

# Symons's Meteorological Magazine.

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## THE METEOROLOGICAL OFFICE.

By W. N. SHAW, SC.D., F.R.S.,

*Director of the Meteorological Office.*

IN moving its quarters from 63, Victoria Street, to the new building in Exhibition Road, South Kensington, the Meteorological Office enters on a new era. It may be interesting to note the successive steps by which its present position has been attained.

In 1854 Admiral FitzRoy was appointed Superintendent of a new department of the Board of Trade, formed for the collection and discussion of meteorological data supplied by observations made at sea.

In 1860, following the precedent of Leverrier in France, FitzRoy introduced the system of weather telegraphy which rendered possible the issue of storm warnings and the publication of forecasts in the daily newspapers.

In 1865, on the death of FitzRoy, Mr. T. H. Babington took over the management of the department. At the same time a Departmental Committee was appointed to consider the work and position of the Meteorological Department of the Board of Trade. The result of the inquiry was that in 1867 the control of the Parliamentary Grant for Meteorology was transferred to a Committee of the Royal Society, with Sir E. Sabine, President of the Society, as Chairman of the Committee. The work was extended to include with the marine meteorology and weather telegraphy, land meteorology, as represented by six fully equipped meteorological observatories, Falmouth, Stonyhurst, Aberdeen, Glasgow, Armagh, and Valencia, in addition to Kew, which became the central observatory of the system. Mr. R. H. Scott was appointed Director of the re-organized Office, with Captain H. Toynbee as Superintendent of the marine branch.

In 1869 the Department was dispossessed of its quarters in 1, Parliament Street, belonging to the Board of Trade, and hired for itself the residential flat then known as 116, Victoria Street.

In 1876 a second Government inquiry was held, and in the following year the Office passed under the control of a Council appointed by the Royal Society, with Mr. Scott as Secretary.

In 1903 a third inquiry into the work and status of the Office was held and the present system was then adopted, under which the Office is managed by a Director with an Advisory Committee appointed by the Treasury.

From 1869 to the present time the Office has occupied the premises at 116 (which was renumbered 63), Victoria Street.

The work of the Office has extended, and the Staff now includes, besides the Marine Superintendent (Commander Campbell Hepworth, R.N.R., C.B., R.D.), a Superintendent of Forecasts (Mr. R. G. K. Lempfert, M.A.), a Superintendent of Statistics (Mr. E. Gold, M.A.), and a Superintendent of Instruments (Mr. Richard Curtis).

The fully-equipped Meteorological Observatory at Eskdalemuir (under the superintendence of Mr. G. W. Walker) has been added to the list of Observatories already associated with the Office.

In 1903, Sir H. Maxwell's Committee pronounced the premises at 63, Victoria Street unsuitable for the work that had to be done in them, and in view of the importance to the working of the Office of the near proximity of a Post Office, a proposition was made to erect a building for the Meteorological Office and a new District Post Office in Exhibition Road, South Kensington.

The transfer of the Office Staff to the new premises was completed on November 15th, 1910, and the Committee invited a large party to an "At Home" in the new building on December 1st.

The Office premises are for the most part on the first and second floors of the new building at the corner of Exhibition Road and Imperial Institute Road; these two floors provide, besides the Library and its anteroom, a room for the Director and four rooms for the Superintendents and Director's Secretary; a large room for the Clerical Staff and another for the Forecast Staff; two rooms for the Marine Staff and two for the Instrument Staff. The ground floor and the greater part of the basement are assigned to the Post Office, but in the basement space has been reserved for a Printing Office and for a Workshop in connection with the Meteorological Office. A small Physical Laboratory and Photographic Room are provided on the third floor, the remainder of which is temporarily occupied by the Staff of the Science Museum. Access is gained on the third floor to a large flat roof, with space for the exposure of instruments for purposes of trial and investigation.

The Staircase, Library and anteroom, are finished with ornamental woodwork in Austrian oak. The Library is divided into six compartments by bookcases extending from the side walls; two of these recesses are furnished with tables for students, and on the book cabinets near them the latest additions to the Library are placed.

The Forecast Room on the second floor is in direct connection, by means of a pneumatic tube, with the instrument room of the Post Office.

Until quite recently education in the science of Meteorology has been neglected; the subject has been allowed to fall out of the

school curricula, and its place has been taken by sciences with which the teachers are more familiar. In moving their home from 63, Victoria Street to South Kensington, the Meteorological Committee hope to change that state of things. They have sought to secure space in which to display, for the information of the public, a series of exhibits which show what the work of the Office has been during the last 50 years, what its work is now, how it does it, and what its purpose is in doing it. The manner in which the Committee have utilised the space at their disposal, and have kept in view the educational purpose of the Office, will be seen from the subjoined abstract of the list of exhibits prepared for the party of December 1st.

*Outer Vestibule.*—Barograph, and the recording parts of instruments showing the Temperature on the roof of the Office and the Wind Velocity experienced at the top of the flag-pole.

*Ground Floor Hall.*—Weekly Report. Diagram showing the comparison of the weekly statistics of temperature, rainfall and sunshine of the present year with the average for 25 years.

*Staircase.*—Photographs of clouds. Diagrams representing the Temperature in the Upper Air as obtained from registering balloons in 1907-8. The Average Variation of temperature, rainfall and sunshine, week by week throughout the year in the 12 districts of the British Isles, and Local Variations of Weather.

*Hall. First Floor.*—Three cases of historical instruments, &c. :—illustrating (a) the period of Admiral FitzRoy, (b) that of Lieut-General Sir E. Sabine and Dr. R. H. Scott, (c) that of Professor H. J. S. Smith and Sir R. Strachey.

Record obtained by the Callendar electric sunshine recorder on the roof. Record of Rainfall on the roof.

*Ante-room.*—Relief map of the British Isles and neighbouring countries within a circle of 1,000 miles diameter, on the horizontal scale of 1/1,000,000, vertical scale 15/1,000,000.

Harmonic Analyser constructed by Mr. R. W. Munro from Lord Kelvin's designs.

The ordinary Outdoor Equipment of a Meteorological Station of the Second Order on the scheme approved by the Meteorological Office, the Royal Meteorological Society and the Scottish Meteorological Society.

Wall cases showing :—

Barograms from ships and from stations in the British Isles.

Illustrations of the use of isopleths : the average distribution of relative humidity and of the distribution of rainfall throughout the day at different times in the year.

Selection of Pressure-Tube Anemograms, to illustrate wind structure, &c.

Illustrations of line squalls.

Distribution of mean January and July temperature and rainfall along sections round the globe at latitudes  $50^{\circ}$  N. and  $50^{\circ}$  S., at  $23^{\circ}$  N. and  $23^{\circ}$  S., and at the Equator.

Sunshine and fog in London in the past 36 years.

Diagrams for comparing (a) the yield of Barley with the accumulated temperature of the summer and spring ; (b) the yield of Wheat with the rainfall of the previous autumn.

*Museum and Library.*—Normal Instruments adopted by the Meteorological Office for use at meteorological stations, and corresponding Instruments adopted by other countries.

Meteorological Logs and other documents illustrating the work in Marine Meteorology.

Charts, diagrams, &c., illustrating the history of the Daily Telegraphic Service for forecasts and storm warnings, and the results obtained from the observations at Climatological and Rainfall Stations.

Instruments designed and constructed by Mr. W. H. Dines, F.R.S., for the registration of temperature, &c., in the upper air, with specimens of the kite and balloons used in the investigation.

Glass models representing the distribution of temperature in the atmosphere up to a height of 15 miles over the British Isles on July 27th and 29th, 1908.

Wind vanes showing the velocity and direction of wind in the upper air, deduced from observations of pilot balloons at Ditcham Park, by Mr. C. J. P. Cave.

Apparatus, &c., designed and constructed for the Advisory Committee for Aeronautics.

Four cases illustrating the use of developable globes to represent mean values over the globe, viz. :—

i. Synoptic Chart of the distribution of pressure over the globe on 27th January, 1907, during the occurrence of exceptionally high pressure.

ii. "Réseau Mondial," showing the relation of the British Empire to the Meteorology of the globe.

iii. Averages of sea surface temperature and of air temperature over the land for February.

iv. Pressure and air temperature over the globe for January, 1905, on the smaller scale of  $1/80,000,000$ .

Kew and Eskdalemuir Observatories. Magnetic and Seismological results.

Stereo-photographs of clouds with extended base. (Presented by J. Tennant, Esq.)

Examples of lantern slides prepared in the Office.

Zoetrope showing the motion of air in travelling storms.

Rare Meteorological Books.

Relief Model of the Winter Quarters of the Antarctic S.S. "Discovery."

Two Kiosks exhibiting the Meteorological Records of the past week for Kew, Falmouth and Aberdeen. Sunshine records for a summer

day at 92 stations included in the Weekly Weather Report, and for the winter, December, 1909—January, 1910, in London (Bunhill Row), Westminster, Kew, Cambridge and Eastbourne.

Three Cabinets containing the Daily Weather Reports of all countries, the latest Climatological Reports for the British Dominions, and the unfolded maps for developable globes on the scale of 1/20,000,000.

Two Tables on which are set out Meteorological Atlases and New Books.

*Physical Laboratory and Photographic Room.* — Experimental illustrations of the formation of clouds and of halos and coronæ.

*Marine Rooms.* — Collection of 13,500 meteorological logs, from 1854 to the present time, with some logs of a still earlier date.

*Instrument Rooms.* — Pantagraphs and other drawing apparatus. Stock of instruments for the supply of the Navy, the Mercantile Marine, and Office Stations.

*Forecast Room.* — Collection of working charts and reports prepared in the Office, 1860–1910, and of Daily Weather Reports, with daily synoptic charts of the Atlantic Ocean and of the Northern Hemisphere.

*Statistical Room.* — Collection of manuscript registers of observations from British stations.

With the permission of the Director the Museum and Library are open to anyone who wishes to consult the books or documents or to examine the results exhibited; opportunity is thus afforded for school classes, and others interested in Meteorology as a subject of education, to make themselves acquainted with the most recent developments of Meteorological work.

## ROYAL METEOROLOGICAL SOCIETY.

THE opening meeting of the session, which was held on Wednesday evening, November 16th, was devoted to the consideration of four papers dealing with the investigation of the upper atmosphere.

The first was by Miss Margaret White, in which she described the second series of hourly balloon ascents made from Manchester with the object of obtaining information on the diurnal variation in the temperature at high altitudes. These experiments, which have been carried out at the suggestion of Prof. A. Schuster, F.R.S., were made on March 18th–19th, 1910. Twenty-eight small rubber balloons, carrying Dines' meteorographs, were liberated hourly from the Physical Laboratories of the University, and of these 20 have been recovered. The balloons left Manchester going at first in a southerly and later south-easterly direction, and were found in the Worcester, Hereford and Monmouth district — one reaching North Devon. Although the maximum height varied from 9 to 20 km., the direction of the places of fall was constant within less than 2°, showing that the direction of the upper wind was unchanged during the period over

which the ascents extended. The general character of the variation with height of the temperature of the earth's atmosphere, as obtained from the results of registering balloon and kite ascents, is clearly shown by the results of this series. A large gradient for the first kilometer is followed by a small gradient from 1 to 3 km., which gradually increases up to about 10 km., when it suddenly decreases rapidly and changes sign between 10 and 12 km. at the lower limit of the stratosphere. This small negative gradient in general persists up to above 15 km., beyond which a very small gradient, either positive or negative, is recorded. Such an inversion of temperature has been shown in every ascent at the lower limit of the stratosphere, and its existence is confirmed by the records of the hourly balloon series, both in June, 1909, and in March, 1910. The average height of the stratosphere was 10·7 km.

The second paper was read by Mr. W. H. Dines, F.R.S., in which he gave a brief summary of the results obtained from the registering balloon ascents, which were carried out in the British Isles during the two international weeks, December 6th–11th, 1909, and August 8th–13th, 1910. Balloons were sent up on each occasion from Ditcham Park, near Petersfield; Pyrton Hill, Oxon; Manchester; Crinan in Argyllshire, and also in the west of Ireland. Seventeen records were secured in the December ascents, and these show that the values for the height of the stratosphere are some of the lowest ever observed, and the temperatures are, perhaps, the lowest ever recorded at a height of 5 miles. Of the balloons sent up in the August week, seventeen were found. The average height attained was about 10 miles. The inversion of temperature at the commencement of the isothermal layer was larger than usual.

In the third paper Mr. C. J. P. Cave gave an account of the Pilot Balloon Observations which were made in Barbados during the International week, December 6th–11th, 1909. These observations, which were undertaken at the request of the Royal Meteorological Society, were carried out by Mr. Radcliffe Hall and others. Eighteen balloons were sent up. They were not followed by the theodolites long enough for the westerly current above the trade wind to be observed. The greatest height reached was 5 km. on December 10th, and the wind was east at this height and apparently slightly increasing in strength. In general the wind behaves like an east wind in this country, increasing to a maximum and then falling off above. The prevalence of clouds during the day-time interfered with the ascents, many of the balloons being lost to sight after a few minutes.

The fourth paper, by Mr. W. Marriott, described three registering balloon ascents carried out at the Royal Agricultural Society's Show at Liverpool, June 21st–23rd, 1910. All three records were recovered. On the 21st the lowest temperature recorded was  $-52^{\circ}6$  F. at 6·2 miles, and the balloon fell at Kirkby Stephen, 77 miles north-north-east. On the 22nd the balloon, which reached an altitude of only 5 miles where the temperature was  $-29^{\circ}2$  F., fell at Kirkham,

26 miles north. On the 23rd the lowest temperature recorded was  $-59^{\circ} \cdot 8$  F. at a height of 6·5 miles, and the balloon fell near Buxton, 43 miles east-south-east.

Dr. W. N. Shaw congratulated both the authors of the various papers and all those who had helped them in the ascents. He pointed out that the sending up of balloons carrying recording instruments for 24 hours in succession was a piece of enterprise which, with the exception of the previous Manchester ascents, was unique.

Dr. R. Glazebrook thought that much of the success of the investigations was due to the remarkable simplicity of the instruments used, and their extreme adaptability to the purposes necessary; and that meteorology owed a large debt of gratitude to Mr. Dines for the designs of the instruments used, and also for the way in which he had placed his services at the disposal of meteorologists, and showed how the results obtained from the instruments should be interpreted.

Mr. E. Gold drew attention to the fact that the results shown both by Miss White and by Mr. Marriott indicated that the general direction of the wind, at the surface and up above, was in agreement with the theoretical wind shown by the isobars. It was generally the case that where there was a well defined gradient having the same general direction over a considerable area, the direction of the place of fall of the balloon was roughly the same as that of the gradient wind.

Mr. W. W. Bryant and Prof. C. V. Boys considered it desirable that steps should be taken to ensure a thoroughly efficient calibration of the instruments.

Capt. C. H. Ley, Mr. A. Mallock, Colonel H. E. Rawson, Mr. J. E. Clark and Mr. E. S. Bruce, also took part in the discussion.

Mr. Dines, in reply, said that the upper northerly current was a hindrance to his work, as it carried the balloons sent up at Pyrton Hill into the Channel. It did not seem possible to know from the surface conditions where it would prevail; were it possible to know he should certainly abstain from starting balloons on such occasions. Mr. Dines explained how the instruments were calibrated, and referred to letters on the subject that had appeared in *Nature*.

Miss White and Mr. Cave also replied.

The following new Fellows were elected:—Dr. H. S. Anders, Mr. A. Barnes, Mr. J. Busfield, Mr. H. G. Busk, Mr. R. Chambers, Mr. A. F. Collins, Mr. D. J. Devlin, Mr. F. W. Dyson, F.R.S., Mr. G. M. S. Farmer, Mr. G. G. Kennedy, Dr. P. Olsson-Seffer, Mr. Abdus-Salam Rafiqi, Mr. H. P. Raikes, M.Inst.C.E., Mr. A. S. M. Smith, Lieut. C. E. Stuart, R.N.R., Mr. J. A. Turnbull, Capt. W. G. Walker-Gilchrist, Rev. S. B. Warde, and Mr. O. J. Wilkinson, Assoc. M.Inst.C.E.

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## THE WEATHER OF NOVEMBER.

By FRED. J. BRODIE.

THE absence of cold weather which formed so striking a feature in the meteorological history of October was amply compensated for in the succeeding month, which was undoubtedly one of the coldest, and in many parts of the country, one of the wettest Novembers on record. In London the one month is normally about six degrees colder than the other; this year, owing to the unusual warmth of October and the coolness of November, the difference in mean temperature amounted to more than fifteen degrees—a decline altogether without precedent in the record of the past 40 years.

The general inclemency of last month appears to have been due, in the first place, to the abnormal prevalence of cyclonic systems, which passed in quick succession across the United Kingdom. The absence of warmth may, however, be attributed in a larger measure to the almost constant presence of high barometrical pressures over and to the northward of Iceland, a feature which has been in evidence for some months past, and accounted in a degree for the unseasonable weather of the summer. Over and over again, in the rear of the various depressions which appeared last month over our own islands, a stream of air descended from the cold northern anticyclone, the normal prevalence of south-westerly winds being thus replaced by harsh breezes from north-west and north. When the southerly and south-westerly current had fair play, which occurred only once or twice, and chiefly between the 13th and 15th of the month, the thermometer rose to a tolerably high level, the shade readings mounting to between  $50^{\circ}$  and  $55^{\circ}$  in many parts of England and Ireland, and touching  $58^{\circ}$  on the 15th at Geldeston. Equally high values were recorded over Ireland on the 22nd and 23rd, but at other times the daily maxima were nearly all below  $50^{\circ}$ , and in many parts of north Britain that very moderate level was not reached in the course of the whole month. At the London observing station of the Meteorological Office the absolute maximum,  $54^{\circ}$  on the 1st, 4th and 6th, was the lowest recorded in November since 1878, when the thermometer failed to rise above  $53^{\circ}$ . At Leith, and a similar remark applies doubtless to many other northern stations, the absolute maximum of  $48^{\circ}$  was the lowest in November for at least 39 years past.

The sharpest frosts of last month occurred respectively on the 5th, between the 9th and 11th, the 17th to 19th, the 22nd and 23rd and the 29th and 30th. Those of the 17th to 19th and 22nd to 23rd were especially severe, the sheltered thermometer falling below  $20^{\circ}$  in many parts of the United Kingdom, and below  $15^{\circ}$  in some of the Scottish districts; at Balmoral early on the 23rd a minimum as low as  $10^{\circ}$  was registered. On the surface of the grass the readings on the 22nd and 23rd were in many places at least  $20^{\circ}$  below the freezing point, a minimum as low as  $7^{\circ}$  being recorded at West



THAMES VALLEY RAINFALL NOVEMBER, 1910.



ALTITUDE  
SCALE

Below 250 feet	250 to 500 feet	500 to 1000 feet	Above 1000 feet

SCALE OF MILES



Symons's Meteorological Magazine.

Watershed of River Thames above Teddington, and River Lee above Felldes Weir.

### Rainfall Stations reporting Isohyets.



Linton, in Peebleshire, and a reading of  $8^{\circ}$  at Balmoral and Llangamarch Wells. At a large number of stations frosty nights were more numerous than in any recent November. In London the thermometer in the screen sank below the freezing point on as many as 17 nights, the number of such occasions being nearly three times the average, and larger than in any November since that of 1871. The mean minimum temperature in the metropolis,  $32^{\circ}5$ , was nearly  $6^{\circ}$  below the average, and was lower than in any November of the past forty years.

In spite of the generally unsettled state of the weather, the total duration of bright sunshine last month was nearly everywhere above the normal. Up to the close of the third week the aggregate in London bid fair to eclipse the record, but owing to a complete absence of sunshine during the last nine days the total at Westminster for the month, 36 hours, was only 9 hours in excess of the average.

### Correspondence.

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

#### HEAVY RAINFALL IN GUERNSEY.

OCTOBER and November, but November especially, have been two such very wet months in Guernsey that a few particulars may be interesting. Seventeen years ago I commenced measuring the rainfall at this place and had never, until last month, reached 8 inches as a monthly total. Including November, 1910, 7 inches, in fact, has only been topped on six occasions in the entire period. The dates and the total rainfall for these very wet months are given below, and it will be seen that November, 1910, beat the previous record (October, 1896, with 7.65 in.) by as much as 3.48 in. The table also shows that, together, October and November have given the enormous amount, for the Channel Islands, of 18.72 in. This is 55 per cent. of the year's average total, which, at this station, is 33.95 in.

1896	1905	1907	1909	1910	1910
Oct.	Nov.	Oct.	Oct.	Oct.	Nov.
in.	in.	in.	in.	in.	in.
7.65	7.45	7.46	7.18	7.59	11.13

October and November, 1910, 18.72 in.

The island possesses, in addition to my own and other shorter records of rainfall, a valuable record (Hoskins-Collinette) extending back, intact, from to-day to the year 1843. From this I gather that twice only during the long interval of nearly seven decades has 11 inches of rain fallen in Guernsey in one month. These exceptional instances were October, 1872, with 11.04 in., and December, 1876, with 11.47 in.

In 1908 Guernsey suffered from an unusual deficiency of rainfall, a deficiency which 1909 in no way helped to make up. The wiping

out of the great shortage has apparently been reserved for 1910 to accomplish, and to all appearances it will be done, or very nearly so. At any rate from an accumulated deficit of 12·05 in., as late as last September, the figures have fallen rapidly and to-day stand at 0·90 in. It only requires that December be rather more wet than usual and the rainfall at this station will once more be at par.

BASIL T. ROWSWELL.

*"Les Blanchés," Guernsey, December 3rd, 1910.*

THE rainfall here for the month of November may be of interest. The total was 9·80 in. on 26 days, the greatest fall in 24 hours was 1·57 in. on 29th. In November, 1907, the total fall was 1·70 in., and in November, 1909, 2·13 in. For November, 1908, I have no record. Much of the country is under water. We have registered practically no frost as yet.

PERCY A. GORE.

*Les Combournaises, Dinan, Côtes-du-Nord, December 1st, 1910.*

### EXCEPTIONAL NOVEMBER COLD.

ON November 16th the thermometer fell below 32° at 5.30 p.m., and during the night registered a minimum of 20°·5. At 9 a.m. on the 17th it was 23°, and during the day reached a maximum of only 31°·2, a very low reading for the time of year. At 6 p.m. it was 26°·7, and did not rise above 32° until 7.30 a.m. on the 18th.

The temperature was therefore continuously below the freezing point from 5.30 p.m. on the 16th until 7.30 a.m. on the 18th, or 38 hours consecutively. This, I think, is very unusual for the middle of November in the south of England.

The above readings were taken in the Stevenson screen with Kew certified thermometer.

H. K. G. ROGERS.

*"Glenart," Weybridge, 20th November, 1910.*

### UNUSUAL DARKNESS.

ON November 15th, from 2 to 3 p.m., dense slow-moving clouds from N.N.W. involved us in a gloom which, as far as my recollection serves, is without a parallel in my experience. It was impossible to read without artificial light, in fact people here found it necessary to employ gas or oil lamps in proceeding with their business or domestic occupations. Showers of rain fell, but the amount was light, and nothing like the torrential descent which accompanies a thunderstorm. There was also a little hail, but no fog or mist, the barometer was very low, and had shown great fluctuations on few preceding days. At night there was a brilliantly coloured lunar halo and corona.

W. F. DENNING.

*Bristol, November 17th 1910.*

## REMARKABLE WEATHER IN SEPTEMBER AND OCTOBER, 1910, IN THE LAKE DISTRICT.

As the rainfall for the two months, September and October, when taken together, and the long continuance of most beautiful weather during the same period, constitutes an absolute record in this neighbourhood, I send you some figures relating thereto, which perhaps may not be uninteresting.

The records of myself and my predecessor go back for 39 years, and the average rainfall in the two months, September and October, for the whole series of years is 11.55 in. For this year the full amount was 3.30 in.; the nearest approach to this was in 1902 when there was just 6.00 in. of rain in the two months. Of this amount, (3.30 in.), 1.55 in. fell in the first two days of September and the last day of October; of the intervening 58 days 41 were absolutely fine and mostly sunny; of the remaining 17 days, ten had an average fall of .025 in. per day, and the other seven had an average fall of .214 in. per day. From September 2nd to 24th there was no rain, except for some slight showers which fell on four nights, and which were not noticeable except by a regular observer. In October there was no rain from the 4th to the 16th, except for a slight shower on the 11th, and it was again rainless from the 21st to 30th inclusive, except that .01 in. was measured on the 28th, which was due to a thick mist one evening.

CHAS. P. CHAMBERS.

*Orchard Head, Broughton-in-Furness, November 9th, 1910.*

## LUNAR ECLIPSE: FIREBALL.

THE eclipse of the moon was witnessed here under the best atmospheric conditions on November 16th. Not a cloud marred the picturesque spectacle. There was sharp hoar frost and a little fog, but during totality the stars apparently shone with the same brilliancy as on an ordinary moonless night. The moon is very rarely altogether obscured during a so-called total eclipse, and on this occasion she could be seen as a pretty bright copper coloured ball near the Pleiades. The ring of the Earth's atmosphere, through which the solar rays were refracted to the eclipsed moon, must have been fairly transparent on this occasion. It is remarkable that nearly all the lunar eclipses which have occurred during the last 40 years have been witnessed at Bristol. This gives weight to the opinion held by Sir J. Herschel and others that the full moon possesses the faculty of clearing away clouds.

A splendid meteoric fireball belonging to the shower of Leonids appeared during the total phase at 12.26 a.m., and passed from over a point between Edinburgh and Glasgow to above the sea north of Portrush, Ireland. Its height was from 80 to 41 miles, length of luminous course 133 miles, traversed at a velocity of 35 miles per second. The fireball left a drifting streak for 20 minutes as observed at Penicuik, near Edinburgh.

W. F. DENNING.

*Bristol, November 25th, 1910.*

### ROOF WATERSHEDS.

I WAS much interested in the account in *Symons's Meteorological Magazine* for November, of the house at Barnoldswick which acts as a water parting, and no doubt you will receive many communications as to similar cases. At the risk of calling your attention to one of which you already know, I may mention that there stands, or used to stand some years ago, a house by the side of the road from Dolgelly to Bala exactly on the dividing line between the gathering ground of the river Dee and that of the Wnion, which enters the sea at Barmouth, after junction with the Mawddach. The fact is mentioned in some guide books to North Wales.

M. J. SALTER.

*Mickleton, Glos., 22nd November, 1910.*

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### THE COLD NOVEMBER IN LONDON.

IN contrast to the very mild October of this year November proved extremely cold, and the temperature observations at Camden Square afford some interesting comparisons with past years. The return to mild conditions during the early part of December, has put out of the minds of most the long persistence of early frost which took place during the month just closed, and it comes almost as a shock to find that we have experienced a November the mean temperature of which, as recorded at Camden Square, was only  $38^{\circ}6$ , or  $4^{\circ}7$  below the average, and the lowest with one single exception in 53 years. As in October, although the conditions were reversed, the minimum temperature was the special feature, and in the case of both the screen and grass temperatures the means for the month were well below the previously lowest recorded, the former being  $32^{\circ}3$ , or  $5^{\circ}8$  below the average, and the latter  $27^{\circ}3$ , or  $6^{\circ}6$  below the average; the previous lowest mean grass minimum was  $29^{\circ}2$  in 1896. The number of frosts in the screen, 15, or 9 above the average, has been equalled twice, in 1871 and 1879, but never exceeded; and the number on grass, 25, or 13 above the average, has never been approached nearer than by 22 in 1861 and 1879; in 1871, which was the only November with a lower mean temperature, the number of grass frosts was 21. The mean maximum in 1910 was  $45^{\circ}4$ , or  $3^{\circ}6$  below the average; this has been lower on four previous occasions. The actual extremes of minimum temperature, viz.,  $24^{\circ}0$  in the screen and  $19^{\circ}7$  on the grass, have been exceeded fairly frequently, bearing witness to the fact that the low temperature recorded on this occasion was not the result of a few very cold days, but of a continuous cold spell.

It is not without interest to observe that the fall of mean temperature from October to November during the present year was as much as  $15^{\circ}2$  compared with a normal fall of  $6^{\circ}7$ . No larger fall has ever been recorded here. The fall of the mean minimum was



still more remarkable, amounting to  $16^{\circ}0$ , or  $11^{\circ}5$  above the average in the screen, and to  $16^{\circ}5$ , or  $11^{\circ}1$  above the average, on the grass.

The usual accompaniment of a cold winter month is anticyclonic weather and lack of rainfall; but although the total rainfall in London was not greatly above the average, the conditions were, except for a brief period, of an unsettled type, with frequent prolonged rain showers. The duration of rainfall was 81.9 hours, or 36.4 hours above the average of 24 years, and the greatest in November in 30 years' observations, the nearest approach being 81.8 hours in November, 1888. On four days the duration measured more than 10 hours, a figure not previously reached during 1910. A period of sunlessness set in on the 22nd, and at the time of writing (December 12th) the total duration of bright sunshine recorded since and including that date has amounted to less than one hour.



### SCOTTISH METEOROLOGICAL SOCIETY.

THE Annual Business Meeting of the Society was held at 5, St. Andrew's Square, Edinburgh, on 6th December, 1910, Sir Archibald Buchan-Hepburn, Bart., in the chair.

The report from the Council expressed satisfaction at the fact that the publication, by the Royal Society of Edinburgh, of the observations made on Ben Nevis and at Fort William had been completed by the issue of Vol. 44 of the *Transactions* of that Society. It was to be noted that not only had the observations themselves been printed in great detail, but that the four volumes in which they appeared (*Trans. Roy. Soc. Edin.*, Vols. 36, 42, 43 and 44) contained also numerous papers in which various theoretical and practical aspects of the observations were discussed. The Council desired to place on record their sense of the deep obligation they were under to the Royal Society of Edinburgh for publishing the work in such a complete and handsome manner. It was a matter of further satisfaction that almost simultaneously with the completion of the publication of the Ben Nevis observations and results, the Society had, through the generosity of its friends, been entirely relieved from the burden of debt which it had to assume when the Observatories were closed in 1904.

The following were appointed Office-bearers and Council for the ensuing twelve months:—*President*: Professor A. Crum Brown, M.D., LL.D., F.R.S. *Vice-Presidents*: J. Mackay Bernard and Ralph Richardson, W.S. *Council*: James Macdonald, C. G. Knott, D.Sc., Sir David Paulin, Gilbert Thomson, H. M. Cadell, Captain H. G. Lyons, D.Sc., F.R.S., Sir A. Buchan-Hepburn, Bart., G. G. Chisholm and M. McCallum Fairgrieve. *Hon. Secretaries*: R. T. Omond and E. M. Wedderburn, W.S. *Hon. Treasurer*: W. B. Wilson, W.S.

Thereafter Mr. A. Watt, Secretary, read a paper on "The Early Days of the Society." The foundation of the Society in 1855 was due mainly to the exertions of Sir John Stuart Forbes, Bart., brother

of the famous Professor of Natural Philosophy, and of David Milne Home, of Wedderburn, who was well known as a geologist. And from the beginning the society was supported in the most strenuous manner by the Eighth Marquis of Tweeddale, by Alexander Keith Johnston, by Thomas Stevenson and by Sir Arthur (then Dr) Mitchell. That early band of remarkable men never wavered in their allegiance to the society, and of them Stevenson and Milne Home lived to see the establishment of the Observatory on Ben Nevis, which may be regarded as the crowning point of Milne Home's long scientific career, for the suggestion of the observatory was due to him; whilst Sir Arthur Mitchell rendered devoted service to the society for fully half a century. A sketch was given of the scientific outlook in the middle of last century. The founders of the society had, of course, in view the double aim of encouraging special researches and of organising observations in the various districts of Scotland, and though from the first generous support was received from people of all classes, the actual commencement of work might have been considerably delayed but for the independent action of Dr. James Stark, who had just been appointed Superintendent of Statistics in the newly-established Department of the Registrar-General for Scotland. In 1856 Dr. Stark was appointed secretary to the society, but resigned two years later when the growing interests of the society demanded the attention of a man who could give his whole time to the work. Dr. Buchan became secretary in 1860. The paper went on to relate the various researches in which the society had engaged, the state of the membership at various times, and the present outlook.

## INTERNATIONAL BALLOON ASCENTS, IN JUNE, 1908.

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

*June 11th, 1908.*

Starting Point.	Country.	A miles.	B ° F.	C miles.	D ° F.	E miles.	F
Brussels .....	Belgium ....	7·5	—85	9·1	—67	16	S.S.E.
Hamburg.....	Germany ....	7·5	—81	10·6	—58	37	S. by E.
Lindenberg....	" ....	7·5	—71	8·7	—58	88	S. by E.
Strassburg ....	" ....	7·7	—83	11·2	—62	21	S. by E.
Munich.....	" ....	7·9	—73	11·6	—44	27	S.S.E.
Pavia.....	Italy.....	7·2	—87	8·0	?	26	S.W. by S
Nigin Oltchidaeff .....	.....	6·7	—53	10·0	—58	70	N.E.

A=Height in miles of commencement of isothermal column.

B=Temperature, F°, at bottom of column.

C=Greatest height of reliable record in miles.

D=Temperature, F°, at greatest height.

E=Distance in miles of point where balloon fell.

F=Bearing of falling point from starting point.

Again all the English balloons were lost. Over the Continent an extensive high-pressure area prevailed, with small gradients.



## METEOROLOGICAL NEWS AND NOTES.

DR. W. N. SHAW, F.R.S., will give a course of eight lectures on "Climatology, with special reference to British Possessions," at the London School of Economics and Political Science, Clare Market, on Fridays at 5 p.m., beginning on January 20th, 1911.

LOCAL RAINFALL RECORDS are liable to be influenced by a multitude of disturbing influences into which we make it our duty to enquire. In the case of health resorts one of these influences may possibly be inferred from the following innocent remark which we take from the report of a council meeting printed in a local paper :—

"Alderman Jones said he was told that the rain water gauge from which the rainfall records were taken showed higher results than the one in the open. He thought this was a matter which should be seen to, as it was detrimental to the town."

A METEOROLOGICAL POST CARD has fallen into our hands, which suggests that in the King's Dominions over the Seas the authorities are less conservative in their methods of making public useful scientific information than we have grown to be in this country. The post card gives in the form of a neat diagram the average monthly rainfall at a number of important stations in Australia, and serves to illustrate in a striking manner the extraordinary diversity of type of seasonal distribution which exists in that continent.

THE "BOTANICAL JOURNAL," which entered on its career with the issue for October last, is intended to take the place of the now defunct *Quarterly Record of the Royal Botanic Society*. The number before us contains an abstract of the meteorological observations taken in the Gardens of the Society in Regent's Park during 1909, and complete daily records for the last six months of that year. We welcome the reappearance of this valuable series in its new and greatly improved setting.

ROOF AND GROUND RAIN GAUGES usually differ somewhat widely in their indications. We have been informed that Mr. H. D. Vavasour, of Ugbrooke Station, Blenheim, New Zealand, has a rain gauge funnel fixed 3 feet above the roof of his house, and the rainfall is led by a "compo." pipe into a room beneath, for a distance of about 15 feet, to a bottle. He has made comparisons between the records obtained in this way and those of a gauge set up in the garden under the usual conditions. The most remarkable fact obtained was that in registering dews the roof gauge will register ·01, and the ground gauge *nil*. If the gauge on the roof registers ·02, the gauge on the ground will register ·005, which is taken as ·01 according to the rules. In heavy rains the gauge on the ground will register from 2 to 4 per cent. more than the roof gauge.

## RAINFALL TABLE FOR NOVEMBER, 1910.

STATION.	COUNTY.	Lat. N. ° /	Long. W. [*E.] ° /	Height above Sea. ft.	RAINFALL OF MONTH	
					Aver. 1875— 1909. in.	1910. in.
Camden Square.....	London.....	51 32	0 8	111	2'34	3'19
Tenterden.....	Kent.....	51 4	*0 41	190	3'07	5'19
Steyning.....	Sussex.....	50 53	0 20	80	3'91	6'06
Southampton (Cadland) ..	Hampshire.....	50 50	1 22	52	3'39	3'98
Hitchin.....	Hertfordshire.....	51 57	0 17	238	2'46	4'00
Oxford (Magdalen College).	Oxfordshire.....	51 45	1 15	186	2'25	2'95
Bury St. Edmunds (Westley)	Suffolk.....	52 15	*0 40	226	2'40	2'71
Geldeston [Beccles].....	Norfolk.....	52 27	*1 31	38	2'49	3'69
Polapit Tamar [Launceston]	Devon.....	50 40	4 22	315	4'07	6'94
Rousdon [Lyme Regis].....	„.....	50 41	3 0	516	3'51	4'94
Stroud (Upfield).....	Gloucestershire..	51 44	2 13	226	2'77	4'01
Church Stretton (Wolstaston)..	Shropshire.....	52 35	2 48	800	2'94	4'36
Coventry (Kingswood).....	Warwickshire....	52 24	1 30	340	2'61	4'95
Market Overton.....	Rutland.....	52 44	0 41	475	2'47	3'86
Boston.....	Lincolnshire.....	52 58	0 1	25	2'05	2'58
Worksop (Hodsock Priory).	Nottinghamshire	53 22	1 5	56	1'98	3'00
Macclesfield.....	Cheshire.....	53 15	2 7	501	3'00	5'12
Southport (Hesketh Park)..	Lancashire.....	53 38	2 59	38	3'16	4'82
Wetherby (Ribston Hall) ...	Yorkshire, W.R.	53 59	1 24	130	2'34	3'13
Arneliffe Vicarage.....	„.....	54 8	2 6	732	6'12	6'52
Hull (Pearson Park).....	„ E.R.	53 45	0 20	6	2'34	3'01
Newcastle (Town Moor) ...	Northumberland	54 59	1 38	201	2'63	3'10
Borrowdale (Seathwaite) ...	Cumberland.....	54 30	3 10	423	13'59	9'98
Cardiff (Ely).....	Glamorgan.....	51 29	3 13	53	4'08	6'67
Haverfordwest.....	Pembroke.....	51 48	4 58	95	5'16	5'49
Aberystwyth (Gogerddan)..	Cardigan.....	52 26	4 1	83	4'50	6'78
Llandudno.....	Carnarvon.....	53 20	3 50	72	3'19	5'27
Cargen [Dumtries].....	Kirkcudbright...	55 2	3 37	80	4'35	6'18
Marchmont House.....	Berwick.....	55 44	2 24	498	3'21	3'52
Girvan (Pinnore).....	Ayr.....	55 10	4 49	207	5'24	4'64
Glasgow (Queen's Park) ...	Renfrew.....	55 53	4 18	144	3'63	2'95
Inveraray (Newtown).....	Argyll.....	56 14	5 4	17	7'39	4'66
Mull (Quinish).....	„.....	56 34	6 13	35	6'24	4'31
Dundee (Eastern Necropolis)	Forfar.....	56 28	2 57	199	2'62	2'62
Braemar.....	Aberdeen.....	57 0	3 24	1114	3'76	2'85
Aberdeen (Cranford).....	„.....	57 8	2 7	120	3'29	5'98
Cawdor.....	Nairn.....	57 31	3 57	250	2'60	5'04
Fort Augustus (S. Benedict's)	E. Inverness.....	57 9	4 41	68	4'51	4'07
Loch Torridon (Bendamph)	W. Ross.....	57 32	5 32	20	8'90	8'51
Dunrobin Castle.....	Sutherland.....	57 59	3 56	14	3'25	6'51
Wick.....	Caitness.....	58 26	3 6	77	2'95	6'77
Killarney (District Asylum)	Kerry.....	52 4	9 31	178	5'54	6'11
Waterford (Brook Lodge)...	Waterford.....	52 15	7 7	104	3'80	4'30
Nenagh (Castle Lough).....	Tipperary.....	52 54	8 24	120	3'88	3'23
Miltown Malbay.....	Clare.....	52 52	9 26	400	4'50	4'87
Gorey (Courtown House) ..	Wexford.....	52 40	6 13	80	3'41	4'80
Abbey Leix (Blandsfort)....	Queen's County..	52 56	7 17	532	3'28	3'35
Dublin (Fitz William Square)	Dublin.....	53 21	6 14	54	2'64	2'54
Mullingar (Belvedere).....	Westmeath.....	53 29	7 22	367	3'38	3'16
Ballinasloe.....	Galway.....	53 20	8 15	160	3'59	3'55
Crossmolina (Enniscroe).....	Mayo.....	54 4	9 18	74	5'75	6'13
Collooney (Markree Obsy.).	Sligo.....	54 11	8 27	127	4'02	5'22
Seaforde.....	Down.....	54 19	5 50	180	3'86	3'73
Bushmills (Dundarave).....	Antrim.....	55 12	6 30	162	3'77	5'53
Omagh (Edenfel).....	Tyrone.....	54 36	7 18	280	3'66	3'65

RAINFALL TABLE FOR NOVEMBER, 1910—*continued.*

RAINFALL OF MONTH (con.)					RAINFALL FROM JAN. 1.				Mean Annual 1875-1909.	STATION.
Diff. from Av. in.	% of Av.	Max. in 24 hours.		No. of Days	Aver. 1875-1909.	1910.	Diff. from Aver. in.	% of Av.		
		in.	Date.		in.	in.			in.	
+ .85	137	.76	30	16	22.98	22.07	— .91	96	25.11	Camden Square
+2.12	169	.75	13	19	24.87	26.65	+1.78	107	27.64	Tenterden
+2.15	155	1.07	13	13	30.13	36.08	+5.95	120	33.58	Steyning
+ .59	117	.67	23	17	28.64	28.65	+ .01	100	31.87	Cadland
+1.54	162	1.08	27	16	23.05	23.27	+ .22	101	25.16	Hitchin
+ .70	131	.85	27	16	22.52	21.66	— .86	96	24.58	Oxford
+ .31	113	.68	27	14	23.26	24.67	+1.41	106	25.40	Westley
+1.20	148	.58	27	22	21.66	26.42	+4.76	122	23.73	Geldeston
+2.87	170	1.00	13	27	33.81	41.59	+7.78	123	38.27	Polapit Tamar
+1.43	141	.82	23	20	29.86	31.55	+1.69	106	33.54	Rousdon
+1.24	145	.79	27	22	27.10	29.87	+2.77	110	29.81	Stroud
+1.42	148	.94	27	23	29.42	29.74	+ .32	101	32.41	Wolstaston
+2.34	190	1.12	27	18	26.32	25.68	— .64	98	28.98	Coventry
+1.39	156	.88	27	18	24.69	25.36	+ .67	103	27.10	Market Overton
+ .53	126	.83	27	15	21.47	22.01	+ .54	103	23.35	Boston
+1.02	152	.97	27	16	22.29	21.34	— .95	96	24.46	Hodsock Priory
+2.12	170	.92	27	22	31.38	35.02	+3.64	112	34.73	Macclesfield
+1.66	152	1.01	10	22	29.60	32.23	+2.63	109	32.70	Southport
+ .79	134	.83	10	15	24.60	27.92	+3.32	113	26.87	Ribston Hall
+ .40	107	1.12	10	18	54.74	61.38	+6.64	112	61.49	Arneliffe
+ .67	129	.90	27	18	24.10	22.74	—1.36	94	26.42	Hull
+ .47	118	.46	10	19	25.48	25.34	— .14	99	27.94	Newcastle
—3.61	73	3.00	6	18	114.34	112.83	—1.51	99	129.48	Seathwaite
+2.59	163	1.02	13	22	37.58	44.46	+6.88	118	42.28	Cadliff
+ .33	106	.77	27	22	41.63	38.56	—3.07	93	46.81	Haverfordwest
+2.28	151	1.08	23	24	40.80	48.78	+7.98	119	45.46	Gogerddan
+2.08	165	.57	28	27	27.52	32.44	+4.92	117	30.36	Llandudno
+1.83	142	1.42	6	11	38.63	49.26	+10.63	128	43.47	Cargen
+ .31	110	.85	12	19	30.93	26.82	—4.11	87	33.76	Marchmont
— .60	89	.75	12	18	44.29	46.86	+2.57	106	49.77	Girvan
— .68	81	.78	12	12	32.02	35.01	+2.99	109	35.97	Glasgow
—2.73	63	1.06	6	17	60.10	59.51	— .59	99	68.67	Inveraray
—1.93	69	1.02	6	20	49.98	47.18	—2.80	94	56.57	Quinish
.00	100	.64	13	12	25.97	26.00	+ .03	100	28.64	Dundee
— .91	76	...	...	...	31.80	35.77	+3.97	112	34.93	Braemar
+2.69	182	.75	6	24	29.30	28.14	—1.16	96	32.73	Aberdeen
+2.44	194	.76	13, 14	18	26.80	29.60	+2.80	110	29.33	Cawdor
— .44	90	.63	14	22	38.91	38.26	— .65	98	44.53	Fort Augustus
— .39	96	1.42	1	20	73.91	75.05	+1.14	102	83.61	Bendamph
+3.26	200	1.62	6	24	28.81	30.00	+1.19	104	31.90	Dunrobin Castle
+3.82	229	.75	6	26	26.77	28.99	+2.22	108	29.88	Wick
+ .57	110	.73	4	27	47.89	53.36	+5.47	111	54.81	Killarney
+ .50	113	1.08	22	17	35.25	35.52	+ .27	101	39.57	Waterford
— .65	83	.50	22	23	35.09	37.49	+2.40	107	39.43	Castle Lough
+ .37	108	1.18	22	23	40.27	40.01	— .26	99	45.11	Miltown Malbay
+1.39	140	1.03	22	19	31.57	33.42	+1.85	106	34.99	Courtown Ho.
+ .07	102	.80	22	21	32.51	38.22	+5.73	118	35.92	Abbey Leix
— .10	96	.58	22	17	25.41	29.87	+4.46	117	27.68	Dublin
— .22	93	.55	22, 25	16	32.76	36.91	+4.15	113	36.15	Mullingar
— .04	99	.62	22	23	32.95	32.50	— .45	99	36.64	Ballinasloe
+ .38	107	.72	14	27	46.76	49.58	+2.90	106	52.87	Enniscoie
+1.20	130	.54	22	24	38.37	50.70	+12.33	132	42.71	Markree
— .13	97	.57	23	19	35.14	32.93	—2.21	94	38.91	Seaforde
+1.76	147	.54	23	25	33.69	37.70	+4.01	112	37.56	Dundarave
— .01	100	.78	22	19	35.47	40.18	+4.71	113	39.38	Omagh

## SUPPLEMENTARY RAINFALL, NOVEMBER, 1910.

Div.	STATION.	Rain inches	Div.	STATION.	Rain inches
II.	Warlingham, Redvers Road	3·95	XI.	Llangyhanfal, Plâs Draw...	6·69
„	Ramsgate .....	3·94	„	Dolgelly, Bryntirion .....	6·02
„	Hailsham .....	6·66	„	Bettws-y-Coed, Tyn-y-bryn	7·30
„	Totland Bay, Aston House.	4·14	„	Lligwy .....	6·79
„	Stockbridge, Ashley .....	3·51	„	Douglas .....	9·93
„	Grayshott .....	4·28	XII.	Stoneykirk, Ardwell House	7·15
„	Reading, Calcot Place .....	3·46	„	Dalry, The Old Garroch ...	5·82
III.	Harrow Weald, Hill House.	3·28	„	Langholm, Grove Road .....	5·94
„	Pitsford, Sedgebrook .....	3·33	„	Moniaive, Maxwellton House	4·45
„	Huntingdon, Brampton .....	3·74	XIII.	St Mary's Loch, Cramilt Ldge	3·09
„	Woburn, Milton Bryant .....	3·53	„	Edinburgh, Royal Observty.	2·38
„	Wisbech, Monica Road .....	2·09	XIV.	Maybole, Knockdon Farm..	4·27
IV.	Southend Water Works .....	2·73	XV.	Campbeltown, Witchburn...	5·48
„	Colchester, Lexden .....	2·87	„	Glenreadell Mains .....	6·16
„	Newport .....	3·53	„	Ballachulish House .....	3·00
„	Rendlesham .....	3·41	„	Islay, Fallabus .....	6·05
„	Swaffham .....	3·22	XVI.	Dollar Academy .....	3·48
„	Blakeney .....	3·14	„	Balquhiddier, Stronvar .....	4·00
V.	Bishops Cannings .....	3·60	„	Coupar Angus .....	2·99
„	Winterbourne Steepleton ..	4·74	„	Blair Atholl .....	2·76
„	Ashburton, Druid House ..	7·72	„	Montrose, Sunnyside Asylum	3·04
„	Honiton, Combe Kaleigh ...	5·81	XVII.	Alford, Lynturk Manse ...	5·50
„	Okehampton, Oaklands .....	7·42	„	Keith Station .....	8·99
„	Hartland Abbey .....	5·64	XVIII.	Glenquoich, Loan .....	8·30
„	Lynmouth, Rock House ...	6·13	„	Skye, Dunvegan .....	5·59
„	Probus, Lamellyn .....	7·57	„	N. Uist, Lochmaddy .....	5·48
„	North Cadbury Rectory ..	3·84	„	Alvey Manse .....	4·96
VI.	Clifton, Pembroke Road ..	5·17	„	Loch Ness, Drumnadrochit.	5·09
„	Ross, The Graig .....	3·83	„	Glencarron Lodge .....	6·70
„	Shifnal, Hatton Grange .....	4·11	„	Fearn, Lower Pitkerrie .....	3·34
„	Blockley, Upton Wold .....	4·32	XIX.	Invershin .....	6·14
„	Worcester, Boughton Park.	3·76	„	Altnaharra .....	...
VII.	Market Rasen .....	3·09	„	Bettyhill .....	4·89
„	Bawtry, Hesley Hall .....	2·92	XX.	Dunmanway, The Rectory..	6·27
„	Derby, Midland Railway ...	4·56	„	Cork .....	3·33
„	Buxton .....	6·27	„	Mitchelstown Castle .....	5·36
VIII.	Nantwich, Dorfold Hall .....	5·69	„	Darrynane Abbey .....	8·00
„	Liscard .....	4·82	„	Glenam [Clonmel] .....	3·24
„	Chatburn, Middlewood .....	5·52	„	Nenagh, Traverston .....	3·29
„	Cartmel, Flookburgh .....	6·22	„	Newmarket-on-Fergus, Fenloe	4·89
IX.	Langsett Moor, Up. Midhope	5·12	XXI.	Laragh, Glendalough .....	6·33
„	Scarborough, Scalby .....	4·55	„	Moynalty, Westland .....	3·05
„	Ingleby Greenhow .....	3·56	„	Athlone, Twyford .....	2·65
„	Mickleton .....	2·65	XXII.	Woodlawn .....	3·10
X.	Bardon Mill, Beltingham ...	3·23	„	Westport, St. Helens .....	5·61
„	Ilderton, Lilburn Cottage ..	3·92	„	Achill Island, Dugort .....	7·60
„	Keswick, The Bank .....	4·47	„	Mohill .....	4·56
XI.	Llanfrechfa Grange .....	6·94	XXIII.	Enniskillen, Portora .....	3·52
„	Treherbert, Tyn-y-waun ...	10·23	„	Dartrey [Cootehill] .....	2·85
„	Carmarthen, The Friary .....	6·70	„	Warrenpoint, Manor House	2·63
„	Castle Malgwyn [Llechryd].	6·62	„	Banbridge, Milltown .....	2·19
„	Plynlimon .....	...	„	Belfast, Springfield .....	4·69
„	Crickhowell, Ffordlas .....	5·10	„	Glenarm Castle .....	...
„	New Radnor, Ednol .....	6·53	„	Londonderry, Creggan. Res.	4·41
„	Rhayader, Tyrmynydd .....	9·11	„	Killybegs .....	7·08
„	Lake Vyrnwy .....	7·09	„	Horn Head ... ..	4·31

## METEOROLOGICAL NOTES ON NOVEMBER, 1910.

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

LONDON, CAMDEN SQUARE.—The abnormally mild weather which prevailed through October came to an end in the first week of November, and the month throughout was extremely cold with frequent and persistent R (see p. 212). A good deal of fog occurred, but, except during the night of 22nd, it was never very thick. Duration of sunshine, 46·5\* hours, and of R 81·9 hours. Mean temp. 38°·6, or 4°·7 below the average, and with the exception of 37°·5 in 1871, the lowest for November in 53 years. Shade max. 53°·3 on 1st; min. 24°·0 on 17th. F 15, f 25.

TEXTERDEN.—The wettest November, except 1906, since 1877 and the coldest since 1890. Four inches of S fell on 17th. Duration of sunshine, 80·0† hours. Shade max. 53°·0 on 27th; min. 24°·0 on 23rd. F 14, f 19.

TOTLAND BAY.—More windy than usual, but no fog. Duration of sunshine 102·7\* hours. Mean temp., 3°·7 below the average. Shade max. 54°·1 on 6th; min. 28°·4 on 21st. F 3, f 22.

PITSFORD.—R ·91 in. above the average. Mean temp. 36°·3. Shade max. 53°·5 on 1st; min. 18°·4 on 23rd. F 20.

WINTERBOURNE STEEPLTON.—R ·88 in. above the average of 17 years, the coldest November in that period, excepting 1896. Shade max. 54°·3 on 4th; min. 22°·8 on 10th. F 18, f 21.

ROSS.—Shade max. 51°·3 on 1st; min. 22°·8 on 21st and 22nd. F 17, f 20.

HODSOCK PRIORY.—The coldest November for at least 35 years, but the first frost in the screen, on the 4th, was unusually late. Shade max. 52°·0 on 13th; min. 23°·3 on 23rd. F 19, f 27.

SOUTHPORT.—The coldest November in 40 years' record, excepting 1878. Duration of sunshine 69·6\* hours, or 18·3 hours above the average. Duration of R 97·1 hours. Mean temp. 38°·9, or 4°·4 below the average. Shade max. 53°·5 on 1st; min. 22°·2 on 22nd. F 8, f 18.

HULL.—Shade max. 50°·0 on 13th and 14th; min. 25°·0 on 23rd. F 16, f 23.

HAVERFORDWEST.—Cold, wet and stormy to 18th. Aurora on 29th. Duration of sunshine, 80·1\* hours. Shade max. 56°·0 on 1st.

LLANDUDNO.—Shade max. 54°·0 on 13th; min. 31°·0 on 21st.

CARGEN.—Cold, unpleasant month with northerly winds on 29 days. Mean temp. 36°·0. Shade max. 52°·0 on 1st; min. 19°·0 on 20th and 22nd. F 16. Splendid view of lunar eclipse.

EDINBURGH.—Shade max. 46°·3 on 1st; min. 25°·5 on 20th. F 11, f 22.

COUPAR ANGUS.—The mean temp., 35°·6, or 4°·2 below the average, was chiefly due to a cold snap on 22nd—23rd. Shade max. 49°·5 on 4th; min. 16°·0 on 23rd. F 18.

FORT AUGUSTUS.—Shade max. 47°·3 on 13th; min. 20°·7 on 22nd. F 15.

CORK.—A foggy month with R ·57 in. below the average. Shade max. 53°·0 on 23rd; min. 24°·0 on 17th. F 15, f 16.

DUBLIN.—The coldest November since 1878, when the mean temp. was only 38°·2. An unusual prevalence of N.W. winds. Mean temp. 40°·8, or 4°·5 below the average. L was seen on 6th and aurora on 5th. Shade max. 56°·3 on 1st; min. 28°·0 on 30th. F 9, f 14.

MARKREE.—Frequent H with S and frosts during the whole month. Shade max. 52°·4 on 1st and 25th; min. 19°·0 on 30th. F 16, f 20.

WARRENPOINT.—Fairly fine with W. and N.W. winds prevailing. Shade max. 49°·0 on 12th and 25th; min. 31°·0 on 20th and 29th. F 4, f 13.

\* Campbell-Stokes.

† Jordan.

## Climatological Table for the British Empire, June, 1910.

STATIONS.  (Those in italics are South of the Equator.)	Absolute.				Average.				Absolute.		Total Rain		Aver.
	Maximum.		Minimum.		Max.	Min.	Dew Point.	Humidity.	Max. in Sun.	Min. on Grass.	Depth.	Days.	
	Temp.	Date.	Temp.	Date.									
London, Camden Square	81°3	20	45°5	27	72°3	53°2	53°4	77	125°4	40°0	2·17	13	7·5
Malta ... ..	84·9	28	61·0	1, 2	76·7	64·4	...	...	150·1	...	·00	0	1·9
Lagos ... ..	92·0	3	71·0	14	77·1	74·0	73·7	77	160·0	69·0	16·70	22	8·3
Cape Town ... ..	75·1	16	40·0	14	64·4	47·9	43·8	80	...	...	2·75	11	4·9
Durban, Natal	80·3	22	46·5	25	72·4	52·9	...	...	127·9	...	·49	3	1·0
Johannesburg ... ..	68·2	2	30·1	27	57·3	40·7	35·9	69	118·2	27·1	·28	5	3·6
Mauritius ... ..	80·2	2	54·5	11	76·0	59·9	57·8	72	139·4	45·9	·53	16	4·3
Calcutta... ..	98·4	2	73·3	4	91·9	78·4	78·3	83	...	71·8	6·48	12	7·3
Bombay .. ...	95·2	2	75·4	23	87·0	79·3	77·4	83	135·3	72·7	23·92	25	7·9
Madras ... ..	104·5	4	73·1	23	97·2	80·5	71·4	65	149·5	73·0	1·75	9	7·2
Kodaikanal ... ..	70·2	3	51·1	30	63·2	53·6	52·5	83	140·5	42·2	3·57	24	7·7
Colombo, Ceylon	89·5	3	71·9	25	85·8	76·9	74·6	80	155·9	70·3	4·20	16	7·1
Hongkong ... ..	90·9	27	73·2	2	86·9	78·8	75·2	79	141·4	...	18·19	12	6·3
Melbourne ... ..	67·4	22	32·1	16	58·1	46·0	43·5	73	106·9	30·1	1·33	12	6·1
Adelaide ... ..	65·9	19	41·0	6	61·2	48·2	47·5	79	124·8	30·3	3·04	13	3·3
Coolgardie ... ..	67·9	1	33·0	22	60·1	42·3	41·3	70	129·0	27·2	1·90	12	4·6
Perth ... ..	74·4	3	41·2	10	62·7	49·3	48·4	75	122·3	32·3	6·34	23	6·4
Sydney ... ..	68·9	9	44·9	5, 28	61·1	49·3	47·5	83	110·4	36·8	3·51	25	6·6
Wellington ... ..	63·0	5	40·0	22*	54·5	45·9	41·0	70	100·0	30·0	3·09	17	7·6
Auckland ... ..	66·0	5	39·5	19†	59·3	50·1	51·7	90	123·0	35·0	5·10	22	6·8
Jamaica, Kingston	91·4	20	68·5	6	87·7	72·0	70·3	75	...	...	5·09	7	4·0
Grenada ... ..	86·6	3	72·0	4, 9	83·0	74·8	71·8	78	137·0	...	10·62	27	5·5
Toronto ... ..	93·4	22	41·2	4	75·3	53·9	...	...	111·0	38·0	1·07	7	4·0
Fredericton ... ..	83·5	22	39·9	6	67·9	48·2	...	73	...	...	8·01	13	6·3
St. John's, N.B.	75·8	14	39·3	5	63·6	51·0	...	...	...	...	4·01	18	6·1
Victoria, B.C. ...	76·2	4, 10	41·4	3	65·1	48·9	...	58	...	...	·93	7	6·0
Dawson ... ..	85·0	29	31·0	12	70·4	43·7	...	...	...	...	1·41	12	5·9

\* and 24. † and 21.

MALTA.—Mean temp. of air 70°·5. Average bright sunshine 11·8 hours per day.

Johannesburg.—Bright sunshine 225·7 hours.

Mauritius.—Mean temp. of air 1°·3, of dew point 3°·3, and R 1·53 in., below, averages. Mean hourly velocity of wind 9·1 miles, or 2·1 below average.

KODAIKANAL.—Bright sunshine 104 hours.

COLOMBO.—Mean temp. of air 78°·5 or 2°·4 below, of dew point 0°·4 above, and R 3·37 in. below, averages. Mean hourly velocity of wind 7·2 miles.

HONGKONG.—Mean temp. of air 82°·3 or 1°·6 above, bright sunshine 242·1 hours or 86 hours above, and R 1·80 in. above, the average. Mean hourly velocity of wind 11·0 miles.

Melbourne.—Mean temp. of air 1°·7 above, and R ·77 in. below, averages.

Coolgardie.—Mean temp 1°·2 below, and R about half-inch above, average.

Sydney.—Mean temp. of air 0°·8 above, and R 1·77 in. below, averages.

Wellington.—Mean temp. of air 0°·7 above, and R 3·19 in. above, averages. Bright sunshine 89·4 hours.

Auckland.—Mean temp. of air 1°·0 above average. Rainfall ·25 in. above 40 years' average.