	COUNTY.	Lat. N. ° /	Long. W. [° E.] ° /	Height above Sea. ft.	RAINFALL OF MONTH.	
					Aver. 1875— 1909. in.	1910. in.
Camden Square.....	<i>London</i> .....	51 32	0 8	111	1.75	2.22
Tenterden.....	<i>Kent</i> .....	51 4	*0 41	190	1.65	2.47
Steyning .....	<i>Sussex</i> .....	50 53	0 20	80	1.93	2.84
Southampton (Cadland) ...	<i>Hampshire</i> .....	50 50	1 22	52	1.96	1.48
Hitchin .....	<i>Hertfordshire</i> .....	51 57	0 17	238	1.93	2.49
Oxford (Magdalen College).	<i>Oxfordshire</i> .....	51 45	1 15	186	1.81	1.53
Bury St. Edmunds (Westley)	<i>Suffolk</i> .....	52 15	*0 40	226	1.93	2.78
Geldeston [Beccles].....	<i>Norfolk</i> .....	52 27	*1 31	38	1.78	3.91
Polapit Tamar [Launceston]	<i>Devon</i> .....	50 40	4 22	315	2.08	2.66
Rousdon [Lyme Regis] .....	" .....	50 41	3 0	516	2.02	3.08
Stroud (Upfield) .....	<i>Gloucestershire</i> ..	51 44	2 13	226	2.10	1.35
Church Stretton (Wolstaston)..	<i>Shropshire</i> .....	52 35	2 48	800	2.64	2.53
Coventry (Kingswood) .....	<i>Warwickshire</i> ..	52 24	1 30	340	2.15	2.06
Market Overton .....	<i>Rutland</i> .....	52 44	0 41	475	2.13	3.21
Boston .....	<i>Lincolnshire</i> .....	52 58	0 1	25	1.80	2.82
Worksop (Hodsock Priory).	<i>Nottinghamshire</i> ..	53 22	1 5	56	2.08	2.19
Macclesfield .....	<i>Cheshire</i> .....	53 15	2 7	501	2.43	2.24
Southport (Hesketh Park)..	<i>Lancashire</i> .....	53 38	2 59	38	2.13	2.32
Wetherby (Ribston Hall) ...	<i>Yorkshire, W.R.</i> ..	53 59	1 24	130	2.09	2.44
Arneliffe Vicarage .....	" .....	54 8	2 6	732	3.55	3.25
Hull (Pearson Park) .....	" <i>E.R.</i> .....	53 45	0 20	6	1.98	1.90
Newcastle (Town Moor) ...	<i>Northumberland</i> ..	54 59	1 38	201	2.04	2.64
Borrowdale (Seathwaite) ...	<i>Cumberland</i> .....	54 30	3 10	423	7.50	7.96
Cardiff (Ely).....	<i>Glamorgan</i> .....	51 29	3 13	53	2.56	3.36
Haverfordwest (High Street)	<i>Pembroke</i> .....	51 48	4 58	95	2.62	2.40
Aberystwyth (Gogerddan)..	<i>Cardigan</i> .....	52 26	4 1	83	2.63	1.90
Llandudno .....	<i>Carnarvon</i> .....	53 20	3 50	72	1.86	2.23
Cargen [Dumfries] .....	<i>Kirkcudbright</i> ...	55 2	3 37	80	2.87	2.92
Marchmont House .....	<i>Berwick</i> .....	55 44	2 24	498	2.53	1.60
Girvan (Pinmore).....	<i>Ayr</i> .....	55 10	4 49	207	2.97	2.73
Glasgow (Queen's Park) ...	<i>Renfrew</i> .....	55 53	4 18	144	2.40	1.78
Inveraray (Newtown) .....	<i>Argyll</i> .....	56 14	5 4	17	3.53	3.58
Mull (Quinish).....	" .....	56 36	6 13	35	2.99	2.90
Dundee (Eastern Necropolis)	<i>Forfar</i> .....	56 28	2 57	199	2.05	1.36
Braemar .....	<i>Aberdeen</i> .....	57 0	3 24	1114	2.33	1.25
Aberdeen (Cranford) .....	" .....	57 8	2 7	120	2.40	2.55
Cawdor .....	<i>Nairn</i> .....	57 31	3 57	250	2.07	1.73
Fort Augustus (S. Benedict's)	<i>E. Inverness</i> ...	57 9	4 41	68	2.36	3.52
Loch Torridon (Bendamph)	<i>W. Ross</i> .....	57 32	5 32	20	4.54	6.62
Dunrobin Castle .....	<i>Sutherland</i> .....	57 59	3 56	14	2.19	2.98
Wick .....	<i>Caithness</i> .....	58 26	3 6	77	2.04	2.09
Killarney (District Asylum)	<i>Kerry</i> .....	52 4	9 31	178	3.05	3.34
Waterford (Brook Lodge)...	<i>Waterford</i> .....	52 15	7 7	104	2.33	1.63
Nenagh (Castle Lough)...	<i>Tipperary</i> .....	52 54	8 24	120	2.51	2.23
Miltown Malbay.....	<i>Clare</i> .....	52 52	9 26	400	2.57	2.73
Gorey (Courtown House) ..	<i>Wexford</i> .....	52 40	6 13	80	2.24	1.27
Abbey Leix (Blandsfort)....	<i>Queen's County</i> ..	52 56	7 17	532	2.43	2.35
Dublin (Fitz William Square)	<i>Dublin</i> .....	53 21	6 14	54	2.07	2.55
Mullingar (Belvedere) .....	<i>Westmeath</i> .....	53 29	7 22	367	2.51	2.26
Ballinasloe .....	<i>Galway</i> .....	53 20	8 15	160	2.58	1.72
Crossmolina (Enniscoe).....	<i>Mayo</i> .....	54 4	9 18	74	3.17	3.13
Collooney (Markree Obsy.).	<i>Sligo</i> .....	54 11	8 27	127	2.80	3.89
Seaforde .....	<i>Down</i> .....	54 19	5 50	180	2.72	2.15
Bushmills (Dundarave) .....	<i>Antrim</i> .....	55 12	6 30	162	2.37	2.43
Omagh (Edenfel).....	<i>Tyrone</i> .....	54 36	7 18	280	2.66	2.71



## RAINFALL TABLE FOR MAY, 1910—continued.

RAINFALL OF MONTH (con.)					RAINFALL FROM JAN. 1.				Mean Annual 1875-1909.	STATION.
Diff. from Av. in.	% of Av.	Max. in 24 hours.	No. of Days		Aver. 1875-1909.	1910.	Diff. from Aver. in.	% of Av.		
		in. Date.			in.	in.			in.	
+	47	127	52	18	19	8.68	9.96	+1.28	115	Camden Square
+	82	150	39	2	18	9.41	12.03	+2.62	128	Tenterden
+	91	147	47	18	16	11.61	16.35	+4.74	141	Steyning
—	48	75	23	12	16	11.14	11.77	+ .63	106	Cadland
+	56	129	36	18	...	8.61	10.15	+1.54	118	Hitchin
—	28	85	24	11	19	8.33	8.38	+ .05	101	Oxford
+	85	144	41	14	19	8.55	10.35	+1.80	121	Westley
+2	13	219	93	14	18	7.84	10.36	+2.52	132	Geldeston
+	58	128	47	17	17	13.70	19.63	+5.93	144	Polapit Tamar
+1	06	152	92	17	18	12.15	12.58	+ .43	104	Rousdon
—	75	64	30	28	17	10.65	10.54	— .11	99	Stroud
—	11	96	35	18	18	11.71	10.96	— .75	94	Wolstaston
—	09	96	46	21	17	10.23	9.57	— .66	94	Coventry
+1	08	151	72	18	21	9.42	10.83	+1.41	115	Market Overton
+1	02	157	68	8	17	7.91	9.12	+1.21	115	Boston
+	11	105	46	15	18	8.74	7.93	— .81	91	Hodsock Priory
—	19	92	42	6	17	11.91	13.35	+1.44	112	Macclesfield
+	19	109	43	15	17	10.70	12.25	+1.55	114	Southport
+	35	117	43	5	19	9.46	12.89	+3.43	136	Ribston Hall
—	30	92	83	5	18	23.59	31.60	+8.01	134	Arncliffe
—	08	96	27	5†	17	8.99	8.24	— .75	92	Hull
+	60	129	44	31	23	9.51	11.21	+1.70	118	Newcastle
+	46	106	1.81	30	20	49.44	64.53	+15.09	130	Seathwaite
+	80	131	57	19	21	14.67	19.06	+4.39	130	Cardiff
—	22	92	37	30	18	16.71	15.53	—1.18	93	Haverfordwest
—	73	72	36	3	19	15.15	18.24	+3.09	120	Gogerddan
+	37	120	35	15	20	10.40	13.86	+3.46	133	Llandudno
+	05	102	49	15	11	16.22	22.39	+6.17	138	Cargen
—	93	63	42	11	14	12.00	9.98	—2.02	83	Marchmont
—	24	92	45	8	16	18.05	23.87	+5.82	132	Girvan
—	62	74	32	12	15	13.10	16.08	+2.98	123	Glasgow
+	05	101	56	6, 29	20	25.68	32.63	+6.95	127	Inveraray
—	09	97	53	4	21	20.25	24.04	+3.79	119	Quinish
—	69	66	52	8	11	9.96	8.19	—1.77	82	Dundee
—1	08	54	...	...	...	12.97	16.31	+3.34	126	Braemar
+	15	106	46	18	18	12.00	11.77	— .23	98	Aberdeen
—	34	84	34	11	12	10.38	12.99	+2.61	125	Cawdor
+1	16	149	82	30	15	18.15	23.99	+5.84	132	Fort Augustus
+2	08	146	1.35	4	17	33.32	44.63	+11.31	134	Bendamp
+	79	136	46	14	20	12.18	11.91	— .27	98	Dunrobin Castle
+	05	102	25	8, 27	19	10.88	11.81	+ .93	109	Wick
+	29	110	71	18	19	21.95	28.39	+6.44	129	Killarney
—	70	70	41	18	15	14.61	12.61	—2.00	86	Waterford
—	28	89	41	18	18	14.81	19.89	+5.08	134	Castle Lough
+	16	106	35	18	21	15.59	19.14	+3.55	123	Miltown Malbay
—	97	57	20	3, 18	15	12.83	11.36	—1.47	89	Courtown Ho.
—	08	97	62	18	18	13.26	16.67	+3.41	126	Abbey Leix
+	48	123	37	18	21	10.15	12.42	+2.27	122	Dublin
—	25	90	35	30	13	13.29	15.88	+2.59	119	Mullingar.
—	86	67	29	30	19	13.46	15.64	+2.18	116	Ballinasloe
+	04	99	37	7, 15	21	20.21	25.09	+4.96	124	Enniscoe
+1	09	139	53	15	20	15.72	22.71	+6.99	144	Markree
—	57	79	31	15	18	14.54	13.46	—1.08	93	Seaforde
+	06	103	57	3	19	12.93	16.85	+3.92	130	Dundarave
+	05	102	42	20	18	14.28	17.75	+3.47	124	Omagh

## SUPPLEMENTARY RAINFALL, MAY, 1910.

Div.	STATION.	Rain inches	Div.	STATION.	Rain. inches
II.	Warlingham, Redvers Road	2.61	XI.	Llangyhanfal, Plâs Draw....	2.16
"	Ramsgate .....	4.11	"	Dolgelly Bryntirion .....	3.90
"	Hailsham .....	2.47	"	Bettws-y-Coed, Tyn-y-bryn	3.00
"	Totland Bay, Aston House.	1.24	"	Lligwy .....	2.50
"	Stockbridge, Ashley .....	1.81	"	Douglas, Woodville .....	...
"	Grayshott.....	2.15	XII.	Stoneykirk, Ardwell House	2.25
"	Reading, Calcot Place.....	1.55	"	Dalry, The Old Garroch ...	3.13
III.	Harrow Weald, Hill House.	2.44	"	Langholm, Drove Road.....	2.43
"	Pitsford, Sedgebrook .....	2.32	"	Moniaive, Maxwellton House	2.26
"	Huntingdon, Brampton.....	2.90	XIII.	St.Mary's Loch, CramiltLdge	2.03
"	Woburn, Milton Bryant....	2.59	"	Edinburgh, Royal Observty.	1.46
"	Wisbech, Monica Road.....	2.87	XIV.	Maybole, Knockdon Farm...	3.26
IV.	Southend Water Works.....	3.34	XV.	Campbeltown, Witchburn...	3.85
"	Colchester, Lexden.....	2.49	"	Glenreasdell Mains.....	3.43
"	Newport .....	2.49	"	Ballachulish House.....	4.81
"	Rendlesham .....	3.03	"	Islay, Fallabus .....	2.96
"	Swoffham .....	3.12	XVI.	Dollar Academy .....	.87
"	Blakeney .....	2.24	"	Balquhider, Stronvar .....	2.83
V.	Bishops Cannings .....	1.86	"	Coupar Angus .....	1.37
"	Winterbourne Steepleton ..	2.48	"	Blair Atholl.....	.82
"	Ashburton, Druid House ..	3.31	"	Montrose, Sunnyside Asylum	2.37
"	Honiton, Combe Raleigh ...	2.79	XVII.	Alford, Lynturk Manse ...	2.55
"	Okehampton, Oaklands.....	3.34	"	Keith Station .....	1.07
"	Hartland Abbey .....	2.47	XVIII.	Glenquoich, Laon .....	13.20
"	Lynmouth, Rock House ...	2.93	"	Skye, Dunvegan.....	5.29
"	Probus, Lamellyn .....	2.14	"	N. Uist, Lochinaddy .....	3.19
"	North Cadbury Rectory ..	2.16	"	Alvey Manse .....	.94
VI.	Clifton, Pembroke Road ...	1.98	"	Loch Ness, Drumnadrochit.	2.86
"	Ross, The Graig .....	1.52	"	Glen carron Lodge .....	6.60
"	Shifnal, Hatton Grange.....	1.62	"	Fearn, Lower Pitkerrie.....	.72
"	Blockley, Upton Wold .....	2.07	XIX.	Invershin .....	2.66
"	Worcester, Boughton Park.	1.32	"	Altnaharra .....	2.29
VII.	Market Rasen .....	2.79	"	Bettyhill .....	1.97
"	Bawtry, Hesley Hall.....	1.94	XX.	Dunmanway, The Rectory..	2.12
"	Derby, Midland Railway ...	2.43	"	Cork .....	1.65
"	Buxton.....	2.93	"	Mitchelstown Castle .....	3.56
VIII.	Nantwich, Dorfold Hall.....	2.32	"	Darrynane Abbey .....	3.75
"	Liscard .....	2.37	"	Glenam [Clonmel] .....	2.93
"	Chatburn, Middlewood .....	2.61	"	Nenagh, Traverston .....	2.70
"	Cartmel, Flookburgh .....	2.50	"	Newmarket-on-Fergus, Fenloe	...
IX.	Langsett Moor, Up. Midhope	4.23	XXI.	Laragh, Glendalough .....	3.27
"	Scarborough, Scalby .....	2.43	"	Moynalty, Westland .....	3.52
"	Ingleby Greenhow .....	2.53	"	Athlone, Twyford .....	1.86
"	Mickleton.....	2.06	XXII.	Woodlawn .....	2.12
X.	Bardon Mill, Beltingham ...	2.33	"	Westport, St. Helens .....	3.07
"	Ilderton, Lilburn Cottage...	1.88	"	Achill Island, Dugort .....	5.19
"	Keswick, The Bank .....	3.08	"	Mohill .....	2.88
XI.	Llanfrechfa Grange.....	2.48	XXIII.	Enniskillen, Portora .....	3.11
"	Treherbert, Tyn-y-waun ...	4.27	"	Dartrey [Cootehill].....	3.32
"	Carmarthen, The Friary....	2.70	"	Warrenpoint, Manor House	2.40
"	Castle Malgwyn [Llechryd].	2.94	"	Banbridge, Milltown .....	1.89
"	Plynlimon.....	6.00	"	Belfast, Springfield .....	3.01
"	Crickhowell, Ffordlas.....	2.80	"	Glenarm Castle.....	2.85
"	New Radnor, Ednol .....	2.82	"	Londonderry, Creggan. Res.	3.38
"	Rhayader, Tyrmynydd .....	3.52	"	Killybegs .....	4.31
"	Lake Vyrnwy .....	2.89	"	Horn Head ...	2.73

## METEOROLOGICAL NOTES ON MAY, 1910.

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

LONDON, CAMDEN SQUARE.—Variable conditions prevailed throughout the first half, showers and sunshine alternating with great frequency. Temp. rose rapidly on 14th, and it continued warm and sunny to the close. A heavy TS with .52 in. of R occurred between 3 and 4.30 a.m. on 19th. Duration of sunshine, 196.1\* hours, with only one sunless day. Duration of R 39.5 hours. Mean temp. 54°·9, or 1°·0 above the average. Shade max. 80°·0 on 22nd; min. 29°·8 on 10th. F 1, f 7.

TENTERDEN.—Duration of sunshine, 187.0† hours. Shade max. 73°·0 on 16th; min. 32°·5 on 10th. F 0, f 4.

TOTLAND BAY.—Duration of sunshine, 227.6\* hours. Shade max. 73°·9 on 23rd; min. 34°·2 on 10th. F 0, f 7.

PITSFORD.—R .27 in. above the average. Mean temp. 53°·6. Shade max. 78°·6 on 20th; min. 28°·5 on 10th. F 3.

RENDLESHAM.—A heavy TS with L and E, and a strong, squally N.E. wind occurred on 12th, but the weather was fine and dry from 15th to 27th, with sunshine lasting several hours daily.

NORTH CADBURY.—T was much more frequent than usual, though only one storm came here, during which a tree was struck. It was cold to 13th but warm after. Shade max. 77°·5 on 23rd; min. 30°·5 on 9th. F 1, f 8.

ROSS.—Unsettled until 19th but the last 10 days were fine and warm and vegetation made rapid growth, although flowers generally were rather late. Shade max. 77°·6 on 23rd; min. 27°·0 on 9th. F 3, f 3.

HODSOCK PRIORY.—Shade max. 75°·6 on 20th; min. 28°·4 on 11th. F 2, f 6.

SOUTHPORT.—Duration of sunshine 224.6\* hours, and of R 46.9 hours. Mean temp. 51°·8, or 1°·3 above the average. Shade max. 76°·7 on 20th; min. 33°·8 on 9th. F 0, f 7.

HULL.—Generally dull with winds from between N.E. and N.W. Often squally and stormy with cold showers. Shade max. 73°·0 on 26th; min. 33°·0 on 3rd. F 0, f 6.

HAVERFORDWEST.—Generally cold and dry but with some warm days. Vegetation backward. Shade max. 76°·0 on 24th; min. 40°·8 on 26th.

LLANDUDNO.—The outlook for the hay harvest is very encouraging. Shade max. 65°·8 on 26th; min. 38°·2 on 7th.

CARGEN.—Halley's comet seen on 19th and 20th, resembling a hazy star. Vegetation was forward, and hay and corn crops promised well. Shade max. 77°·5 on 22nd; min. 29°·0 on 9th. F 2.

EDINBURGH.—Shade max. 65°·2 on 26th; min. 30°·3 on 9th. F 1, f 2.

COUPAR ANGUS.—The mean temp., 51°·2, was above the average, but this was due more to bright sunny days than to general warmth. A welcome change for the better occurred on 12th, but did not last, for a return to N. winds, with unpropitious weather, soon set in again and lasted generally to the close. Shade max. 73°·0 on 15th; min. 29°·5 on 9th.

FORT AUGUSTUS.—Shade max. 72°·7 on 25th; min. 31°·6 on 11th. F 2.

WATERFORD.—Several H showers occurred during the month, and T on 14th, 17th and 24th. Halley's comet was seen on 21st, 22nd and 23rd. Shade max. 72°·5 on 3 days; min. 34°·0 on 12th.

DUBLIN.—Except during an anti-cyclonic spell in the fourth week, the weather was unsettled and showery. H fell on 5th and the 3 following days, and there was a brief TS on the afternoon of 6th. Mean temp. 51°·5. Shade max. 69°·2 on 22nd; min. 35°·0 on 9th. F 0, f 1.

MARKREE.—H and E showers occurred in the first part with a TS on 13th, but the remainder was fine and dry generally. Shade max. 69°·0 on 25th; min. 32°·8 on 4th. F 0, f 7.

WARRENPOINT.—Shade max. 66°·0 on 4 days; min. 39°·0 on 8th. F 0, f 5.

## Climatological Table for the British Empire, December, 1909.

STATIONS.  (Those in italics are South of the Equator.)	Absolute.				Average.				Absolute.		Total Rain		Aver.
	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	53°·7	22	23°·2	21	45°·5	35°·1	38°·0	90	72°·1	18°·6	2·79	23	7·1
Malta ... ..	68°·9	25	47°·0	11	62°·9	54°·6	50°·3	80	130°·0	...	2·89	14	5·6
Lagos ... ..	90°·0	5, 7*	71°·0	2	87°·7	75°·0	74°·4	75	150°·0	69°·0	1·42	6	8·5
Cape Town ... ..	91°·0	16	45°·7	7	71°·3	57°·5	54°·0	72	...	...	2·97	13	5·4
Durban, Natal	90°·2	4	61°·8	7	80°·8	67°·3	...	...	148°·5	...	8°·07	22	7·1
Johannesburg ... ..	82°·2	13	50°·5	28	73°·5	55°·7	56°·1	81	145°·9	45°·5	5°·12	17	5·9
Mauritius ... ..	89°·3	27	65°·6	18	86°·0	70°·0	66°·1	69	159°·7	58°·2	1°·97	11	6°·0
Calcutta... ..	83°·0	2	52°·2	10	77°·3	57°·6	57°·2	72	...	46°·7	°·65	2	2°·3
Bombay... ..	88°·1	28	65°·8	16	83°·7	70°·3	67°·8	76	133°·6	59°·7	°·00	0	1°·5
Madras ... ..	90°·4	4	65°·5	27	85°·6	71°·1	68°·8	77	136°·5	62°·1	°·70	3	3°·5
Kodaikanal ... ..	66°·0	24	43°·4	28	61°·3	46°·9	45°·8	76	130°·8	29°·0	1°·32	7	5°·2
Colombo, Ceylon	88°·9	19	70°·0	29	86°·4	72°·1	72°·9	82	168°·0	66°·1	1°·14	10	5°·4
Hongkong ... ..	77°·9	9	50°·8	26	68°·9	58°·9	49°·6	59	126°·0	...	°·00	0	3°·0
Melbourne ... ..	103°·9	26	43°·6	4	75°·1	52°·3	46°·8	54	167°·7	40°·2	2°·77	13	4°·7
Adelaide ... ..	100°·7	27	44°·5	10	76°·9	54°·7	48°·8	55	156°·7	36°·2	°·33	5	4°·1
Coolgardie ... ..	109°·0	25	51°·0	1	91°·7	60°·7	47°·9	37	171°·0	49°·2	°·00	0	0°·6
Perth ... ..	100°·8	23	55°·1	21	86°·7	64°·1	55°·5	50	154°·3	46°·7	°·01	1	1°·8
Sydney ... ..	102°·8	14	50°·9	9	78°·8	61°·4	55°·9	59	145°·5	41°·5	3°·64	11	3°·6
Wellington ... ..	75°·2	6	43°·0	27	68°·9	56°·6	53°·2	71	136°·0	39°·0	1°·77	8	6°·5
Auckland ... ..	77°·5	22	54°·5	4†	72°·8	59°·4	58°·7	77	158°·0	51°·0	°·79	10	4°·7
Jamaica, Kingston	87°·8	12	63°·5	2	84°·9	66°·6	65°·2	74	...	...	°·00	0	...
Grenada ... ..	87°·6	5	71°·0	1	83°·0	73°·4	69°·0	74	141°·0	...	4°·10	23	3°·5
Toronto ... ..	44°·9	5	—5°·0	29	31°·7	20°·2	...	86	71°·2	—8°·7	2°·65	12	7°·5
Fredericton ... ..	43°·3	5	—15°·0	29	27°·7	14°·4	...	89	...	...	2°·53	8	7°·1
St. John's, N.B.	41°·3	6	3°·5	29	30°·1	20°·8	...	82	...	...	2°·65	12	7°·0
Victoria, B.C. ...	49°·0	12	23°·6	3	40°·0	33°·3	...	89	...	...	3°·76	10	7°·0
Dawson ... ..	18°·0	28†	45°·5	7	—8°·0	—19°·1	...	...	...	...	1°·17	8	6°·0

\* and 9. † and 29. ‡ 15 and 26. || and 30.

MALTA.—Mean temp. of air 57°·8. Average bright sunshine 5·6 hours.

Natal.—Rainfall 3·28 in. above the average.

Johannesburg.—Bright sunshine 221 hours.

Mauritius.—Mean temp. of air 0°·7, of dew point 1°·5, and R 2·97 in., below averages. Mean hourly velocity of wind 9·6 miles, or 1·2 below average.

KODAIKANAL.—Bright sunshine 184 hours.

COLOMBO.—Mean temp. of air 77°·6, or 1°·5 below, of dew point 2°·0 above, and R 4°·13 in. below, averages. Mean hourly velocity of wind 5·7 miles. TSS on 2 days.

HONGKONG.—Mean temp. of air 63°·6, bright sunshine 249·7 hours, or 70 hours above average. Mean hourly velocity of wind 11·4 miles. R 1·18 in. below average.

Melbourne.—Mean temp. of air 0°·8 below, and R ·53 in. above, averages.

Adelaide.—Mean temp. of air 5°·5 below, and R ·54 in. below, averages. The coolest December on record.

Sydney.—Mean temp. of air 0°·1 above, and R 1·16 in. above, averages.

Wellington.—Mean temp. of air 2°·7 above, and R 1°·63 in. below, averages. Bright sunshine 280·5 hours.

Auckland.—Rainfall only a quarter of the average. Mean temp. slightly above average.