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GREENWICH AIR TEMPERATURE.

By William Ellis, F.R.S.

The recently published volume of results of Greenwich air temperature for the years 1891 to 1905* is really supplementary to that which appeared in the year 1895 containing similar information for the previous fifty years 1841 to 1890,† thus forming, taken together, a continuous record of air temperature at Greenwich for the 65 years 1841 to 1905. Meteorological observations had always been taken at the Royal Observatory for astronomical purposes, and for many years previous to 1841 a daily meteorological register had been kept by members of the staff, but it was not until the establishment of the Magnetical and Meteorological Department of the Observatory in the latter part of the year 1840 that regular meteorological work was undertaken as part of the official duty. The observations previously for so many years taken at the apartments of the Royal Society at Somerset House were shortly afterwards discontinued.

The first four tables of the two volumes contain severally: (1) the mean temperature of the air; (2) the daily maximum; (3) the daily minimum, and (4) the daily range of temperature for every day throughout the sixty-five years, these being followed by twenty-nine abstract tables giving further information on special points, the results in the later publication being in every sense a direct continuation of those of the earlier volume, so giving every facility for the intercomparison thereof.‡ With the kind consent of the Astronomer Royal, Sir William Christie, I am able to add thereto a

* Reduction of Greenwich Meteorological Observations. Part IV. Temperature of the Air as determined from the Observations and Records of the fifteen years 1891 to 1905.

† Reduction of Greenwich Meteorological Observations. Part III. Temperature of the Air as determined from the Observations and Records of the fifty years 1841 to 1890.

‡ The continuation by Professor Wolfer of Zürich of the tabulation of the frequency of sunspots in the form originally arranged by his predecessor Dr. Wolf, may be noted as an instance of the value of respecting the traditions of an establishment whilst at the same time inaugurating also other advanced work.

reduced copy of the chart of temperature variations forming frontispiece to the second of the Greenwich volumes (an extension of a like chart appearing in the first volume), to which further reference will hereafter be made.

In Table I. we have in addition to the mean daily temperature of the air on every day of each of the 65 years, extremes and means of the daily values, and also means for each month in every year. It is sufficient here to say that from 1841 to 1847 the daily values depend on twelve two-hourly readings of the thermometer of the rotatory stand, except on Sundays when fewer observations were taken; in 1848 on six daily observations of the same thermometer, and from 1849 to 1905 on twenty-four hourly measures of the photographic record reduced to the reading of the thermometer of the rotatory stand, reverting in case of accidental photographic failure to the readings of that thermometer. The results thus depend either on observations in sufficient number of the thermometer of the rotatory stand or on photographic values reduced thereto. For a description of the rotatory stand reference may be made to the Introduction to the first of the two volumes, and for details concerning the treatment of the eye observations to the Introduction to either volume.

The daily maximum and daily minimum temperatures given in Tables II. and III. depend on the readings of the self-registering thermometers of the rotatory stand. From 1841 to 1847 these thermometers were read at 9.20 a.m. instead of at night, consequently the maximum temperature during this period was taken, in accordance with the usual practice of meteorologists, as applying to the preceding civil day. In Table IV. the daily range is the difference between the maximum and minimum readings of Tables II. and III., excepting that the apportionment of the maximum reading from 1841 to 1847 to the preceding day, in the manner mentioned, led on some occasions, in the irregular variations of winter, to an anomalous daily range, in which case a value was obtained by reference to the two-hourly eye observations of the particular day. Extreme and mean values are added in these tables as in Table I.

In Table V. we have the mean temperature of each day of the year (mean of 65 years) as collected from Table I. The lowest daily temperature of the year, 37°·47, is reached on January 12, followed by a rise to 40°·23 on January 31. A further descent to 38°·00 occurs on February 12, after which the rise towards spring begins, receiving, however, a slight check in the last week of April. The highest daily temperature of the year, 64°·01, is reached on July 15, followed by a fall to 61°·78 on August 3. A second rise to 63°·12 occurs on August 13, after which there is continuous fall to the minimum of winter. There are similar variations, Tables VIII. and X., in the corresponding values of mean maximum and mean minimum temperature.

Table XII. gives the mean daily temperature (65-year means)

found by taking the mean of the maximum and minimum temperatures indicated by the self-registering thermometers, and Table XIII. shows the difference on each day between this mean and the true mean temperature of Table V. The monthly means of these daily differences show the mean from the maximum and minimum in January to be too low by 0°·22, in February too high by 0°·23, and continuously too high in March by 0°·61, in April by 0°·81, in May by 0°·77, in June by 0°·89, in July by 1°·07, in August by 1°·24, in September by 0°·96, and in October by 0°·39; in November the maximum and minimum mean is again too low by 0°·08, and in December by 0°·31.

In Tables XIX., XX. and XXI. we have respectively the mean monthly temperature and the corresponding mean maximum and mean minimum temperatures for each month of the 65 years, collected from Tables I. to III., adding here extremes and means and corresponding annual values. The mean annual temperature of the whole series being 49°·56, the years having a lower temperature than 48° were 1845=47°·60, 1853=47°·96, 1855=47°·20, 1860=47°·47, 1879=46°·28, 1887=47°·94 and 1888=47°·78; and those having a higher temperature than 51° were 1846=51°·35, 1857=51°·31, 1859=51°·17, 1868=52°·00, 1872=51°·01, 1893=51°·03 and 1898=51°·45. The years 1860 and 1879 were memorable for low summer temperature. The year of absolute maximum was 1868, 52°·00, warmer than that of absolute minimum, 1879=46°·28, by 5°·72. In regard to secular change the 65 years were divided into five groups of 13 years each, and means of the annual values formed for mean temperature and mean maximum and minimum temperature. These, with the departure from the general average in each case, are as follows:—

Period.	Mean Temperature.		Mean Maximum.		Mean Minimum.	
	°	°	°	°	°	°
1841—1853...	49·47	—0·09	57·89	—0·01	42·58	+0·31
1854—1866...	49·66	+0·10	58·42	+0·52	42·17	—0·10
1867—1879...	49·64	+0·08	58·07	+0·17	42·21	—0·06
1880—1892...	48·89	—0·67	57·16	—0·74	41·59	—0·68
1893—1905...	50·12	+0·56	57·96	+0·06	42·82	+0·55
General Mean	49·56		57·90		42·27	

These differences are interesting, but are clearly accidental, that is, due to unascertained causes, and give really no information on secular change, for which purpose a very much longer period than 65 years is necessary.

Referring again to years of extreme high and low temperature, it may be seen by comparing together the values of Tables XIX. and XXII. that the warm years tend to have a greater, and the colder years a lesser, mean diurnal range. These differences are mainly due to the influence of summer. A warm summer is one of diminished cloud, inducing large diurnal range; a cold summer is one of increased cloud, inducing a lesser diurnal range. One

state is a direct accompaniment of the other. The warm summers of 1868 and 1893 were summers of diminished cloud, and the cold summers of 1860 and 1879 summers of increased cloud, the influence of which conditions is seen in the monthly values of diurnal range in the summers of the years mentioned, as given in Table XXII.

As further indicating the extreme climatic variations experienced in months of different years, the highest monthly mean summer temperature (Table XIX.) was that of July, 1859=68°·9, the lowest month of winter temperature being that of February, 1895=29°·1, showing a divergence between summer and winter of 39°·8. Conversely, the month of lowest summer temperature was that of June, 1871=55°·5, and that of highest winter temperature that of December, 1852=47°·6, a difference between summer and winter of 7°·9 only as compared with the greater divergence of 39°·8.

In following tables, XXIII. to XXXIII., much information is given in regard to the variations and irregularities of atmospheric temperature, to some of the more striking points only of which will it be possible here to refer. In Table XXIII. we have the highest daily maximum and lowest daily minimum temperature recorded in each of the 65 years. The absolute highest was 97°·1 on July 15, 1881, and the absolute lowest 4°·0 on January 9, 1841, a difference of 93°·1. It so happens that this day of absolute maximum, July 15, is also the day of highest mean temperature (65 years), 64°·01, in Table V. as before mentioned, a value which in this table is distinctly higher than adjacent values before and after. The highest daily temperature of summer occurred in 4 years in May, in 11 years in June, in 32 years in July, in 16 years in August, and in 2 years in September; and the lowest daily temperature of winter occurred in 3 years in November, in 17 years in December, in 24 years in January, in 13 years in February, and in 8 years in March.

Table XXIV. deals with the comparative severity of cold in successive winters. Therein is set out the number of days in individual months of the 65 years on which the temperature fell to or below the freezing point. The average yearly number of such wintry days was 54, of which 18 occurred before and 36 after the end of the year. As the day lengthens so the cold strengthens; the coldest portion of the winter coming some weeks after the December solstice, as also the warmest portion comes some weeks after the June solstice. Winters having 80 or more days of this character were those following 1846, 1854, 1878, 1886, 1887 and 1890; and winters having fewer than 30 of such days were those following 1845, 1850, 1883, 1895 and 1897. In the three successive winters following the year 1878 there were in the aggregate 224 of these wintry days; and the average for three years being 162, this indicates an excess of 38 per cent. of such days continued through three winters. Again, in the three successive winters following the year 1885 the wintry days numbered 245, indicating an excess of 51 per cent. above the average continued through three winters.

Contrasting with these high numbers there were in the three successive winters following the year 1895 only 96 similar days, indicating a diminution of 41 per cent. of days continuously through three winters. In Table XXV. we further have the latest day in spring and the earliest day in autumn in each year on which the temperature fell to or below the freezing point, from which we see that the latest day in spring in any year that this occurred was May 24, 1867=31°·9; and the earliest day in autumn, September 27, 1885=30°·6. In the whole 65 years there were 41 instances in all of temperature in May below the freezing point; four times in 1877, and three times in each of the years 1852, 1855, 1857, 1870, 1876 and 1879, or 22 of the 41 instances occurring in seven years. On these occasions there would naturally be a more severe ground frost. Continuing the particulars as regards cold, it appears by Table XXVI. that during the whole period the temperature fell to or below 20° on 176 days, the degree of cold and day of occurrence being given. The absolute lowest was on January 9, 1841=4°·0, as already once mentioned, and there were in all 10 cases of temperature below 10° (including one of 10°·0). Months excessively severe were those of February, 1855, temperature below 20° on 10 days (lowest=11°·1); January, 1881, below 20° on 10 days (lowest=12°·7), and February, 1895, below 20° on 11 days (lowest =6°·9). Other information is given concerning periods during which the temperature remained continuously below freezing. On 14 days during the whole period the maximum daily temperature never reached 25°. The most remarkable case is that of March 13, 1845, with a maximum of 24°·8, a unique circumstance, of which I have myself distinct recollection.

Tables XXIX. to XXXIII. contain information principally in regard to higher temperatures. The average number of days in the year with maximum temperature of 70° or above is 76. The years having more than 100 of such days were, 1846=108, 1857=100, 1858=104, 1859=103 (three years in succession), 1865=132, 1868=108, 1893=104 and 1895=101. There were nine years in which the numbers of such days were few, in seven years ranging from 49 to 57, but in the two years 1860 and 1879 the numbers fell to 28 and 30 respectively. On 55 days during the whole period the temperature rose to 90° or above, of which 6 days were in June, 32 in July, 15 in August and 2 in September. The earliest day in any year was June 16, 1858=94°·5, and the latest day September 8, 1898=92°·1.

Reverting now to the accompanying chart of variations of temperature at Greenwich, there is therein exhibited the mean temperature of the air (average of 65 years) on each day of the year with corresponding mean maximum and mean mimimum temperature, also curves indicating the highest daily maximum and the lowest daily minimum recorded on each day of the year, founded on the numbers of Tables V., VIII., X. and XVII. The three centre

curves, mean maximum, mean temperature, and mean minimum, although depending on the observations of 65 years, show many irregularities, for the most part accidental, that is to say, in the sense of their direct cause being unattainable, to eliminate which a very long period of time would be necessary. Some of the inflections may, however, be real, that is such as more extended observation would intensify. One peculiarity of the curves of extreme daily maximum and extreme daily minimum is the small amplitude of the variations of the maximum in winter as compared with summer, and the greater amplitude of the variations of the minimum in winter as compared with summer. In clear weather under a hot summer sun the daily maximum may rise to 90° or more, but in winter the sun at a low altitude has no such corresponding power. Conversely, in clear weather in winter, the nightly minimum may descend to anything approaching zero; but in the short nights of summer such arctic influences are absent. These circumstances may be indicated numerically by extracting the numbers for a summer and a winter month from Tables V. and XVIII. :—

	July.	January.
	°	°
Mean monthly temperature.....	62·7	38·6
Mean monthly highest daily maximum	90·9	54·7
Mean monthly lowest daily minimum	43·5	15·5
Maximum higher than mean	28·2	16·1
Minimum lower than mean.....	19·2	23·1

Thus in summer the maximum rises to a greater extent above the mean than the minimum descends below it, and conversely in winter.

Temperature is the most important factor in meteorology, consequent on its variations being primarily due to action of the sun. Not by the influence of sunspot variation, which, if assignable, is practically insignificant in all questions of weather change. It is from the direct action of solar heat that all else flows—the seasonal variation, winter and summer; the diurnal variation, day and night; atmospheric currents, winds and storms, and also evaporation, cloud, and rainfall, and these are the elements that produce, in all its varied conditions, what we call weather.

ROYAL METEOROLOGICAL SOCIETY.

THE opening meeting of the new session was held on Wednesday evening, November 20th, at the Institution of Civil Engineers, Great George Street, Westminster, the President, Dr. H. R. Mill, being in the chair.

The President, in a few introductory remarks, referred to several points of interest in connection with the work of the Society, and also to some important changes which have occurred in colonial and foreign meteorological organizations. He congratulated the Society on the large number of new Fellows to be ballotted for that evening, and the still larger number to be proposed.

The meeting was largely devoted to the consideration of the Reports on the results obtained by the balloon observations made in the British Isles, July 22nd to 27th. The International Aeronautical Committee has for some years set apart the first Thursday in each month for the ascent of kites and balloons, but at the conference held at Milan last year, it was decided to make a special effort to obtain information on a series of consecutive days, and the last week in July was finally decided upon for the purpose.

The Joint Kite Committee of the Royal Meteorological Society and the British Association, and the Meteorological Office, participated in the work, and organized the following stations in the British Isles, *viz.*, Pyrton Hill, Oxon, and Crinan, on the west coast of Scotland, both under the direction of Mr. W. H. Dines, F.R.S.; Manchester, under the direction of Mr. J. E. Petavel, F.R.S.; Sellack, Herefordshire, Capt. C. H. Ley, R.E.; Ditcham Park, Petersfield, Mr. C. J. P. Cave; and Dublin, Prof. W. E. Thrift.

Twenty-five balloons, with registering instruments, were sent up during the week, and fourteen of these have been found. Nearly all the balloons drifted to the eastward, but several which reached a fair height fell within 20 miles of their starting point. The heights ranged up to over 12½ miles, the average being about 7½ miles. It has been known for some time that after a certain height is reached the air temperature ceases to fall. This layer is of variable height, and is known as the region of the "great inversion." Above this comes the isothermal region, where the temperature remains almost unaltered with change of height. The ascents which have been made in England have proved the existence of the isothermal conditions about 7½ miles. There also seems to be some slight evidence that the air at extreme heights is warmer in the evening than in the morning.

A paper giving a "Discussion of the Meteorological Observations at the British Kite Stations, 1906-7," by Miss M. White, Mr. T. V. Pring and Mr. J. E. Petavel, F.R.S., was also read. Investigations of the upper air by means of kites carrying meteorographs are carried

out at four British stations, *viz.*, Pyrton Hill, Oxon; Ditcham Park, Petersfield; Brighton; and Glossop Moor, Derbyshire. The authors have made an analysis of the records obtained during the past session. Under ordinary circumstances the air temperature decreases continually with increasing height. The rate of fall is, in the daytime, very rapid close to the ground and diminishes at higher levels. The temperature gradient varies with the direction and the velocity of the wind, and also with the amount of cloud, being greatest for a north-west wind and on clear and fine days. It appears that the direction of the wind alters at high levels, rotating in a clock-wise direction, thus a south wind tends to become more westerly.

The President, Mr. W. H. Dines, Mr. J. E. Petavel, Mr. W. Marriott, Mr. C. J. P. Cave, Capt. C. H. Ley, Dr. W. N. Shaw and Mr. J. E. Clark, spoke on the above papers.

The following were elected Fellows of the Society :—

Mr. W. S. Allely, Mr. H. G. Banerji, M.A., Lieut. E. H. Bate, R.N., Mr. R. J. Clarke, Mr. A. Dallas, Mr. C. N. Day, Mr. J. Desmond, Capt. J. Elmes, Capt. H. Findlay, Capt. E. Gates-James, Mr. W. Gaw, Mr. H. Gorsain, Capt. G. Gregory, Capt. H. Hollies, Mr. H. J. Hunt, Mr. A. Lander, Capt. W. G. Lingham, Capt. A. W. McKellar, Mr. E. N. Plevins, Capt. S. W. V. Plunkett, Mr. T. Rule, Capt. R. W. Scarff, Capt. W. S. Shelford, Mr. E. J. Walsh, and Capt. R. C. Warden.

Correspondence.

To the Editor of Symons's Meteorological Magazine.

FOG IN TOWN AND COUNTRY ON NOV. 11th & 20th.

On November 11th I noticed a striking instance of the dryness of London fog as compared with nearly simultaneous fog at a place 15 miles away in the outer suburban area—to all intents and purposes perfect country. Travelling to town in the middle of the day I have only to record passing through several dense banks of damp white fog on the journey. The afternoon in London was hazy but sunny, with every promise of thick fog settling down before nightfall. At 7.0 p.m. a thick dry fog prevailed, with the pungent fumes of oxide of sulphur very noticeable; torches were carried in the streets and fires stationed at street junctions. I left Marylebone station at 7.30 p.m., and reaching Northwood at 8.30 (the train was half-an-hour late), found the fog just as dense as in town, but perfectly pure and extremely *wet*—so wet that drizzling rain was falling. This instance struck me as a good illustration of the drying qualities attaching to the large carbonaceous nuclei of town fog.

It may be interesting also to place on record that while Nov. 20th

was a day of darkest night in town through *overhead* fog, there was no surface fog. At Northwood, and I suppose in the country generally immediately to the north of London, there was a thick yellowish-white surface-fog all day, but no darkness. Can any readers supply particulars as to the qualities of fog or weather on this day in their respective neighbourhoods?

L. C. W. BONACINA.

Northwood, Middlesex, Nov. 21st, 1907.

THE THUNDERSTORM IN SOUTH-EAST CLARE ON THE 22nd JULY, 1907.

In continuation of his article in the August Magazine (Vol. 42, p. 133), Colonel W. A. Bentley sends us the following copy of a letter from R. S. Parker, Esq., J.P. :—

"It was the second thunderstorm which did the damage here on the 22nd ult. We had heavy thunder all that afternoon over towards Keeper, and working on by Thontina; but about 5.30 p.m. we began to hear another thunderstorm towards the S.W., working, as you say, to the N.E. The thunder and lightning soon got very bad, but no rain till after seven. Then it poured sometimes more and sometimes less, when about eight a flood burst on us from above, which swept the garden wall, some 20 yards broad, cut a chasm through the ground at the top of the garden, and filled up the bottom with stones and gravel. Then the water rose in our back yard several feet high, and in another moment would have inundated the house, only fortunately the yard wall gave way and let it off, leaving offices and yard full of mud and gravel. Then it carried away about 15 yards of wall near my gate lodge, to say nothing of destroying about four acres of hay—cut and uncut—and putting stones and gravel on the land. I think there must have been a small waterspout up behind us, for though the rain was desperate it seemed hardly sufficient to make such a torrent.

"The stream is usually quite a small one, only starting a few fields above us. The Board of Works people, who keep a rain gauge, say there was 3½ inches of rain, and I fancy we had more here even than they had at Killaloe. I have not been up the glen, but I saw Ballycorney bridge, which is ready to fall. A fine bridge near Garranboy is gone altogether, and a very deep hole washed out at the lower side of Ballyheigue bridge. It will cost the county a good bit of money. I am afraid my observations of the storm from a meteorological point of view are of no interest. You seem to have told them pretty accurately as to the hours and direction of the storm. There was a waterspout seen over the lake on the 22nd by a great many people."

Bally Valley, Killaloe, co. Clare, 12th August, 1907.

He adds that Bally Valley House, where Mr. Parker lives, is situate a mile north of Killaloe, on the side of the mountain overlooking Lough Derg, which is the lake he mentions. The house is high above the Shannon.

OZONE.

WILL you grant me a small space in the *Meteorological Magazine* to ask if any recent research has been made as to the testing of Ozone in the air? If so, we should have a better, or say more scientific, definition of the element; and whether the symbol Oz is the proper expression, or what? I suppose it is the province of the chemist rather than of the meteorologist to determine the point.

It is some years since Dr. R. H. Scott in his "Instructions" gave the following opinion, as expressed by the Vienna Congress:—"The existing methods of determining the amount of ozone in the atmosphere are insufficient, and the Congress therefore recommends investigations for the discovery of better methods."

Have any investigations been made all these years?

If you would kindly stimulate the matter into activity you would do a good service. We should know once for all whether it is worthy of a proper recognition.

TURNOR PEEL.

Deal, 23rd November, 1907.

THE GREENWICH SUMMER OF 1907.

THERE is an unfortunate misstatement in my letter on p. 196; it looks as if a line had slipped out.

The correct statement is to this effect: "On 69 of the 92 days the mean temperature was under the (day) average, and the thermometer never (in those three months) got above the seventies, though, &c." Perhaps you will kindly correct in your next issue.

ALEX. B. MACDOWALL.

Brooklyn, Letchworth, 21st November, 1907.

OCTOBER, 1907.

RAIN fell on twenty-five days, the total being 7·47 inches. There were heavy falls as under: 14th ·82 in., 17th 1·06 in., 18th ·78 in., 19th ·42 in., 20th ·35 in., 28th ·47 in.., 29th 1·00 in. It was a wet month without any dry periods. Our ten year average for the month is 4·48 in.; for the ten months, January–October, 27·28 in. The ten months of 1907 have totalled 27·65 in., or ·37 in. in excess of average. The October rainfall has exceeded 7 inches as under; the figures, with the exception of 1907, are Mr. Penfold's, and go back to 1873.

October,	1882	8·16 in.
,,	1889	7·93 ,,
,,	1891	8·80 ,,
,,	1903	9·21 ,,
,,	1907	7·47 ,,

T. P. NEWMAN.

Hazelhurst, Haslemere, Surrey.

REVIEWS.

Results of the Magnetical and Meteorological Observations made at the Royal Observatory, Greenwich, in the year 1905, under the direction of Sir W. H. M. Christie, K.C.B. . . . . Published by order of the Board of Admiralty in obedience to His Majesty's command. Edinburgh, Printed for His Majesty's Stationery Office, 1906. Size $12\frac{1}{2} \times 10$. Pp. $8 + lviii. + (cxxviii)$.

THIS invaluable record of the meteorology of the London district is arranged on the familiar plan. It is to be regretted that the hour of observations on Sundays is different from that on the other six days of the week, and that certain observations are omitted on "Sundays and a few other days"; but a more regrettable circumstance about the meteorological equipment of this national observatory is the absence of a rain gauge of the deep vertical rim pattern, now happily in use at all stations of the Meteorological Office, of the Royal Meteorological Society, and of most private observers. The absence of a Dines' pressure tube anemometer is another matter of regret; and we believe that were a meteorologist appointed to the Board of Visitors, the desirability of bringing the efficiency and completeness of the meteorological equipment into line with the astronomical and magnetic departments would be urged upon those responsible with a force that external criticism cannot bring to bear.

Hourly Readings obtained from the self-recording instruments at four observatories in connection with the Meteorological Office, 1906. Thirty-eighth year. New series. Vol. VII. London: Printed for His Majesty's Stationery Office, 1907. Size, 12×10. Pp. xiv. + 198. Price, 25s.

WE offer our hearty congratulations to the Meteorological Office on the early appearance of this volume, which, by the new method of publication in monthly numbers, is available when most likely to be useful. But by what system of official arithmetic 12 monthly numbers at 6d. each, with 14 pp. of introduction, are priced at 25s., in a blue paper cover, we are at a loss to understand.

Grundzüge einer Theorie der synoptischen Luftdruckveraenderungen, II. Mitteilung [Principles of a theory of synoptic pressure changes. Second communication], von FELIX M. EXNER. Aus den Sitzungberichten der k. Akademie der Wissenschaften in Wien. Math.-Naturw. Klasse Bd., CXVI. Abt. IIa. Wien, 1907. Size, $9\frac{1}{2} \times 6\frac{1}{2}$. Pp. 36. Plates.

THIS is the continuation of the investigation, the first part of which was noticed in the May number, p. 73. Dr. Exner explains that he

treats the discussion of the diurnal variations merely as a hypothesis, though in time it may be so developed as to be of service in weather predictions. The treatment of the subject in the present communication is more general than in the earlier.

Internationale Meteorologische Kodex. Im Auftrage des International Meteorologischen Komitees, bearbeited von [International Meteorological Code. Prepared on behalf of the International Meteorological Committee by] G. HELLMANN, Berlin, und H. H. HILDEBRANDSSON, Upsala. Deutsche Ausgabe. Berlin, 1907. Behrend & Co. Size, 11 × by 7½. Pp. viii. + 82.

THE German edition of a systematic collection of the Resolutions passed at the meetings of the International Meteorological Committee since 1871, which have hitherto appeared only in the various volumes of Minutes. The resolutions are arranged under the heads of the various meteorological phenomena dealt with, and there is a complete index embracing authors and subjects.

Returns of Rainfall, &c., in Dorset for 1906, by H. STILWELL. From *Proceedings* Dorset Natural History and Antiquarian Field Club. Dorchester, 1907. Size, 8½ × 5½. Pp. [14].

The Cornwall County Council Annual Report. Vital Statistics and Meteorological Summary for 1906. Truro, 1907. Size, 11 × 8½. Pp. 28.

THESE are some of the valuable county reports dealing mainly with rainfall that we have received, and we must acknowledge also, with regret, that our space will not admit of a more adequate notice, the reports for 1906 of the Fernley Observatory, *Southport*, admirably edited as usual by Mr. Baxendell, the *Bath* Health Reports by Dr. Symons, the indefatigable Medical Officer of Health, the *Falmouth* Observatory, where Mr. Kitto's name is a guarantee of first-class work, Mr. A. W. Preston's meteorological notes for *Norwich*, and the Coats' Observatory, *Paisley*, where Mr. Donald Maclean reports for the Observatory Committee of the Paisley Philosophical Institution.

A Discussion of the Anemographic Observations recorded at Rangoon from 1878 to 1901 . . . . at Chittagong from 1879 to 1896 . . . . at Allahabad from 1890 to 1904 . . . . from 1878 to 1892, by SIR JOHN ELIOT, M.A., F.R.S., K.C.I.E. *Memoirs of the Indian Meteorological Department.* Vol. XVIII., part 1, Calcutta, 1907, Vol. XVIII., part 3, London, 1907. Size, 12 × 9½. Pp. 1-122, 283-430, with plates.

THIS important discussion of the winds at various stations in India, where anemometer records are available, is copiously illustrated by wind-roses, curves of diurnal variations of the wind, and other diagrams.

An account of the preparations made for the determining the conditions of the Upper Air in India by means of Kites, by J. A. FIELD, ESQ., B.A., Deputy Meteorologist. *Memoirs of the Indian Meteorological Department.* Vol. XX. Part I. Calcutta, 1906. Size, 12 × 9½. Pp. 16. Plates.

PARTICULARS of the instruments and methods, with the record of ascents near Karachi.

Mysore Government Meteorological Department. Fourteenth Annual Report on Meteorology in Mysore, 1906. Report on Rainfall Registration in Mysore, 1906. By JOHN COOK, M.A., F.R.S.E. Bangalore, 1907. Size, 12 × 10. Pp. xviii. + 122 + 48. Plates.

MR. COOK is much to be congratulated on the promptitude with which he has completed his annual volumes and carried them through the press.

The Windrush at Biggin. By J. E. CLARK, B.A., B.Sc. [Privately printed]. Size, 9½ × 6, pp. 4. Plates.

THE "windrush" in question is not the tributary of the Thames, but a severe squall which occurred at Biggin, near Church Fenton, Yorkshire, during the passage of the famous line-squall of 8th February, 1906. Mr. Clark gives an excellent description of the damage done, illustrated by maps of the line-squall and photographs of the wrecked farm-buildings, the tiles of which were reported to have been blown about like feathers.

Ueber tatsächliche vieltägige Perioden des Luftdruckes [On actual many-day periods of atmospheric pressure]. Von PROF. DR. E. HERRMANN. Sonderabdruck aus "Annalen der Hydrographie, &c." 1907. Size, 10½ + 7½. Pp. 8. Plates.

THE author believes that a solution of the varied and apparently chaotic movements of the barometer may be found in considering atmospheric disturbances to be due to the combination of onward moving waves of different velocities and the surge-like swingings of air to and fro without progressive movement. He traces a 51 and 59-day periodicity in atmospheric pressure, in which he sees evidence of lunar influence.

The Climatology of Ireland in relation to the Public Health. By SIR JOHN W. MOORE, M.D., &c. (From *Journal of Royal Sanitary Institute*, Vol. **28** (1907), No. 8.) Size, 10 × 7. Pp. 12.

AN address given at the recent conference of the Royal Sanitary Institute in Dublin. The author says:—"And speaking of climate

in general and of the climate of Ireland in particular, I may frankly state that the latter is probably the most temperate climate in the world, as it is certainly most conducive to health and to longevity."

Notes on Maritime Meteorology. By M. W. CAMPBELL HEPWORTH, C.B., Commander R.N.R. (Retired). With 7 plates. London, George Philip & Son, Ltd., 1907. Size, $8\frac{1}{2} \times 5\frac{1}{2}$. Pp. viii. + 90.

CAPTAIN HEPWORTH has conferred an obligation on more than sailors in bringing together the seven chapters of this little book. Each chapter was prepared separately for the most part from his own observations and communicated to the Royal Meteorological Society, the Royal United Service Institute, the Royal Society of New South Wales and the London Shipmasters' Society; but in the scattered publications of these institutions it was a serious matter to consult them all. The chapters bear the following titles:—I. Meteorology—a Factor in Naval Warfare; II. The Value of Meteorological Observations at Sea and some hints upon observing; III. Weather Forecasts and Storm Warnings on the Coast of South Africa; IV. Wind Systems and Trade Routes between the Cape of Good Hope and Australia; V. The Tracks of Ocean Wind Systems in transit over Australasia; VI. Current Observations on the Canadian-Australian route; VII. Remarks on the Weather Conditions of the steamship track between Fiji and Hawaii.

Regenkarte von Deutschland, mit erläuternden Bemerkungen. Im amtlichen Auftrage bearbeitet von [Rainfall Map of Germany, with explanatory notes. Prepared officially by] Professor DR. G. HELLMANN. Berlin, 1906. Dietrich Reimer. Size, $12\frac{1}{2} \times 10$. [*Map folded.*] Price 3 marks.

THIS map appeared with Dr. Hellmann's three great volumes on German Rainfall. It is on the scale of 1 : 1,800,000, or about 29 miles to an inch, and has been prepared from the records at 3000 stations for the period of ten years, 1893—1902. The map is coloured in lightening shades of brown from the lowest rainfall up to 60 centimetres ($23\frac{1}{2}$ in.), and then, in deepening shades of blue, up to the highest rainfall shown; so that the browner the country is shown the drier it is, and the bluer the wetter. The result is very effective in distinguishing the wetter and drier parts of the country. The map shows in a very beautiful manner the dependence of rainfall on the configuration of the land, and on distance from the sea whence the prevailing winds blow. It should interest both students and practical men, and its very low price (3s.) and fine execution are worthy of remark.

METEOROLOGICAL NEWS AND NOTES.

THE COMMONWEALTH OF AUSTRALIA has inaugurated a Meteorological Bureau for the whole continent, with its headquarters in Melbourne, and Mr. H. A. Hunt has been appointed the first Commonwealth Meteorologist. This is an event of very great importance in the meteorological world, for the new Bureau will have control of the weather service over an area scarcely less than that of the United States or the Dominion of Canada, and very much larger than that of India.

THE TEACHING OF ELEMENTARY METEOROLOGY of the simplest kind in schools has recently been attracting considerable attention. The Council of the Royal Meteorological Society desire to encourage such teaching, and they are inviting elementary teachers and others to send in essays in the form of an original Nature Study lesson on Weather or Climate (not exceeding 1,500 words in length), together with a brief synopsis of five other lessons to cover the whole subject of Climate and Weather. If essays of sufficient merit are received, three prizes will be awarded of £5, £3 and £2, respectively. The essays are to be sent in before January 31st, 1908, and addressed to Mr. William Marriott, Assistant Secretary, Royal Meteorological Society, 70, Victoria Street, London, S.W., from whom further information can be obtained. This prize competition will, no doubt, stimulate many teachers to take an interest in the subject, and to impart to their scholars some definite teaching on it.

MESSRS. C. F. CASELLA & CO. send us two illustrated catalogues, one of Richard's self-recording instruments, with a supplement giving a selection of the firm's own instruments, and the second dealing with anemometers, air meters and wind direction instruments. Many of these instruments are both interesting and ingenious. We note that Professor A. Laurence Rotch's instrument for ascertaining the true direction of the wind on board a rapidly moving steamer is included in the list. Both pamphlets are models of clear description and attractive printing.

THE FRANCO-BRITISH EXHIBITION OF 1908 will contain a section representative of British Science, and a fair amount of space will be devoted to meteorology. If any reader proposes to lend instruments of historic interest for the department of meteorology, an early intimation should be made to Dr. W. N. Shaw, 63, Victoria Street, S.W., the Convenor of the Sub-Committee on Meteorology.

RAINFALL OBSERVERS ARE REMINDED that any changes in the pattern or position of their rain gauges should be made on January 1st, and it would be well if all Observers were to make a careful inspection of their gauges so as to be sure that they are in good condition and not unduly sheltered. A copy of a revised edition of the Rules for Rainfall Observers will be sent free on application to Dr. H. R. Mill, 62, Camden Square, London, N.W.

TEMPERATURE FOR NOVEMBER, 1907.

STATION.	COUNTY.	Lat. N.	Long. W. [*E.]	Height above Sea. ft.	TEMPERATURE. Max.		TEMPERATURE. Min.		No. of Nights at or below 32° Shade.	No. of Nights at or below 32° Grass.
		° ′	° ′		°	Date.	°	Date.		
Camden Square	*London*	51 32	0 8	111	60·4	9	30·1	16	3	9
Tenterden	*Kent*	51 4	*0 41	190	60·0	9	30·0	12	4	9
West Dean	*Hampshire*	51 3	1 38	137	58·0	9	26·0	16	9	17
Hartley Wintney	,,	51 18	0 53	222	59·0	15. 16	25·0	16	7	16
Hitchin	*Hertfordshire*	51 57	0 17	238	56·0	2	25·0	29	10	...
Winslow (Addington)	*Buckinghamshr.*	51 58	0 53	309	57·0	2, 9	23·0	30	9	13
Bury St. Edmunds (Westley)	*Suffolk*	52 15	*0 40	226	60·0	9	27·8	26	5	...
Brundall	*Norfolk*	52 37	*1 26	66	57·6	9	28·0	26	5	13
Winterbourne Steepleton	*Dorset*	50 42	2 31	316	57·9	9	26·8	16	5	10
Torquay (Cary Green)	*Devon*	50 28	3 32	12	60·0	3	36·5	16	0	3
Polapit Tamar [Launceston]	,,	50 40	4 22	315	57·8	5	28·3	16	2	13
Bath	*Somerset*	51 23	2 21	67	58·7	9	27·0	16	6	...
Stroud (Upfield)	*Gloucestershire*	51 44	2 13	226	55·0	9	30·0	29	4	...
Church Stretton (Wolstaston)	*Shropshire*	52 35	2 48	800	55·0	9	...	...	...	...
Coventry (Kingswood)	*Warwickshire*	52 24	1 30	340	54·0	2, 9	27·0	15	6	...
Boston	*Lincolnshire*	52 58	0 1	25	55·0	1	26·0	26	4	...
Worksop (Hodsock Priory)	*Nottinghamshire*	53 22	1 5	56	57·0	5	24·5	26	7	17
Derby (Midland Railway)	*Derbyshire*	52 55	1 28	156	57·0	2	26·0	29	9	...
Bolton (Queen's Park)	*Lancashire*	53 35	2 28	390	55·9	3	28·2	30	4	12
Wetherby (Ribston Hall)	*Yorkshire, W.R.*	53 59	1 24	130	...	...	...	...	...	...
Arncliffe Vicarage	,, ,,	54 8	2 6	732	...	...	...	...	...	...
Hull (Pearson Park)	,, *E.R.*	53 45	0 20	6	58·0	2	28·0	16†	6	13
Newcastle (Town Moor)	*Northumberland*	54 59	1 38	201	...	...	...	...	...	...
Borrowdale (Seathwaite)	*Cumberland*	54 30	3 10	423	58·5	2	26·7	26	3	...
Cardiff (Ely)	*Glamorgan*	51 29	3 13	53	...	...	...	..	...	...
Haverfordwest (High Street)	*Pembroke*	51 48	4 58	95	55·8	5	29·1	21	...	10
Aberystwyth (Gogerddan)	*Cardigan*	52 26	4 1	83	58·0	5	23·0	29	...	...
Llandudno	*Carnarvon*	53 20	3 50	72	56·2	4	32·2	30	...	...
Cargen [Dumfries]	*Kirkcudbright*	55 2	3 37	80	55·0	2, 4	22·0	19	11	...
Lilliesleaf (Riddell House)	*Roxburgh*	55 31	2 46	550	...	...	...	...	...	...
Edinburgh (Royal Observy.)	*Midlothian*	55 55	3 11	442	55·3	4	29·9	25	3	11
Girvan (Pinmore)	*Ayr*	55 10	4 49	207	58·0	3	24·0	30	13	..
Glasgow (Queen's Park)	*Renfrew*	55 53	4 18	144	58·0	4	25·0	25	8	23
Tighnabruaich	*Argyll*	55 55	5 14	50	48·0	2, 3, 4, 5	25·0	28	15	15
Mull (Quinish)	,,	56 36	6 13	35	56·0	11	...	...	...	...
Dundee (Eastern Necropolis)	*Forfar*	56 28	2 57	199	55·5	4	26·3	25	9	...
Braemar	*Aberdeen*	57 0	3 24	1114	...	...	...	...	...	...
Aberdeen (Cranford)	,,	57 8	2 7	120	53·0	2, 4	24·0	18	15	...
Cawdor	*Nairn*	57 31	3 57	250	...	...	...	...	...	...
Invergarry	*E. Inverness*	57 4	4 47	130?	...	...	...	...	...	...
Loch Torridon (Bendamph)	*W. Ross*	57 32	5 32	20	...	...	...	...	...	...
Dunrobin Castle	*Sutherland*	57 59	3 56	14	53·5	2	30·5	25	...	6
Castletown	*Caithness*	58 35	3 23	100	53·0	4, 14	21·0	25	12	12
Killarney (District Asylum)	*Kerry*	52 4	9 31	178	59·0	2	29·0	30	...	...
Waterford (Brook Lodge)	*Waterford*	52 15	7 7	104	56·0	2	26·0	21	8	...
Broadford (Hurdlestown)	*Clare*	52 48	8 38	167	54·0	2	27·0	24	12	...
Abbey Leix (Blandsfort)	*Queen's County*	52 56	7 17	532	56·0	2, 3	...	...	...	...
Dublin (Fitz William Square)	*Dublin*	53 21	6 14	54	56·1	4	29·8	25	2	8
Ballinasloe	*Galway*	53 20	8 15	160	62·0	2	20·0	25, 30	16	...
Clifden (Kylemore House)	,,	53 32	9 52	105	...	...	...	...	...	...
Crossmolina (Enniscoe)	*Mayo*	54 4	9 18	74	...	...	...	...	...	...
Seaforde	*Down*	54 19	5 50	180	53·0	2, 3	28·0	24	7	19
Londonderry (Creggan Res.)	*Londonderry*	54 59	7 19	320	...	...	...	...	...	...
Omagh (Edenfel)	*Tyrone*	54 36	7 18	280	...	...	...	...	...	...

and 26, 30.

RAINFALL FOR NOVEMBER, 1907.

RAINFALL OF MONTH.							RAINFALL FROM JAN. 1.					
Aver. 1870-99.	1907.	Diff. from Av.	% of Av.	Max. in 24 hours.		No. of Days	Aver. 1870-99.	1907.	Diff. from Aver.	% of Av.	Mean Annual 1870-1899.	STATION.
				in.	Date.							
in.	in.	in.					in.	in.	in.		in.	
2·45	2·16	— ·29	88	·49	18	12	23·04	19·24	— 3·80	84	25·16	Camden Square
3·22	2·64	— ·58	82	1·29	26	11	25·62	22·08	— 3·54	86	28·36	Tenterden
3·25	2·75	— ·50	82	·58	25	15	27·19	24·96	— 2·23	92	29·93	West Dean
3·03	2·23	— ·80	74	·48	26	13	24·55	23·78	— ·77	97	27·10	HartleyWintney
2·56	2·27	— ·29	89	·64	26	14	22·61	21·25	— 1·36	94	24·66	Hitchin
2·63	2·07	— ·56	79	·63	26	18	24·48	21·75	— 2·73	89	26·75	Addington
2·50	2·39	— ·11	96	·56	26	14	23·28	21·73	— 1·55	93	25·39	Westley
2·71	2·48	— ·23	92	·58	26	19	23·27	22·81	— ·46	98	25·40	Brundall
4·82	4·72	— ·10	98	1·30	8	20	34·87	33·74	— 1·13	97	39·00	Winterbourne Stpltn
3·71	4·09	+ ·38	110	·94	8	17	31·54	28·85	— 2·69	92	35·00	Torquay
4·29	3·50	— ·79	82	·68	17	21	34·46	31·66	— 2·80	92	38·85	Polapit Tamar
3·06	2·23	— ·83	73	·43	8, 25	17	27·99	27·53	— ·46	98	30·75	Bath
2·99	2·14	— ·85	72	·39	8	17	27·37	26·59	— ·78	97	29·85	Stroud
3·18	3·12	— ·06	98	·45	8, 25	20	30·12	32·17	+ 2·05	107	33·04	Wolstaston
2·80	2·37	— ·43	85	·50	24	13	26·77	25·83	— ·94	96	29·21	Coventry
2·14	2·12	— ·02	99	·57	24	16	21·51	19·95	— 1·56	93	23·30	Boston
2·10	1·91	— ·19	91	·40	26	19	22·68	21·29	— 1·39	94	24·70	Hodsock Priory
2·28	1·83	— ·45	80	·36	24	21	23·90	25·53	+ 1·63	107	26·18	Derby
3·91	3·57	— ·34	91	·82	22	21	38·24	40·97	+ 2·73	107	42·43	Bolton
2·23	3·20	+ ·97	114	·75	26	19	24·77	26·68	+ 1·91	109	26·96	Ribston Hall
6·00	4·64	—1·36	77	1·00	22	22	54·55	54·31	— ·24	99	60·96	Arncliffe Vic.
2·45	2·29	— ·16	94	·73	26	17	24·66	22·27	— 2·39	90	27·02	Hull
2·65	1·77	— ·88	67	·45	26	20	25·35	24·27	— 1·08	96	27·99	Newcastle
13·91	11·43	—2·48	82	1·75	27	17	117·98	109·68	— 8·30	93	132·68	Seathwaite
4·26	2·29	— ·97	77	·60	22, 25	19	38·38	34·78	— 3·60	91	42·81	Cardiff
5·41	4·23	—1·18	78	·82	22	21	42·66	39·91	— 2·75	94	47·88	Haverfordwest
4·68	4·40	— ·28	94	·74	23	22	40·92	42·46	+ 1·54	104	45·41	Gogerddan
3·38	2·46	— ·92	73	·39	26	21	28·03	24·17	— 3·86	86	30·98	Llandudno
4·50	3·81	— ·69	84	1·18	26	13	38·75	43·76	+ 5·01	113	43·43	Cargen
3·29	...	...	...	...	...	...	29·86	...	...	...	33·04	Riddell House
...	1·06	...	...	·31	12	12	...	26·42	...	...	...	Edinburgh
5·31	6·40	+1·09	121	1·18	22	27	43·63	...	...	...	48·87	Girvan
3·48	2·31	—1·17	66	·60	22	18	32·27	36·65	+ 4·38	114	35·80	Glasgow
6·21	5·76	— ·45	93	·78	26	18	51·57	56·86	+ 5·29	110	57·90	Tighnabruaich
6·43	6·70	+ ·27	104	1·07	26	19	51·05	48·04	— 3·01	94	57·53	Quinish
2·76	1·40	—1·36	51	·80	26	12	26·22	27·85	+ 1·63	106	28·95	Dundee
3·94	3·15	— ·79	80	...	...	...	32·92	28·97	— 3·95	88	36·07	Braemar
3·47	2·49	— ·98	72	·77	26	14	29·62	29·10	— ·52	98	33·01	Aberdeen
2·65	1·76	— ·89	66	·45	12	14	26·84	28·89	+ 2·05	108	29·37	Cawdor
5·98	6·29	+ ·31	105	1·60	13	10	49·33	52·63	+ 3·30	107	56·00	Invergarry
9·79	9·37	— ·42	96	1·80	21	20	77·46	81·81	+ 4·35	106	86·50	Bendamph
3·26	2·50	— ·76	77	·91	26	11	28·21	29·36	+ 1·15	104	31·60	Dunrobin Castle
...	2·08	...	...	·30	26	21	...	28·17	...	...	...	Castletown
5·85	4·22	—1·63	72	1·03	21	19	51·47	38·67	—12·80	75	58·11	Killarney
3·91	5·38	+1·47	138	·94	4	16	34·99	34·51	— ·48	99	39·30	Waterford
3·19	4·34	+1·15	136	1·15	27	19	30·10	33·05	+ 2·95	110	33·47	Hurdlestown
3·21	3·83	+ ·62	119	·86	27	18	31·71	33·96	+ 2·25	107	35·19	Abbey Leix
2·60	2·58	— ·02	99	·53	26	14	25·36	24·83	— ·53	98	27·75	Dublin
3·60	3·61	+ ·01	100	·70	25	22	33·41	33·02	— ·39	99	37·04	Ballinasloe
8·25	...	...	...	...	...	...	71·24	...	...	...	80·23	Kylemore House
5·63	5·13	— ·50	91	1·27	21	25	44·69	45·87	+ 1·18	103	50·50	Enniscoe
3·94	3·05	— ·89	77	1·00	27	14	34·97	36·22	+ 1·25	104	38·61	Seaforde
4·19	3·28	— ·91	78	·74	26	22	36·89	42·86	+ 5·97	116	41·20	Londonderry
3·53	...	...	..	...	...	...	34·08	...	...	...	37·85	Omagh

SUPPLEMENTARY RAINFALL, NOVEMBER, 1907.

Div.	STATION.	Rain inches	Div.	STATION.	Rain. inches
II.	Abinger Hall	2·91	XI.	Rhayader, Tyrmynydd	3·81
,,	Ramsgate	1·97	,,	Lake Vyrnwy	4·57
,,	Hailsham	3·05	,,	Llangyhanfal, Plâs Draw	2·43
,,	Crowborough, Uckfield Lodge	2·98	,,	Criccieth, Talarvor	2·74
,,	Totland Bay, Aston House	2·71	,,	Llanberis, Pen-y-pass	9·84
,,	Emsworth, Redlands	2·54	,,	Lligwy	3·27
,,	Alton, Ashdell	2·88	,,	Douglas, Woodville	3·79
,,	Newbury, Welford Park	3·22	XII.	Stoneykirk, Ardwell House	5·40
III.	Harrow Weald, Hill House.	2·33	,,	Dalry, The Old Garroch	5·53
,,	Oxford, Magdalen College	2·09	,,	Langholm, Drove Road	4·19
,,	Bloxham Grove	1·73	,,	Moniaive, Maxwelton House	3·71
,,	Pitsford, Sedgebrook	2·09	XIII.	N. Esk Reservoir [Penicuick]	1·80
,,	Huntingdon, Brampton	2·65	XIV.	Maybole, Knockdon Farm	3·80
,,	Wisbech, Bank House	2·46	XV.	Campbeltown, Witchburn	4·99
IV.	Southend Water Works	2·16	,,	Inveraray, Newtown	6·95
,,	Colchester, Lexden	1·61	,,	Ballachulish House	9·47
,,	Newport, The Vicarage	2·22	,,	Islay, Eallabus	5·82
,,	Rendlesham	1·83	XVI.	Dollar Academy	2·56
,,	Swaffham	2·58	,,	Loch Leven Sluice	2·67
,,	Blakeney	1·96	,,	Balquhidder, Stronvar	5·53
V.	Bishops Cannings	2·39	,,	Perth, Pitcullen House	1·97
,,	Ashburton, Druid House	5·88	,,	Coupar Angus Station	1·85
,,	Okehampton, Oaklands	3·37	,,	Blair Atholl	2·15
,,	Hartland Abbey	3·27	,,	Montrose, Sunnyside Asylum	2·10
,,	Lynmouth, Rock House	2·78	XVII.	Alford, Lynturk Manse	2·36
,,	Probus, Lamellyn	6·52	,,	Keith Station	1·81
,,	Wellington, The Avenue	...	XVIII.	N. Uist, Lochmaddy	4·53
,,	North Cadbury Rectory	3·26	,,	Alvey Manse	1·98
VI.	Clifton, Pembroke Road	3·11	,,	Loch Ness, Drumnadrochit.	3·12
,,	Ross, The Graig	2·26	,,	Glencarron Lodge	7·11
,,	Shifnal, Hatton Grange	2·28	,,	Fearn, Lower Pitkerrie	2·16
,,	Cheadle, The Heath House.	...	XIX.	Invershin	2·57
,,	Blockley, Upton Wold	1·88	,,	Altnaharra	2·73
,,	Worcester, Boughton Park.	2·16	,,	Bettyhill	1·96
VII.	Market Overton	2·33	XX.	Dunmanway, The Rectory	4·29
,,	Market Rasen	2·13	,,	Cork	3·93
,,	Bawtry, Hesley Hall	2·04	,,	Darrynane Abbey	3·59
VIII.	Neston, Hinderton Lodge	2·58	,,	Glenam [Clonmel]	4·25
,,	Southport, Hesketh Park	2·74	,,	Ballingarry, Gurteen	3·16
,,	Chatburn, Middlewood	3·47	,,	Miltown Malbay	4·59
,,	Cartmel, Flookburgh	5·19	XXI.	Gorey, Courtown House	3·75
IX.	Langsett Moor, Up. Midhope	4·42	,,	Moynalty, Westland	2·68
,,	Scarborough, Scalby	2·62	,,	Athlone, Twyford	2·34
,,	Ingleby Greenhow	3·02	,,	Mullingar, Belvedere	2·59
,,	Mickleton	1·90	XXII.	Woodlawn	3·08
X.	Bardon Mill, Beltingham	1·47	,,	Westport, Murrisk Abbey	...
,,	Ewesley, Fallowlees	2·39	,,	Collooney, Markree Obsy.	2·89
,,	Ilderton, Lilburn Cottage	2·03	,,	Mohill	2·57
,,	Keswick, York Bank	5·34	XXIII.	Enniskillen, Portora	2·33
XI.	Llanfrechfa Grange	3·91	,,	Warrenpoint, Summer Hill.	2·39
,,	Treherbert, Tyn-y-waun	6·29	,,	Banbridge, Milltown	2·36
,,	Carmarthen, The Friary	5·13	,,	Belfast, Springfield	2·93
,,	Castle Malgwyn [Llechryd].	3·60	,,	Bushmills, Dundarave	3·67
,,	Plynlimon	7·45	,,	Stewartstown, The Square	2·94
,,	Crickhowell, Ffordlas	3·20	,,	Killybegs	3·74
,,	New Radnor, Ednol	3·38	,,	Horn Head	4·41

METEOROLOGICAL NOTES ON NOVEMBER, 1907.

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.

CAMDEN SQUARE.—Mild, with practically no frost, but in other respects a normal month, and a typical November. Fog was not extremely frequent, but occasionally very dense, particularly on 20th, when, though the fog did not reach the ground, London was enveloped in absolute darkness for several hours during the morning. Mean temp. 45°·6, or 2°·6 above the average. Duration of sunshine 30·6*, and of R 43·6, hours.

CROWBOROUGH.—R 1·18 in. below the average of 36 years, raising the deficiency for the year to 1·35 in. Mean temp. 44°·7, or 1°·5 above the average.

TORQUAY.—Duration of sunshine 65·5* hours, or 4·0 below the average. Mean temp. 48°·8, or 1°·2 above the average.

NORTH CADBURY.—Rather wet, with normal temp. and great humidity. A mulberry tree still retained green leaves on December 2nd.

ROSS.—Gloomy, with much fog but little frost. The temp. was 1°·2 above the average. On 26th the Wye was in flood.

BOLTON.—Remarkably mild till 15th, but afterwards much colder with frequent fogs, especially on 21st and 30th. The duration of sunshine was 25·6* hours, or 1·8 above the average. Mean temp. 43°·0, close to the average.

SOUTHPORT.—Calm generally, S.E. and E. airs predominating. Mean temp. 43°·7, or 0°·3 below the average; the changes from day to day were, however, excessive. Duration of sunshine 53·1 hours, or 6·0 above the average, and of R 70·2 hours. Total R ·50 in. below the average of 35 years.

LILBURN.—Calm, with slight frosts. The outstanding corn was got in before 22nd, when it became rainy till 28th. There was no S except on the Cheviots, which had a slight covering for 10 days.

HAVERFORDWEST.—Mild and damp, with considerable R, but no severe storms. Duration of sunshine 73·5* hours.

ABERYSTWYTH.—Heavy and dull, the atmosphere being saturated with moisture. At times there were high and variable winds, with low but equable temp. On 12th there was a hurricane from W., from about 6 p.m. till about 11 a.m. on 13th, accompanied at times by terrific R.

DOUGLAS.—Mild, seasonable, and unusually quiet until 25th, with many beautiful days. Severe gale from S.E. on 26th and 27th, and T and L on 27th.

DUMFRIES.—Very unsettled. Harvest operations were completed at about the middle of the month, but both grain and straw were seriously damaged.

INVERARAY.—There were many pleasant days, and summer lingered as long as possible. Fine and frosty at the close.

COUPAR ANGUS.—R 1·05 in. below the average, reducing the surplus since January 1st to 2·28 in. Mean temp. 40°·0, or one degree below the average.

ABERDEEN.—Cold and wet and bad for harvest; much of this was still out at the end of the month.

CASTLETOWN.—On the whole a fairly good month, the first part being dry and breezy, and enabling farmers to secure corn crops. Harvest was fairly good with abundance of straw, but rather light ear. Potatoes and turnips were average.

CORK.—R ·50 in. above, and temp. 4°·5 below, the average. T and L on 26th.

DARRYNANE.—Constant but not heavy R, the total being 9 per cent. below the average.

DUBLIN.—Opening mild, the month ultimately proved rather cold, the mean temp. being 44°·6, or 0°·7 below the average of 35 years. Fog occurred on 8 days.

MARKREE.—Although dry, the month was one of low temp., with frost and S, sleet and H, on several occasions.

BANBRIDGE.—R ·44 in. below the average of 45 years.

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* Campbell-Stokes.

Climatological Table for the British Empire, June, 1907.

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	78·0	9	43·9	17	67·0	50·4	50·2	77	123·8	39·9	2·03	19	...
Malta	84·2	13	58·5	9	75·7	63·9	58·7	68	141·0	...	·00	0	2·9
Lagos	89·0	9	71·6	6	84·7	73·7	74·2	84	162·0	67·0	19·39	25	7·9
Cape Town	75·3	8	38·8	6	62·1	47·1	48·3	79	...	...	2·01	9	3·3
Durban, Natal ...	83·5	24	46·3	9	74·4	52·4	...	...	134·4	...	·34	6	1·8
Johannesburg	...	...	...	...	..	...	...	...	...	...	...	...	...
Mauritius	77·3	15	56·1	5	74·7	62·3	61·9	80	138·0	49·0	4·17	16	6·4
Calcutta...	97·0	16	71·2	3	90·9	79·1	77·7	82	153·0	70·3	18·52	16	7·4
Bombay...	93·7	10	75·4	17	88·6	80·0	77·0	79	139·0	72·8	22·49	20	6·7
Madras	107·6	1	74·9	14	100·1	81·5	69·7	60	148·6	73·1	2·80	9	5·6
Kodaikanal	74·7	3	50·9	17	65·5	53·6	50·6	77	147·6	41·7	1·94	15	6·7
Colombo, Ceylon ...	88·2	4	73·4	15	86·2	77·1	74·7	82	148·8	71·0	6·45	19	6·7
Hongkong	89·5	19	71·8	6	84·3	76·4	73·2	80	138·4	...	13·17	17	7·2
Melbourne	72·2	1	30·2	26	56·0	40·7	42·5	81	122·2	23·3	1·17	7	7·1
Adelaide	65·0	4	34·3	27	58·9	45·5	45·7	80	116·0	22·9	2·34	11	6·3
Coolgardie	70·6	8	34·2	15	60·9	44·2	40·7	69	133·9	29·0	·85	13	5·6
Sydney	64·3	2	42·9	29	58·9	48·9	48·2	89	91·9	34·9	9·14	30	7·4
Wellington	58·5	30	33·0	16	51·8	42·4	41·9	81	93·0	26·0	4·29	14	5·9
Auckland	68·0	6	38·0	22	58·1	46·7	44·8	75	115·0	31·0	3·61	10	5·5
Jamaica, Negril Point.	88·9	30	68·2	21	86·7	73·0	72·8	78	...	...	8·20	15	...
Trinidad	92·0	3	67·0	7	83·8	70·8	73·3	82	157·0	60·0	11·01	22	...
Grenada	87·2	10	70·4	6	83·9	74·4	70·9	77	141·0	...	6·10	25	5·1
Toronto	86·8	18	43·9	7	73·7	53·8	...	...	112·3	39·1	2·12	9	4·0
Fredericton	91·0	18	34·0	12	71·1	47·4	...	70	...	...	2·94	9	6·0
St. John's, N.B. ...	75·9	19	38·5	1	62·2	47·7	...	...	...	...	1·60	13	6·5
Victoria, B.C.	78·2	25	43·4	2	...	...	...	...	...	...	·33	5	...
Dawson	87·0	27	31·0	4	71·9	42·5	...	...	...	...	·85	9	6·2

MALTA.—Mean temp. of air 69°·8. Mean hourly velocity of wind 8·4 miles. Bright sunshine 11·5 hours per day.

LAGOS.—5·08 in. of R fell on the 17th.

Mauritius.—Mean temp. of air 0°·2 below, dew point 0°·8, and relative humidity 3·6 per cent. and R 2·12 in. above averages. Mean hourly velocity of wind 2·0 miles below average.

MADRAS.—R 33 per cent. above, temp. above, averages. A dust storm on 10th. L on 6 days; TS on 5 other days.

KODAIKANAL.—Bright sunshine 133 hours.

COLOMBO.—Mean temp. of air 80°·9 or 0°·2 below, of dew point 0°·5 above, and R 1·55 in. below, averages. Mean hourly velocity of wind 9·3 miles.

HONGKONG.—Mean temp. of air 79°·9. Bright sunshine 181·0 hours. Mean hourly velocity of wind 11·6 miles. R 3·63 in. below, and sunshine 30 hours above, averages.

Adelaide.—Mean temp. of air 1°·3 below, and R ·65 in. below, averages.

Sydney.—Mean temp. of air 0°·5 below, and R 3·72 in. above, averages.

Wellington.—Mean temp. of air 2°·4 below, and R ·71 in. below, averages.

Auckland.—R 1 inch below average. Violent gale 26th—29th, with low barometer.

TRINIDAD.—Rainfall 2·74 in. above 43 years' average.