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UNUSUAL AUTUMNAL WARMTH

The mean October temperature at Camden Square, derived from the average of the daily maximum and minimum and 9 a.m. and 9 p.m. dry bulb readings, was 53°·4, or 3°·3 above the 50 years' average, while for November the mean was 47°·8, or 4°·3 above the normal. The October mean temperature was relatively unimportant because among recent years the Octobers of 1906, 1908 and 1910 were all warmer than that of 1913. November, on the other hand, was much more remarkable, its mean temperature, 47°·8, or 4°·3 above the normal, being the highest in the 56 years' record at Camden Square, with the single exception of November, 1881, which was exactly one degree warmer. The mean maximum shade temperature was 54°·3, or 5°·2 above the normal, and the highest ever recorded in November, the nearest approach being 54°·2 in November, 1881. The lowest maximum temperature was 47°·2, recorded on the 23rd, and this was also a record high value for November. The high mean temperature was due to persistent warm air rather than to days of extreme temperature, there being only four days in the month when temperature failed to reach 50°, yet on no day did it exceed 60°.

The mean shade minimum temperature, 41°·3, was 3°·1 above the average and in no way exceptional, higher values having occurred in seven Novembers during the previous 55 years. The only shade frost of the month occurred on the 23rd, when the minimum on the Glaisher stand fell to 29°·8.

The mean temperature of October and November, 50°·6, or 3°·8 above the normal, was the highest observed at Camden Square for these two months in the 56 years' record, the nearest approach to this high mean occurring in 1906, when the mean was 50°·4.

Tables of mean monthly temperature for London since the year 1763 were prepared some time ago by Dr. Buchan and are published in the *Journal of the Scot. Met. Soc.*, Vol. IX., p. 216. A comparison of the mean monthly values there given for October and November, with the corresponding Camden Square means for the 30 years 1861–1890 shows that the mean temperatures for the two months under consideration differ by 0°·2 in October, while in November the two series are identical, so that to make Buchan's series comparable with the present record it is only necessary to

reduce the October and November temperature means by one-tenth of a degree. Looking back over the values since 1763 it was found that the only higher mean temperatures recorded in the period under review were as follows: 1811, mean temperature of October and November, 53°·4; 1783, 52°·7; 1777, 52°·3; 1772, 51°·3, and 1765, 50°·7; so that the present extreme mildness has not been exceeded in the London district for 102 years, when the mildest on record during the last century and a half was recorded.

Mr. A. Watt, Secretary of the Scottish Meteorological Society, has kindly sent us by request some notes on the temperature in Scotland. He says:—

"On the basis of the Eight Large Towns' Report to the Registrar-General the difference from the normal of the general mean temperature for last month is +3°·7, a greater positive difference has occurred only in 1894 (+3°·9), in 1897 (+4°·1), and 1899 (+5°·8), the Reports going back to 1856. It thus seems safe to say that a conspicuously milder November has occurred in Scotland only in 1897 and 1899."

The Edinburgh values of mean temperature, which Mr. Watt has also sent, show that November there had a mean temperature 4°·6 in excess of the average of the last century and a half, there being four warmer months of the name since 1764, viz., so recently as 1899, in 1894, 1881, and 1818, of these the first named was the mildest of the series, mean temperature being 6°·3 above the normal.

Taking the combined October and November mean temperatures in Edinburgh, the average comes out 4°·0 above the normal, and although there are only five warmer on record, yet so recently as 1908 the mean temperature of October was 7°·2 above the normal and November 4°·0, a mean of +5°·6; 1899, 1857, 1818, and 1811, being all milder than the two months under review.

Taking the United Kingdom as a whole the mean temperature of November was 4°·2 above the normal, the excess ranging from 5°·9 in the East of England and 5°·2 in the Midland Counties to 2°·9 in the South of Ireland and 3°·1 in the English Channel. The unusual mildness on the whole was specially marked in the eastern parts of the country.

ROYAL METEOROLOGICAL SOCIETY.

THE opening meeting of this Society for the Session was held on Wednesday evening, the 19th instant, at the Institution of Civil Engineers, Great George Street, Westminster, S.W., Mr. C. J. P. Cave, President, in the chair.

Mr. W. H. Dines, F.R.S., read a paper on "The Daily Temperature Change at Great Heights," in the course of which he remarked that the only direct information available about the diurnal variation of temperature at altitudes beyond that reached by kites was derived

from two series of hourly registering balloon ascents at Manchester. There were numerous observations from registering balloons, but they were very badly distributed owing to the International Aeronautical Committee having fixed 7 a.m., Greenwich mean time, as the hour for the ascents. The continental ascents were thus practically useless, but an attempt was made to utilize the British observations, which were much better distributed for the object in view. There were some 200 British observations available reaching to about 16 kilometres (10 miles), these being divided into two nearly equal groups, the mean time of the one set being two hours after sunrise, and the other about a quarter of an hour after sunset. It was very important to know whether there was a daily range of temperature in the free air at heights exceeding 2 miles. The observations were, therefore, divided into eight hourly groups, sunrise and the four hours after it; the hour before sunset, and the hour after it. Mr. Dines described various difficulties which had to be overcome in the treatment of the available data. The results showed signs of a minimum at 2 and 3 kms. (1 to 2 miles) at about 2 hours after sunrise. A fairly uniform temperature from sunrise to 4 hours later, at and above 3 kms. (2 miles). A similar uniformity throughout the period 1 hour before to 1 hour after sunset throughout all strata. A temperature excess of about 1° C. (1°·8 F.) at sunset over sunrise from 2 to 8 kms. (1 to 5 miles) inclusive, with a reverse deficiency of 3° C. (5°·4 F.) at 11 kms. (7 miles) and above. These were the observed facts, but after a careful analysis of the results the conclusion arrived at was that above 2 kms. (1 mile), and up to the limits of the troposphere, the daily range of temperature does not exceed 2° C. (3°·6 F.), and that the temperature maximum occurs in the afternoon or evening.

Dr. Shaw thought it probable that the differences in the up trace and the down trace, as shown by the instruments, was due to change of temperature in the interval between the rise and fall of the balloon. The heavier instruments used on the continent had a clock attached which would show whether this was really the explanation.

Dr. Chree feared that Mr. Dines had shown some want of confidence in the continental observations. He did not share Mr. Dines' opinion as to the heating up of the air around the balloon, and thought that the paucity of observations was such that particular kinds of days, and kinds of seasons, could hardly be treated independently. Mr. Gold had found from a study of kite and balloon observations made at Lindenberg that the daily variation of temperature at a height of 2 km. was only 1°·5 C. and at 1 km. it was 2° C. He thought that when above the limits of convection the daily variation in temperature ought not to be more than a degree C. He calculated that if the balloon was stationary and absorbing all solar radiation it could not warm up the air at 40 feet distance for more than 3° C. in a day, and in the experiments carried out it was probable that the temperature of the air around the instruments was not raised by more than one-tenth of a degree.

The President emphasized the desirability of the continental observations being taken in the evening as well as in the morning.

Mr. Bryant and Mr. Hooker also took part in the discussion, and Mr. Dines replied.

Mr. H. Harries gave an account of the results of some experimental observations which he had made on the eddy winds of Gibraltar. The rock rises within an area of less than two square miles to heights ranging from 1,100 to 1,400 feet. With easterly winds which blow directly on to the cliff face it was obvious that the stream lines were deflected upwards so that when a strong wind from the east was blowing an observer at the edge of the cliff was in a calm, while a short distance away from the edge, in a westerly direction, a wind from that quarter was met with. These eddy winds were observed by means of small balloons and pieces of wadding on days of strong winds and also during calms.

Lieut. Gill, who had taken part in the experiments with Mr. Harries, said that from the aviator's standpoint the first question was a choice of starting point and of the probable landing place. It was also necessary in carrying out experiments of this kind to consider whether the aviator would use an aeroplane or a waterplane. He considered a further study of wind eddies in the Bay would be of great advantage to those aviators making experiments with waterplanes.

The President thought the paper a further demonstration of the dangers to aviators of descending and ascending currents. He felt sure that the skilled aviator would realise that there are places which he must avoid in certain winds.

The following new Fellows were elected:—Mr. C. E. P. Brooks, B.Sc., Mr. D. C. Buch, Mr. J. W. P. Chalmers, Mr. T. C. Clarke, Capt. C. C. Dixon, Mr. D. Hogarth, Mr. E. H. Hunt, Mr. P. N. Mukerji, M.A., Mr. A. J. Munro, Mr. W. G. Sherman, Mr. A. Thurston, D.Sc., Mr. C. H. Trusler.

SOUTHERN HEMISPHERE SEASONAL CORRELATIONS.

By R. C. Mossman, F.R.S.E.

(of the Argentine Meteorological Office).

Sixth Article.

Hildebrandsson has shown in his third memoir, p. 9, that the temperature variations in winter (January and February) are the same over a wide area extending from the Faeröe to Western Siberia, the six stations discussed ranging in latitude from 59° to 64½° N. In the Argentine Republic and Chile, between the parallels, of 29° and 35° S., and the meridians of 58° and 69° W., the winter variations of temperature at four selected stations, where long records are available, are in harmony with each other for the period May to August.

On extending the area of inquiry into Brazil, it was found that the winter temperature at Rio de Janeiro (lat. 23° S., long. 44° W.) was usually not in agreement with the conditions at more southern stations.

In the following table the departure from the normal of the 36 years, 1876-1911, is given for the five stations under discussion, the actual mean temperature being shown graphically in Fig. 1. For the Argentine data we are indebted to Mr. W. G. Davis, Director of the Argentine Meteorological Office; the values for Rio de Janeiro are from Señor Crul's well-known work, supplemented by data since 1890 sent by Dr. Morize; while the Santiago data are from the official publications of that Observatory. The data are strictly comparable since they refer to hourly values in each instance.

Mean Temperature, May to August. Departure from Normal, 1876 to 1911.

	1876	1877	1878	1879	1880	1881	1882	1883	1884
	°	°	°	°	°	°	°	°	°
Santiago de Chile..	+ ·3	+1·8	+ ·7	+ ·7	+1·3	— ·4	— ·2	—1·1	—1·3
Cordoba	+ ·3	— ·8	—1·3	— ·3	+1·6	—1·7	·0	+ ·3	·0
Buenos Aires	+2·1	+1·3	—1·5	+ ·3	+1·3	— ·4	— ·6	+ ·4	—1·3
Goya	+3·5	+2·3	— ·3	+ ·7	+1·0	—1·2	— ·8	—1·0	— ·5
Rio de Janeiro.....	+ ·3	+2·5	+2·2	—1·3	+3·3	·0	—1·1	— ·5	+ ·4

	1885	1886	1887	1888	1889	1890	1891	1892	1893
Santiago de Chile..	—1·6	—1·1	+ ·8	— ·1	—1·3	—2·0	+1·3	—2·3	—1·9
Cordoba	—2·5	— ·2	+3·0	+ ·3	—1·5	—1·1	— ·4	— ·9	—1·6
Buenos Aires	—2·8	—1·0	+1·3	— ·2	— ·8	—1·9	·0	—1·3	—1·6
Goya	—3·8	—2·4	+ ·8	—1·2	—1·7	—3·0	— ·2	—3·0	—2·2
Rio de Janeiro ...	+1·6	—2·4	+ ·2	— ·2	+ ·6	— ·6	— ·4	—1·7	—1·9

	1894	1895	1896	1897	1898	1899	1900	1901	1902
Santiago de Chile..	— ·4	+ ·9	+3·9	+ ·6	— ·5	+1·1	+1·3	+1·0	·0
Cordoba	— ·4	+3·1	+3·8	—1·2	— ·3	+3·1	+1·9	+2·9	+ ·4
Buenos Aires	—1·5	+2·2	+2·4	— ·8	—1·6	+2·4	+2·1	+2·0	+·11
Goya...	—1·1	+2·0	+2·8	—1·3	— ·8	+3·1	+3·8	+2·3	+1·7
Rio de Janeiro.....	—1·5	— ·2	—1·0	—1·2	+ ·3	+ ·5	— ·4	— ·3	+1·4

	1903	1904	1905	1906	1907	1908	1909	1910	1911	Mean.
Santiago ...	— ·8	+2·3	+2·1	— ·4	— ·1	+ ·3	— ·4	—1·9	—1·0	48·0
Cordoba ...	— ·3	+1·0	— ·2	— ·6	—2·8	+ ·1	—1·2	— ·3	—1·1	52·5
Buenos Aires	+1·8	+1·9	+ ·3	+ ·7	—1·7	— ·3	— ·7	— ·5	—1·5	52·1
Goya	+1·3	+ ·6	+1·4	+1·1	— ·3	— ·2	— ·4	+ ·9	—2·2	59·2
Rio Janeiro	+ ·2	—1·2	+1·4	+2·7	— ·4	+1·0	+ ·1	+ ·1	—1·3	69·3

Excluding the Brazilian station, it will be seen that in two-thirds of the years discussed the departures from the normal were represented by the same sign at all the stations, although the Andine chain separates Santiago de Chile on the west side of the range from

the Argentine stations on the east side. Taking cases in which the temperature departures at the latter stations were all of the same sign, there were only three seasons, viz., those of 1878, 1891 and 1897 in which Santiago differed as regards sign. During the above winters the weather was warm on the west side and cold on the east side of the Andes.

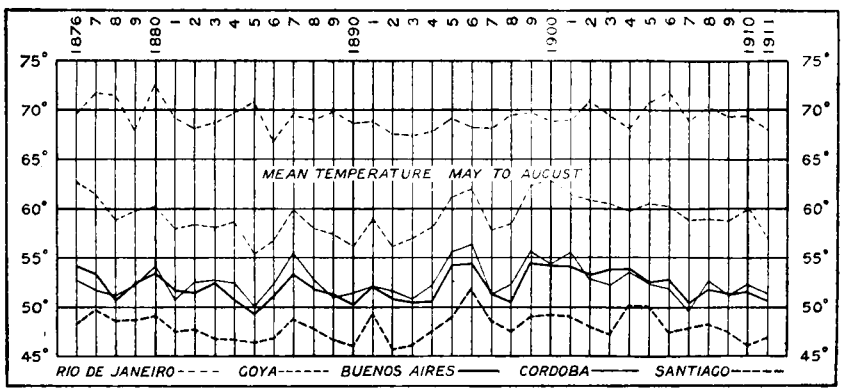

FIG. 1.

The warmest winter was that of 1896 at Santiago, Cordoba and Buenos Aires, and at Goya the temperature was also much above the normal, but at this station the maximum May to August temperature was in 1900.

The coldest winter occurred at Goya and Buenos Aires in 1885, at Cordoba in 1907, and at Santiago in 1892. On the mean of all the stations the warmest season was that of 1896, 3°·2 above the normal, and the coldest 1885, 2°·7 below normal.

The Rio observations show that this part of Brazil is not in general affected by the conditions that govern the temperature variations in the middle latitudes of Argentina and Chile, although in 13 years it is in agreement.

Efforts to correlate the S. American winter temperature variations from 1876 to 1911 with concurrent atmospheric conditions in other regions have, with one partial exception, yielded negative results. The temperature variations at Cape Town during the 21 years 1888 to 1908 agree, however, in the main with the S. American values, as will be seen from the following table showing the departures from the normal for Cape Town and Santiago.

The years of pronounced disagreement were thus 1895, 1898, and 1902, the sign of the departure from the mean in the other 18 years being the same. In the three years 1909-1911 the correlation breaks down completely. The Cape Town mean temperatures are the averages of the maximum and minimum values published monthly in this Magazine.

Departure from Normal of the Mean Temperature from May to August, from 1888 to 1908.

	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898
	°	°	°	°	°	°	°	°	°	°	°
Cape Town	—·6	— ·1	— ·8	+ ·4	—1·0	— ·2	—·4	—1·5	+ ·8	+1·2	+·4
Santiago...	—·3	—1·5	—2·2	+1·1	—2·5	—2·1	—·6	+ ·7	+3·7	+ ·4	—·7

	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	Mean.
Cape Town	+·9	+1·1	+1·1	+1·0	—1·3	+ ·2	·0	—1·3	—·4	+·3	56·0
Santiago...	+·9	+1·1	+ ·8	— ·2	—1·0	+2·1	+1·9	— ·6	—·3	+·1	48·2

AUCKLAND AND ALICE SPRINGS.

On comparing the mean temperature at Auckland, New Zealand, for the second quarter of the year, with the values at Alice Springs, Australia, for the last quarter, it was found that from 1892 to 1906 the former was an index of the latter. The departures from the normal of the 15 years under review were as follows :—

	1892	1893	1894	1895	1896	1897	1898	1899
	°	°	°	°	°	°	°	°
Auckland, April to June...	+1·1	+1·6	·0	— ·7	+ ·9	+1·4	+ ·3	—1·1
Alice Springs, Oct. to Dec.	+2·1	+1·5	+·2	—1·0	+3·1	+2·1	+1·2	+ ·2

	1900	1901	1902	1903	1904	1905	1906	Mean.
Auckland, April to June...	+1·9	+ ·2	—·8	—1·2	— ·7	— ·7	—1·6	57·0
Alice Springs, Oct. to Dec.	+2·3	+1·8	—·6	—3·5	—1·6	—1·4	—3·0	78·7

At both stations the mean temperature is the average of the max. and min., the values referring to Auckland being extracted from this Magazine or the New Zealand Meteorological Reports; while for the Alice Springs data we are indebted to Mr. H. A. Hunt, Commonwealth Meteorologist.

SYDNEY, N.S.W., AND SAN FRANCISCO, CAL.

From 1864 to 1889 a well-marked relation was apparent between the mean temperature at Sydney from May to August and the rainfall at San Francisco during the period October to April following. When the temperature at the one station was below the normal in the May to August period the aggregate rainfall during the period October to April following was deficient at the other place, and *vice versa.*

The mean May to August temperature at Sydney during the above period was 55°·2, and the mean San Francisco rainfall from October to April was 24·0 in. The departures from the normal during the period under review were as follows, the rainfall being given as a percentage above or below the normal. Under the first year, 1864, is given the San Francisco rain data for the seven months ending with April, 1865.

	1864	1865	1866	1867	1868	1869	1870	1871	1872
Sydney Temp., May to August ... deg.	—·1	—1·4	+1·0	+1·3	+·2	+·1	—·4	+·3	—·9
San Francisco Rain, Oct.-April following %	—1	—12	+45	+60	—11	—21	—43	+27	—35

	1873	1874	1875	1876	1877	1878	1879	1880	1881
Sydney Temp., May to August ... deg.	+1·3	—1·0	+·4	+·2	+1·1	—·7	—1·3	—·4	—·4
San Francisco Rain, Oct.-April following %	0	—20	+29	—57	+46	—11	+6	+21	—35

	1882	1883	1884	1885	1886	1887	1888	1889	Mean.
Sydney Temp., May to August ... deg.	—·3	+·2	+·9	+·8	+·4	—·7	—·3	+·8	55·2°
San Francisco Rain, Oct.-April following %	—32	+21	—27	+35	—22	—34	—14	+86	24·0 in.

In the following diagram (fig. 2), the actual values are shown in graphic form, the Sydney data being derived from a table kindly sent by Mr. H. A. Hunt, while the San Francisco rain has been taken from *Bulletin W* issued by the U.S. Weather Bureau.

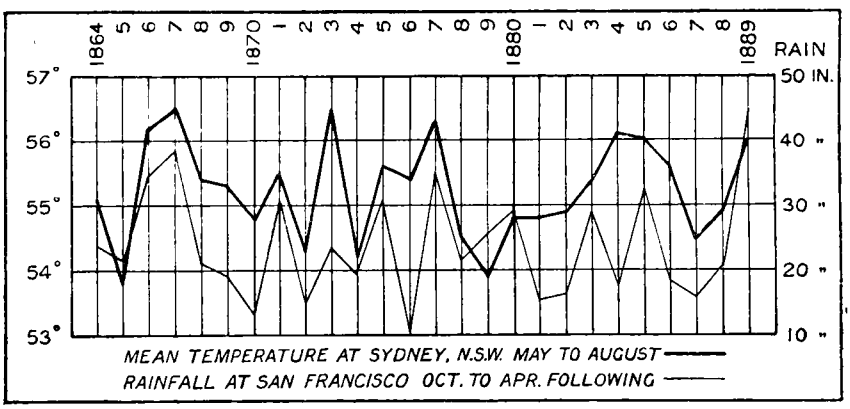

Fig. 2.

SOUTH ORKNEYS AND KIMBERLEY.

Since the South Orkney observatory was established in 1903 the August and September temperature there has been a direct index of the temperature at Kimberley, South Africa, during the three months following. The South Orkney data 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, while the Kimberley data are from Dr. Sutton's recent paper on "A Preliminary Survey of the Meteorology of Kimberley," published in the *Trans. Roy. Soc. of South Africa*, Vol. **3**, p. 226.

The mean temperatures are as follows, being shown graphically in Fig. 3 :—

	1903	1904	1905	1906	1907	1908	1909	1910	1911	Mean
S. Orkneys, Aug. & Sept.	16°·0	16°·6	24°·2	16°·9	9°·9	23°·8	19°·3	16°·5	23°·3	18°·5
Kimberley, Oct. to Dec.	74·6	74·3	76·4	73·1	72·7	75·0	74·7	73·2	77·6	74·6

Expressed as departures from the normal we have :—

	1903	1904	1905	1906	1907	1908	1909	1910	1911
S. Orkneys ...	—2°·5	—1°·9	+5°·7	—1°·6	—8°·6	+5°·3	+°·8	—2°·0	+4°·8
Kimberley ...	·0	— ·3	+1·8	—1·5	—1·9	+ ·4	+·1	—1·4	+3·0

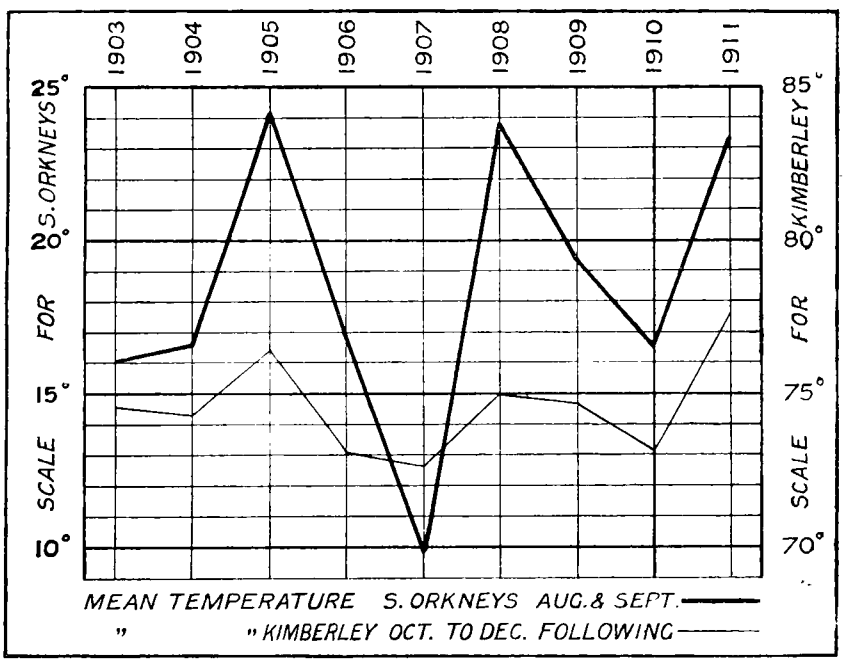

Fig. 3.

The temperature during August and September at the South Orkneys is largely dependent on the ice conditions of the ocean surrounding, and as the ice is moving east-north-east it is feasible to suppose that the temperature prevailing over South Africa is related in some way to the antecedent conditions in the great Southern Ocean. The relation is not a direct one, however, since the temperature at Cape Town for the three months under review is not in harmony with that of Kimberley or the South Orkneys.

BAROMETRIC PRESSURE AT THE SOUTH ORKNEYS AND HEIGHT OF THE PARANA.

In the month of December the height of the River Parana at Rosario (lat. 33° S., long. 61° W.), and the mean barometric pressure at Laurie Island, South Orkneys, are intimately related. When the barometric pressure in the sub-Antarctic is high the height of the Parana is also high, and when pressure is low in the far south the Parana is also low. The explanation is that the height of the Parana, as measured at Rosario, really depends on the rainfall over the south of Brazil and adjacent areas, and this is related to the barometric pressure. There is at this time of year a marked tendency for high pressure to the south and south-east of Cape Horn,

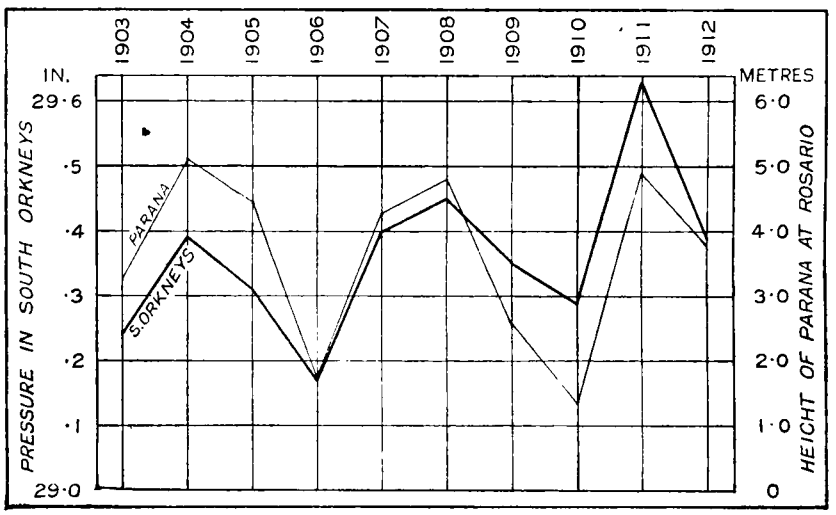

FIG. 4.

and it is not unreasonable to suppose that when the Grahams Land lobe of the Antarctic anti-cyclone is intensified the pressure over the interior of Brazil will be correspondingly diminished, and *vice versa*. The following are the values of barometric pressure in December at the S. Orkneys and the height (in metres) of the Parana at Rosario, the former being derived from the volume already mentioned, and the latter from the records in possession of the Hydrometric Branch of the Argentine Meteorological Office.

December.	1903	1904	1905	1906	1907	1908
S. Orkneys, Barometer ... (inches)	29·24	·39	·31	·17	·40	·45
Parana at Rosario ..... (metres)	3·27	5·11	4·44	1·70	4·27	4·80

	1909	1910	1911	1912	Mean.
S. Orkneys, Barometer ... (inches)	·35	·29	·63	·39	29·36
Parana at Rosario ..... (metres)	2·57	1·32	4·92	3·79	3·62

The barometric observations are at station level and require a correction of + ·07 inch to reduce them to sea-level and gravity. The above data are shown in Fig. 4, and the annexed table gives the departures from the normal.

	1903	1904	1905	1906	1907
S. Orkneys, Pressure ..... (inches)	— ·12	+ ·03	— ·05	— ·19	+·04
Height of Parana.....(metres)	— ·35	+1·49	+ ·82	—1·92	+·65
	1908	1909	1910	1911	1912
S. Orkneys, Pressure ..... (inches)	+ ·09	— ·01	— ·07	+ ·27	+·03
Height of Parana.....(metres)	+1·18	—1·05	—2·30	+1·30	+·17

Hence the only year of divergence as regards sign was 1905, and it will be seen that the curves follow each other very closely from one year to another.

(To be concluded).

Correspondence.

To the Editor of Symons's Meteorological Magazine.

FORECASTS.

It has been suggested to me that I ought to say something about the "attack" on the Weather Forecasts of the Meteorological Office by Mr. A. O. Walker, F.L.S., in your issue for October. I am a little doubtful, but if I had to make a reply this is what I should like to say.

First, I can well understand that to anyone who *knows* what the weather is going to be, or to anyone who *does not care*, the forecasts of the Meteorological Office must seem futile; but very few of the 1,000,000,000 people on this planet place themselves in either category. I know of four. The other 999,999,996, so far as they are known to me, are not certain what the weather is going to be, but they do care; and the people who do their best to help them need not be regarded as wasting their time.

Secondly, the weather is not the only subject about which people make forecasts. One often learns much on such a question as Mr. Walker raises by looking around and seeing what is done in other walks of life. In London my experience is that no one can cross a road without making a forecast, which is generally, but not invariably, justified. I never make the perilous voyage across Piccadilly Circus or Trafalgar Square, or, indeed, anywhere else, in a taxi cab without mentally paying a tribute of admiration to the skill in forecasting of the men to whose keeping my life and limbs are, for

the time being, entrusted, and at the end of the journey I generally "signify the same in the usual way." Sometimes it interests me to try to formulate the rules of forecasting which taxi-cab drivers use, but I will not trouble you with the result. One thing is clear that the rules, whatever they are, are not infallible as the records of street casualties show. Mr. Walker's line of argument seems to me to amount to saying that in facing the traffic of the London streets the better way would be to go straight on, pay no attention to it and take the risks. I can only say I do not agree.

Take another case. The whole system of trade is based upon credit which is simply forecasting the willingness and the ability of the other side to keep its bargain. Again the system is not infallible or there would be no bankruptcy court, but the common sense rule of life is neither to trust everybody nor to to trust nobody. In this case there are various agencies which supply information (in return for a small fee) and help a business man to make up his mind in a doubtful case.

Such a case is on all fours with that of the Meteorological Office forecasts. We have certain information about the weather which is at the disposal of the public to help anyone who has to come to a decision one way or another in matters with which the weather is concerned. That the inferences are not infallible is not denied, but to quote instances of their failure locally, as conclusive against their utility, is much the same as to quote street accidents as conclusive against caution in street traffic, or occasional bad debts as conclusive against credit.

The only effective way of telling whether forecasts are useful is to try them long enough and regularly enough for them to be as automatic a part of one's practice as the inferences drawn while one pauses on the footway before crossing a road. Knowing what I do about forecasts of various kinds, I am bold enough to say that when that time comes the majority who will "signify their opinion in the usual way" will not be small.

W. N. SHAW.

Edinburgh, 29th November, 1913.

WEATHER FALLACIES.

Mr. A. O. Walker is very pessimistic in his remarks on this subject, and a good deal of what he says is obviously open to criticism. I only wish now to refer to his objection to the Stevenson screen record of temperature in hot weather, "owing to radiation from the heated wood,"—an objection which, if it were a valid one, would throw doubt not only upon the daily maxima whenever the sun had shone in the course of the day, but also upon the *mean* temperature values deduced from the maxima and minima, in accordance with the common practice. Some years ago Mr. Mawley, a former well-remembered President of the Royal Meteorological Society, to whom

the adoption of the Stevenson screen as the standard screen was largely due, showed me on his lawn at Berkhamsted two such screens alike in every respect, standing side by side, at a distance apart of a few feet. Their exposure to the sun was the same, except that to the south of one of them he had placed a light calico screen, just large enough to intercept the rays which otherwise would have fallen during the middle hours of the day upon the louvred box which contained thermometers. The experiment was intended to test the very point now raised by Mr. Walker, and the answer it gave was, I believe, that the maxima in the two screens were practically identical under all conditions of weather. Possibly, although I cannot recall his doing so, Mr. Mawley may have published an account of his experiment; it was certainly one of great importance and should have been made generally known. But the exposure of thermometers is a subject to which I have myself given some attention, and I have for some years had in use a Stevenson screen in which I keep a very sensitive thermograph giving excellent records. In the screen I have also three control thermometers,—an ordinary mercurial thermometer, a maximum, and a spirit minimum, all tested instruments, which are read every day for comparison with the thermograph trace. The max. is a very sensitive instrument, *unmounted*, and has a slender cylindrical bulb, and both it and the min. are, for want of space, fixed to the back (south) of the screen, the bulbs being three-quarters of an inch away from the louvres; the ordinary thermometer is fixed to the louvres on the west side of the screen; whilst the coil of the thermograph is quite open to the ground which is 4 ft. beneath it. It is extremely rare to find a difference amounting to half a degree between either of the control instruments and the trace, no matter what may have been the character of the weather. This fact leads me to ask whether Mr. Walker's thermometer in the "N. verandah about 20 yards distant," which gave max. readings 7° lower than those obtained in the screen, was hung against a wall, or in some position in which its reading was influenced by radiation from cool surroundings, very slow in taking up the temperature of the air? If it was so hung, I submit that in that fact is to be found the explanation of the lower readings mentioned by him; and the difference between the screen and the verandah is explained without the reliability of the screen being affected.

R. H. CURTIS.

THE WARM AND THE COLD WINDS.

In the last number of this Magazine (Nov., page 185), Mr. A. O. Walker objects to the common assumption that the S.W. wind is warm and the E. cold, especially in the spring. He quotes particularly the case of May 7th and 8th, 1913, at Ulcombe, near Maidstone, Kent. On the 7th, 9 a.m., the wind was S.W., force 5, with occasional sunshine, and the temperature 48°·5. On the 8th

wind E., force 5, with sky overcast and temperature 51°·5. Thus the E. wind was warmer than the S.W. wind. Mr. Walker does not try any explanation of the case. And yet the desirable explanation is at hand and the simple principle on which it dwells has been summarily exposed in this Magazine in the years 1903 (page 183), and 1905 (pages 19 and 27), and at length and several times elsewhere since 1886.

On May 7th the Bulletin International of Paris shows a centre of low barometer off Ireland (29·27 in. at Valencia $S._2$, 29·50 in. at Scilly, $S.S.W._4$). The wind is S.W. at Greenwich and at Ulcombe; but it blows from W. at Yarmouth and from W.N.W. and N.W. on the French shore of the Channel. All these winds from S.W. to N.W. are divergent or of the nature of anticyclonic winds; the air is in that part of England and on the Channel dispersing and subject consequently to cooling. Since the preceding morning effectively the variation of temperature was —3°·2 at Greenwich, —3°·1 at Yarmouth, —2°·0 at Boulogne, —4°·3 at Gris Nez, and —3°·2 at Dunkirk.

The next day, May 8th, at the same hour, the low was south of Ireland (29·03 in. at Valencia E_2; 29·07 in. at Scilly S_6; 29·28 in. at Ouessan $S.S.W._9$) The wind on the Channel is reversed, it blows now from S.E. towards the centre of the depression. At Ulcombe the wind E_5 runs against the S.S.W. at Greenwich, if this S.S.W. is not a deflection at right hand of the former E. direction. Excepting that wind of S.S.W., all other directions in Kent and on the Channel are converging and the concentrating air is subject to warming. The rise of the temperature is naturally the greatest on the Channel, + 5°·0 at Gris Nez, on account of the facing about of the wind.

Related to the centre of low the $S.S.W._4$ wind at Greenwich is again rather diverging than converging and there again is noted a lowering (—1°·3) of the temperature in that particular place.

In the year 1898 I have quoted and discussed some fifty remarkable cases of warming or cooling of the different cyclonic and anticyclonic winds, which ought to have created the conviction that the chief dynamical process of the accidental variations of the temperature of the air resides in the convergence and divergence of horizontal currents in the atmosphere, whatever may be the altitude of them.

MARC DECHEVRENS, S.J.

Jersey, Observatory St. Louis.

FROZEN PRECIPITATION.

I AM glad to see Mr. Bonacina's note on Frozen Precipitation. It has never seemed to me that there was any evidence in support of the super-cooled water theory, for, as Mr. Bonacina says, the phenomenon occurs in just those circumstances when warm air above might be expected.

A small local "glazed frost" can be produced by anyone who likes to use a hose or syringe when the temperature is below the freezing point, a fact which I have several times put to a practical use. We have here a workshop with a tiled but unboarded roof and dry snow drives through the openings under the tiles very readily. By using a common garden syringe and a few pails of water the roof can be glazed whenever dry snow is falling, and on three, if not four, occasions we have used this plan; but for the sake of personal comfort during the job we employ lukewarm water, which answers perfectly.

W. H. DINES.

Pyrton Hill.

THE "BRITISH" RAIN GAUGE.

THE "British" rain gauge, described in your last issue, appears to be an excellent gauge at a moderate price. It would, however, be a great convenience if all instrument makers would state an inclusive price at which a gauge can be delivered at any address in the British Isles. The list price is, as a rule, that at which the gauge is delivered "over the counter," and additional charges for packing and carriage in some cases add fully one-third to the nominal price. It is possible by packing the gauge in loose straw in a rough cardboard case, to ensure safe transit and to bring the total weight within the limit of the parcels post service, and this practice might be generally adopted. One would then be able to let Observers, in any part of the country, know the exact price of a gauge delivered at the door.

ANDREW WATT.

Scottish Meteorological Society,
122, George Street, Edinburgh, December 6th, 1913.

TEMPERATURE VARIATIONS IN FOG.

THE thermograph reading here on the night of the 24th–25th was rather exceptional. At 9 p.m. the temperature was 42°, and 39° at midnight. Then followed irregular upward movements to 42° at 5.30, followed by a rapid fall to 38½° at 5.45, and fluctuations down and up again till 6.45. Until then the fog had filled the valley below, but had left us spectators of a glorious volcanic ash (?) sunrise glow from 6 to 6.30. At 6.45 the fog rose rapidly to our level with a clammy chill, and in a quarter of an hour or less the thermograph fell 4½°, to 34°. There was not even a ground frost at this level (360 feet and N.E. slope); presumably the 34° indicated the temperature of an exposed thermometer. Sunrise was at 6.41. Max., 2 to 3 p.m 62½°.

J. EDMUND CLARK.

Asgarth, Purley, 26th October, 1913.

LONG DRY PERIODS AT TOTLAND BAY.

In Totland Bay there has been an absolute drought of 20 days, beginning on July 20th. We have had a partial drought of 42 days, which began on July 11th, and a long dry period of 93 days, which began on May 30th and gave a total rainfall of 1·93 in.

During my stay of 27 years in Totland I have only experienced five of these long dry periods of less than 2 inches of rain spread over at least thirteen weeks, viz. :—

		Rainfall. in.
95 days.....	20th February—24th May, 1892.....	1·88
109 ,, ...	17th March—3rd July, 1893	1·94
91 ,, ...	2nd January—2nd April, 1907	1·99
97 ,, ...	30th June—4th October, 1911	1·90
93 ,, ...	30th May—30th August, 1913	1·93

JOHN DOVER.

Aston House, Totland Bay, 13th September, 1913.

HEAVY RAINS IN CEYLON.

Floods occurred at Gampola, Ratnapura, and various places in the Kelani Valley, during October, 1913. Some of the chief rainfalls recorded were as under :—

Stations.	Height above Sea Level.	Oct. 4th.	Oct. 5th.	Oct. 6th.	Month's Total.
	ft.	in.	in.	in.	in.
Padupola	1606	12·00	21·00	22·00	74·97
Watawala.....	3259	8·05	9·14	20·65	55·28
Strathellie	2500	11·10	20·19	·68	63·90
Kegalle	800	1·03	14·23	10·42	42·14
Kandy	1654	·26	5·10	6·94	26·74

At Colombo, floods reached their highest on the 9th under clear sky, *i.e.*, the water came almost entirely from the River Kelani, not from local rain.

The readings from Ratnapura are unfortunately not available owing to the gauge being inaccessible at the crucial time. It is not claimed that the figures at Padupola are more than an approximation.

A. J. BAMFORD.

Colombo Observatory, Ceylon, 19th November, 1913.

[The above are inland stations situated approximately in lat. 7° N., long. 80 °E.—Ed., *S.M.M.*]

THE CLIMATE OF TORQUAY.

Mr. MacDowall reminds me of a story that used to be current at the Foreign Office some thirty or forty years ago. At the request of a friend medically ordered to . . . . , the S. of S. asked the British Consul there for a report upon the winter climate. That functionary prefaced his reply by expressing doubts whether he was really

THAMES VALLEY RAINFALL — NOVEMBER, 1913.

ALTITUDE SCALE: Below 250 feet | 250 to 500 feet | 500 to 1000 feet | Above 1000 feet

SCALE OF MILES: 0 5 10 15 20

Symons's Meteorological Magazine.

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

Rainfall Stations reporting ●

Isohyetals

qualified to give an opinion upon the point, as, though he had spent 37 winters there, he had been solemnly assured by the very best authority that he had experienced 37 *exceptional* seasons! I have spent six winters here, and I have recorded the impressions derived therefrom, and figures as regards the last four confirming those impressions. Mr. MacDowall, whom, for aught I know, birth and life-long residence may qualify for the position of "the very best authority," thinks otherwise. I don't suppose that anything that I could say would convince him, and certainly nothing that he can say will, so long as my rain-gauge approaches its records of recent winters, convert me. But in closing, so far as I am concerned, this correspondence, I may assure him that no one hopes more earnestly than myself that the coming winter may go to support his contention rather than my experience, and afford a marked and happy contrast to the deluges and depression of its recent (but of course exceptional) predecessors.

JOHN EDWARDS-MOSS.

Roby Hall, Torquay, November 27th, 1913.

VISIBILITY.

MANY readers of your Magazine have, no doubt, made notes on that distinct clearness of the air which precedes rain. I am not now purposing to make any comments but to ask for commentary remarks from Observers. The matter resolved itself into two questions:—*a*. Is it admitted as a fact that when distant objects appear unusually distinct—objects like a distant shore, as the coast of France seen from this neighbourhood, but not ordinarily visible—or a clear deep blue sky at night, ; is such a spectacle a prognostic of coming rain? *b*. What are the physical conditions which produce such phenomena? Should these enquiries commend themselves to your readers I shall be much interested in their replies.

S. MILLER.

Deal, 8th October, 1913.

THE WEATHER OF NOVEMBER.

THE outstanding features of the weather of November were an almost constant succession of stormy southerly to westerly winds, seldom veering as far as north-west, accompanied by an abnormally high temperature, frequent precipitation which, although above the average in most districts, was seldom heavy, and a marked absence of frost and snow.

Throughout practically the whole month a succession of cyclonic systems moved in the usual north-easterly direction outside our coasts with their centres located over Iceland, and the resultant weather was thus of a generally unsettled character with rough to high seas around our coasts.

Throughout the month there was a marked increase in the intensity of the sub-tropical pressure maxima about the Azores, associated with an unusual deepening of the barometrical minima around Iceland. The barometric gradient between these two regions was thus unusually steep, there being a difference of 1·08 in. of mercury between the latitudes of 65° and 38° N. As the normal difference of pressure on the average of the 47 years, 1865-1911, is ·36 in., the barometric gradient was thus three times steeper than usual, and a quarter of an inch more than the previous maximum of ·83 in. recorded in November, 1890. In the neighbourhood of Stykkisholm, Iceland, in lat. 65° N., the mean barometric pressure (at 32° M.S.L. and lat. 45°), was 29·18 in., being 0·55 in. below the normal and the lowest November pressure since the record commenced in 1845. At Horta, in the Azores, on the other hand, pressure was 30·26 in., or ·17 in. above the normal, so that the anomaly in the pressure gradient was ·72 in., one of the very largest observed in any month between these two "action centres." To the north-east of Iceland pressure increased, the mean at Spitzbergen (from the 7 a.m. values given in the Daily Weather Report of the Meteorological Office), being 29·53 in., while it was 29·20 in. at Isafjord, and 29·16 in. at Reykjavik, on the west coast of Iceland.

During the first half of the month seldom a day passed without gales on some exposed parts of our coasts, with frequent thunderstorms over England. The month opened with high temperatures in the south of our islands, and heavy rain in the west of Scotland, Bendamph reporting 1·82 in. on the 2nd. On the 6th, when a low-pressure area was located over the west of Ireland, temperature fell rapidly in Scotland, with sharp frost in the eastern and central districts, a shade minima of 22° being recorded at Balmoral, with frost over the greater part of Britain. On the 7th a rapid rise of temperature occurred in the north, but in the south a fall had taken place, and by the 8th a general rise was in progress, with maxima as high as 60° in eastern, central and southern England. The general type of pressure distribution was so constant, and the resulting weather so regular that it is not necessary to give a detailed account of the sequence of phenomena from one group of days to the other. At several places in the south-west rain fell every day during the month, among such reporting stations being Darrynane, Waterville, Fenloe, co. Clare, and Northam Vicarage in Devon. Rains exceeding an inch and a half in the 24 hours were uncommon. On the 12th heavy rain fell over Wales, the maximum falls reported being 1·75 in. at Claerwen and 1·71 in. at Dolgelly. Temperature also was unusually high, rising to 62° in the Midlands on the 11th and to 63° at Ventnor on the 12th. On the 17th temperatures as high as 60° were reported as far north as Aberdeen. Heavy rain again fell from the 19th to the 21st. On the 19th many stations in the normally wet area in the west of Scotland reported falls ranging from 1·49 in. at Ballachulish to 2·04 in. at Glencarron and 2·15 in. at

Arisaig, and other stations in Snowdonia and the Lake District also had heavy falls exceeding one-and-a-half inches. On the 20th 2·85 in. fell at Rhiwbryfdir, which had also 1·58 in. on the 19th. Tynywaun reported 3·03 in. on the 20th, but at Seathwaite only 1·50 in. fell. Local heavy rains occurred on the 21st (Monmouth), 23rd (Ireland, N.W.), 26th and 28th (Scotland, W.). Of these the latter was the most important, Loch Stack reporting 3·32 in., and Glencarron 2·27 in. During the last ten days of the month temperature was again very high and varied from 22° at Raunds on the 23rd to 63° at Hawarden on the 27th and 64° at Bettws-y-Coed on the 29th, the month closing with a continuation of unusual warmth.

The general rainfall of the month expressed as a percentage of the average was: England and Wales, 109; Scotland, 126; Ireland, 116; British Isles, 116.

INTERNATIONAL BALLOON ASCENTS.

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

February 2nd, 1911.

Starting Point.	Country.	A (H_c.) miles.	B (T_c.) ° F.	C miles.	D ° F.	E miles.	F
Manchester.....	England ..	7·3	—87	12·8	—65	73	S.W.
Pyrton Hill.. *Feb. 1st*	,, ..	7·7	—94	9·6	—76	40	S.W.
Pyrton Hill.. *Feb. 2nd*	,, ..	6·5	—78	7·7	—74	58	S.W.
Brussels	Belgium ..	6·6	—83	13·0	—65	80	S.S.W.
Hamburg	Germany..	6·2	—80	7·6	—76	86	S.
Lindenberg.....	,, ..	6·6	—75	10·3	—68	78	S.
Paris	France ...	7·3	—79	7·8	—66	128	S.W.
Strassburg	Germany..	..	..	5·9	—65	37	S.W. by S.
Pavlovsk	Russia	5·9	—72	6·0	—72	48	S. by W.
Nishni Olchedaeff	,, ..	5·3	—56	10·0	—45	46	S.

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.

The pressure was very high over England, but decreased towards the south-east of Europe. A depression was passing from Iceland on the 2nd to the north of Scandinavia on the 3rd.

The drift to the south and south-west was unusually large over the whole area, and a greater inversion than is usual, 22° at Manchester, occurred at many stations.

ERRATA.

In July number, p. 110, fourth line from bottom, *for* last *read* first.
,, August ,, pp. 119 to 124, *for* Azo *read* Ajo.
,, ,, ,, p. 123, heading to diagram, *for* 1876-1904 *read* 1876-1894.
,, ,, ,, p. 124, 17th line from top, *for* ·37 *read* ·57.

RAINFALL TABLE FOR NOVEMBER, 1913.

STATION.	COUNTY.	Lat. N.	Long. W. [*E.]	Height above Sea. ft.	RAINFALL OF MONTH. Aver. 1875—1909. in.	1913. in.
		° ′	° ′			
Camden Square	*London*	51 32	0 8	111	2·34	2·35
Tenterden	*Kent*	51 4	*0 41	190	3·07	3·25
Arundel (Patching)	*Sussex*	50 51	0 27	130	3·54	4·48
Fawley (Cadland)	*Hampshire*	50 50	1 22	52	3·39	3·75
Oxford (Magdalen College)	*Oxfordshire*	51 45	1 15	186	2·25	2·30
Wellingborough (Croyland Abbey)	*Northampton*	52 18	0 41	174	2·23	1·83
Shoeburyness	*Essex*	51 31	*0 48	13	2·09	2·66
Bury St. Edmunds (Westley)	*Suffolk*	52 15	*0 40	226	2·40	2·21
Geldeston [Beccles]	*Norfolk*	52 27	*1 31	38	2·49	1·96
Polapit Tamar [Launceston]	*Devon*	50 40	4 22	315	4·07	5·58
Rousdon [Lyme Regis]	,,	50 41	3 0	516	3·51	3·30
Stroud (Upfield)	*Gloucestershire*	51 44	2 13	226	2·77	2·52
Church Stretton (Wolstaston)	*Shropshire*	52 35	2 48	800	2·94	2·50
Coventry (Kingswood)	*Warwickshire*	52 24	1 30	340	2·61	2·98
Boston	*Lincolnshire*	52 58	0 1	11	2·05	2·17
Worksop (Hodsock Priory)	*Nottinghamshire*	53 22	1 5	56	1·98	1·74
Macclesfield	*Cheshire*	53 15	2 7	501	3·00	3·18
Southport (Hesketh Park)	*Lancashire*	53 38	2 59	38	3·16	3·83
Arncliffe Vicarage	*Yorkshire, W.R.*	54 8	2 6	732	6·12	8·77
Wetherby (Ribston Hall)	,, ,,	53 59	1 24	130	2·34	2·07
Hull (Pearson Park)	,, *E.R.*	53 45	0 20	6	2·34	2·17
Newcastle (Town Moor)	*Northumberland*	54 59	1 38	201	2·63	1·31
Borrowdale (Seathwaite)	*Cumberland*	54 30	3 10	423	13·59	13·49
Cardiff (Ely)	*Glamorgan*	51 29	3 13	53	4·08	5·95
Haverfordwest	*Pembroke*	51 48	4 58	90	5·16	4·82
Aberystwyth (Gogerddan)	*Cardigan*	52 26	4 1	83	4·50	7·02
Llandudno	*Carnarvon*	53 20	3 50	72	3·19	3·63
Cargen [Dumfries]	*Kirkcudbright*	55 2	3 37	80	4·35	5·82
Marchmont House	*Berwick*	55 44	2 24	498	3·21	1·95
Girvan (Pinmore)	*Ayr*	55 10	4 49	207	5·24	7·73
Glasgow (Queen's Park)	*Renfrew*	55 53	4 18	144	3·63	5·09
Inveraray (Newtown)	*Argyll*	56 14	5 4	17	7·39	12·19
Mull (Quinish)	,,	56 34	6 13	35	6·24	8·53
Dundee (Eastern Necropolis)	*Forfar*	56 28	2 57	199	2·62	1·79
Braemar	*Aberdeen*	57 0	3 24	1114	3·76	2·21
Aberdeen (Cranford)	,,	57 8	2 7	120	3·29	1·65
Cawdor	*Nairn*	57 31	3 57	250	2·60	2·27
Fort Augustus (S. Benedict's)	*E. Inverness*	57 9	4 41	68	4·51	7·32
Loch Torridon (Bendamph)	*W. Ross*	57 32	5 32	20	8·90	14·37
Dunrobin Castle	*Sutherland*	57 59	3 56	14	3·25	4·00
Wick	*Caithness*	58 26	3 6	77	2·95	3·10
Killarney (District Asylum)	*Kerry*	52 4	9 31	178	5·54	7·48
Waterford (Brook Lodge)	*Waterford*	52 15	7 7	104	3·80	3·62
Nenagh (Castle Lough)	*Tipperary*	52 54	8 24	120	3·88	4·72
Ennistymon House	*Clare*	52 57	9 18	37	4·62	5·80
Gorey (Courtown House)	*Wexford*	52 40	6 13	80	3·41	3·88
Abbey Leix (Blandsfort)	*Queen's County*	52 56	7 17	532	3·28	3·68
Dublin (Fitz William Square)	*Dublin*	53 21	6 14	54	2·64	2·24
Mullingar (Belvedere)	*Westmeath*	53 29	7 22	367	3·38	3·07
Crossmolina (Enniscoe)	*Mayo*	54 4	9 16	74	5·75	7·91
Cong (The Glebe)	,,	53 33	9 16	112	5·00	5·69
Collooney (Markree Obsy.)	*Sligo*	54 11	8 27	127	4·02	5·26
Seaforde	*Down*	54 19	5 50	180	3·86	4·41
Bushmills (Dundarave)	*Antrim*	55 12	6 30	162	3·77	4·50
Omagh (Edenfel)	*Tyrone*	54 36	7 18	280	3·66	3·82

RAINFALL TABLE FOR NOVEMBER, 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.
+ ·01	100	·67	21	17	22·98	21·62	—1·36	94	25·11	Camden Square
+ ·18	106	·74	12	16	24·87	24·85	— ·02	100	27·64	Tenterden
+ ·94	127	1·27	12	18	27·57	35·63	+8·06	129	30·48	Patching
+ ·36	111	·62	11	27	28·64	30·16	+1·52	105	31·87	Cadland
+ ·05	102	·52	10	16	22·52	21·06	—1·46	94	24·58	Oxford
— ·40	82	·59	10	17	23·04	21·44	—1·60	93	25·17	Croyland Abbey
+ ·57	127	·56	12	14	17·57	18·92	+1·35	108	19·28	Shoeburyness
— ·19	92	·65	11	15	23·26	21·91	—1·35	94	25·40	Westley
— ·53	79	·52	11	21	21·66	21·36	— ·30	99	23·73	Geldeston
+1·51	137	1·09	11	26	33·81	38·69	+4·88	114	38·27	Polapit Tamar
— ·21	94	·54	11	19	29·86	29·37	— ·49	98	33·54	Rousdon
— ·25	91	·57	11	18	27·10	28·02	+ ·92	103	29·81	Stroud
— ·44	85	·36	11	22	29·42	33·61	+4·19	114	32·41	Wolstaston
+ ·37	114	·89	12	16	26·32	24·68	—1·64	94	28·98	Coventry
+ ·12	106	·50	10	24	21·47	22·28	+ ·81	104	23·35	Boston
— ·24	88	·31	11	17	22·29	21·00	—1·29	94	24·46	Hodsock Priory
+ ·18	106	·34	20	27	31·38	28·97	—2·41	92	34·73	Macclesfield
+ ·67	121	·81	20	26	29·60	27·03	—2·57	91	32·70	Southport
+2·65	143	1·43	20	27	54·74	52·23	—2·51	95	61·49	Arncliffe
— ·27	88	·44	16	17	24·60	20·45	—4·15	83	26·87	Ribston Hall
— ·17	93	·48	10	22	24·10	18·93	—5·17	79	26·42	Hull
—1·32	50	·19	26	19	25·48	25·68	+ ·20	101	27·94	Newcastle
— ·10	99	1·50	20	26	114·34	110·00	—4·34	96	129·48	Seathwaite
+1·87	146	·57	5, 9	28	37·58	43·13	+5·55	115	42·28	Cardiff
— ·34	93	·77	9	25	41·63	49·88	+8·25	120	46·81	Haverfordwest
+2·52	156	1·22	20	26	40·80	53·42	+12·62	131	45·46	Gogerddan
+ ·44	114	·68	12	24	27·52	29·56	+2·04	107	30·36	Llandudno
+1·47	134	·90	2	24	38·63	44·01	+5·38	114	43·47	Cargen
—1·26	61	·28	10	19	30·93	23·62	—7·31	76	33·76	Marchmont
+2·49	148	1·25	15	28	44·29	41·17	—3·12	93	49·77	Girvan
+1·46	140	·75	2	23	32·02	31·50	— ·52	98	35·97	Glasgow
+4·80	165	1·32	19	26	60·10	63·39	+3·29	105	68·67	Inveraray
+2·29	137	·89	19	25	49·98	49·23	— ·75	99	56·57	Quinish
— ·83	68	·53	2	20	25·97	21·95	—4·02	85	28·64	Dundee
—1·55	59	·27	2	20	31·80	28·70	—3·10	90	34·93	Braemar
—1·64	50	·43	6	15	29·30	23·72	—5·58	81	32·73	Aberdeen
— ·33	87	·31	30	12	26·80	20·30	—6·50	76	29·33	Cawdor
+2·81	162	1·20	2	26	38·91	39·69	+ ·78	102	44·53	Fort Augustus
+5·47	162	1·82	2	26	74·07	76·59	+2·52	103	83·93	Bendamph
+ ·75	123	·48	30	18	28·81	22·05	—6·76	77	31·90	Dunrobin Castle
+ ·15	105	·31	18	22	26·77	20·97	—5·80	78	29·88	Wick
+1·94	135	·90	12	27	47·89	54·24	+6·35	113	54·81	Killarney
— ·18	95	·65	20	19	35·25	38·76	+3·51	110	39·57	Waterford
+ ·84	122	·56	7	22	35·09	39·04	+3·95	111	39·43	Castle Lough
+1·18	126	·82	2	28	41·49	47·23	+5·74	114	46·52	Ennistymon
+ ·47	114	1·14	9	18	31·57	32·34	+ ·77	102	34·99	Courtown Ho.
+ ·40	112	·52	9	22	32·51	38·95	+6·44	120	35·92	Abbey Leix
— ·40	85	·51	7	21	25·41	26·98	+1·57	106	27·68	Dublin
— ·31	31	·58	7	24	32·76	35·12	+2·36	107	36·15	Mullingar
+2·16	137	2·04	23	26	46·76	54·68	+7·92	117	52·87	Enniscoe
+ ·69	114	1·03	23	27	43·48	46·40	+2·92	107	48·90	Cong
+1·24	131	1·10	23	26	38·37	40·46	+2·09	105	42·71	Markree
+ ·55	114	·84	11	21	35·14	37·16	+2·02	106	38·91	Seaforde
+ ·73	119	·87	15	25	33·69	27·95	—5·74	83	37·56	Dundarave
+ ·16	104	·47	7	25	35·47	36·17	+ ·70	102	39·38	Omagh

SUPPLEMENTARY RAINFALL, NOVEMBER, 1913.

Div.	STATION.	Rain inches.	Div.	STATION.	Rain inches.
II.	Warlingham, Redvers Road..	3·29	XI.	Lligwy	5·05
,,	Ramsgate	2·45	,,	Douglas	5·99
,,	Hailsham	4·80	XII.	Stoneykirk, Ardwell House...	5·40
,,	Totland Bay, Aston House...	3·64	,,	Dalry, The Old Garroch.....	10·21
,,	Stockbridge, Ashley..	2·27	,,	Beattock, Kinnelhead	8·07
,,	Grayshott	3·21	,,	Langholm, Drove Road	7·06
,,	Caversham, Rectory Road ...	2·27	XIII.	Meggat Water, Cramilt Lodge	7·11
III.	Harrow Weald, Hill House...	2·64	,,	North Berwick Reservoir.....	1·27
,,	Pitsford, Sedgebrook...	2·30	,,	Edinburgh, Royal Observaty.	1·97
,,	Woburn, Milton Bryant.....	2·36	XIV.	Maybole, Knockdon Farm ...	5·76
,,	Chatteris, The Priory..... ...	·99	XV.	Ballachulish House	11·34
IV.	Colchester, Hill Ho., Lexden	2·75	,,	Campbeltown, Witchburn ..	6·79
,,	Newport, Belmont House ...	...	,,	Holy Loch, Ardnadam.....	12·16
,,	Ipswich, Rookwood, Copdock	2·93	,,	Islay, Eallabus	5·73
,,	Blakeney..... . ..	1·90	,,	Tiree, Cornaigmore	6·37
,,	Swaffham	2·21	XVI.	Dollar Academy	5·25
V.	Bishops Cannings	2·29	,,	Balquhidder, Stronvar.....	...
,,	Winterbourne Steepleton.....	...	,,	Glenlyon, Meggernie Castle..	9·70
,,	Ashburton, Druid House.....	6·74	,,	Blair Atholl	3·70
,,	Cullompton	3·92	,,	Coupar Angus	2·05
,,	Lynmouth, Rock House	6·47	,,	Montrose, Sunnyside Asylum.	1·37
,,	Okehampton, Oaklands... ...	5·96	XVII.	Alford, Lynturk Manse	1·06
,,	Hartland Abbey.....	4·65	,,	Fyvie Castle	1·63
,,	Probus, Lamellyn.....	5·03	,,	Keith Station	1·69
,,	North Cadbury Rectory.....	3·07	XVIII.	Alvey Manse.....	...
VI.	Clifton, Pembroke Road.....	3·32	,,	Loch Quoich, Loan	37·25
,,	Ross, The Graig	3·36	,,	Drumnadrochit	4·56
,,	Shifnal, Hatton Grange.....	2·38	,,	Skye, Dunvegan	11·56
,,	Droitwich.....	3·02	,,	N. Uist, Lochmaddy	...
,,	Blockley, Upton Wold.....	3·24	,,	Glencarron Lodge	18·40
VII.	Market Overton.....	2·89	XIX.	Inversnin	5·42
,,	Market Rasen	2·06	,,	Melvich	4·91
,,	Bawtry, Hesley Hall	1·81	,,	Loch Stack, Ardchullin	14·20
,,	Derby, Midland Railway.....	2·39	XX.	Skibbereen Rectory	5·66
,,	Buxton	5·17	,,	Dunmanway, The Rectory ..	7·67
VIII.	Nantwich, Dorfold Hall	2·26	,,	Glanmire, Lota Lodge, No. 1	4·92
,,	Chatburn, Middlewood	4·29	,,	Mitchelstown Castle.....	5·18
,,	Cartmel, Flookburgh	4·60	,,	Darrynane Abbey.....	6·14
IX.	Langsett Moor, Up. Midhope	3·23	,,	Clonmel, Bruce Villa	4·40
,,	Scarborough, Scalby	2·08	,,	Newmarket-on-Fergus, Fenloe	4·25
,,	Ingleby Greenhow	1·79	XXI.	Laragh, Glendalough	3·07
,,	Mickleton	3·70	,,	Ballycumber, Moorock Lodge	2·58
X.	Bellingham, High Green Manor	2·74	,,	Balbriggan, Ardgillan	2·69
,,	Ilderton, Lilburn Cottage ...	1·76	XXII.	Woodlawn	3·95
,,	Keswick, The Bank.....	6·24	,,	Westport, St. Helens	6·18
XI.	Llanfrechfa Grange	5·04	,,	Dugort, Slievemore Hotel ...	7·11
,,	Treherbert, Tyn-y-waun	15·64	,,	Mohill Rectory	3·50
,,	Carmarthen, The Friary	6·40	XXIII.	Enniskillen, Portora.....	4·29
,,	Castle Malgwyn [Llechryd]...	5·10	,,	Dartrey [Cootehill]	3·58
,,	Crickhowell, Tal-y-maes.....	5·80	,,	Warrenpoint, Manor House ..	3·62
,,	New Radnor, Ednol	3·75	,,	Banbridge, Milltown	2·83
,,	Birmingham WW., Tyrmynydd	8·56	,,	Belfast, Cave Hill Road	4·32
,,	Lake Vyrnwy	6·51	,,	Glenarm Castle..... ...	4·83
,,	Llangyhanfal, Plâs Draw.....	2·65	,,	Londonderry, Creggan Res...	4·19
,,	Dolgelly, Bryntirion.....	7·88	,,	Dunfanaghy, Horn Head ...	6·51
,,	Bettws-y-Coed, Tyn-y-bryn...	6·50	,,	Killybegs	8·65

METEOROLOGICAL NOTES ON NOVEMBER, 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.—Fair to dull weather with frequent light R. Unusually mild throughout the month, the mean temp. 47°·8 being 4°·3 above the average, and the highest for November in the 56 years' record, excepting only November, 1881, when it was 48°·8. Though persistently high, temp. was never extreme for November, there being only 4 days with shade max. below 50°, but no day on which 60° was reached. Duration of sunshine 54·5* hours, and of R 43·9 hours. Evaporation ·36 in. Shade max. 59°·9 on 11th; min. 29°·8 on 23rd. F 0, f 3.

TENTERDEN.—A warm month and wet in the first half. Duration of sunshine 78·5† hours. Shade max. 59°·5 on 17th; min. 31°·5 on 23rd. F 1, f 6.

TOTLAND BAY.—Mean temp. 50°·2 and the warmest November in 28 years, the nearest approach being November, 1894, with mean temp. 49°6. Duration of sunshine 87·3* hours. Shade max. 58°·6 on 11th; min. 34°·0 on 23rd. F 0, f 1.

IPSWICH, COPDOCK.—The mildest November ever recorded here. The first half of the month was wet, but the duration of sunshine 87·6* hours. was the greatest in 11 years for November. Mean temp. 46°·8. Shade max. 59°·0 on 2nd; min. 30°·0 on 23rd. F 1, f 8.

POLAPIT TAMAR.—Unusually mild though wet, with a good deal of wind. Shade max. 57°·9 on 9th and 10th; min 29°·2 on 23rd. F 2, f 7.

NORTH CADBURY.—No extremes of warmth, but entire absence of marked cold; a damp November although wind was above and cloud below the average. Shade max. 61°·0 on 1st and 2nd; min. 31°·0 on 23rd. F 1, f 9.

DROITWICH.—Very mild month. Rambler roses, primroses, fuchsias, etc., were in flower on November 30th.

HODSOCK PRIORY.—Shade max. 58°·1 on 17th; min. 28°·2 on 23rd. F 4, f 14.

SOUTHPORT.—An unusually stormy month. Duration of sunshine 52·7* hours, and of R 78·1 hours. Evaporation ·31 in. Mean temp. 47°·5, or 4°·2 above the average. Shade max. 56°·0 on 2nd and 16th; min. 35°·0 on 23rd. F 0, f 7.

HULL.—Mild throughout with some fine sunny days and others very dull, often with mist. Duration of sunshine 46·2* hours. Shade max. 58°·0 on 2nd and 17th; min. 33°·0 on 10th F 0, f 8.

HAVERFORDWEST.—Duration of sunshine 72·3* hours. Shade max. 66°·9 on 14th; min. 39°·0 on 22nd.

LLANDUDNO.—Shade max. 58°·0 on 10th; min. 37°·0 on 23rd. F 0, f 0.

CRAMILT LODGE.—Heavy R on night of 2nd, the total being 2·53 in., most of which fell between 6 p.m. on 2nd and 3 a.m. on 3rd.

EDINBURGH.—Shade max. 54°·9 on 17th; min. 34°·0 on 9th. F 0, f 8.

INVERARAY.—A wet month, R falling on all but 4 days, but without any such great storms as in November of the last two years.

LYNTURK.—The features of the month were the low R and the high winds which often approached gale force, and the general mildness of the latter half of the month. Shade max. 59°·5 on 27th; min. 20°·4 on 5th. F 8.

LOCH STACK.—Duration of sunshine 28·1* hours.

DARRYNANE.—A wet but mild month. The last 4 days were foggy and close.

DUBLIN.—An open windy month with frequent R and constant winds from S.W. and W. Mean temp. 47°·8 or 2°·4 above the average. Shade max. 57°·1 on 17th; min. 35°·3 on 22nd. F 0, f 1.

MARKREE.—Duration of sunshine 54·4 hours. Shade max. 57°·0 on 10th and 28th; min. 28°·0 on 1st and 22nd. F3, f 9.

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* Campbell-Stokes. † Jordan.

Climatological Table for the British Empire, June, 1913.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Absolute. Maximum. Date.	Absolute. Minimum. Temp.	Absolute. Minimum. Date.	Average. Max.	Average. Min.	Average. Dew Point.	Average. Humidity.	Absolute. Max. in Sun.	Absolute. Min. on Grass.	Total Rain Depth.	Total Rain Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
London, Camden Square	85·4	17	43·6	9	72·2	51·2	50·3	70	130·3	41·0	·58	7	5·7
Malta	...	...	...	...	...	...	...	...	...	..	...	...	...
Lagos	89·5	14	71·5	4	86·7	75·1	74·2	78	154·5	69·4	16·87	20	6·3
Cape Town	78·9	25	42·0	10	64·1	50·5	50·7	80	...	...	3·35	14	5·9
Natal, Durban ...	71·0	4,6	50·0	30	65·3	54·8	52·4	75	...	...	1·03	4	2·0
Johannesburg	67·5	4	31·5	8	60·6	41·6	33·8	61	121·7	30·7	0·0	0	1·2
Mauritius	80·0	1	55·7	*13	75·9	62·9	61·9	79	145·7	46·9	10·84	16	5·3
Bloemfontein	68·5	1	28·7	9	62·1	34·9	30·8	65	...	...	·11	3	3·8
Calcutta...	95·0	16	74·0	15	87·3	77·9	77·2	87	...	72·0	31·15	21	8·7
Bombay...	95·0	4	74·4	23	87·6	79·8	77·6	82	142·5	69·8	25·88	21	7·6
Madras	105·3	20	78·9	4	100·2	82·7	71·6	61	139·6	78·7	·13	7	5·3
Colombo, Ceylon ...	88·1	9	73·3	6, 12	86·2	77·1	75·0	81	151·8	70·1	4·96	13	6·9
Hongkong	88·2	2	70·6	8	85·6	77·6	75·5	83	...	...	16·04	23	7·5
Sydney	63·7	23	41·3	9	56·4	47·9	45·6	80	106·0	32·2	11·22	25	6·8
Melbourne	61·6	29	31·6	9	56·3	43·8	42·6	74	96·9	26·6	1·43	10	5·6
Adelaide	66·6	28	32·8	12	60·3	41·7	41·6	71	127·0	22·9	·58	6	4·4
Perth	74·2	6	43·8	17	64·9	50·7	50·6	77	134·8	34·9	8·64	18	6·2
Coolgardie	73·2	1	35·0	17	64·5	44·1	40·6	55	135·0	27·0	·60	6	4·9
Hobart, Tasmania ..	59·7	19	29·3	12	52·0	40·5	38·5	72	109·0	24·4	1·26	13	5·7
Wellington	62·2	4	35·0	30	54·4	43·4	41·7	77	108·8	26·0	2·02	17	6·3
Auckland	64·5	3	36·5	26	55·2	44·4	45·7	86	108·0	34·0	1·47	14	4·9
Jamaica, Kingston ..	90·7	23	70·8	5	88·4	73·2	69·9	74	...	...	1·38	4	5·6
Grenada	88·0	8	72·0	25	84·1	74·5	...	77	137·0	...	6·55	23	6·0
Toronto	95·0	16	38·0	8	77·0	53·0	49·0	58	...	...	1·35	7	3·3
Fredericton	83·0	11	34·0	10	71·0	45·0	...	62	...	...	1·88	12	4·9
St. John, N.B. ...	74·0	22	41·0	10	63·0	48·0	45·0	67	...	...	·56	10	4·6
Edmonton, Alberta ...	86·2	9	33·0	3	70·0	47·9	...	67	139·4	20·0	2·88	17	5·6
Victoria, B.C.	78·0	2	43·0	6	69·0	50·0	48·0	70	...	...	1·05	7	6·2

* and 19.

Johannesburg.—Bright sunshine 282·0 hours.

Mauritius.—Mean temp. of air 0°·1, dew point 0°·9, and R 8·26 in. above averages. Mean hourly velocicy of wind 11·0, or 0·2 below average.

COLOMBO.—Mean temp. of air 81°·7, same as average, dew point 0°·2 above, and R 2·95 in. below, averages. Mean velocity of wind 5·7 miles per hour. T88 on 2 days.

HONGKONG.—Mean temp. of air 81°·2. Mean hourly velocity of wind 9·6 miles. Bright sunshine 181·5 hours.

Sydney.—A wet month, H on 2 days, heavy rains and storms.

Melbourne.—Mean temp. of air 0°·3 below, and R ·68 in. below, averages.

Adelaide.—Mean temp. of air 2°·4 below, and R 2·52 in. below, averages.

Perth.—Temp. above average.

Coolgardie.—Temp. of air 2°·0 above, and R half an inch below, averages.

Hobart.—Mean temp. of air 0°·6 below, and R 0·96 in. below, averages.

Wellington.—Mean temp. of air 0°·5 below, and R 3·06 in. below, averages. Bright sunshine 115·1 hours. F on 8 days, H on 2 days.

Auckland.—A dry June, with one exception the driest ever recorded. R less than a third of the average and mean temp. 0°·3 below average. Bright sunshine above average.