Symons's
Meteorological Magazine.

No. 567. APRIL, 1913. Vol. XLVIII.

NORTH ATLANTIC ICE OBSERVATIONS.

As a result of the recommendations of the Commission of Enquiry into the loss of the *Titanic*, after collision with an iceberg in the North Atlantic in April, 1912, the British Government decided that investigations should be set on foot with a view to warning shipping of the movements of ice in the Atlantic north of the steamer tracks. While larger schemes requiring time for their elaboration and involving considerable expense in their execution are under consideration, a preliminary step has been taken by the Board of Trade, in conjunction with the principal shipowners, who divide the expense with the Government, in dispatching a vessel early last month.

The ship selected is the *Scotia*, an old Norwegian whaler, which was practically rebuilt by the famous yacht designer, G. L. Watson of Troon, in 1902, for the Scottish Antarctic expedition under Dr. W. S. Bruce. A photograph of the vessel appeared in this Magazine for December, 1902 (Vol. **37**, p. 177). She has been fitted with a powerful wireless telegraphy installation to enable her to report at frequent intervals to the Marconi stations on the coast of Newfoundland and Labrador, the messages will be forwarded thence to the Meteorological Office, which has undertaken the collection of the data and their utilization on the weekly ice maps published on the Pilot Charts. We suppose that the *Scotia* will also communicate with liners at sea in case of need. The investigation ship is under the command of her old captain, Mr. Thomas Robertson, who has had unique experience of ice-navigation in both the Arctic and the Antarctic regions. He is one of the most experienced of the whalers still sailing from Dundee, and in the voyage of Dr. Bruce and on other occasions has had considerable practice in making oceanographical observations. The scientific staff on board is under the charge of Mr. D. J. Matthews, one of the most accomplished practical oceanographers in the country, whose work on the English Channel and its approaches carried out for the International Council for the Study of the Sea is well known. He has the assistance of two other scientific men. One of these is qualified for the study of

plankton—the minute organisms which are invaluable in the investigation of ocean currents, as their character often indicates the place of origin of the water. The other is a trained meteorologist, so that there is no doubt that valuable additions will be made not only to our knowledge of ice-movements, but to the physical conditions of sea and air on which these movements ultimately depend.

It is gratifying that this country should have taken the initiative in a work of such scientific and practical importance; and we observe with no less pleasure that investigations of a somewhat similar character are being undertaken simultaneously by the Canadian Government.

ROYAL METEOROLOGICAL SOCIETY.

At the meeting of the Royal Meteorological Society, held on March 12th, at the Surveyors' Institution, Great George Street, Westminster, Mr. C. J. P. Cave, President, in the chair, Mr. R. G. K. Lempfert, Superintendent of the Forecast Branch of the Meteorological Office, delivered a lecture on "British Weather Forecasting, Past and Present."

The lecturer gave a very interesting account of the origin and evolution of weather forecasting in this country. He traced the development of the present system from the first attempts to construct synoptic weather maps, and recalled that the first weather reports were produced by Glaisher as early as 1849, and that stimulus was given to the matter by the great exhibition of 1851.

The utilization of telegraphy, for the rapid collection of meteorological data, was the first important step in development. This was discussed at the British Association Meeting, at Aberdeen, in 1859, and in the following summer Admiral Fitzroy commenced the systematic study of simultaneous meteorological observations for the Meteorological Department of the Board of Trade. Among the lantern slides exhibited was an early issue of Fitzroy's Weather Report, which, we were interested to observe, was in the familiar handwriting of Mr. G. J. Symons at a period which must have immediately preceded his resignation from the Meteorological Department in order to take up his life work in connection with the study of British Rainfall.

The first use to which the data thus brought together was put was not forecasting of weather so much as the issue of storm warnings to fishing vessels. The necessity of even this does not seem to have been realised until the nation was awakened by the great *Royal Charter* disaster, which stimulated the hitherto somewhat languid interest in the subject.

Fitzroy's first scheme, produced early in 1860, involved only *occasional* reports from stations in the extreme west, but on April 4th

of that year, before this scheme had come into operation, the French astronomer, Le Verrier, wrote asking for a *regular* exchange of daily observations. This led to the establishment of a regular service in September, 1860. From this time forward the collection of meteorological statistics, within a few hours of their having been observed, has been carried on without intermission; and Mr. Lempfert gave an extremely interesting account of the part played by various newspapers in helping forward this great national work. At the death of Admiral Fitzroy, in 1865, the work of the Meteorological Office was placed in charge of a committee of the Royal Society, and the forecasts which Fitzroy had commenced to make on a somewhat ambitious scale were for a time discontinued. Various experimental investigations were made during the following years, that of the phenomenon of weather travel, which was exploited by Gordon Bennett of the *New York Herald*, being among the number.

In 1879 forecasting was resumed as the result of numerous petitions, and it has from that time been continued without interruption. The newspaper press again played a large part in the encouragement of the work, and *The Times*, the *Standard*, and the *Daily News* for many years bore the entire charges of the evening services.

The lecturer gave a very detailed account of the various extensions which have been made in the observation area, and made it possible for the audience to realise the immense amount of organization and patient grappling with difficulties carried out by Dr. R. H. Scott, who succeeded in practically completing the network of land stations, and more recently by the exertions of Dr. W. N. Shaw, the present Director. The story of the international negotiations, which have led to the wide exchange of information, and the prompt manner in which advantage has been taken of any new means by which the area could be extended, such, for example, as the laying of a new cable, bear witness to the zeal and energy of the Meteorological Office; and the most recent triumph of the utilization of wireless telegraphy, so as to bring a portion of the hitherto unknown ocean area into the scheme, formed a fitting climax.

A description was given of the elaborate and careful methods by which the weather forecasts, and especially the storm-warnings which are issued, are subsequently checked, and the large proportion of successful forecasts is a sufficient guarantee that the labour is not ill-spent.

A very hearty vote of thanks were proposed by Mr. Mellish and seconded by Mr. Druce.

The following were elected Fellows of the Society:—Messrs. A. J. Ashdown, D. K. Syed Ebrahim, C. F. W. Hallilley, Rabbi J. L. Levy, D.D., I. V. Margary, James Watt, F.R.S.E., W.S., H. L. Wilkinson; Mrs. Theodore Williams.

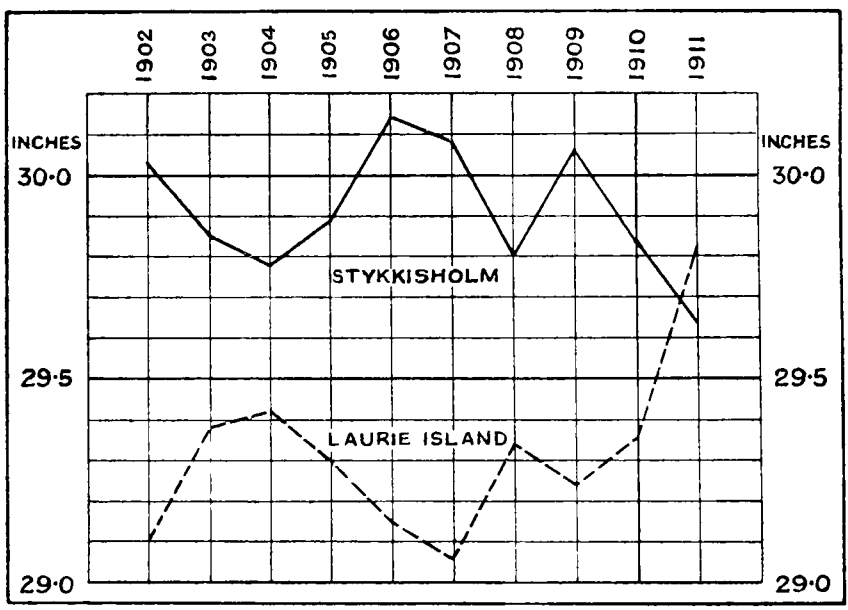
SOUTHERN HEMISPHERE SEASONAL CORRELATIONS.

By R. C. Mossman, F.R.S.E.
(of the Argentine Meteorological Office).

(Second Article).

In the month of May a most pronounced opposition is shown between the barometric pressure at Stykkisholm, Iceland, lat. 65° N., and Laurie Island, South Orkneys, lat. 61° S. Stykkisholm, it is almost superfluous to remark, is situated in the vicinity of the great North Atlantic "centre of action," while the South Orkneys are located a little to the N.W. of one of the most pronounced Antarctic

BAROMETRIC PRESSURE IN MAY AT STYKKISHOLM, ICELAND (LAT. 65°N.) AND LAURIE ISLAND, SOUTH ORKNEYS (LAT. 61° S.)



"centres of action," viz., that in the Weddell Sea. The mean barometric pressure* at these two places for the month under review

* For Stykkisholm data I am indebted to Captain Ryder, Director of the Danish Meteorological Institute. The South Orkney data from 1904 to 1911 are taken, by kind permission of Mr. W. G. Davis, from Vol. 17 of the *Anales* (Part II.) now in course of publication by the Argentine Meteorological Office. The 1903 data are from the *Scotia* Reports, while the value for May, 1902, is from Tafel 3 of the *Meteorologischer Atlas, Deutsche Südpolar-Expedition, 1901-1903*, von Wilhelm Meinardus und Ludwig Mecking, Berlin, 1911. I am also indebted to Dr. W. N. Shaw for St. Helena data to end of 1911, in continuation of data given in publication M.O. 203.

is as follows, the values being given reduced to sea-level and gravity at lat. 45°.

	1902. ins.	1903. ins.	1904. ins.	1905. ins.	1906. ins.	1907. ins.	1908. ins.	1909. ins.	1910. ins.	1911. ins.	Mean. ins.
Stykkisholm .... (65° N. lat.)	30·03	29·85	29·78	29·89	30·14	30·08	29·80	30·06	29·83	29·63	29·91
Laurie Island .. (61° S. lat.)	29·10	29·38	29·42	29·30	29·15	29·06	29·34	29·24	29·36	29·82	29·32

The above data are shown graphically in the foregoing curves. Expressed as departures from the normal the above values show the following deviations :—

	1902. in.	1903. in.	1904. in.	1905. in.	1906. in.	1907. in.	1908. in.	1909. in.	1910. in.	1911. in.
Stykkisholm..	+0·12	—0·06	—0·13	—0·02	+0·23	+0·17	—0·11	+0·15	—0·08	—0·28
S. Orkneys ..	—0·22	+0·06	+0·10	—0·02	—0·17	—0·26	+0·02	—0·08	+0·04	+0·50

The correlation co-efficent deduced from these values is 0·90, and probable error = 0·12.

An examination of the barometric data for May at a number of stations on the South Atlantic littoral, shows that in South America, south of about latitude 47°, the pressure departures from the normal are in harmony with those observed at the South Orkneys and South Georgia. At Punta Arenas, situated in Magellan Strait, the correlation weakens, this station being located on the wind divide that separates Pacific from Atlantic influences. Even here, however, the May pressure departures differ from those at Stykkisholm in 75 per cent. of the 23 years during which a comparison could be made (1889–1911). The physical processes that in May month bring about a high pressure in the Icelandic region, are thus associated with a lowering of pressure over the south temperate and sub-antarctic Atlantic areas. Having examined barometric data from inter-tropical regions, including St. Helena, and also from the Azores, eastern Europe, and the United States of America with indefinite results, I have come to the conclusion that the dominating factor influencing these May pressure variations in the North and South Atlantic is to be found in the polar regions. Owing to lack of data it has not been possible to ascertain whether the thermal equator oscillated to any extent during the month of May in the period under consideration, so as to cause changes in the general circulation of the atmosphere. As to *why* the above striking differences should obtain only in the month of May no explanation can be offered. No break has yet shown itself in the sequence, as in May, 1912, an inspection of Icelandic and south Atlantic data (the latter represented by South Georgia and Punta Arenas) shows a rise of pressure over the former and a marked fall over the latter area, when compared with the very abnormal features of May, 1911.

In order to ascertain the effect on southern wind circulation (as represented by data from Punta Arenas and the adjacent station of Evangelists Island, at the Pacific entrance to the Straits of Magellan, for both of which places we have observations of wind direction from 1899 to 1909), the May records of the two three-year groups, 1900, 1904, and 1905, and of 1899, 1902, and 1907, have been taken. At Punta Arenas the Mays of the first group show a mean departure of pressure (normal 1889-1911) of +0·181 in., and of the second group —0·213 in. The corresponding departures from the normal at Stykkisholm were —0·069 in. and +0·125 in. respectively. Similarly, to see what difference existed in the North Atlantic circulation for these two series of years, May wind data were extracted from the summaries given in the Journals of the Scottish Meteorological Society. These comprise the frequency of the wind for the whole of that country based on all the returns, for two stations in Scotland North (Bressay Sound and North Unst), for four stations in Scotland West (Cape Wrath, Butt of Lewis, Barra Head and Skerryvore), for three stations in Scotland East (Kinnaird Head, Aberdeen and Bell Rock), and finally for all England.* The values, based on observations taken twice a day, have all been reduced to percentages, and in the following table (1) refers to the Mays of 1900, 1904 and 1905, with pressure high in the extreme South and low in the far North Atlantic, and (2) to the Mays of 1899, 1902 and 1907, when the reverse conditions of barometric pressure obtained in the regions under consideration :—

	Punta Arenas.		Evangelists Island.		Scotland.								England.	
					Whole Country.		North.		West.		East.			
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
N.	12	13	6	5	8	14	16	29	9	16	12	19	12	15
N.E.	11	12	5	3	12	14	17	21	13	16	16	19	15	13
E.	7	6	8	3	13	20	6	9	11	23	7	10	7	9
S.E.	4	0	18	6	8	8	13	9	10	10	8	10	6	7
S.	12	3	20	11	11	6	14	6	16	9	21	10	10	8
S.W.	27	11	14	15	15	10	12	7	16	10	14	10	17	12
W.	20	35	9	33	17	13	11	12	14	10	9	11	14	14
N.W.	7	20	14	24	11	10	10	6	10	6	12	10	12	12
Calm	0	0	6	0	5	5	1	1	1	0	1	1	7	10

It will be seen that in Mays with high pressure at Punta Arenas, the winds there show a marked excess (as compared with Mays in which pressure is low) from the S.W. and S., while those from W. and N.W. are in defect. At Evangelists Island where the winds are free from the effect of land disturbance, marked differences are also apparent between the two three-year groups. Here in Mays with high pressure the prevailing direction is from the south (S.E., S. and S.W.), while in Mays with low pressure the predominant winds are

* See Marriott, Variations in the English Climate during the Thirty Years 1881-1910. *Quar. Jour. Roy. Met. Soc.*, Vol. **37**, July, 1911. Table I.

westerly (S.W., W. and N.W.). Without entering into details, it may be stated that in the Mays of 1900, 1904 and 1905 the barometric gradient on the S. Atlantic and Pacific coasts between the latitudes of 40° and 52½° S. latitude was only one-quarter of that observed in the Mays of 1899, 1902 and 1907, which clearly points during the first three Mays to a northward extension of the anticyclone which normally covers the south of Grahams Land south of the Antarctic circle. In the second group, embracing the Mays of 1899, 1902 and 1907, the region south of Cape Horn was the theatre of cyclonic activity, with a very steep gradient south of the 40th parallel.

In the northern Atlantic area represented by the groupings for Scotland and England, there are also pronounced variations in the wind circulation during the two groups of years. The Mays of 1900, 1904 and 1905 with pressure at Iceland below the normal, show an excess of south and south-west, and a defect of north and east winds, compared with the Mays of 1899, 1902 and 1907, when pressure at Stykkisholm was in excess of the normal, thus intensifying the easterly current. The differences between the two groups are smaller in England than in Scotland, and the contrast is most pronounced in Scotland W. or the region nearest to the North Atlantic low pressure area. It is of interest to note that the mean temperature of the Mays of 1900, 1904 and 1905 with pressure below normal in Iceland were warmer in Britain than those of 1899, 1902 and 1907 (Iceland pressure above normal) to the extent of 1°·4 in England, 1°·6 in Scotland, 1°·8 in Scotland W., 1°·5 in Scotland E., and 0°·9 in Scotland N.

THE WEATHER OF MARCH.

OVER the whole of the British Isles the conditions were of a changeable type with frequent precipitation, which, in the northern part of the kingdom, was often in the form of sleet or snow.

At the beginning of the month a large anticyclone with pressure above 30·3 inches covered the east and south of England and extended over France and Germany. This occasioned southerly winds over the British Isles which blew freshly on the northern and north-western coasts. As this system moved away to the east an Atlantic depression approached, causing heavy rain in Ireland and lesser falls over the United Kingdom generally. Temperature rose to above 50° over the greater part of the kingdom. On the 4th the centre of a very deep depression, with minimum readings below 27·9 inches, moved north-eastward across Iceland, and south-westerly gales were experienced over the British Isles. The passage of several Atlantic depressions over these Islands during the days following resulted in a succession of southerly or westerly gales over a wide area. Temperature remained high, 55°, or above, being recorded on several days in different parts of the kingdom. Many stations experienced the highest temperature of the month between

the 4th and 6th, maximum readings of 57° being registered in many places, 58° in the west of Ireland and 59° in the London area. On the 7th and 8th the maxima were generally below 50° and were only a little higher on the 9th and 10th. On the 11th 55° was recorded in many districts during the day, but frosts occurred in the midland and south-eastern counties at night. A "V-shaped" depression that appeared over the western and northern parts of the Kingdom travelled quickly eastward, and rain, sleet or snow fell generally in the west and north. During the 13th a large and deep depression advanced over Iceland, and southerly gales occurred on the north-western coasts of the British Isles. On the 14th a decided fall in temperature occurred, and rain, sleet or snow fell generally on that and the following day. On the night of the 16th a small depression passed over the south and east of England, and the weather continued very unsettled. Frequent gales, with rain or snow, occurred, generally with temperature below the average except in the east and south-east of the country. On the 18th the temperature failed to reach 45° in many parts, and on the following day it reached 50° in the south-west and south, but in the north of Scotland only touched 40°. This was the coldest day of the month in most localities, and frosts occurred over practically the whole kingdom. The minima at Crieff, Marchmont and Fulbeck, were 20°, and at West Linton, 16°. A small depression developed off the south-west of England on the 22nd and travelled across the country during the night, causing severe southerly and south-westerly gales in the Channel and in the south of England. Rain fell generally, and thunderstorms occurred in many places. Fresh winds or gales blew during the week following, with unsettled weather generally. As a rule the western parts of the kingdom enjoyed fairer conditions than the eastern. Temperature fluctuated frequently, but on the whole did not differ greatly from the average. A reading of 58° occurred on the 29th at Killarney, and 55° or above was recorded in many districts.

The rainfall of the month was in excess of the average over practically the whole kingdom. Rather less than 2 inches fell over the extreme eastern counties, and practically the whole of the Thames Valley had less than 4 inches. Nearly 9 inches fell over an area on Dartmoor, many stations in Brecon had over 10 inches, and an area in the Lake District had over 15 inches. In Scotland less than 3 inches fell on the low land of Aberdeenshire, but at Loan, in Inverness, the fall exceeded 18 inches. The rainfall in Ireland varied from about 2 inches in Dublin to 6 or 7 inches in the western counties, and over 10 inches in County Kerry. The general rainfall over the great divisions of the kingdom, expressed as a percentage of the average, was as follows:—England and Wales, 169; Scotland, 159; Ireland, 145; British Isles, 159.

The duration of bright sunshine differed but slightly from the average generally.

THAMES VALLEY RAINFALL — MARCH, 1913.

Symons's Meteorological Magazine.

Watershed of River Thames above Teddington, and River Lee above Feildes Weir

Rainfall Stations reporting

Isohyetals.

INTERNATIONAL BALLOON ASCENTS.

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

August 11th, 1910.

Starting Point	Country.	A miles.	B ° F.	C miles	D ° F.	E miles	F
Manchester	England ...	7·5	—74	11·9	—65	116	S.E. by E.
Pyrton Hill	,, ...	7·8	—87	9·2	—71	70	S.E. by E.
Oughterard	Ireland	7·6	—71	9·4	—56	52	E. by N.
Brussels	Belgium ..	6·8	—72	10·3	—58	61	S.
Hamburg	Germany ..	6·9	—71	9·6	—56	25	S.S.W.
Lindenberg	,, ..	6·8	—60	9·6	—54	65	S.S.E.
Paris	France	6·5	—56	9·2	—56	12	S.
Strassburg	Germany ..	6·3	—58	11·3	—56	26	S.E. by S.
,, ...	,, ..	6·3	—60	8·3	—60	47	S. by W.
Vienna	Austria	6·8	—71	13·1	?	12	E. by S.
Pavia	Italy	6·9	—78	8·9	—60	55	W.S.W.
Nizhni Olchedaeff	Russia	6·2	—58	9·8	—53	57	E. by N.
Ekaterinberg ...	,, ...	6·5	—58	10·6	—53	77	N.E.

August 12th, 1910.

Petersfield	England ...	7·6	—71	8·8	—72	200	E. by S.
Brussels	Belgium ...	7·7	—85	10·4	—65	60	S.E.
Hamburg	Germany ..	6·8	—71	7·8	—62	35	E.S.E.
Lindenberg	,, ..	7·3	—87	14·0	—56	21	S.E.
Paris	France	7·9	—74	9·7	—64	103	E.S.E.
Strassburg	Germany ..	7·3	—69	8·3	—64	51	S.
Vienna	Austria	6·6	—65	13·8	—45	17	S.E. by S.
Pavlovsk	Russia	5·8	—63	10·8	—49	46	E.
Nizhni Olchedaeff	,, ...	6·1	—56	8·8	—53	33	N.E.by E.

August 13th, 1910.

Brussels	Belgium ...	7·9	—71	8·6	—69	119	S.S.E.
Lindenberg	Germany...	6·5	—45	11·3	?	63	S.S.E.
Paris	France	8·0	—72	10·4	—67	95	S.E. by S.
Strassburg	Germany ..	7·7	—72	10·3	—71	72	S.E. by S.
Munich	,, ..	8·6	—69	9·7	—60	66	S.E. by S.
Vienna	Austria ...	7·7	—72	12·1	—50 ?	42	S.E.
Pavia	Italy	7·9	—74	9·7	—78	39	S.E. by S
Pavlovsk	Russia	5·4	—51	10·7	—45	19	S.
Nizhni Olchedaeff	,, ...	7·2	—65	7·8	—53	31	S. by E.

A Height in miles of commencement of isothermal column.
B Temperature, F°., at bottom of column.
C Greatest height of reliable record in miles.
D Temperature, F°., at greatest height.
E Distance in miles of point where balloon fell.
F Bearing of falling point from starting point.

During the three days shown above, and, in fact, during the whole week, very uniform barometric conditions prevailed; but, on the whole, the barometer was lower to the eastward. The figures present no unusual features, except one or two high temperatures at the top, which may, perhaps, be due to solar radiation.

Correspondence.

To the Editor of Symons's Meteorological Magazine.

THE LOWEST BAROMETER ON RECORD IN NEW YORK.

On January 3rd, 1913, this city was visited by a phenomenal storm. At 9 a.m. the barometer stood as low as 29·15 in., and was falling rapidly, the wind was light, with a dense fog on the river. About 2 p.m. pressure had fallen to 28·61 in., which is the lowest reading ever known in this city; the wind then rose rapidly, and soon attained a velocity of 87 miles an hour. The maximum temperature was 56°, and by 8 p.m. it had fallen to 30°, and it was snowing.

The barometer recovered from this decline abnormally slowly, and the following morning the wind was blowing at the rate of 60 miles an hour. The precipitation that attended this storm was less than ·50 in.

C. DECKER.

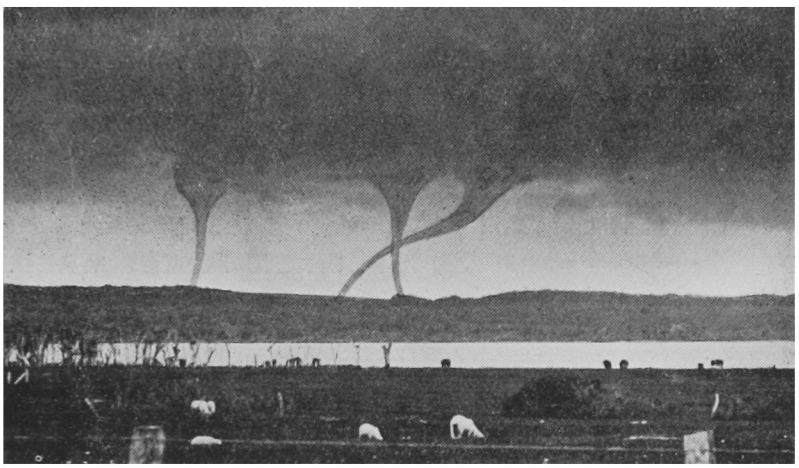
65, West 50th Street, New York, January 9th, 1913.

WATERSPOUTS AT THE CHATHAM ISLANDS.

Waterspouts were observed here on November 10th, 1912, and the following notes, if not of scientific value, may be of interest.

The weather for some days previous had been unsettled, and on the 9th there was thunder and lightning, with showers. The sky cleared after nightfall, and the night of the 9th was clear and starlight, the wind being S.E. On the morning of the 10th the weather was clear, but it began to cloud over at about 10 a.m., when we again had thunder and lightning. On the morning of the 10th I was sitting in the porch facing north-north-east at about 10 a.m., enjoying the bright sunshine. Gradually the sky became overcast, and there was a dense rain-cloud above, as shown in the photograph. Below the bank of clouds to sea level it was quite clear and bright, and towards the eastward heavy rain was evidently falling. From the porch, where I and my daughter were sitting, we had a very good view of the sea. A little after 11 a.m. my daughter drew my attention to a peculiar funnel-shaped form which was beginning to appear on the lower edge of the cloud bank. I saw at once that something very out of the common was beginning, and said "Well, I have never seen a waterspout, but it looks to me as if this was one forming." We then carefully watched, and it was soon plainly evident that a waterspout was taking place. We marked how the funnel shaped excrescence from the cloud bank gradually extended downwards to the sea, and from below we could observe another funnel rising which soon joined the one above; the whole appearance had that of a spiral tube evidently formed by a rotary

motion ; the water on the sea end of the spout was in a perfect foam. The spout first formed was to the right hand on the eastward side next to where the heavy rain was evidently falling. Almost immediately after the formation of the first spout another began to make its appearance. It was much thicker than the first, and, as in that case, the sea below the cloud was violently agitated, and even from were we stood, which must have been quite seven or eight miles



distant, the form like columns was plainly seen. This was by far the largest of the spouts, and continued for nearly half an hour. Towards the end, before the spout began to subside, the sea had almost the appearance of a geyser, so violently was it agitated. I think the large one must have been nearer to us than the first, for as the first began to dissolve it gradually drifted towards the big one, and soon the remains appeared as a sort of appendix hanging from the cloud above. The spouts disappeared slowly, and the whole phenomenon occupied about three-quarters of an hour.

Chatham Islands. F. A. D. COX, LIEUT., R.N.

CURIOUS PHENOMENON.

AT 11 p.m., on Monday, 17th March, the air was calm after a squally day, and the stars were visible through a damp haze, temperature being just above 32° F., I heard sounds like a shower of small pebbles on the roofs of neighbouring houses, evidently due to the slates crackling. I have noticed this phenomenon on one previous occasion under precisely similar conditions of weather, but have never seen mention of it anywhere. Perhaps some of your readers have had a similar experience.

A. S. MARTIN-SMITH.

Cedar Villa, Wood Street, Barnet, 2nd April, 1913.

ORIGIN OF THE SNOWDON GAUGE.

It may interest some of your readers to know the origin of the so-called Snowdon Gauge. When my old friend Mr. Symons came down to my house at Calne to see my rain gauges, 9 of the elevation series and 14 of the magnitude series, on July 15th, 1863, he was much struck by an 8-inch gauge (an ordinary white metal one invented by Mr. Rowden, a chemist in Calne, where the gauge was made) with a rim of the same height as that of the Snowdon Gauge. Mr. Rowden was a very keen observer of rainfall, and he told me that he had for some time noticed that, in our stormy weather on the Wiltshire Downs, the wind blew out both rain and snow in the low-rimmed gauge—and he lent me his new one to try it with my 8-inch gauge, with the result that it invariably collected more than the low-rimmed one. Mr. Symons was so much interested that he forthwith started the Snowdon. I think it should have been called the "Rowden." He was with me four days, and had a good opportunity of testing the two, the weather being stormy. MICHAEL FOSTER WARD.

Upton Park, Slough, 19th February, 1913.

THE RAINFALL OF THE WINTER SIX MONTHS, 1912-1913.

As was the case in the six months, October, 1911, to March, 1912, the rainfall of the winter six months ending March, 1913, was decidedly in excess of the average amount. The period was, however, not so notable in this respect as on that occasion; and in fact the months of October and November were almost exactly normal in point of view of total general rainfall, whilst February was in all parts of the kingdom a distinctly dry month. December was wet in all parts; and January, though dry in England, was much less so in

Rainfall, October, 1912--March, 1913, when the Average is taken as 100.

1912—1913.	England & Wales. As per cent. of Average.	Scotland. As per cent. of Average.	Ireland. As per cent. of Average.	British Isles. As per cent. of Average.
October	99	106	88	98
November ...	92	113	86	97
December ...	131	159	143	143
January	66	95	174	147
February ...	60	80	71	69
March	169	159	145	160
October to March	118	119	118	119

Scotland, and was very wet in Ireland. March was relatively the wettest month of the season, though the actual amount of rain measured was larger both in December and January. An interesting feature is the unusual uniformity of the rainfall in relation to the average, which is noticeable in every month except January. This is even more striking when the period is considered as a whole, the excess of 19 per cent. being substantially identical in all the great divisions of the British Isles.

REVIEWS.

Weather Science. By R. G. K. LEMPFERT, M.A., Superintendent of the Forecast Division of the Meteorological Office. London, T. C. & E. C. Jack. Not dated. Size $6\frac{1}{2} \times 4$. Pp. 94.

THIS is the latest of the important group of small books on meteorology by responsible authors, which has been brought into existence by the competition of rival series of popular scientific booklets. Mr. Lempfert's work is welcome in a special degree as a simple and authoritative introduction to the study of the weather charts and forecasts of the Meteorological Office, which are the most widely disseminated, generally read and, we fear, least understood by the people, of all the products of Government endowment of science. It would be possible to criticise any treatment of any branch of science contained in less than 100 pages by just complaints of what has been left out, for it is obvious that completeness of presentation within such limits is impossible, but this really matters little for the aspects ignored by the writer in one series are usually those which are most fully dealt with by the writers in other series, and taking together all the popular books on meteorology reviewed in these pages during the last year the public of to-day can obtain at a moderate price a far better outline of meteorology than was ever available before.

We cannot resist calling attention to the slip on p. 12, "The normal height of the barometer is 760 centimetres or 29·92 inches." This, of course is the veriest inadvertence, but the fact that it was not noticed by the proof readers shows that the metric system is still very far from being familiar to the British mind. We venture to think that if the slip had been feet for inches, instead of centimetres for millimetres, the printer's reader would have queried the statement.

On p. 23 the average rainfall of the British Islands is given as 25 inches per annum. This is an error which a printer could hardly detect, but it is obviously a slip for 35 inches, and even so, we are inclined to think that 40 inches would be nearer the truth. As a historical point we may observe that the word "recent" on p. 69 might well have been omitted from the statement that "In the southern hemisphere recent Antarctic expeditions have also met with easterly wind after the west wind belt of the 'roaring forties' had been left behind." Such winds were reported by the earliest Antarctic explorers. The best chapter is in our opinion the last, which treats of the Upper Air, and we rejoice to see that Mr. Lempfert adopts the term stratosphere in place of the ambiguous or even misleading phrase isothermal column.

Der tägliche Gang der Lufttemperatur in Deutschland, von [The daily march of Air Temperature in Germany, by] DR. H. HENZE. (*Veröffentlichungen des Königlich Preussischen Meteorologischen Instituts, Nr. 254.*) Berlin, 1912. Size 13 × 10, pp. 47, 1 plate. Price 4 marks.

THE phenomenon of the diurnal variation of temperature in Germany is somewhat fully discussed in this publication, together with the different combinations of hours that have been adopted for deducing the true daily mean. The periodic daily amplitude of temperature or difference between the mean of the warmest and coldest hour—a quantity naturally somewhat smaller than the aperiodic amplitude or difference between the mean daily extremes—is greater, as we should expect, in the inland regions than near the coast, and in summer than in winter. It ranges on the average of the year among the places given from 7·1°C (12·7°F) at Eberswald to 1·36°C (2·4°F) at the high-level station of Schneekoppe. At Potsdam the amplitude minimum of 2·08°C (3·7°F) for sixteen years' observations taken in an open field occurs in December, and the maximum of 8·94°C (16·0°F) in June. The minimum temperature on the average of the various German places occurs some two hours before sunrise in the winter months, less than an hour before at midsummer, and slightly after sunrise in part of the spring and autumn. We know, of course, from observations in England that the minimum temperature is more liable to occur at any time during the long winter nights than during the shorter nights at other seasons, when loss of heat by radiation goes on more definitely till sunrise.

The times of occurrence of the daily maximum temperature agree at the several stations better than is the case with the minimum. At stations where the thermometers are placed on a tower the maximum occurs later than at those where the observations are made near the ground. The average interval between the times of maximum and minimum is six hours in winter and eleven in summer. L.C.W.B.

The Liability to Drought in India as compared with that in other Countries. By GILBERT T. WALKER, C.S.I., M.A., Sc.D., F.R.S. (Memoirs of the Indian Meteorological Department.) Simla, 1912. Size 12 × 9, pp. 9. Price 8 annas.

THIS is only a preliminary investigation, prompted by the occurrence of severe famines from time to time in India, which naturally suggest the question whether the rainfall of India is more variable than that of other parts of the world. Famine may, of course, result from excessive rain at wrong seasons, as well as from the dearth of it at the right time, and Dr. Walker points out that an adequate treatment of the subject must needs be based upon a knowledge of the agricultural conditions of different countries. Droughts in

countries like India or Australia, with a burning sun and hot dry winds, are shown to be much more harmful than, for instance, those in a temperate region like North America or Europe. It is concluded from a statement of figures showing percentage deficiencies of annual rainfall, that of those countries which are dependent on agriculture and are not liable to famine, there is none which has such a precarious rainfall as India. L.C.W.B.

Data of Heavy Rainfall over Short Periods in India. By GILBERT T. WALKER, C.S.I., M.A., Sc.D., F.R.S. (Memoirs of the Indian Meteorological Department). Calcutta, 1912. Size $12\frac{1}{2} \times 10$, pp. 110. Price 1 rupee.

PART I. of this publication consists of a series of Tables, arranged in chronological order, showing the data of all daily falls of rain exceeding ten inches between 1891 and 1911 in each of the chief political divisions into which India is divided, and also such fragmentary records as are available previous to 1891, while Part II. shows the short bursts of heavy rain—3 inches or more in 3 hours—at various places during a longer or shorter period of years. According to a supplementary statement extracted from Mr. Blanford's "Climates and Weather of India," 12 inches fell in three hours at Calcutta on May 11th, 1835, whilst 17 inches in 12 hours fell at Madras on October 21st, 1846. Cases of falls at rates of between 2 and 3 inches an hour are, as one might expect in a hot monsoon country, quite common. Dr. Walker points out that reliable information regarding the maximum amount of rain to be expected within short periods, over various districts of India, is in considerable demand now owing to the extension of irrigational and commercial works dependent upon rainfall, and that the data are published in a concise form to meet this want. It is proposed to afford better equipment in the matter of self-recording rain gauges at the various Indian observatories, so that the hourly rainfall may be more closely studied. L.C.W.B.

METEOROLOGICAL NEWS AND NOTES.

THE HIGH-LEVEL OBSERVATORY IN TENERIFFE, which was established by Professor Hergesell on the Cañadas (the crater-floor from which the famous Peak rises), has now been taken over by the Spanish Government, and placed under the charge of Señor Juan Garcia de Lomas Lobaton. We understand that the meteorology of Teneriffe is to be investigated by the establishment of several new observing stations at various levels.

RAINFALL TABLE FOR MARCH, 1913.

STATION.	COUNTY.	Lat. N.	Long. W. [*E.]	Height above Sea.	RAINFALL OF MONTH.	
					Aver. 1875—1909.	1913.
		° ′	° ′	ft.	in.	in.
Camden Square	*London*	51 32	0 8	111	1·70	2·29
Tenterden	*Kent*	51 4	*0 41	190	1·95	2·66
Arundel (Patching)	*Sussex*	50 51	0 27	130	1·95	3·19
Fawley (Cadland)	*Hampshire*	50 50	1 22	52	2·17	...
Oxford (Magdalen College)	*Oxfordshire*	51 45	1 15	186	1·45	2·25
Wellingborough (Croyland Abbey)	*Northampton*	52 18	0 41	174	1·69	3·08
Shoeburyness	*Essex*	51 31	*0 48	13	1·19	1·65
Bury St. Edmunds (Westley)	*Suffolk*	52 15	*0 40	226	1·71	1·91
Geldeston [Beccles]	*Norfolk*	52 27	*1 31	38	1·57	1·84
Polapit Tamar [Launceston]	*Devon*	50 40	4 22	315	2·74	5·24
Rousdon [Lyme Regis]	,,	50 41	3 0	516	2·30	2·88
Stroud (Upfield)	*Gloucestershire*	51 44	2 13	226	2·01	3·75
Church Stretton (Wolstaston)	*Shropshire*	52 35	2 48	800	2·19	5·84
Coventry (Kingswood)	*Warwickshire*	52 24	1 30	340	1·89	3·82
Boston	*Lincolnshire*	52 58	0 1	11	1·47	2·35
Worksop (Hodsock Priory)	*Nottinghamshire*	53 22	1 5	56	1·70	2·74
Macclesfield	*Cheshire*	53 15	2 7	501	2·50	4·41
Southport (Hesketh Park)	*Lancashire*	53 38	2 59	38	2·11	3·42
Arncliffe Vicarage	*Yorkshire, W.R.*	54 8	2 6	732	5·17	10·43
Wetherby (Ribston Hall)	,, ,,	53 59	1 24	130	1·92	2·98
Hull (Pearson Park)	,, *E.R.*	53 45	0 20	6	1·84	2·41
Newcastle (Town Moor)	*Northumberland*	54 59	1 38	201	2·10	2·55
Borrowdale (Seathwaite)	*Cumberland*	54 30	3 10	423	10·63	16·22
Cardiff (Ely)	*Glamorgan*	51 29	3 13	53	2·89	5·89
Haverfordwest	*Pembroke*	51 48	4 58	90	3·16	6·18
Aberystwyth (Gogerddan)	*Cardigan*	52 26	4 1	83	3·04	6·27
Llandudno	*Carnarvon*	53 20	3 50	72	2·13	3·81
Cargen [Dumfries]	*Kirkcudbright*	55 2	3 37	80	3·33	5·77
Marchmont House	*Berwick*	55 44	2 24	498	2·64	3·34
Girvan (Pinmore)	*Ayr*	55 10	4 49	207	3·62	4·77
Glasgow (Queen's Park)	*Renfrew*	55 53	4 18	144	2·61	4·52
Inveraray (Newtown)	*Argyll*	56 14	5 4	17	5·41	9·85
Mull (Quinish)	,,	56 34	6 13	35	4·28	7·80
Dundee (Eastern Necropolis)	*Forfar*	56 28	2 57	199	2·06	3·58
Braemar	*Aberdeen*	57 0	3 24	1114	2·87	5·26
Aberdeen (Cranford)	,,	57 8	2 7	120	2·65	3·74
Cawdor	*Nairn*	57 31	3 57	250	2·35	2·68
Fort Augustus (S. Benedict's)	*E. Inverness*	57 9	4 41	68	3·79	6·77
Loch Torridon (Bendamph)	*W. Ross*	57 32	5 32	20	7·29	12·19
Dunrobin Castle	*Sutherland*	57 59	3 56	14	2·64	2·35
Wick	*Caithness*	58 26	3 6	77	2·24	3·16
Killarney (District Asylum)	*Kerry*	52 4	9 31	178	4·51	6·39
Waterford (Brook Lodge)	*Waterford*	52 15	7 7	104	2·64	3·51
Nenagh (Castle Lough)	*Tipperary*	52 54	8 24	120	2·99	5·62
Ennistymon House	*Clare*	52 57	9 18	37	3·24	5·96
Gorey (Courtown House)	*Wexford*	52 40	6 13	80	2·28	2·32
Abbey Leix (Blandsfort)	*Queen's County*	52 56	7 17	532	2·59	3·28
Dublin (Fitz William Square)	*Dublin*	53 21	6 14	54	1·98	2·16
Mullingar (Belvedere)	*Westmeath*	53 29	7 22	367	2·64	4·05
Crossmolina (Enniscoe)	*Mayo*	54 4	9 16	74	4·36	7·37
Cong (The Glebe)	,,	53 33	9 16	112	3·80	6·59
Collooney (Markree Obsy.)	*Sligo*	54 11	8 27	127	3·33	5·05
Seaforde	*Down*	54 19	5 50	180	2·84	3·09
Bushmills (Dundarave)	*Antrim*	55 12	6 30	162	2·73	3·09
Omagh (Edenfel)	*Tyrone*	54 36	7 18	280	2·98	3·77

RAINFALL TABLE FOR MARCH, 1913—*continued.*

RAINFALL OF MONTH (*con.*)					RAINFALL FROM JAN. 1.					
Diff. from Av. in.	% of Av.	Max. in 24 hours. in.	Max. in 24 hours. Date.	No. of Days	Aver. 1875—1909. in.	1913. in.	Diff. from Aver. in.	% of Av.	Mean Annual 1875-1909. in.	STATION.
+ ·59	135	·32	16	21	5·19	5·65	+ ·46	109	25·11	Camden Square
+ ·71	136	·53	16	24	5·99	8·18	+2·19	137	27·64	Tenterden
+1·24	164	·52	16	23	6·71	9·98	+3·27	149	30·48	Patching
...	...	...	...	...	7·20	...	...	...	31·87	Cadland
+ ·80	155	·35	16	20	4·85	5·66	+ ·81	117	24·58	Oxford
+1·39	182	·73	16	20	5·27	6·94	+1·67	132	25·17	Croyland Abbey
+ ·46	139	·25	21	22	3·71	4·30	+ ·59	116	19·28	Shoeburyness
+ ·20	112	·31	16	19	5·00	5·24	+ ·24	105	25·40	Westley
+ ·27	117	·31	31	18	4·51	5·15	+ ·64	114	23·73	Geldeston
+2·50	191	·83	22	24	9·28	14·16	+4·88	153	38·27	Polapit Tamar
+ ·58	125	·48	29	20	7·74	10·68	+2·94	138	33·54	Rousdon
+1·74	187	·57	16	23	6·46	9·88	+3·42	153	29·81	Stroud
+3·65	267	·83	22	25	6·87	10·95	+4·08	159	32·41	Wolstaston
+1·93	202	·81	16	14	6·12	9·52	+3·40	156	28·98	Coventry
+ ·88	160	·52	14	19	4·54	5·74	+1·20	126	23·35	Boston
+1·04	161	·46	14	19	5·04	6·46	+1·42	128	24·46	Hodsock Priory
+1·91	176	·88	22	23	7·46	9·07	+1·61	122	34·73	Macclesfield
+1·31	162	·61	22	24	6·73	8·37	+1·64	124	32·70	Southport
+5·26	202	1·69	2	27	16·31	23·04	+6·73	141	61·49	Arncliffe
+1·06	155	·45	19	25	5·52	6·25	+ ·73	113	26·87	Ribston Hall
+ ·57	131	·38	16	20	5·32	6·86	+1·54	129	26·42	Hull
+ ·45	121	·63	22	19	5·63	8·39	+2·76	149	27·94	Newcastle
+5·59	153	2·20	3	25	35·03	42·43	+7·40	121	129·48	Seathwaite
+3·00	204	·98	22	26	9·61	15·10	+5·49	157	42·28	Cardiff
+3·02	195	·94	23	26	11·27	16·55	+5·28	147	46·81	Haverfordwest
+3·23	206	1·00	22	27	10·04	14·47	+4·43	144	45·46	Gogerddan
+1·68	179	·74	22	25	6·75	8·19	+1·44	121	30·36	Llandudno
+2·44	173	1·00	22	24	10·85	14·98	+4·13	138	43·47	Cargen
+ ·70	127	·81	22	24	7·19	7·58	+ ·39	105	33·76	Marchmont
+1·15	132	1·02	18	24	12·27	13·10	+ ·83	107	49·77	Girvan
+1·91	173	·47	4	23	8·84	10·87	+2·03	123	35·97	Glasgow
+4·44	182	1·04	9	25	18·46	21·10	+2·64	114	68·67	Inveraray
+3·52	182	1·01	1	25	14·28	17·29	+3·01	121	56·57	Quinish
+1·52	174	·73	22	20	5·98	7·67	+1·69	128	28·64	Dundee
+2·39	183	1·11	6	19	8·34	11·48	+3·14	138	34·93	Braemar
+1·09	141	1·40	22	20	7·37	7·70	+ ·33	104	32·73	Aberdeen
+ ·33	114	·47	22	14	6·69	6·06	— ·63	91	29·33	Cawdor
+2·98	179	·75	9	25	13·57	15·43	+1·86	114	44·53	Fort Augustus
+4·90	167	1·38	9	25	24·24	25·38	+1·14	105	83·93	Bendamph
— ·29	89	·48	19	18	7·97	4·35	—3·62	55	31·90	Dunrobin Castle
+ ·92	141	·51	19	23	6·95	5·64	—1·31	81	29·88	Wick
+1·88	142	·90	2	28	15·44	19·52	+4·08	126	54·81	Killarney
+ ·87	133	·68	1	25	9·60	13·11	+3·51	136	39·57	Waterford
+2·63	188	·81	2	25	9·76	13·59	+3·83	139	39·43	Castle Lough
+2·72	184	·94	6	25	10·98	14·97	+3·99	136	46·52	Ennistymon
+ ·04	102	·33	1	20	8·22	11·87	+3·65	144	34·99	Courtown Ho.
+ ·69	127	·45	2	26	8·29	11·95	+3·66	144	35·92	Abbey Leix
+ ·18	109	·27	2	22	6·05	8·34	+2·29	138	27·68	Dublin
+1·41	153	·79	2	24	8·41	11·72	+3·31	139	36·15	Mullingar
+3·01	169	·66	2	29	13·91	19·41	+5·50	139	52·87	Enniscoe
+2·79	173	·78	2	26	12·31	18·46	+6·15	150	48·90	Cong
+1·72	152	·40	15	24	10·40	14·16	+3·76	136	42·71	Markree
+ ·25	109	·54	18	22	9·06	11·24	+2·18	124	38·91	Seaforde
+ ·36	113	·36	7	20	8·48	6·86	—1·62	81	37·56	Dundarave
+ ·79	126	·42	18	23	9·12	11·21	+2·09	123	39·38	Omagh

SUPPLEMENTARY RAINFALL, MARCH, 1913.

Div.	STATION.	Rain inches	Div.	STATION.	Rain inches.
II.	Warlingham, Redvers Road..	3·75	XI.	Lligwy	3·44
,,	Ramsgate.....	1·93	,,	Douglas	4·12
,,	Hailsham	3·26	XII.	Stoneykirk, Ardwell House...	3·37
,,	Totland Bay, Aston House...	2·91	,,	Dalry, The Old Garroch.....	6·77
,,	Stockbridge, Ashley..	3·32	,,	Beattock, Kinnelhead	8·81
,,	Grayshott	3·96	,,	Langholm, Drove Road	6·23
,,	Caversham, Rectory Road ...	2·11	XIII.	Meggat Water, Cramilt Lodge	6·46
III.	Harrow Weald, Hill House...	1·99	,,	North Berwick Reservoir.....	2·36
,,	Pitsford, Sedgebrook...	2·93	,,	Edinburgh, Royal Observaty.	3·21
,,	Woburn, Milton Bryant.....	2·39	XIV.	Maybole, Knockdon Farm ...	3·40
,,	Chatteris, The Priory..... ...	2·39	XV.	Ballachulish House	14·16
IV.	Colchester, Hill Ho., Lexden	1·45	,,	Campbeltown, Witchburn ..	4·38
,,	Newport, Belmont House ...	1·82	,,	Holy Loch, Ardnadam.....	11·24
,,	Ipswich, Rookwood, Copdock	1·50	,,	Islay, Eallabus	5·76
,,	Blakeney.....	2·26	,,	Tiree, Cornaigmore	5·72
,,	Swaffham	2·04	XVI.	Dollar Academy	5·33
V.	Bishops Cannings	2·76	,,	Balquhidder, Stronvar.....	10·86
,,	Winterbourne Steepleton.....	...	,,	Glenlyon, Meggernie Castle..	9·70
,,	Ashburton, Druid House.....	7·23	,,	Blair Atholl	5·37
,,	Cullompton	4·16	,,	Coupar Angus	5·26
,,	Lynmouth, Rock House	7·07	,,	Montrose, Sunnyside Asylum.	3·31
,,	Okehampton, Oaklands.....	6·77	XVII.	Alford, Lynturk Manse	3·75
,,	Hartland Abbey.....	5·02	,,	Fyvie Castle	2·88
,,	Probus, Lamellyn.....	3 77	,,	Keith Station	2·70
,,	North Cadbury Rectory.....	2·66	XVIII.	Alvey Manse.....	4·00
VI.	Clifton, Pembroke Road.....	4·33	,,	Loch Quoich, Loan	18·10
,,	Ross, The Graig	5·38	,,	Drumnadrochit	5·46
,,	Shifnal, Hatton Grange.....	4·91	,,	Skye, Dunvegan	10·87
,,	Droitwich.....	4·28	,,	N. Uist, Lochmaddy	4·48
,,	Blockley, Upton Wold.....	4·24	,,	Glencarron Lodge	6·58
VII.	Market Overton.....	3·85	XIX.	Invershin	3·57
,,	Market Rasen.....	2·70	,,	Melvich	3·65
,,	Bawtry, Hesley Hall	2·30	,,	Loch Stack, Ardchullin	6·80
,,	Derby, Midland Railway.....	3·78	XX.	Skibbereen Rectory	4·67
,,	Buxton	6·38	,,	Dunmanway, The Rectory ..	7·22
VIII.	Nantwich, Dorfold Hall	4·14	,,	Glanmire, Lota Lodge, No. 1	4·14
,,	Chatburn, Middlewood	5·80	,,	Mitchelstown Castle.....	4·03
,,	Cartmel, Flookburgh	4·54	,,	Darrynane Abbey.....	6·32
IX.	Langsett Moor, Up. Midhope	5·52	,,	Clonmel, Bruce Villa	3·79
,,	Scarborough, Scalby	2·15	,,	Newmarket-on-Fergus, Fenloe	4·42
,,	Ingleby Greenhow	3·33	XXI.	Laragh, Glendalough	5·74
,,	Mickleton	6·70	,,	Ballycumber, Moorock Lodge	3·00
X.	Bellingham, High Green Manor	4·39	,,	Balbriggan, Ardgillan	1·98
,,	Ilderton, Lilburn Cottage ...	3·86	XXII.	Woodlawn	5·11
,,	Keswick, The Bank.....	6·91	,,	Westport, St. Helens	5·93
XI.	Llanfrechfa Grange	7·17	,,	Dugort, Slievemore Hotel ...	7·40
,,	Treherbert, Tyn-y-waun	15·00	,,	Mohill Rectory	4·28
,,	Carmarthen, The Friary	6·60	XXIII.	Enniskillen, Portora.....	3·73
,,	Castle Malgwyn [Llechryd]...	5·75	,,	Dartrey [Cootehill]	3·97
,,	Crickhowell, Tal-y-maes.....	9·50	,,	Warrenpoint, Manor House ..	4·31
,,	New Radnor, Ednol	5·05	,,	Banbridge, Milltown	2·44
,,	Birmingham WW., Tyrmynydd	9·59	,,	Belfast, Cave Hill Road	3·26
,,	Lake Vyrnwy	6·46	,,	Glenarm Castle..... ...	3·91
,,	Llangyhanfal, Plâs Draw.....	4·63	,,	Londonderry, Creggan Res...	3·71
,,	Dolgelly, Bryntirion.....	6·69	,,	Dunfanaghy, Horn Head ...	4·41
,,	Bettws-y-Coed, Tyn-y-bryn...	7·67	,,	Killybegs	6·14

METEOROLOGICAL NOTES ON MARCH, 1913.

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.—A dull, showery and mild month, with a few bright springlike days. Fresh or squally winds, generally from between S. and W., were frequent, and TSS occurred on 17th, 20th and 22nd. Mean temp. 45°·0 or 2°·9 above the average. Duration of sunshine 78·1* hours, and of R 47·2 hours. Evaporation ·77 in. Shade max. 59°·3 on 6th; min. 26°·0 on 18th. F 3, f 11.

TENTERDEN.—Showery the first week, then a few dry days. Mostly wet after 13th and a good deal of wind, especially on 17th, 19th and 22nd. Duration of sunshine 113·0† hours. Mean temp. 44°·9. Shade max. 58°·0 on 29th; min. 28°·5 on 18th. F 1, f 12.

TOTLAND BAY.—Very windy month. Duration of sunshine 121·5* hours. Shade max., 53°·1 on 30th; min., 29°·9 on 18th. F 1, f 6.

PITSFORD.—Mean temp. 44°·8. R 1·23 in. above the average. Shade max. 57°·1 on 23rd; min. 24°·5 on 12th. F 4.

IPSWICH, COPDOCK.—Duration of sunshine 103·6† hours. Mean temp. 43°·7. Shade max. 57°·5 on 6th; min. 28°·0 on 17th. F 6, f 17.

POLAPIT TAMAR.—Wet and stormy with cold winds. Warmer towards the end. Shade max. 54°·0 on 30th; min. 24°·1 on 12th. F 4, f 13.

NORTH CADBURY.—A windy March with temp. decidedly above normal. Remarkable bar. fluctuations and great range of pressure. Shade max. 61°·0 on 31st; min. 27°·5 on 18th. F 5, f 18.

ROSS.—The wettest March for 94 years. Shade max. 57°·5 on 31st; min. 26°·7 on 18th. F 5, f 12.

HODSOCK PRIORY.—A mild month with frequent R and high winds. Shade max. 57°·1 on 4th; min. 24°·0 on 18th. F 6, f 20.

SOUTHPORT.—Duration of sunshine 116·9* hours, and of R 70·8 hours. Mean temp. 43°·1 or 1°·8 above the average. Evaporation 1·31 in. Shade max. 56°·0 on 31st; min. 27°·0 on 18th. F 2, f 14.

HULL.—Generally mild, cloudy days with colder nights. S on 17th and 18th and sharp TS on night of 22nd. Duration of sunshine 75·5* hours. Shade max. 57°·0 on 4th; min. 28°·0 on 18th. F 3, f 20.

GOGERDDAN.—Greater part of month stormy and cold. Very changeable from 14th to 18th. S, R, T, L, strong winds and spells of fine weather followed in quick succession. Great gale and heavy T at about midnight on 15th. Month closed much finer with wind in S.E.

LLANDUDNO.—Shade max. 55°·0 on 31st; min. 29°·0 on 18th.

MARCHMONT.—Duration of sunshine 119·9 hours on 25 days.

EDINBURGH.—Shade max. 53°·2 on 31st; min 24°·8 on 18th. F 7, f 14.

ARDNADAM.—The first three weeks were cold, wet and stormy, but the last 10 days were dry and generally bright with keen winds. Shade max. 57°·5 on 30th; min. 21°·9 on 18th. F 7, f 19.

LYNTURK.—Rough and windy. Frequent S though to no great depth.

LOCH STACK.—Duration of sunshine 86·0* hours.

DUNMANWAY.—The wettest March since 1905. Several fine and warm days, especially St. Patrick's Day and Easter Monday and Tuesday. S on night of 16th and frequent H showers during the month.

DUBLIN.—An unsettled windy month with moderate temp. and frequent though not heavy R. Showers of H, sleet or S on several days, and W. or S.W. winds. Mean temp. 43°·8. Shade max. 57°·1 on 4th; min. 28°·1 on 18th. F 2, f 10.

BELFAST.—Until the 21st the weather was very severe and wintry, but afterwards it was ideal for the seed time.

KILLYBEGS.—A cold wet month with much E. wind.

---

* Campbell-Stokes. † Jordan.

Climatological Table for the British Empire, October, 1912.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Date.	Absolute. Minimum. Temp.	Date.	Average. Max.	Min.	Dew Point.	Humidity.	Absolute. Max. in Sun.	Min. on Grass.	Total Rain. Depth.	Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
London, Camden Square	64·8	1	30·8	5	55·9	39·8	43·8	91	106·0	28·1	2·03	15	4·7
Malta	78·3	4	60·0	30	72·6	64·9	...	...	144·1	.	1·17	8	4·5
Lagos	88·0	Sev.	71·0	13	86·6	74·6	73·3	75	168·0	68·0	3·96	14	6·7
Cape Town	91·8	29	43·5	22	71·7	54·0	52·1	68	...	...	·93	6	4·2
Johannesburg	87·0	14	35·7	6	76·5	51·0	40·7	50	149·2	37·0	·73	7	2·2
Mauritius	82·1	1	60·4	22	79·2	65·5	63·5	76	152·0	54·3	6·82	23	7·2
Bloemfontein	93·0	31	35·3	1	82·0	50·5	38·0	38	...	...	1·02	4	1·4
Calcutta...	91·9	13	67·3	31	87·5	74·0	73·2	79	...	61·4	4·28	8	4·4
Bombay...	92·4	19	73·1	29	88·9	77·5	74·0	76	136·0	62·6	·65	4	4·1
Madras	98·3	7	68·6	31	90·2	75·8	74·4	81	147·4	65·4	11·00	12	5·3
Kodaikanal	66·2	17	46·4	31	62·0	51·6	52·6	89	143·2	38·6	10·73	25	8·6
Colombo, Ceylon ...	88·2	26	72·6	25	85·4	75·7	73·8	80	151·5	65·9	14·21	25	7·6
Hongkong	90·2	28	69·5	17	81·5	72·1	64·6	68	136·4	...	·02	1	4·0
Sydney	90·4	31	46·9	15	73·5	56·6	48·8	55	144·5	36·1	1·14	21	3·9
Melbourne	90·4	30	36·5	16	67·9	47·3	45·0	60	146·2	31·6	1·32	8	5·3
Adelaide	95·8	30	41·8	5, 14	72·2	50·9	47·0	55	149·9	33·7	·96	8	4·4
Perth	81·6	22	47·0	4	69·1	52·5	50·2	68	146·8	35·5	2·33	10	4·7
Coolgardie	97·4	15	40·0	21	78·9	50·9	43·6	41	162·0	37·0	·58	4	2·8
Hobart, Tasmania ..	77·6	7	37·2	14	60·8	46·0	42·2	63	144·0	30·0	3·31	17	6·6
Wellington ...	66·8	12	39·6	2	59·7	49·1	46·9	76	137·8	29·0	3·49	20	6·3
Auckland	68·0	6	43·0	26	61·9	50·2	49·9	79	138·0	47·6	2·09	17	6·3
Jamaica, Kingston ..	92·1	6	70·8	18	88·5	73·6	72·1	78	...	...	1·87	15	...
Grenada	88·0	Sev.	73·0	Sev.	85·3	75·4	...	78	139·0	...	4·72	17	3·5
Toronto	73·8	6	30·1	16	59·6	41·7	...	81	126·6	25·1	2·27	9	...
Fredericton	77·8	6	25·0	21*	55·3	34·7	...	78	...	...	7·07	13	5·0
St. John, N.B. ...	68·0	5	32·0	16	53·5	42·6	42·0	76	...	...	3·23	15	4·9
Edmonton, Alberta ...	72·1	14	16·8	31	50·3	30·7	...	71	118·2	6·0	·70	9	5·1
Victoria, B.C.	63·2	2	33·0	20	55·2	41·9	44·0	82	...	...	2·33	14	5·5

* and 30th.

MALTA.—Mean temp. of air 68°·1. Average daily sunshine 6·9 hours.

Johannesburg.—Bright sunshine 309·9 hours.

Mauritius.—Mean. temp. of air 0°·3 below and R 5·54 in. above averages. Mean hourly velocity of wind 10·1 miles or 0·1 miles below average.

KODAIKANAL.—Bright sunshine 86 hours. T8S on 21 days.

COLOMBO.—Mean temp. of air 80°·6 or 0°·6 above, and R ·26 in. below, averages. Mean velocity of wind 5·2 miles per hour. T8S on 13 days.

HONGKONG.—Mean temp. of air 76°·1. Mean hourly velocity of wind 12·3 miles. Bright sunshine 241·6 hours.

Sydney.—Mean temp. of air 1°·6 above, and R 1·65 in. below, averages.

Melbourne.—Mean temp. of air 0°·1 above, and R 1·35 in. below, averages.

Adelaide.—Mean temp. of air 0°·3 below, and R ·82 in. below, averages.

Coolgardie.—Mean temp. of air 1°·4 above, and R slightly below, averages.

Hobart.—Mean temp. of air 0°·8 below, and R 50 per cent. above, averages.

Wellington.—Mean temp. of air 0°·5 below, and R ·77 in. below, averages. Bright sunshine 180·3 hours. H on 26th.

Auckland.—Cool, dry and windy. R considerably under average of 44 years.